SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

(Affiliated to J.N.T. University Anantapur, Anantapuramu)

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Program
(for the batches admitted from the academic year 2014–15)
&
B.Tech. (Lateral Entry Scheme)
(for the batches admitted from the academic year 2015–16)

For pursuing four year undergraduate Degree Program of study in Engineering (B.Tech) offered by Sree Vidyanikethan Engineering College under Autonomous status and herein after referred to as SVEC (Autonomous):

1. Applicability : All the rules specified herein, approved by the Academic Council, shall be in force and applicable to students admitted from the academic year 2014-2015 onwards. Any reference to "College" in these rules and regulations stands for SVEC (Autonomous).

2. Extent: All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, Sree Vidyanikethan Engineering College shall be the Chairman, Academic Council.

3. Admission :

3.1. Admission into first year of Four Year B.Tech. Degree Program of study in Engineering:

3.1.1. Eligibility: A candidate seeking admission into the First Year of four year B.Tech. Degree Program should have (i) passed either Intermediate Public Examination (I.P.E.) conducted by the Board of Intermediate Education, Andhra Pradesh, with Mathematics, Physics and Chemistry as optional courses (or any equivalent examination recognized by JNTUA, Anantapuramu) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or equivalent Diploma recognized by JNTUA, Anantapuramu) for admission as per the guidelines of Andhra Pradesh State Council of Higher Education (APSCHE). (ii) secured a rank in the EAMCET examination conducted by APSCHE for allotment of a seat by the Convener, EAMCET, for admission.

3.1.2. Admission Procedure: Admissions shall be made into the first year of four year B.Tech. Degree Program as per the stipulations of APSCHE, Government of Andhra Pradesh:

(a) By the Convener, EAMCET, (for Category-A Seats). (b) By the Management (for Category-B Seats).

3.2. Admission into the Second Year of Four year B.Tech Degree Program in Engineering

3.2.1. Eligibility: Candidates qualified in ECET and admitted by the Convener, ECET. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained.

3.2.2. Admission Procedure: **20%** of the sanctioned strength in each Program of study as lateral entry students or as stipulated by APSCHE shall be filled by the Convener, ECET.

4. Programs of study offered leading to the award of B.Tech. Degree

Following are the four year undergraduate Degree Programs of study offered in various branches in SVEC (Autonomous) leading to the award of B.Tech (Bachelor of Technology) Degree:

1) B.Tech (Civil Engineering)
2) B.Tech (Computer Science & Engineering)
3) B.Tech (Computer Science & Systems Engineering)
4) B.Tech (Electrical & Electronics Engineering)
5) B.Tech (Electronics & Communication Engineering)
6) B.Tech (Electronics & Instrumentation Engineering)
7) B.Tech (Information Technology)
8) B.Tech (Mechanical Engineering)

5. Academic Year: The College shall follow Year-wise pattern for the First year courses of four year B.Tech Program and semester system from second year onwards for conducting all its curricula. An

academic year shall consist of a first semester and a second semester from second year onwards and the summer vacation follows in sequence.

The first year of four year B.Tech Program shall have duration to accommodate a minimum of **31** instructional weeks. The first and second semesters (from second year onwards) shall have the duration to accommodate a minimum of **16** instructional weeks per semester.

First Year B.Tech. (38 weeks)	Instruction Period:I Spell : 07 weeks II Spell : 12 weeks III Spell : 12 weeks	31 weeks
	Mid-term Examinations: I Mid : 1 week II Mid : 1 week III Mid: 1 week	3 weeks
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
	Summer vacation	4 weeks
First Semester (22 weeks)	Instruction Period:I Spell : 7 weeks II Spell : 9 weeks	16 weeks
	Mid-term Examinations: I Mid : 1 week II Mid : 1 week	2 weeks
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
	Semester Break	2 weeks
Second Semester (22 weeks)	Instruction Period:I Spell : 7 weeks II Spell : 9 weeks	16 weeks
	Mid-term Examinations: I Mid: 1 week II Mid: 1 week	2 weeks
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
	Summer Vacation	6 weeks

6. Course Structure: Each Program of study shall consist of:

- General Courses comprising of the following:

i. Language / Communication Skills
ii. Humanities and Social Sciences
iii. Economics and Principles of Management
iv. Environmental Sciences

The above areas are common to all branches.

- Basic Science Courses comprising of the following:

i. Computer Programming with Numerical Analysis

ii. Mathematics
iii. Physics
iv. Chemistry

The above courses are common to all branches.

▪ Engineering Science Courses comprising of the following, pertaining to the branch:

i. Engineering Graphics
ii. Workshop Practice
iii. Engineering Mechanics
iv. Electrical Sciences
v. Thermodynamics
vi. Material Sciences and Engineering
vii. Building Materials
viii. Surveying
ix. Basic Electronics
x. Computer Programming and Data Structures
xi. IT Workshop
xii. Fluid Mechanics

▪ Professional core courses:

The list of professional core courses are chosen as per the suggestions of the experts, to impart broad based knowledge needed in the concerned branch of study.

▪ Elective courses:

Elective courses shall be offered to the students to diversify their spectrum of knowledge. The elective courses can be chosen based on the interest of the student to broaden his individual skills and knowledge.

Distribution of types of courses is indicated below:

General Courses	5-10%
Basic Science Courses	15-20%
Engineering Science Courses	15-20%
Professional Core Courses	40-50%
Elective Courses	10-15%

Contact Hours: Depending on the complexity and volume of the course, the number of contact hours per week shall be assigned.

7. Credit System: Credits are assigned based on the following norms as given in Table 1.

Table 1

Course	**Year Pattern**		**Semester Pattern**	
	Hour(s)/Week	**Credits**	**Hour(s)/ Week**	**Credit (s)**
Theory	01	02	01	01
Practical	03	03	03	02
Seminar	--	--	--	02
Comprehensive Viva-Voce	--	--	--	02
Project Work	--	--	--	10

i. As a norm, for the theory courses, **one credit** for one contact hour per week is assigned in semester system. In yearly pattern **two credits** for one contact hour per week is assigned.
ii. As a norm, for practical courses **two credits** will be assigned for three contact hours per week in semester pattern. In yearly pattern **three credits** will be assigned for three contact hours per week.
iii. Tutorials do not carry any credits.

iv. For courses like Project/Seminar/Comprehensive Viva-Voce, where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

The four year curriculum of any B. Tech. Program of study shall have total of **187** credits. However the curriculum for lateral entry students shall have a total of **142** credits.

8. Examination System: All components in any Program of study shall be evaluated through internal evaluation and / or an external evaluation conducted as year-end/semester-end examination.

8.1. Distribution of Marks:

<table>
<tr><th>Sl. No.</th><th>Course</th><th>Marks</th><th>Examination and Evaluation</th><th>Scheme of examination</th></tr>
<tr><td rowspan="4">1.</td><td rowspan="4">Theory</td><td>70</td><td>Year-end / Semester-end examination of 3 hours duration (External evaluation)</td><td>The examination question paper in theory courses shall be for a maximum of 70 marks. The question paper shall be of descriptive type with 5 questions, taken one from each unit of syllabus, having internal choice and all 5 questions shall be answered. All questions carry equal marks.</td></tr>
<tr><td rowspan="3">30</td><td rowspan="3">Mid-term Examination of 2 hours duration (Internal evaluation).</td><td>The question paper shall be of descriptive type with 4 essay type questions out of which 3 are to be answered and evaluated for 24 marks and also 6 short answer questions out of which all are to be answered and evaluated for 6 marks.</td></tr>
<tr><td><u>For I B.Tech:</u> Three (03) mid-term examinations, each for 30 marks are to be conducted. For a total of 30 marks, 75% of average of better two and 25% of the other examination are added and finalized.
Mid-I: After first spell of instruction (I Unit).
Mid-II: After second spell of instruction (II to III Units).
Mid-III: After third spell of instruction (IV to V Units).</td></tr>
<tr><td><u>For a Semester:</u> Two mid-term examinations each for 30 marks are to be conducted. For a total of 30 marks, 75% of better one of the two and 25% of the other one are added and finalized.
Mid-I: After first spell of instruction (I to II Units).
Mid-II: After second spell of instruction (III to V Units).</td></tr>
</table>

Sl. No.	Course	Marks	Examination and Evaluation		Scheme of examination
2	Laboratory	50	Year-end / Semester-end Lab Examination for 3 hours duration (External evaluation)		50 marks are allotted for laboratory/drawing examination during year-end / semester-end. *Combined laboratories shall be conducted separately for 3 hours duration each.*
		25	15	Day-to-Day evaluation	Performance in laboratory experiments/drawing and Record.
			10	Internal evaluation	For first year three practical tests and for semester two practical tests shall be conducted. Average of the tests is to be finalized for 10 marks.
3	a) Seminar	50	Semester-end Examination		50 marks are allotted for Seminar during semester-end evaluation by the Departmental Committee (DC) as given in 8.2.1.
	b) Comprehensive Viva-Voce	100	Semester-end Examination		Comprehensive Viva-Voce examination shall be conducted at the end of IV Year II Semester by a committee as given in 8.2.2.
5	Project Work	200	140	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed in 8.2.3.
			60	Internal evaluation	Continuous evaluation by the DC as detailed in 8.2.3.

8.2 Seminar/Comprehensive Viva-Voce/Project Work/Design and Drawing of Irrigation Structures Evaluation:

8.2.1 For the seminar, the student shall collect information through literature survey on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department just before presentation. The report and the presentation shall be evaluated at the end of the semester by the Departmental Committee (**DC**) consisting of Head of the Department, concerned supervisor and a senior faculty member. The DC is constituted by the Principal on the recommendations of the Head of the Department.

8.2.2 Comprehensive Viva-Voce examination shall be conducted by a committee consisting of HOD and two senior faculty members.

8.2.3 The project Viva-Voce examination shall be conducted by a Committee consisting of External examiner (nominated by the Chief Controller of Examinations), HOD and concerned Supervisor. The evaluation of project work shall be conducted at the end of the IV year II semester. The Internal Evaluation shall be made by the DC, on the basis of two project reviews conducted on the topic of the project.

8.2.4. Mid-term examinations for Design and Drawing of Irrigation Structures shall be conducted similar to like in other theory courses. However, semester-end examination comprises of two questions and out of which one question has to be answered for 70 marks.

8.3. Eligibility to appear for the year-end / semester-end examination:

8.3.1 A student shall be eligible to appear for year-end / semester-end examinations if he acquires a minimum of 75% of attendance in aggregate of all the courses in a year/ semester.

8.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in first year or each semester may be granted by the College Academic Committee.

8.3.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned.

8.3.4 Students whose shortage of attendance is not condoned in first year/any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.

8.3.5 A student shall not be promoted to the next semester unless he satisfies the attendance requirements of the current year/semester, as applicable. The student may seek readmission for the year/ semester when offered next. He will not be allowed to register for the courses of the year/semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that year/semester when offered next.

8.3.6 A stipulated fee shall be payable to the College towards condonation of shortage of attendance.

8.4. Evaluation: Following procedure governs the evaluation.

8.4.1. Marks for components evaluated internally by the faculty shall be submitted to the Controller of Examinations one week before the commencement of the End examinations. The marks for the internal evaluation components shall be added to the external evaluation marks secured in the Year-end/Semester-end examinations, to arrive at total marks for any course in that Year/semester.

8.4.2. Performance in all the courses is tabulated course-wise and shall be scrutinized by the Examination Committee and moderation is applied if needed, and course-wise marks are finalized. Total marks obtained in each course are converted into letter grades.

8.4.3. Student-wise tabulation shall be done and individual grade Sheet shall be generated and issued to the student.

8.5. Personal verification / Revaluation / Recounting:

Students shall be permitted for personal verification/request for recounting/ revaluation of the Year-end/Semester-end examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records are updated with changes if any and the student shall be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a notice.

8.6. Supplementary Examination:

In addition to the regular year-end / semester-end examinations conducted, the College may also schedule and conduct supplementary examinations for all the courses of other year/ semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

9. Academic Requirements for promotion/ completion of regular B.Tech Program of study:

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion/ completion of regular B.Tech Program of study.

For students admitted into B.Tech. (Regular) Program:

9.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, laboratory course and project work, if he secures not less than 40% of marks in the year-end/semester-end examination and a minimum of 40% of marks in the sum total of the internal evaluation and Year-end/Semester-end examination taken together. For the seminar and comprehensive Viva-Voce, he should secure not less than 40% of marks in the semester-end examination.

9.2 A student shall be promoted from second year to third year of Program of study only if he fulfills the academic requirement of securing **33** credits from

a. One regular and one supplementary examinations of first year.
b. One regular examination of second year first semester irrespective of whether or not the candidate appears for the year-end/semester-end examination as per the normal course of study.

9.3 A student shall be promoted from third year to fourth year of Program of study only if he fulfils the academic requirements of securing **58** credits from the following examinations,

a. Two regular and two supplementary examinations of first year
b. Two regular and one supplementary examinations of second year first semester
c. One regular and one supplementary examinations of second year second semester
d. One regular examination of third year first semester irrespective of whether or not the candidate

appears for the year-end/semester-end examination as per the normal course of study and in case
of getting detained for want of credits by sections 9.2 and 9.3 above, the student may make up the credits through supplementary examinations.

9.4 A student shall register for all the **187** credits and earn all the **187** credits. Marks obtained in all the **187** credits shall be considered for the calculation of the DIVISION based on CGPA.

9.5 A student who fails to earn **187** credits as indicated in the course structure within **eight** academic years from the year of their admission shall forfeit his seat in B.Tech. Program and his admission stands cancelled.

For Lateral Entry Students (batches admitted from the academic year 2015–2016):

9.6 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical course and project, if he secures not less than 40% of marks in the semester-end examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester-end examination taken together. For the seminar and comprehensive Viva-Voce, he should secure not less than 40% of marks in the semester-end examination.

9.7 A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing **36** credits from the following examinations.

a. Two regular and one supplementary examinations of II year I semester
b. One regular and one supplementary examinations of II year II semester
c. One regular examination of III year I semester.irrespective of whether or not the candidate appears for the semester-end examination as per the normal course of study and in case of getting detained for want of credits the student may make up the credits through supplementary examinations.

9.8 A student shall register for all **142** credits and earn all the **142** credits. Marks obtained in all the **142** credits shall be considered for the calculation of the DIVISION based on CGPA.

9.9 A student who fails to earn **142** credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit his seat in B.Tech Program and his admission stands cancelled.

10. Transitory Regulations:

Students who got detained for want of attendance (**or**) who have not fulfilled academic requirements (**or**) who have failed after having undergone the Program in earlier regulations (**or**) who have discontinued and wish to continue the Program are eligible for admission into the unfinished semester from the date of commencement of class work with the same (**or**) equivalent courses as and when courses are offered and they will be in the academic regulations into which they are presently readmitted.

A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of **eight years**, and a lateral entry student within **six years**, for the award of B.Tech Degree.

11. Grades, Grade Point Average and Cumulative Grade Point Average:

11.1. Grade System: After all the components and sub-components of any course (including laboratory courses) are evaluated, the final total marks obtained shall be converted into letter grades on a "**10 point scale**" as described below.

Grades conversion and Grade points attached

% of Marks obtained	Grade	Description of Grade	Grade Points (GP)
> = 95	S	Superior	10
> = 85 to < 95	O	Outstanding	9
> = 75 to < 85	A	Excellent	8
> = 65 to < 75	B	Very Good	7
> = 55 to < 65	C	Good	6
> = 45 to < 55	D	Fair	5
> = 40 to < 45	E	Pass	4
< 40	F	Fail	0
Not Appeared	N	Absent	0

Pass Marks: A student shall be declared to have passed theory course, laboratory course and project work if he secures minimum of 40% marks in external examination, and a minimum of 40% marks in the sum total of internal evaluation and external examination taken together. For the seminar and comprehensive Viva-Voce, he shall be declared to have passed if he secures minimum of 40% of marks in the semester-end examination. Otherwise he shall be awarded fail grade - **F** in such a course irrespective of internal marks. **F** is considered as a fail grade indicating that the student has to pass the year-end/semester-end examination in that course in future and obtain a grade other than **F** and **N** for passing the course.

11.2. Grade Point Average (GPA): Grade Point Average (GPA) shall be calculated as given below on a "10 point scale" as an index of the student's performanceat the end of I year/ each semester:

$$GPA = \frac{\sum(C\ X\ GP)}{\sum C}$$

where ***C*** denotes the credits assigned to the courses undertaken in that Year/ semester and ***GP*** denotes the grade points earned by the student in the respective courses.

Note: *GPA is calculated only for the candidates who passed all the courses in that Year/Semester.*

11.3. Cumulative Grade Point Average (CGPA):

The CGPA for any student is awarded only when he completes the Program i.e., when the student passes in all the courses prescribed in the Program. The CGPA is computed on a 10 point scale as given below:

$$CGPA = \frac{\sum(C\ X\ GP)}{\sum C}$$

where ***C*** denotes the credits assigned to courses undertaken up to the end of the Program and ***GP*** denotes the grade points earned by the student in the respective courses.

12. Grade Sheet: A grade sheet (Marks Memorandum) shall be issued to each student indicating his performance in all courses registered in that semester/year indicating the **GPA.**

13. Transcripts: After successful completion of the entire Program of study, a transcript containing performance of all academic years shall be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued upto any point of study to a student on request.

14. Award of Degree: The Degree shall be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapuramu on the recommendations of the Chairman, Academic Council of SVEC (Autonomous).

14.1. Eligibility: A student shall be eligible for the award of B.Tech Degree if he fulfills all the following conditions:

- Registered and successfully completed all the components prescribed in the Program of study to which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained CGPA greater than or equal to 4.0 (Minimum requirement for declaring as passed).
- Has no dues to the College, Hostel, Library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

14.2. Award of Division: Declaration of Division is based on CGPA.

Awarding of Division

CGPA	Division
> = 7.0	First Class with Distinction
> = 6.0 and < 7.0	First Class
> = 5.0 and < 6.0	Second Class
> = 4.0 and < 5.0	Pass Class

15. Additional academic regulations:

15.1 A student may appear for any number of supplementary examinations within the stipulated time to fulfill regulatory requirements for award of the degree.

15.2 In case of malpractice/improper conduct during the examinations, guidelines shall be followed as given in the **Annexure-I**.

15.3 Courses such as Project, Seminar and Comprehensive Viva-Voce may be repeated only by registering in supplementary examinations.

15.4 When a student is absent for any examination (Mid-term or Year-end/Semester-end) he shall be awarded **zero** marks in that component (course) and grading will be done accordingly.

15.5 When a component is cancelled as a penalty, he shall be awarded zero marks in that component.

16. Withholding of Results:

If the candidate has not paid dues to the College/University (or) if any case of indiscipline is pending against him, the result of the candidate shall be withheld and he will not be allowed/promoted to the next higher year/semester.

17. Amendments to regulations:

The Academic Council of SVEC (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

18. Attendance for student development activity periods indicated in the class time tables shall be considered as in the case of a regular course for calculation of overall percentage of attendance in a year / semester.

19. General:

The words such as "he", "him", "his" and "himself" shall be understood to include all students irrespective of gender connotation.

Note: ***Failure to read and understand the regulations is not an excuse.***

Annexure-I

GUIDE LINES FOR DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

Rule No.	Nature of Malpractices/ Improper conduct	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the course of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the course of the examination)	Expulsion from the examination hall and cancellation of the performance in that course only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that course only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the courses of the examination (including labs and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all Year-end/Semester-end examinations, if his involvement is established. Otherwise, The candidate is debarred for two consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and

	or after the examination.	project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that course only.
6.	Refuses to obey the orders of the Chief Controller of Examinations/Controller of Examinations/any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the Controller of Examinations or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the Controller of Examinations, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester/year. If the candidate physically assaults the invigilator/Controller of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred and forfeits the seat.

Note: Whenever the performance of a student is cancelled in any course(s) due to Malpractice, he has to register for Year-end/Semester-end Examinations in that course(s) consequently and has to fulfill all the norms required for the award of Degree.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND ENGINEERING

I Year B.Tech. (Yearly Pattern)

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT1HS01	Technical English	2	-	-	4	30	70	100
14BT1BS01	Engineering Physics	2	1	-	4	30	70	100
14BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
14BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
14BT1BS04	Mathematical Methods	3	1	-	6	30	70	100
14BT1ES02	Problem Solving and Computer Programming	3	1	-	6	30	70	100
14BT1ES03	Computer-Aided Engineering Drawing	-	1	3	3	25	50	75
14BT1BS05	Engineering Physics and Engineering Chemistry Lab.	-	-	3	3	25	50	75
14BT1ES05	Problem Solving and Computer Programming Lab.	-	-	3	3	25	50	75
14BT1ES06	Engineering and IT Workshop	-	-	3	3	25	50	75
14BT1HS02	English Language Communication Skills Lab.	-	-	3	3	25	50	75
	TOTAL	15	6	15	45	305	670	975

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND ENGINEERING

II Year B.Tech. I Semester

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS03	Probability and Statistics	3	1	-	3	30	70	100
14BT30501	Data Structures	3	1	-	3	30	70	100
14BT30502	Digital Logic Design	3	1	-	3	30	70	100
14BT31201	Discrete Mathematical Structures	3	1	-	3	30	70	100
14BT30235	Basic Electrical Engineering	3	1	-	3	30	70	100
14BT30431	Electronic Devices and Circuits	3	1	-	3	30	70	100
14BT30521	Data Structures Lab	-	-	3	2	25	50	75
14BT30422	Analog and Digital Electronics Lab	-	-	3	2	25	50	75
	TOTAL	**18**	**6**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND ENGINEERING

II Year B.Tech. II Semester

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int	Ext	Total
14BT4HS01	Business Communication and Presentation Skills	3	1	-	3	30	70	100
14BT3HS01	Environmental Sciences	3	1	-	3	30	70	100
14BT40501	Computer Organization	3	1	-	3	30	70	100
14BT40502	Database Management Systems	3	1	-	3	30	70	100
14BT40503	Design and Analysis of Algorithms	3	1	-	3	30	70	100
14BT41201	Object Oriented Programming	3	1	-	3	30	70	100
14BT41501	Computer Graphics	3	1	-	3	30	70	100
14BT40521	Database Management systems Lab	-	-	3	2	25	50	75
14BT41221	Object Oriented Programming Lab	-	-	3	2	25	50	75
	Total	**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND ENGINEERING

III Year B.Tech. I Semester

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS02	Management Science	3	1	-	3	30	70	100
14BT4HS02	Professional Ethics	3	1	-	3	30	70	100
14BT50501	Theory of Computation	3	1	-	3	30	70	100
14BT50502	UNIX Internals	3	1	-	3	30	70	100
14BT51202	Software Engineering	3	1	-	3	30	70	100
14BT51501	Operating Systems	3	1	-	3	30	70	100
14BT50431	Microprocessors and Interfacing	3	1	-	3	30	70	100
14BT50521	Operating Systems and Unix Lab	-	-	3	2	25	50	75
14BT50424	Microprocessors and Interfacing Lab	-	-	3	2	25	50	75
	Total	**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND ENGINEERING

III Year B.Tech. II Semester

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS01	Managerial Economics and Principles of Accountancy	3	1	-	3	30	70	100
14BT60501	Object Oriented Analysis and Design	3	1	-	3	30	70	100
14BT51201	Computer Networks	3	1	-	3	30	70	100
14BT61202	Web Programming	3	1	-	3	30	70	100
14BT71507	Software Project Management	3	1	-	3	30	70	100
ALL	**OPEN-ELECTIVE**	3	1	-	3	30	70	100
14BT60521	Object Oriented Analysis and Design Lab	-	-	3	2	25	50	75
14BT61222	Web Programming Lab	-	-	3	2	25	50	75
	Total:	**18**	**6**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND ENGINEERING

IV Year B.Tech. I Semester

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT70501	Compiler Design	3	1	-	3	30	70	100
14BT70502	Mobile Computing	3	1	-	3	30	70	100
14BT61201	Data Warehousing and Data Mining	3	1	-	3	30	70	100
14BT71204	Software Testing Techniques	3	1	-	3	30	70	100
	Professional Elective-I							
14BT70503	Advanced Computer Architecture	3	1	-	3	30	70	100
14BT71205	Machine Learning							
14BT71501	Embedded System Programming							
14BT71504	Simulation and Modeling							
	Professional Elective-II							
14BT71202	Multimedia and Application Development	3	1	-	3	30	70	100
14BT71206	Service Oriented Architecture							
14BT81503	Human computer Interaction							
14BT81505	Software Architecture							
14BT70521	Software Testing Techniques Lab	-	-	3	2	25	50	75
14BT71521	Data Warehousing and Data Mining Lab	-	-	3	2	25	50	75
14BT70522	Seminar	-	-	-	2	-	50	50
	TOTAL	**18**	**6**	**6**	**24**	**230**	**570**	**800**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2015-2016)
COMPUTER SCIENCE AND ENGINEERING
IV Year B.Tech. II Semester (Yearly Pattern)

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT80501	Design Patterns	3	1	-	3	30	70	100
14BT81201	Cloud Computing	3	1	-	3	30	70	100
	Professional Elective-III							
14BT80502	Big Data	3	1	-	3	30	70	100
14BT80503	Computer Forensics							
14BT80504	Distributed Systems							
14BT81202	Cryptography and Network Security							
	Professional Elective-IV	3	1	-	3	30	70	100
14BT80505	Network Management							
14BT71201	Mobile Application Development							
14BT81204	Information Retrieval Systems							
14BT81206	Semantic Web							
14BT80521	Comprehensive Viva-Voce	-	-	-	2	-	100	100
14BT80522	Project Work	-	-	20	10	60	140	200
	TOTAL	**12**	**4**	**20**	**24**	**180**	**520**	**700**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND ENGINEERING

IV B.Tech. I Semester
Open Electives

Offering Dept	Course Code	Course Title
BS&H	14BT6HS01	Banking and Insurance
BS&H	14BT6HS02	Cost Accounting and Financial Management
BS&H	14BT6HS03	Entrepreneurship for Micro, Small and Medium Enterprises
CE	14BT70105	Disaster Mitigation and Management
CE	14BT70106	Environmental Pollution and Control
CE	14BT70107	Contract Laws and Regulations
CE	14BT70108	Planning for Sustainable Development
CE	14BT70109	Rural Technology
ME	14BT60305	Artificial Intelligence and Robotics
ME	14BT60306	Global Strategy and Technology
ME	14BT60307	Intellectual Property Rights and Management
ME	14BT60308	Managing Innovation and Entrepreneurship
ME	14BT60309	Material Science
CSE	14BT60502	Engineering Systems Analysis and Design
EIE	14BT71005	Microelectromechanical Systems
IT	14BT61203	Bio-Informatics
IT	14BT61204	Cyber Security and Laws

B.Tech I Year

14BT1HS01: **TECHNICAL ENGLISH**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

DETAILED SYLLABUS:

UNIT – I: (10 periods)

My Early Days by **A. P. J. Abdul Kalam** from **All About English** by Cambridge University Press India Pvt Ltd. 2014.

Communication: Importance of Communication – Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-Verbal Communication.

UNIT – II: (10 periods)

A Speech by N. R. Narayana Murthy from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: (10 periods)

The Town by the Sea by Amitav Ghosh from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: (10 periods)

Sir. C. V. Raman: The Celebrated Genius from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Reading: Reading and Interpretation – Intensive and Extensive Reading–Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: (10 periods)

The Model Millionaire by **Oscar Wilde** from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Writing: Characteristics – Language – Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism - Referencing and Styling.

Total Periods: 50

TEXT BOOKS:

1. *All About English,* Cambridge University Press India Pvt. Ltd., First Edition, 2014.
2. Meenakshi Raman and Sangeetha Sharma, *Technical Communication,* Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, *Effective Technical Communication,* Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.
2. Martin Hewings, *Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,* Cambridge University press, First South Asian Edition, New Delhi, 1999.

B.Tech. I Year

14BT1BS01**: ENGINEERING PHYSICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

COURSE OUTCOMES :

After completion of the course a successful student will be able to

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context.

DETAILED SYLLABUS:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, Ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: (16 periods)

SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III : (17 periods)

PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative treatment), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: **(17 periods)**

DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V : **(17 periods)**

MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS

Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total Periods: 85

TEXTBOOKS:

1. S. Mani Naidu*, Engineering Physics*, Pearson Education, 2013.

2. P. K. Palaniswamy, *Engineering Physics,*Scitech Publications

REFERENCE BOOKS:

1. R. K. Gaur and S. L. Gupta*, Engineering Physics,* DhanpatRai Publications (P) Ltd., 8th Edition, 2001.

2. M. R. Srinivasan, *Engineering Physics,* New Age International (P) Limited, Publishers, 1st Edition,2010.

B.Tech. I Year

14BT1BS02 **: ENGINEERING CHEMISTRY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.

COURSE OUTCOMES:

After successful completion of the course the student is able to:

1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.
2. Develop analytical skills in:
   a. Determination of hardness of water.
   b. Determination of viscosity, flame and fire points, cloud and pour points.
   c. Determination of calorific value of fuels.
3. Develop skills in design of:
   a. Methods for control of corrosion
   b. Chemical methods for the synthesis of Nanomaterials.
4. Develop skills for providing solutions through:
   a. Mitigation of hardness of water.
   b. Control of corrosion
   c. Newer Nanomaterials for specific applications
5. Acquire awareness to societal issues on:
   a. Chemical materials utility and their impact.
   b. Quality of water.
   c. Phenomenon of corrosion.
6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:
   a. Green computing
   b. Green construction
   c. Green manufacturing systems

DETAILED SYLLABUS:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.

Conducting Polymers – Definition, types of conducting polymers and their engineering applications. **Composites** – Introduction, advantages of composites, constituents of composites, types of composites, applications of composites. **Sensors** - Introduction, types of sensors, electrochemical sensors, applications. **Insulators** – Definition, characteristic properties of insulators and classification of insulators.

UNIT–II: WATER TECHNOLOGY (15 periods)

Introduction, types of water, impurities in water and their consequences. Hardness of water, units of hardness, measurement of hardness by EDTA method, disadvantages of hardness. Softening methods – Ion exchange process, Zeolite process-Municipal water treatment. Boiler Troubles. Desalination of brackish water by Electro dialysis and Reverse osmosis. Numerical problems on measurement of hardness of water.

UNIT–III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst's equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, H_2 – O_2 fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT–IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY (17 periods)

Nano Chemistry: Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

Green Chemistry: Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems.

Total periods: 85

TEXT BOOKS:

1. P.C.Jain & Monika Jain*, Engineering Chemistry,* Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah *Engineering Chemistry,* Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2013.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, *Hand book of Nanostructured materials and Nanotechnology,* New Age international publishers, 2nd edition, 2010.
2. Paul T. Anastas, John C Warner, *Green Chemistry: Theory and practice,* Oxford University Press, 2000.

B.Tech. I Year

14BT1BS03 **: ENGINEERING MATHEMATICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas , surfaces and volumes of revolutions.
3. Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton's Law of cooling and heat transfer.
4. Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

DETAILED SYLLABUS:

UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS (20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton's Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for Q(x) = e^{ax}, *sin ax*, *cos ax*, x^n, e^{ax} *V(x)*, *x V(x)*. Method of variation of parameters . Applications to L-R-C circuits.

UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES (22 periods)

Functions of two or more variables – Homogeneous functions – total derivatives – derivatives of implicit function – Jacobian – maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers. Radius ,centre and circle of curvature, tracing of curves in cartesian, parametric and polar forms.

UNIT-III: APPLICATIONS OF INTEGRATION (18 periods)

Applications of integration to – length of curves, area of surfaces of revolution and volume of solids of revolution – Double integrals – change of variables and change of order of integration. Evaluation of Triple integrals -volume as double integral.

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS (20 periods)

Laplace transforms of standard functions – Properties of Laplace transforms–First and second shifting Theorems. Laplace transforms of derivatives and integrals–Laplace transforms of periodic functions – Unit step function – Dirac delta function – Inverse transforms–Convolution theorem. Applications of Laplace transforms to linear differential equations with constant coefficients.

UNIT-V : VECTOR CALCULUS (20 periods)

Vector differentiation – gradient, divergence, curl and vector identities. Laplacian Operator. **Vector integration**: Line integrals independent of path – work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals. Verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

Total periods: 100

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, *Engineering Mathematics,* Vol. 1, S. Chand & Company, 12thedition, 2013.

REFERENCE BOOKS:

1. Grewal, B.S., *Higher Engineering Mathematics*, Khanna Publishers, 42nd edition, 2012.
2. Kreyszig, E., *Advanced Engineering Mathematics*, John Wiley and Sons, 8th edition, 2006.

B.Tech. I Year

14BT1BS04 **: MATHEMATICAL METHODS**

(Common to CSE, CSSE, IT, ECE, EIE and EEE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: This course deals with obtaining the numerical solutions for algebraic and transcendental equations. Fundamentals of matrix theory including introduction to Eigen values, Cayley-Hamilton's theorem, numerical solutions to differential equations, transformation techniques for solving engineering problems and applications of partial differential equations are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire basic knowledge in
   (a) solving linear equations through matrix methods.
   (b) solving algebraic and transcendental equations by various mathematical methods.
   (c) fitting of various types of curves to the given data
   (d) finding the numerical values to derivatives and integrals through different mathematical methods.
   (e) solving differential equations numerically through various methods.
   (f) solving difference equations using z –transforms.
2. Develop analytical skills in
   (a) evaluating the properties of functions through Fourier series and Fourier transforms.
   (b) solving boundary value problems in engineering using Fourier transform
3. Design novel mathematical methods for
   (a) fitting geometrical curves to the given data.
   (b) for solving the differential equations.
   (c) the problems involving heat transformations.
   (d) constructing the interpolating polynomials to the given data and drawing inferences.

DETAILED SYLLABUS:

UNIT–I: MATRIX THEORY AND APPLICATIONS (20 periods)

Rank of a matrix, echelon form, normal form, inverse of a matrix by normal form. Homogenous and non-homogenous linear systems, consistency and solutions of linear system of equations. Solutions of equations by Gauss elimination method. Eigen values, Eigen vectors and properties. Cayley– Hamilton Theorem (without proof), inverse and powers of a matrix using Cayley– Hamilton Theorem, diagonalization of a matrix, quadratic forms, nature of quadratic form and reduction of quadratic form to its normal form.

UNIT-II: NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION (19 periods)

Solutions of Algebraic and Transcendental equations by bisection method, Regula – Falsi method, Newton – Raphson method. Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves. Interpolation, forward difference operator, backward difference operator, central difference operator. Relationship between different operators. Interpolation using Newton's forward formula, Newton's backward formula, Lagrange's interpolation formula.

UNIT-III:

NUMERICAL DIFFERENTIATION AND INTEGRATION, SOLUTIONS OF O D E (20 periods)

Numerical differentiation using Newton's forward formula, Newton's backward formula. Numerical integration using trapezoidal rule, Simpsons 1/3 rule, Simpsons 3/8 rule. Numerical solutions of first order ordinary differential equations using Taylor series, Euler's method modified Euler's method, Runge – Kutta method (4^{th} order only).

UNIT-IV : TRANSFORMATION TECHNIQUES (25 periods)

Fourier series , Dirichlets conditions, determination of Fourier coefficients (Euler's formulae), even and odd functions. Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, inverse transforms. Z – transforms, inverse Z– transform, properties, damping rule, shifting rule, initial and final value theorems. Convolution theorem, solution of difference equations by Z– transforms.

UNIT – V: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS (16 periods)

Formation of partial differential equations . Method of separation of variables for second order partial differential equations – solutions of one dimensional wave equation – heat equation -Laplace equation.

Total periods: 100

TEXTBOOK:

1. T.K.V. Iyenger, B. Krishna Gandhi, S. Ranganadham and M.V.S.S.N. Prasad, *Mathematical Methods,* S.Chand and Company, 8^{th} edition, 2013.

REFERENCE BOOKS:

1. B.S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 42^{nd} edition, 2012.
2. S.S.Sastry, *Introductory Methods of Numerical Analysis*, Prentice Hall of India, 4^{th} edition, 2005.

B.Tech. I Year

14BT1ES02**: PROBLEM SOLVING AND COMPUTER PROGRAMMING**

(Common to CSE, CSSE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100 **L T P C**

3 1 — 6

PREREQUISITE: A course on "Aptitude and Logical Thinking"

COURSE DESCRIPTION: This course deals with the concepts of problem solving, algorithms and program design, elements of 'C' programming language, data types, selection, multi-way selection, repetition, arrays, strings, functions, derived data types, structures, pointers, files and basic data structures of stacks, and queues.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1. Gain knowledge in
- Problem solving Methods and Fundamental Algorithms.
- Elements of C Language
- Selection and Repetition statements.
- Arrays, Strings and Functional statements.
- Derived data types, Files and Pointers.
- Basic data Structures-Stacks and Queues.

CO2. Analyze the problems and develop appropriate algorithms.
CO3. Implement various searching and sorting techniques
CO4. Apply basic data structures such as arrays, stacks and queues in application programs.
CO5. Engage in lifelong learning to develop programming competence.

DETAILED SYLLABUS

UNIT – I: **(20 periods)**

Introduction to Problem Solving: Algorithm and flowchart, the problem solving aspect, top- down design, implementation of algorithms, program verification and efficiency of algorithms.

Introduction to the C Language: C programs, identifiers, types, variables, types of operators, constants, coding constants, type casting and conversion, formatted input and output. Structure of a C program - expressions, precedence and associativity, evaluation of expressions, mixed type expressions.

UNIT – II: **(22 periods)**

Selection - Making Decisions - Two way selection: if, if-else and nested if-else.

Multi-way selection: else-if ladder and switch statements.

Repetition: concept of loop, pre-test and post-test loops, initialization and updating, event and counter controlled loops, loops in C, break, continue and goto statements.

Fundamental Algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, generation of the Fibonacci sequence, reversing the digits of an integer, number base conversion, character to number conversion, the smallest divisor of an integer, greatest common divisor of two integers and generating prime numbers.

UNIT -III: **(20 periods)**

Arrays: Arrays in C, one, two and multidimensional arrays, linear search, binary search, bubble sort, selection sort and insertion sort.

Strings: Concepts, strings in C, string input/output functions, array of strings and string manipulation functions.

Functions: Designing structured programs, functions in C, user- defined functions, types of functions, Recursion and factorial using recursion, standard library functions, scope, storage classes and pre-processor directives

UNIT – IV: **(20 periods)**

Derived Types: Type definition (typedef), enumerated types, structure, accessing structures.

Complex Structures: Nested structures, structures containing arrays, array of structures.

Structures and Functions: Sending individual members, sending the whole structure, unions and bit fields.

Pointers: Concepts, pointer variables, accessing variables through pointers, pointer declaration and definition, initialization, pointer arithmetic, array of pointers, pointers to arrays, pointers and functions, call-by-value and call-by-reference, pointers to pointers, pointers to structures and memory allocation functions.

UNIT – V: **(18 periods)**

Files: Introduction and classification of files, opening and closing of files, read and write operations, conversion of files and command line arguments.

Basic Data Structures: Overview of data structures, implementation of stack operations (push, pop), implementation of linear and Circular queue operations (insertion, deletion) using arrays.

(Total periods: 100)

TEXT BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "A Structured Programming Approach using C," Third Edition, Cengage Learning, NewDelhi, 2007.
2. R.G. Dromey, "How to Solve it by Computer," First Edition, Pearson Education, NewDelhi, 1982.

REFERENCE BOOKS:

1. Pradip Dey and Manas Ghosh, "Programming in C," Second Edition, Oxford University Press, NewDelhi, 2007.
2. Jeri R Hanly and Elliot B. Koffman, "Problem Solving and Program design in C," Seventh Edition, Pearson Education, NewDelhi, 2014.

B.Tech. I Year

14BT1ES03**: COMPUTER AIDED ENGINEERING DRAWING**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	1	3	3

PREREQUISITE: Nil

COURSE DESCRIPTION: This course deals with the concepts of computer-aided sketching, and orthographic and isometric projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES: After completion of the course, a successful student is able to :

1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general audience.

DETAILED SYLLABUS:

UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING (20 periods)

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, Different types of lines, Material conventions and free hand practicing, Definitions of Principle planes and other planes. Computer screen, layout of the software, Creation of 2D/3D environment, Selection of drawing size and scale, Standard tool bar/menus, Coordinate system, and description of most commonly used toolbars, Navigational tools, Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS (20 periods)

Introduction, Definitions- Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), Projection of lines inclined to one plane, inclined to both the planes, finding true lengths and true inclinations (No application problems).

UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES (20 periods)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS (20 periods)

Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS (20 periods)

Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.

Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts.

Total periods: 100

TEXT BOOKS:

1. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, *Engineering Graphics with Auto CAD*, PHI Learning Private Limited, Revised Edition, August 2010.
2. N D Bhat & V M Panchal, *Engineering Drawing,* Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, *AutoCAD 2013 For Engineers And Designers,* Dreamtech Press, 2013
2. T Jeyapoovan, *Engineering Drawing and Graphics Using Autocad,* Vikas Publishing House, 3rd Edition, 2010.
3. Jolhe, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2007.
4. Basant Aggarwal, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

B.Tech. I Year

14BT1BS05: **ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wave length of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:

After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.

Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of $^{P^H}$ of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments :

Engineering Physics:

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
4. Characteristics of LED source.
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee's method
9. Melde's experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
12. Characteristics of laser source.
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum

Engineering Chemistry:

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Conductometric titration of strong acid Vs strong base
6. Determination of P^H of a given solution by P^H metry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
10. Synthesis of Nano metal-oxide using sol– gel process.
11. Determination of the capacity of the given cation-exchange Resin.
12. Measurement of viscosity by Redwood viscometer.

Duration: 3 Periods for each experiment

TEXT BOOKS:

1. *Physics Laboratory Manual*
2. K. Mukkanti, *Practical Engineering Chemistry*, BS Publications, 2013.
3. K.N. Jayaveera, K.B. Chandra Sekhar, *Chemistry laboratory manual,* S.M. Enterprises Limited, 2013.

B.Tech. I Year

14BT1ES05**: PROBLEM SOLVING & COMPUTER PROGRAMMING LAB**

(Common to CSE,CSSE and IT)

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	**-**	**3**	**3**

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with hands on experience in developing simple programs and implementing basic data structures – stack and queue, searching and sorting in C language.

COURSE OUTCOMES:

On successful completion of this course, a successful student will be able to:

CO1. Select the appropriate data structure and algorithm design method for a specified problem.

CO2. Design, code, test, debug, and execute programs in C.

CO3. Implement and use common features found in C programs arrays, pointers, strings, stacks and Queues.

Week 1:

a. Let a and b are two integer variables whose values are 10 and 13 respectively. Write a program to evaluate the following arithmetic expressions.

i) a + b ii) a – b iii) a * b iv) a / b v) a % b

b. Write a program evaluate the following algebraic expressions after reading necessary values from keyword.

i) (ax + b)/(ax – b) ii) 2.5 log x + Cos 32^0+ | $x^2 + y^2$| + v2xy

iii) $x^5 + 10\ x^4 + 8, x^3 + 4\ x + 2$ iv) ae^{kt}

Week 2:

a. Mr. Gupta deposited Rs.1000 in a bank. The bank gives simple interest at the rate of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I = P T R / 100)

b. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 00. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

c. In a town, the percentage of men is 52. The percentage of total literacy is 48.If total percentage of literate men is 35 of the total population; write a program to find the total number of illiterate men and women if the population of the town is 8000.

Week 3:

a. Write a program that prints the given 3 integers in ascending order using if - else.

b. Write a program to calculate commission for the input value of sales amount.

Commission is calculated as per the following rules:

i) Commission is **NIL** for sales amount Rs. 5000.

ii) Commission is 2% for sales when sales amount is >Rs. 5000 and <= Rs. 10000.

iii) Commission is 5% for sales amount >Rs. 10000.

c. A character is entered through keyboard. Write a program to determine whether the Character entered is a capital letter, a small case letter, a digit or a special symbol.

The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127

Week 4:

a. If cost price and selling price of an item is input through the keyboard, write program to determine whether the seller has made profit or incurred loss. Also determine how much profit or loss he incurred in percentage.

b. An insurance company calculates premium as follows:

i) If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lacks.

ii) If a person satisfies all the above conditions and is female then the premium is Rs.3 per thousand and the policy amount cannot exceed Rs.1 lack.

iii) If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then premium is Rs.6 per thousand and the policy cannot exceed Rs. 10000.

iv) In all other cases the person is not insured.

Write a program to determine whether the person should be insured or not, his/her premium rate and maximum amount for which he/she can be insured.

Week 5:

a. Write a program, which takes two integer operands and one operator as input from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %. Use switch statement)

b. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following rules:

i) If the student gets first class and the number of subjects failed is >3, then no grace marks are awarded. If the number of subjects failed is less than or equal to '3' then the grace is 5 marks per subject.

ii) If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in less than or equal to '3' then the grace is 4 marks per subject.

iii) If the student gets third class and the number of subjects failed in is >1, then no grace marks are awarded. If the number of subjects failed in is equal to '1' then the grace is 5 marks per subject.

Week 6:

a. Write a program to find the sum of individual digits of a positive integer.

b. A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

c. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to calculate the following: Sum=$1-x^2/2!+ x^4/4!-x\ 6!+x^8/8!-x^{10}/10!$

i) A perfect number is a number that is the sum of all its divisors except itself. Six is the perfect number. The only numbers that divide 6 evenly are 1,2,3 and 6
(i.e., 1+2+3=6).

ii) An abundant number is one that is less than the sum of its divisors
(Eg: 12 <1+2+3+4+6).

iii) A deficient number is one that is greater than the sum of its divisors (Ex: 9 > 1+3).

Write a program to classify N integers (Read N from keyboard) each as perfect, abundant or deficient.

Week 8:

a. Write a program to find the largest and smallest number in a given list of integers.

b. Write a program to perform the following:

i) Addition of two matrices. ii) Multiplication of two matrices.

Week 9:'

Write a program to perform the following:

i) Linear search ii) Binary search

Week 10:

Write a program to perform the following:

i) Bubble sort ii) Selection sort

iii) Insertion sort

Week 11:

a. Write a program to convert a given octal number into binary form.
b. Write a program to convert a given decimal number into binary form.
c. Write a program to convert a given decimal number into octal form.

Week 12:

a. Write a program that uses functions to perform the following operations:
   i) To insert a sub-string in main string at a specified position.
   ii) To delete N characters from a given string from a specified position.

b. Write a program to determine whether the given string is palindrome or not.

Week 13:

Any number **x** is called colored number if it does not contain any substring **y** with the property that the product **z** of all the digits of **y** is not equal to any of the substrings of **x** (for example, take x=263, then its substrings are 2,6,3,26,63,263 only. Now, take any substring y= 26 then z=2*6=12 or y=63 then z=6*3=18. Neither **z** is the substring of 263). Write a C program to check whether the given any three digit number is colored number or not.

Week 14:

a. Write a program to display the position or index in the main string S where the sub string T begins. Display –1 if S does not contain T.

b. Write a program to count the number of lines, words and characters in a given text.

Week 15:

a. Write a program to read list of student names and perform the following operations using functions.
   i) to print list of names
   ii) to sort them in ascending order
   iii) to print the list after sorting.

b. Write a menu driven program to read list of student names and perform the following operations using array of character pointers.
   i) to insert a student name
   ii) to delete a name
   iii) to print the name

Week 16:

a. Two's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of 1. Eg: 2's complement of 11100 is 00100. Write a program to find the 2's complement of a given binary number using functions.

b. Write a program to convert a roman number (Eg: I,II,III…) in to its decimal equivalent using functions

Week 17:

Write programs to perform the following using recursion
   i) To find the factorial of a given integer.
   ii)To solve Towers of Hanoi problem.

Week 18:

Write a program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers

(**Note**: Represent complex number using a structure.)

Week 19:

a. Write a program to implement the following
   i) Call by value
   ii) Call by reference.
b. Write a program to swap the given two numbers without using additional variable. (using pointers)

Week 20:

a. Write a program which copies one 'text file' to another 'text file'.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

Week 21:

Write a program to implement stack operations using arrays.

Week 22:

Write a program to implement linear queue operations using arrays.

Mini Project 1: Students are allowed to select a lab exercise, which includes arrays, functions, pointer concepts and submit the report in Two weeks.

Mini Project 2: Students are allowed to select a lab exercise, which includes Structures, Files ,Stacks and Queues concepts and submit the report in Two weeks.

i) If the student gets first class and the number of subjects failed is >3, then no grace marks are awarded. If the number of subjects failed is less than or equal to '3' then the grace is 5 marks per subject.

ii) If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in less than or equal to '3' then the grace is 4 marks per subject.

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a. Write a program to find the sum of individual digits of a positive integer.

b. A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

c. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

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a. Write a program to calculate the following: Sum=$1-x^2/2!+ x^4/4!-x\ 6!+x^8/8!-x^{10}/10!$

i) A perfect number is a number that is the sum of all its divisors except itself. Six is the perfect number. The only numbers that divide 6 evenly are 1,2,3 and 6
(i.e., 1+2+3=6).

ii) An abundant number is one that is less than the sum of its divisors
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a. Write a program to find the largest and smallest number in a given list of integers.

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i) Addition of two matrices.

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Week 9:'

Write a program to perform the following:

i) Linear search ii) Binary search

Week 10:

Write a program to perform the following:

i) Bubble sort ii) Selection sort

iii) Insertion sort

Week 11:

a. Write a program to convert a given octal number into binary form.

b. Write a program to convert a given decimal number into binary form.

c. Write a program to convert a given decimal number into octal form.

Week 12:

a. Write a program that uses functions to perform the following operations:

i) To insert a sub-string in main string at a specified position.

ii) To delete N characters from a given string from a specified position.

b. Write a program to determine whether the given string is palindrome or not.

Week 13:

Any number **x** is called colored number if it does not contain any substring **y** with the property that the product **z** of all the digits of **y** is not equal to any of the substrings of **x** (for example, take x=263, then its substrings are 2,6,3,26,63,263 only. Now, take any substring y= 26 then z=2*6=12 or y=63 then z=6*3=18. Neither **z** is the substring of 263). Write a C program to check whether the given any three digit number is colored number or not.

Week 14:

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Week 15:

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i) to print list of names

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b. Write a menu driven program to read list of student names and perform the following operations using array of character pointers.

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Week 16:

a. Two's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of 1. Eg: 2's complement of 11100 is 00100. Write a program to find the 2's complement of a given binary number using functions.

b. Write a program to convert a roman number (Eg: I,II,III…) in to its decimal equivalent using functions

Week 17:

Write programs to perform the following using recursion

i) To find the factorial of a given integer.

ii)To solve Towers of Hanoi problem.

Week 18:

Write a program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(**Note**: Represent complex number using a structure.)

Week 19:

a. Write a program to implement the following

i) Call by value

ii) Call by reference.

b. Write a program to swap the given two numbers without using additional variable. (using pointers)

Week 20:

a. Write a program which copies one 'text file' to another 'text file'.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

Week 21:

Write a program to implement stack operations using arrays.

Week 22:

Write a program to implement linear queue operations using arrays.

Mini Project 1: Students are allowed to select a lab exercise, which includes arrays, functions, pointer concepts and submit the report in Two weeks.

Mini Project 2: Students are allowed to select a lab exercise, which includes Structures, Files ,Stacks and Queues concepts and submit the report in Two weeks.

REFERENCE BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "A Structured Programming Approach using C," Third Edition, Cengage Learning, New Delhi, 2007.
2. PradipDey and Manas Ghosh, "Programming in C," Second Edition, Oxford University Press, New Delhi, 2007.

B.Tech. I Year

14BT1ES06**: ENGINEERING & IT WORKSHOP**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

After completion of the course, a successful student is able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a) Carpentry Shop : Cross lap joint, mortise and tenon, T-joint, dove tail joint.

b) Fitting Shop : Square fit and V-fit, semi circular fit, dove tail fit.

c) Sheet Metal Shop : Trapezoidal tray, square tin, funnel, cylinder.

d) House wiring : Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.

(e) Foundry : Preparation of casting using single piece pattern,
Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) Welding
b) Metal Cutting
c) Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

TWORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

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b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources.

Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.

Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.

Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.

Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, *Engineering Work shop practice,* VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, *Work shop Manua***l**, SciTech Publishers, 2009.
3. K. Venkata Reddy, *Workshop Practice Manual, B*S Publications, 2008

IT WORKSHOP:

1. Vikas Gupta, *Comdex Information Technology Course Tool Kit,* 2nd edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, *Introduction to Information Technology*, 2nd edition, Pearson Education, New Delhi, 2005.
3. *IT Workshop Laboratory Manual,* Department of IT, SVEC, 2014.

B.Tech. I Year

14BT1HS02: **ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which are classified into software based learning, grammar and activities. English Speech Sounds and Phonemic Transcription, Word Stress and Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features, Vocabulary Building, are aided by software. Grammar sessions include Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays, Telephonic Etiquette, Listening Skills, Describing People, Places and Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to

1. Gain practical knowledge in
   - English Speech Sounds
   - Stress Patterns in word and sentence
   - Intonation Patterns
   - Paralinguistic Features
   - Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts.
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.
6. Demonstrate various language functions by participating in
   - Just A Minute
   - Impromptu Speech
   - Elocution
   - Role Plays
   - Presentations
7. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes c. Idioms and Phrases–Homophones–Homonyms–Homographs.
6. Functional Grammar
   a. Parts of Speech b. Tenses
   c. Change of Speech d. Change of Voice
   e. Word Order and Error Correction f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India.

II B.Tech I Semester

14BT3BS03**: PROBABILITY AND STATISTICS**

(Common to CSE, CSSE &IT)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PRE REQUISITE: A course on "Engineering Mathematics"

COURSE OUTCOMES: On successful completion of this course, a successful student will be able to:

CO1 Acquire basic knowledge in
- probability distributions, correlation and regressions,
- Statistical quality control and testing of hypotheses.
- finding regression coefficients ,elucidating relationships in bivariate data
- Tests of significance for small and large samples

CO2 (i) Develop analytical skills for the problems involving means, probability distributions and standard deviations sampling techniques for decision making in uncertain environments

(ii) Develop skills for analyzing the data with suitable tests of significance for practical situations through probability distributions for practical situations.

CO3 Develop skills in applying statistical techniques employed for quality control and maintenance of uniform quality in the manufacturing processes.

Detailed Syllabus:

UNIT - I: PROBABILITY & MATHEMATICAL EXPECTATIONS (9 periods)

Probability- Conditional probability, Bayes theorem, Random Variables: Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density function, Mathematical expectation, Properties of Mathematical expectations, Mean and Variance.

UNIT - II: PROBABILITY DISTRIBUTIONS (9 periods)

Discrete Distributions: Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and Standard Deviations of Poisson Distribution.

Continuous Distributions: Normal Distribution, Mean, Variance and area properties.

UNIT-III: STATISTICAL QUALITY CONTROL AND CORRELATION (9 periods)

Introduction, Advantages and limitations of statistical quality control, Control charts, specification limits, X , R, p, np and c charts. Definition of correlation, correlation coefficient, Rank correlation. Simple linear regression, regression lines and properties.

UNIT-IV: SAMPLING DISTRIBUTIONS AND TESTS OF SIGNIFICANCE FOR LARGE SAMPLES (9 periods)

Population and Sample, Parameter and Statistic, Sampling Distribution of Statistic, Standard Error of Statistic, Null and Alternative Hypothesis, Type I and II errors, Level of Significance, Critical region, Degrees of freedom. Test of Significance for Single Proportion, Difference of Proportions, Single Mean, Difference of Means.

UNIT-V: TESTS OF SIGNIFICANCE FOR SMALL SAMPLES (9 periods)

Student's t-test: single mean, difference of means, F-test for equality of population variance, Chi-Square Test for Goodness of fit, contingency table, Chi-Square Test for Independence of Attributes.

(Total: 45 periods)

TEXT BOOKS:

1. T.K.V. Iyengar, B. Krishna Gandhi ..etal., "Probability and Statistics," S. Chand & Company, 3/e.(2011).
2. S.P.Gupta, Statistical Methods, Sultan and Chand, New Delhi, 34th edition (2005).

REFERENCE BOOKS:

1. Shahnaz Bathul, A text book of Probability and Statistics, Ridge Publications, 2ed,
2. S.C.Gupta and V.K.Kapoor , Fundamentals of Applied Statistics, ultan and Chand, New Delhi.(1998).

II B.Tech. -I Semester

14BT30501**: DATA STRUCTURES**

(Common to CSE, CSSE & IT)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: A Course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Concepts of Data Structures- Linked Lists, Stacks, Queues, Trees Graphs, Sorting, and Hashing.

COURSE OUTCOMES:

After successful completion of the course, the student will be able to

CO1. Gain Knowledge in

- Principles of Data Structures.
- Abstract Data Type.
- Linear and Non-linear Data Structures.

CO2. Analyze and Identify suitable data structure design techniques for problem solving.

CO3. Develop programs to implement linear and non liner data structures.

Detailed Syllabus:

UNIT-I: LINKED LISTS (9 periods)

LINKED LISTS: Introduction To Data Structures, Pointers, Basic Operations, Implementation, Application, Circular Linked Lists, Doubly Linked List.

UNIT-II: STACKS AND QUEUES (8 periods)

STACKS: Basic Stack Operations, Stack Linked List, Implementation, and Stack Applications.

QUEUES: Queue Operations, Queue Linked List Design, Queue Applications

UNIT-III: TREES, SEARCH TREES, AND HEAPS (10 periods)

TREES: Basic Tree Concepts, Binary Trees.

BINARY SEARCH TREES (BST): Basic Concepts, BST Operations, BST Applications.

AVL SEARCH TREES: Basic Concepts, AVL Tree Implementations.

HEAPS: Basic Concepts, Heap Implementation, Heap Application.

UNIT-IV: MULTIWAY TREES AND GRAPHS (9 periods)

MULTIWAY TREES: B-Trees, Simplified B-Trees, B-Tree Variations.

GRAPHS: Basic Concepts, Operations, Graph Storage Structures, Graph Algorithms: Create Graph, Insert Vertex, Delete Vertex, Retrieve Vertex, Depth-first Traversal, Breadth-first Traversal.

UNIT-V: SORTING AND HASHING (9 periods)

SORTING: Sorting by Exchange-Shell Sort, Quick sort. Sorting By Distribution-Counting Sort, Bucket Sort, Radix Sort. Sorting By Merging-Merge Sort

HASHING: Introduction, Hash Table Structure, Hash Functions, Linear Open Addressing, Chaining, Applications.

(Total: 45 periods)

TEXT BOOKS:

1. Richard Gileberg, Behrouz A. Forouzan, "Data Structures: A Pseudo code Approach with C", Second Edition, 2007.
2. Debasis Samanta, "Classic Data Structures", PHI Learning, Second Edition, 2009.

REFERENCE BOOKS:

1. G.A.V. Pai, "Data Structures and Algorithms", Tata McGraw Hill, Second Edition, 2009.
2. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J.Augenstein, "Data Structures Using C", Pearson Education, 2005.

II B. Tech - I Semester

14BT30502**: DIGITAL LOGIC DESIGN**

(Common to CSE, CSSE& IT)

Int. Marks: 30 **Ext. Marks: 70** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITE: NIL

COURSE DESCRIPTION:

Introduction to number systems; logic gates; simplification of Boolean functions; Design of combinational circuits; Design of sequential circuits, Memory and Programmable Logic;

COURSE OUTCOMES:

After Successful completion of this course, the student will be able to:

CO1. Gain knowledge on Boolean algebra, Minimization of Boolean functions using Map method.

CO2. Design combinational and sequential logic circuits for digital systems.

CO3. Apply Simplification techniques for simplifying Boolean functions.

Detailed Syllabus:

UNIT I: BINARY SYSTEMS AND BOOLEAN ALGEBRA (9 periods)

Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, Signed binary numbers, complements, Boolean Algebra, Boolean functions, Canonical and standard forms, Digital logic gates.

UNIT II: GATE LEVEL MINIMIZATION (9 periods)

The k-map method - Four-variable map, Five-Variable map, product of sums simplification, Don't-care conditions, NAND and NOR implementation, other Two-level implementations, Exclusive - OR function

UNIT III: COMBINATIONAL LOGIC (9 periods)

Combinational Circuits, Analysis procedure, Design procedure, Binary Adder-Subtractor, BCD Adder, Binary multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-Multiplexers

UNIT IV: SEQUENTIAL LOGIC (9 periods)

Latches, Flip-Flops, Analysis of clocked sequential circuits, Design of synchronous sequential circuits, registers, shift registers, Ripple counters, Synchronous counters, Ring Counter and Johnson Counter.

UNIT-V: MEMORY AND PROGRAMMABLE LOGIC (8 periods)

Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-only memory, Programmable logic Array, programmable Array logic, Sequential Programmable Devices.

(Total:45 Periods)

TEXT BOOK:

1. M. Morris Mano, "Digital Design", Third Edition, Pearson Education/PHI, 1999.

REFERENCE BOOKS:

1. David J Comer, "Digital Logic and State Machine Design", Third Edition, Oxford University Press, 2012
2. Charles H.Roth Jr, "Fundamentals of Logic Design", Fifth edition, Cengage Learning, 2008.

II B.Tech - I Semester

14BT31201**: DISCRETE MATHEMATICAL STRUCTURES**

(Common to CSE,CSSE & IT)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on "Engineering Mathematics".

COURSE DESCRIPTION: Mathematical Logic; Predicates; Relations; Algebra Structures; Mathematical Reasoning; Recurrence Relations; Graphs; Graph Theory and its applications.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Demonstrate knowledge on mathematical logic, algebraic structures, relations, recurrence relations and mathematical reasoning.

CO2. Analyze and prove given statement by contradiction and automatic theorem.

CO3. Design network applications using Prim's and Kruskal's algorithms.

CO4. Apply the concepts of graph theory, permutation, combinations, counting principle and graph theory in solving real-time problems.

DETAILED SYLLABUS

UNIT-I: MATHEMATICAL LOGIC AND PREDICATES (11 periods)

MATHEMATICAL LOGIC: Statements and notations, Connectives, Well formed formulae, Truth Tables, Tautology, Equivalence of formulae, Normal forms.

PREDICATES: Predicate Calculus, Free and Bound variables, Rules of inference, Consistency, Proof of contradiction and Automatic Theorem Proving.

UNIT-II: FUNCTIONS AND RELATIONS (9 periods)

RELATIONS: Properties of binary relations, Equivalence relations, Compatibility relations, Partial ordering relations, Hasse diagram and related applications.

FUNCTIONS: Inverse Functions, Composition of functions, Recursive functions, Lattice and its Properties.

UNIT-III: ALGEBRAIC STRUCTURES (6 periods)

Algebraic System: Examples and General Properties SemiGroups and Monoids, Groups, Subgroups, Homomorphism and Isomorphism.

UNIT-IV: MATHEMATICAL REASONING AND RECURRENCE RELATIONS (10 periods)

MATHEMATICAL REASONING: Methods of Proof, Mathematical Induction, Basics of counting, The Inclusion- Exclusion Principle, The Pigeon hole principle, Permutations and Combinations, Generalized Permutations and Combinations.

RECURRENCE RELATIONS: Generating Functions of Sequences, Calculating coefficients of Generating function, Recurrence relation, solving recurrence relations by substitution and Generating functions, Methods of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relation.

UNIT-V: GRAPH THEORY AND ITS APPLICATION (9 periods)

Graphs: Introduction to Graphs, Types of Graphs, Graph basic terminology and Special types of simple graphs, Representation of Graphs and graph Isomorphism, Euler Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs, Euler's Formula and Graph Coloring.

Trees: Introduction to Trees, Properties of Trees, Applications of Trees, Spanning Trees, Counting trees, Depth-First Search, Breadth-First Search, Minimum Spanning Trees, Kruskal's Algorithm and Prim's Algorithm.

(Total:45 Periods)

TEXT BOOKS:

1. J.P. Trembly and R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, 2001.
2. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw Hill, 6th edition, 2007.

REFERENCE BOOKS:

1. Joe L.Mott and Abraham Kandel, "Discrete Mathematics for Computer Scientists and Mathematicians", Prentice Hall of India Private Limited, 2nd edition, 2004.
2. Ralph P. Grimaldi and B.V.Ramana, "Discrete and CombinatorialMathematics-anApplied Introduction", Pearson Education, 5th edition, 2006.

II B. Tech. - I Semester

14BT30235**: BASIC ELECTRICAL ENGINEERING**

(Common to CSE&IT)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PRE-REQUISITES:A course on "Engineering physics"

COURSE DESCRIPTION:

Basics of electrical circuits and measuring instruments, principle of operation, characteristics and applications of DC machines, transformers, three phase induction motors and special machines.

COURSE OUTCOMES: On successful completion of this course,

students will be able to

CO1. demonstrate knowledge on
- basics of electrical circuits.
- Construction and working principle of various electrical machines and various measuring instruments.

CO2. analyze the behavior of electrical circuits and operation of several electrical measuring instruments.

CO3. develop skills to evaluate various circuit parameters and performance characteristics of various machines.

DETAILED SYLLABUS:

UNIT-I: ELECTRICAL CIRCUITS (13 periods)

Essence of electricity, basic circuit components, electric current, potential difference, EMF, electric power, Ohm's law, resistive networks, inductive networks, capacitive networks, Kirchhoff's laws, series-parallel circuits, star to delta and delta to star transformations. Mesh analysis, nodal analysis, source transformation technique, numerical problems.

UNIT -II: ALTERNATING QUANTITIES (9 periods)

Principle of AC voltages, wave forms and basic definitions, RMS and average values of alternating currents and voltages for sinusoidal waveform, form factor and peak factor, power factor and concept of power triangle. Polyphase systems, advantages, voltages and currents in balanced star and delta connections, numerical problems, advantages of star and delta connections.

UNIT -III: DC MACHINES (9 periods)

DC Generators-constructional details, principle of operation, EMF equation, types and applications.

DC Motors - principle of operation, significance of back EMF, types, torque equation, losses, efficiency and applications.

UNIT- IV: AC MACHINES (8 periods)

Transformers - principle of operation, constructional details, losses, efficiency and regulation.

Three phase Induction motors -constructional details, operating principle and applications.

Principle of operation and applications-split phase induction motors, AC servomotor and stepper motor.

UNIT-V: MEASURING INSTRUMENTS AND SPECIAL APPARATUS (6 periods)

Classification of instruments, operating principles, essential features of measuring instruments, permanent magnet moving coil and moving iron instruments(voltmeters and ammeters), digital multi-meters, voltage stabilizers, uninterruptible power supply (UPS).

(Total Periods: 45)

TEXT BOOKS:

1. V.K.Mehta, Rohit Mehta, Principles of Electrical Engineering, S. Chand and Company Ltd., New Delhi, 2006.
2. T.K. Nagasarkar, M.S. Sukhija, Basic Electrical Engineering, Oxford University Press, New Delhi, 2010.

REFERENCE BOOKS:

1. B.L. Theraja, A.K. Theraja, A text book of electrical technology in SI units, Vol.2,S.Chand and Company Ltd., New Delhi, 2013.
2. D P Kothari, I J Nagarath, Basic Electrical Engineering, 3rd edition Tata McGraw Hill Education private Limited, New Delhi, 2012.
3. Ali Emadi, Abdolhosein Nasiri, Stoyan B.Bekiarov, Uninterruptible power supplies and active filters, CRC press, USA, 2005.
4. R.K.Rajput, Basic electrical and electronicsengineering, Laxmipublications(P)Ltd., New Delhi,2007.

II B.Tech. I Semester

14BT30431: ELECTRONIC DEVICES AND CIRCUITS

(Common to CSE,CSSE&IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

Prerequisites**:** A course on "Engineering Physics".

COURSE DESCRIPTION:

Characteristics of general and special purpose electronic devices; Rectifiers and regulators; Biasing and small signal analysis of BJT and FET, Feedback Amplifiers, Oscillator.

COURSE OUTCOMES:

On successful completion of the course the students will be able to

CO1. Demonstrate knowledge in
- P-N junction diode, Zener diode and their characteristics
- Rectifiers, Filters and Regulators
- Characteristics of BJT, FET, MOSFET and special purpose electronic devices
- Amplifiers and Oscillators

CO2. Analyze numerical and analytical problems in
- Regulated Power Supply
- Transistor biasing circuits
- Transistor amplifiers
- Feedback amplifiers and
- Oscillators

CO3. Design the electronic circuits like (PO3)
- Transistor biasing circuits
- Transistor amplifiers
- Feedback amplifiers and
- Oscillators

CO4. Solve engineering problems and arrive at solutions pertaining to Electronic circuits.

DETAILED SYLLABUS

UNIT-I: DIODE, RECTIFIERS AND REGULATORS (11 Periods)

PN JUNCTION DIODE

PN Junction Diode Equation, Volt-Ampere (V-I) Characteristics, Temperature Dependence of V-I Characteristics, Ideal Versus Practical, Static and Dynamic Resistances, Diode Equivalent circuits, Junction capacitances, Break down mechanisms in semiconductor Diodes, Zener Diode Characteristics.

RECTIFIERS AND REGULATORS

Halfwave rectifier and Fullwave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter, ? - section filter, comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT-II: BIPOLAR JUNCTION TRANSISTOR (13 Periods)

CHARACTERISTICS:

Transistor construction, BJT Operation, Transistor as an amplifier, Transistor currents and their relations, Input and Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications.

BIASING:

Transistor biasing, Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Emitter Feedback Bias, Voltage Divider Bias.

AMPLIFIER:

BJT Hybrid Modeling, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Analysis of CE, CB and CC configurations using simplified Hybrid Model. Comparison of CB, CE and CC configurations.

UNIT-III: FIELD EFFECT TRANSISTOR (9 Periods)

Construction, Principle of Operation and Characteristics of JFET and MOSFET (Enhancement & Depletion), Biasing of FET, Small Signal Model of JFET & MOSFET. Common Source and Common Drain Amplifiers using FET, Generalized FET Amplifier, FET as Voltage Variable Resistor, Comparison between BJT and FET.

UNIT-IV: FEEDBACK AMPLIFIERS AND OSCILLATORS (6 Periods)

Concepts, Types of Feedback Circuits (block diagram representation), General characteristics of negative feedback amplifier, Effect of Feedback on Amplifier characteristics. Barkhausen criterion, Hartley & Colpitts oscillators, Phase Shift Oscillators and Crystal Oscillator.

UNIT-V: SPECIAL PURPOSE ELECTRONIC DEVICES (6 Periods)

Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR). Principle of operation of Schottky Barrier Diode.

(Total Periods: 45)

TEXT BOOK:

1. J. Millman, Christos C. Halkias and Satyabrata Jit, "Electronic Devices and Circuits," TMH, 3rd Edition, 2010.

REFERENCE BOOK"

1. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits," PHI, 10th Edition, 2009.
2. S. Salivahana, N. Suresh Kumar, "Electronic Devices and Circuits," Mc-Graw Hill, 3rd Edition, 2008.
3. David A. Bell, "Electronic Devices and Circuits, " Oxford University press, 5th Edition, 2008.

II B.Tech. -I Semester

14BT30521**: Data Structures Laboratory**

(Common to CSE, CSSE& IT)

Int. Marks: 25; **Ext. Marks: 50;** **Total Marks: 75**

L	T	P	C
-	-	3	2

PREREQUISITES: A Course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hands on programming on concepts of data structures - Linked lists, Stacks, Queues, Trees, Search trees, Sorting, and Hashing.

COURSE OUTCOMES:

On successful completion of the course, the student will be able to

CO1. Gain practical knowledge on C Programming and Linear and Non-Linear Data Structures**.**

CO2. Analyze and Identify suitable data structure techniques to solve problems

CO3. Develop programs to implement linear and non liner data structures

List of Programming Exercises

1. Write program to implement the following data structures:

   (a) Single linked list. (b) Double linked list. (c) Circular linked list.

2. Write a program to implement stack and queue using linked list.

3. Write a program to evaluate a given postfix expression using stack.

4. Write a program to convert a given infix expression to postfix form using stacks.

5. Write a program to implement

   (a) stack using two queues. (b) queue using two stacks.

6. Write a program to implement In-order, pre-order, post-order tree traversal of binary trees.

7. Write a program to perform operations on a binary search tree(BST) .

8. Write programs for implementation of graph traversals by applying:

   (a) Breadth First Search. (b) Depth First Search.

9. Implement the following sorting algorithms:

   (a) Merge sort. (b) Heap sort. (c) Quick Sort. (d)Radix Sort.

10. Write a program to implement hashing with

    (a) Separate Chaining (b) Open addressing methods.

REFERENCES:

1. Richard Gileberg, Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", Second Edition, 2007.
2. Debasis Samanta, "Classic Data Structures", Phi Learning, Second Edition, 2009.

II B.Tech. - I Semester
14BT30422: ANALOG AND DIGITAL ELECTRONICS LAB
(Common to CSE, CSSE& IT)

Int. Marks: 25 **Ext. Marks: 50** **Total Marks: 75**

L	T	P	C
-	-	3	2

PREREQUISITES: Courses on "Electronic Devices & Circuits" and "Digital Logic Design".
COURSE DESCRIPTION: Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; BJT and FET characteristics; UJT and SCR characteristics; BJT amplifiers; Realization of FFs, Combinational Circuits, sequential Circuits; Demonstration on VHDL Programme.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Analyze the characteristics of different electronic devices and circuits like

   - Diodes-PN Junction Diodes, Zener Diodes, SCR
   - Transistors-BJT,FET,UJT
   - Flip Flops-JK FF,D FF
   - Combinational Circuits-HA,FA
   - Sequential Circuits -Counters

2. Design and analyze the electronic circuits like BJT Amplifiers, Oscillators, Combinational Circuits and Sequential Circuits.

3. Solve engineering problems by proposing potential solutions leading to Design of better electronic circuits.

DETAILED SYLLABUS:

PART A

ELECTRONIC WORKSHOP PRACTICE (Only for Viva-Voce)

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, Low-power JFETs, MOSFETs, LEDs, LCDs, SCR, UJT, Linear and Digital ICs.

PART B

ANALOG DEVICES AND CIRCUITS (Minimum seven experiments to be conducted)

1. PN Junction and Zener diodes characteristics
2. Ripple Factor and Load Regulations of Rectifier with and without filters (Full wave or Half wave)
3. Input and Output characteristics of Transistor in CE configuration
4. Drain and Transfer Characteristics of JFET
5. Gain and Frequency response of CE Amplifier
6. Gain and Frequency response of Feedback Amplifier (Voltage series or current series)
7. Frequency of oscillations of Hartley and Colpitts Oscillator
8. UJT relaxation oscillator
9. SCR characteristics

PART C

DIGITAL CIRCUITS
Realization of

1. Flip Flops using Logic Gates
2. Two Problems on Combinational Circuits
3. Asynchronous Counter
4. Synchronous Counter

Demonstration of

5. VHDL Program

II B. Tech. II Semester

14BT4HS01**: BUSINESS COMMUNICATION AND PRESENTATION SKILLS**

(Common to CSE, IT, CSSE,CE & ME)

Int. Marks: 30 **Ext. Marks: 70** **Total Marks: 100**

L	T	P	C
3	1	-	3

PRE REQUISITES : A course on "Basic grammar and fundamentals of Listening, Speaking, Reading and Writing skills".

COURSE DESCRIPTION:

Nature and Scope of Communication; Non-Verbal Communication; Writing Business Documents; Business Presentations and Public Speaking; Careers and Résumé.

COURSE OUTCOMES: On sucessful completion of the course, a successful student will be able to

CO1 Acquire knowledge in
- a) Managerial Communication
- b) Corporate Communication
- c) Business Writing
- d) Presentation Skills
- e) Career Building

CO2 Analyze and judge the situation through non-verbal communication for effective organizational communication.

CO3 Achieve personal excellence and ability to work in groups.

CO4 Develop effective communication to meet professional needs.

DETAILED SYLLABUS:

UNIT - I : NATURE AND SCOPE OF COMMUNICATION (9 periods)

Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks - Informal Communication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication

UNIT - II : NON-VERBAL COMMUNICATION (9 periods)

Introduction - Significance of Non-verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non-verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross-cultural Communication Strategies - Corporate Communication: Introduction - Crisis Management / Communication - Case Study.

UNIT - III : WRITING BUSINESS DOCUMENTS (10 periods)

Business Writing: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters - Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT - IV : BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 periods)

Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non-functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT - V : CAREERS AND RESUME (7 periods)

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - **Résumé Writing**: **Résumé Formats;** Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non-verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

(**Total periods: 45)**

TEXT BOOK:

1. Meenakshi Raman and Prakash Singh, "Business Communication," Oxford University Press, New Delhi, Second Edition, 2012.

REFERENCE BOOKS:

1. M K Sehgal and Vandana Khetarpal, "Business Communication," Excel Books, New Delhi, 2011.
2 M Ashraf Rizvi, "Effective Technical Communication," Tata McGraw-Hill, 2009.

II B.Tech-II semester:

14BT3HS01**: ENVIRONMENTAL SCIENCES**

(Common to CSE,CSSE,IT,CE &ME)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: A course on "Engineering Physics" and "Engineering Chemistry"

COURSE DESCRIPTION:

Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1. Acquire knowledge in
- diverse components of environment and natural resources
- ecosystem and biodiversity & its conservation methods
- population growth and human health
- green technology

CO2. Identify and resolve the issues related to sources of different types of pollutions.

CO3. Provide solutions to individuals, industries and government for sustainable development of natural resources.

CO4. Create awareness on environmental degradation and to bring best management practices to protect environment.

CO5. Develop skills in analyzing reports on environment for sustainable development.

CO6. Apply environmental ethics in protection of diversified ecosystems.

DETAILED SYLLABUS:

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES (11 periods)

Multidisciplinary nature of environment: Definition, scope and importance of multidisciplinary nature of environment, segments of environment-lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness.

Natural Resources: Renewable and Non-renewable resources and associated problems- (a) forest resources: use and over exploitation, deforestation-causes, effects and remedies, case studies, (b) water resources-use and over utilization of surface & ground water, conflicts over water-benefits and problems of large dams, case studies, (c) mineral resources- mining, adverse effects, case studies, (d) food resources-world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging and salinity, case studies, (e) energy resources-growing needs, renewable energy resources-solar, wind, hydropower, hydrogen fuel and non-renewable energy resources-coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT-II: ECOSYSTEMS AND BIODIVERSITY (10 periods)

Ecosystems: Definition and concept of an ecosystem, structure and function of an ecosystem-producers, consumers and decomposers, food chains, food webs and ecological pyramids-introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem-ponds, lakes & oceans, energy flow in the ecosystem, ecological succession. : Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity-habitat loss, poaching of wildlife, man-wild life conflicts, endemic, endangered and extinct species of India, conservation of biodiversity-in-situ and ex-situ.

UNIT-III: ENVIRONMETAL POLLUTION AND CONTROL (8 periods)

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management-causes, effects and control measures of urban and industrial wastes, hazards and disaster management-floods, earthquakes, tsunamis, case studies.

UNIT-IV: SOCIAL ISSUES AND THE ENVIRONMENT (8 periods)

From unsustainable to sustainable development, urban problems related to energy, environmental ethics-issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

UNIT-V: HUMAN POPULATION AND THE ENVIRONMENT (8 periods)

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies. **Field work**: visit to a local area to document environmental assets-pond/ forest/ grassland/ hill/ mountain/ Environment Impact Assessment procedures for local environmental issues or assignment/seminar.

(Total periods: 45)

TEXT BOOKS:

1. A.Kaushik and C.P. Kaushik, "Environmental Studies", New Age International (P) Ltd Publications, 4th Edition, 2014.
2. Erach Barucha, "Environmental Studies", Orient Blackswan,2nd Edition, 2013.

REFERENCE BOOKS:

1. R. Rajagopalan, "Environmental Studies," Oxford University Press, 2nd Edition, 2011.
2. Benny Joseph, "Environmental Studies," Tata Mcgraw-Hill, 2nd Edition, 2009
3. Dr. B.S. Chauhan, "Environmental Studies," University Science Press, 1st Edition, 2009
4. M. Anji Reddy, "Textbook of Environmental Science andTechnology," BS Publications, 2007
5. Larry W Canter, "Environmental Impact Assessment," Mcgraw-Hill Education, 2nd Edition, 1996

II B.Tech II-Semester

14BT40501**: COMPUTER ORGANIZATION**

(Common to CSE,CSSE & IT)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITE: A course on "Digital Logic Design"

COURSE DESCRIPTION: Basic structure of a digital computer, Organization of the arithmetic, and logical unit, control unit, memory and I/O unit.

COURSE OUTCOMES:

On successful completion of this course, a student will be able to:

CO 1: Gain knowledge on:

- Computer Arithmetic and Register Transfer Language.
- Micro-programmed Control Unit
- Input Output Organization and Memory system
- Pipelining, Multiprocessors and interconnection structures.

CO2: Analyze the functioning of Central Processing Unit

CO3: Design the Micro-programmed Control Unit, memory and I/O

DETAILED SYLLABUS:

UNIT-I: COMPUTER ARITHMETIC, REGISTER TRANSFER LANGUAGE & MICROOPERATIONS (9 periods)

Computer Arithmetic : Data Representation, Fixed Point Representation, Floating Point Representation, Addition and subtraction, Binary multiplication Algorithms, Binary Division Algorithms, Floating point Arithmetic operations. Register Transfer Language And Micro-Operations: Register Transfer, Bus and memory transfers, Arithmetic Micro-operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

UNIT-II: BASIC COMPUTER ORGANIZATION and DESIGN, MICRO PROGRAMMED CONTROL (8 periods)

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and control, Instruction cycle, Memory Reference Instructions, Input - Output and Interrupt.

Micro Programmed Control: Control memory, Address sequencing, Design of control unit, Hard wired control, Micro-pro grammed control.

UNIT-III: INPUT-OUTPUT ORGANIZATION (8 periods)

Input-Output Organization : Peripheral Devices, Input-Output Interface, Modes of Transfer, Priority Interrupt, Direct memory Access, Input -Output Processor (IOP), Serial communication, Introduction to Peripheral Component Interconnect (PCI) bus.

UNIT-IV: THE MEMORY SYSTEM (8 periods)

The Memory System: Semiconductor RAM memories, Read-only memories, Cache memory, Performance considerations, Virtual memory, Secondary storage.

UNIT-V: PIPELINE & VECTOR PROCESSING AND MULTI PROCESSORS (9 periods)

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-Processor Communication and Synchronization.

(Total periods: 44)

TEXT BOOKS:

1. Morris Mano, "Computer System Architecture," Third Edition, Pearson Education, New Delhi.
2. Carl V Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organization," Fifth Edition, McGraw-Hill, New Delhi.

REFERENCE BOOKS:

1. W. Stallings, "Computer Organization and Architecture Designing For Performance," Eighth Edition, PHI, 2012.

2. John P.Hayes, "Computer architecture and Organisation," Third Edition, Tata McGraw-Hill, New Delhi

II B. Tech II Semester

14BT40502: **DATABASE MANAGEMENT SYSTEMS**

(Common to CSE,CSSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: A course on "Data Structures"

COURSE DESCRIPTION:

Introduction to Database Systems; Database Design; Relational Model; SQL Queries, Constraints and Triggers; Schema Refinement and Normal Forms; Transaction Management; Concurrency Control; Overview of Storage and Indexing.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Gain knowledge on
- Fundamentals of DBMS
- Database design
- Normal forms
- Storage and Indexing

CO2. Apply Structured Query Language (SQL) in retrieval and management of data in real time applications.

CO3. Develop skills in designing, managing databases and its security.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTION TO DATABASE SYSTEMS&DATABASE DESIGN (9 periods)

Introduction to Database Systems: Database System Applications, Purpose of Database Systems, View of Data-Data Abstraction, Instances and Schemas, Data Models, Database Languages-DDL,DML, Database Architecture, Database Users and Administrators.

Introduction to Database design: ER diagrams, Beyond ER design, Entities, Attributes and Entity Sets, Relationships and Relationship sets, Additional features of ER model, Conceptual Design with ER model

UNIT II : THE RELATIONAL MODEL&RELATIONAL ALGEBRA AND CALCULUS (8 periods)

Relational Model: Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical database Design, Introduction to Views-Destroying/altering Tables and Views. Relational Algebra and Calculus: Preliminaries, Relational Algebra Operators, Relational Calculus- Tuple and Domain Relational Calculus, Expressive Power of Algebra and calculus

UNIT III : SQL& SCHEMA REFINEMENT (10 periods)

SQL: Form of Basic SQL Query- Examples of Basic SQL Queries, Introduction to Nested Queries, correlated Nested Queries, Set- Comparison Operators, Aggregate Operators, NULL values-Comparison using Null values- Logical connectives- AND, OR and NOT- Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL ,Triggers and Active Databases.

Schema Refinement: Problems Caused by redundancy Decompositions - Problem related to decomposition, Functional Dependencies- Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms- BCNF, Multi valued Dependencies- FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT IV: TRANSACTIONS AND CONCURRENCY CONTROL (9 periods)

Transactions: Transaction Concept- Transaction State- Implementation of Atomicity and Durability- Concurrent Executions- Serializability- Recoverability - Implementation of Isolation - Testing for serializability.

Concurrency Control: Lock Based Protocols - Timestamp Based Protocols- Validation Based Protocols - Multiple Granularity, Deadlock Handling.

UNIT V: STORAGE AND INDEXING (9 periods)

Storage and Indexing: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete

(Total Periods: 45)

TEXT BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke,"Database Management Systems", Tata McGraw Hill, 3rd Edition, 2007.
2. A.Silberschatz, H.F.Korth, S.Sudarshan,"Database System Concepts", Tata McGraw hill , 5th edition, 2005.

REFERENCE BOOKS:

1. RamezElmasri, ShamkantB.Navathe," Database Systems", 6th edition, Pearson Education, 2013
2. Peter Rob and Carlos Coronel,"Database Systems Design, Implementation and Management", Cengage Learing, 7ed, 2009

II B.Tech II semester

14BT40503**: DESIGN AND ANALYSIS OF ALGORITHMS**

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: A course on "Problem Solving & Computer Programming".

COURSE DESCRIPTION: Introduction to algorithms and notations; Disjoint sets and graphs; Divide and conquer; Greedy method; Dynamic programming; Backtracking; Branch and bound; and NP-hard and NP-complete problems.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Gain knowledge on:

- Algorithm Complexities and Asymptotic notations.
- Algorithm Design techniques-Divide and Conquer, Greedy Method, dynamic programming, Back tracking, Branch and Bound.
- NP-Hard and NP-Complete problems.

CO2. Analyze the performance of algorithms with time and Space complexities.

CO3. Design the algorithms for solving real world problems.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO ALGORITHMS & DISJOINT SETS (9 Periods)

INTRODUCTION-Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big (o) notation, Omega notation, Theta notation and Little (o) notation, Recurrences.

DISJOINT SETS - Disjoint set operations, union and find algorithms.

UNIT II: GRAPHS & DIVIDEAND CONQUER (10 Periods)

GRAPHS-Breadth First search and Traversal, Depth First Search and Traversal, spanning trees, connected components and biconnected components DIVIDE AND CONQUER General method, Applications-Analysis of Binary search, Quick sort, Merge sort, Strassen's matrix multiplication, Finding the Maxima and Minima

UNIT III : GREEDY METHOD & DYNAMIC PROGRAMMING (9 Periods)

GREEDY METHOD - General method, Applications-Job sequencing with dead lines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

DYNAMIC PROGRAMMING- General method, Applications-Matrix chain multiplication, Optimal binary search trees,0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem.

UNIT IV: BACKTRACKING & BRANCH AND BOUND (8 Periods)

- General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

-- General method, applications - Travelling sales person problem, 0/ 1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT V: NP-HARD AND NP-COMPLETE PROBLEMS (8 Periods)

NP-HARD AND NP-COMPLETE PROBLEMS- Basic concepts, non-deterministic algorithms, NP-Hard and NP-Complete classes, Cook's theorem, NP-hard scheduling Problems

(Total periods: 44)

TEXT BOOKS:

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, "Fundamentals of Computer Algorithms," Galgotia publications Pvt. Ltd, New Delhi, Second Edition ,2007.

REFERENCE BOOKS:

1. M.T.Goodrich and R. Tomassia, "Algorithm Design: Foundations, Analysis and Internet examples," John Wiley and sons, 2002.
2. S.Sridhar, "Design and Analysis of Algorithms," Oxford Press, First Edition, 2015.

II B.Tech - II Semester

14BT41201**: OBJECT ORIENTED PROGRAMMING**

(COMMON TO CSE,CSSE & IT)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Object Oriented Concepts; Basics of Java; Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling, Applets, AWT, Database Connectivity and Servlets.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Demonstrate Knowledge on:
- Object Oriented Programming concepts - classes, objects, inheritance, polymorphism, encapsulation and abstraction.
- Packages, interfaces, multithreading, exception handling, event handling.

CO2. Apply AWT and Applets to design and develop interactive Graphical User Interfaces.

CO3. Gain problem solving skills to provide effective solutions for real world problems.

DETAILED SYLLABUS:

UNIT-I: OBJECT ORIENTED THINKING: Need for OOP paradigm, OOP concepts (9 Periods)

History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting.

classes and objects: concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-II: INHERITANCE, PACKAGES AND INTERFACES (9 Periods)

Understanding Inheritance: Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, using super, Creating multi-level hierarchy, method overriding, abstract classes, using final with inheritance.

Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

Interfaces: Defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-III: EXCEPTION HANDLING AND MULTITHREADING (9 Periods)

Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Java thread model, thread life cycle, creating threads, thread priority, synchronizing threads, inter thread communication.

UNIT-IV: APPLETS, EVENT HANDLING AND AWT (9 Periods)

Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class.

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes.

The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scrollpane, dialogs, menubar, graphics, layout manager - boarder, grid, flow, card and grid bag.

UNIT-V: JDBC and SERVLETS (Periods:09)

Database Connectivity: Loading the driver, Establishing connection, Create statement, Execute query, Iterate result set, Scrollable Results, and Transactions.

Servlets: The Life Cycle of a Servlet, Using Tomcat for Servlet Development, Create and Compile the Servlet Source Code, Start Tomcat, Start a Web Browser and Request the Servlet, The Servlet API, The Javax.Servlet Package, The javax.Servlet.http Package.

(Total Periods: 45)

TEXT BOOKS:

1. Herbert Schildt, "Java the complete reference," TMH, 7th edition, 2007.
2. Timothy Budd, "Understanding Object-oriented Programming with Java", Addison-Wesley, updated edition, 2002.

REFERENCE BOOK:

1. Sachin Malhotra, Saurab Choudhary, "Programming in java," Oxford university press, 2nd edition, 2014.

II B.Tech - II Semester

14BT41501: **COMPUTER GRAPHICS**

(Common to CSE & CSSE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: A courses on "Engineering Mathematics", "Problem solving and computer programming"

COURSE DESCRIPTION: Introduction to Computer Graphics; Output Primitives; 2-D Geometric Transformations and Viewing; 3-D Geometric Transformations and Viewing; 3-D object representation; Visible Surface Detection Methods.

COURSE OUTCOMES:

After successful completion of this course, the student will be able to:

CO1. Gain knowledge on graphical interactive devices, viewing transformations, 3-D object representations and surface detection methods.

CO2. Design algorithms to generate points, lines, polygons for 2-D, 3-D objects.

CO3. Apply Transformations and Clipping algorithms for 2-D and 3-D objects.

UNIT -I: INTRODUCTION AND OUTPUT PRIMITIVES (10 periods)

Application areas of Computer Graphics, Overview of graphics systems, Video-display devices, Raster-scan systems, Random scan systems, Graphics monitors and work stations and input devices.

Output Primitives: Points and lines, Line drawing algorithms, Mid-point circle and ellipse algorithms.

Filled area primitives: Scan line polygon fill algorithm, Boundary-fill and flood-fill algorithms.

UNIT -II: 2-D GEOMETRICAL TRANSFORMATIONS AND 2-D VIEWING (10 periods)

Translation, scaling, rotation, reflection and shear transformations, homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, Viewing coordinate reference frame, Window to view-port coordinate transformation, Viewing functions, Cohen-Sutherland line clipping algorithms, Sutherland -Hodgeman polygon clipping algorithm.

UNIT -III: 3-D OBJECT REPRESENTATION (8 periods)

Polygon surfaces, Quadric surfaces, Spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces.

UNIT -IV: 3-D GEOMETRIC TRANSFORMATIONS (8 periods)

Translation, Rotation, Scaling, Reflection and shear transformations, Composite transformations.

3-D Viewing: Viewing pipeline, Viewing coordinates, Projections and clipping.

UNIT -V: VISIBLE SURFACE DETECTION METHODS (9 periods)

Classification, Back-face detection, Depth-buffer, Scan-line, Depth sorting, BSP-tree methods, Area sub-division and octree methods, Shading: Gouraud Shading, Phong shading.

(Total periods: 45)

TEXT BOOK:

1. Donald Hearn and M.Pauline Baker, "Computer Graphics C version", Pearson Education, 2006.

REFERENCE BOOKS:

1. Steven Harrington, "Computer Graphics", TMH, 1982.

2. Neuman and Sproul, "Principles of Interactive Computer Graphics", TMH, 2005.

II B. Tech. II Semester

14BT40521**: DATABASE MANAGEMENT SYSTEMS LAB**

(Common to CSE,CSSE & IT)

INT. MARKS: 25 **EXT. MARKS: 50** **TOTAL MARKS: 75**

L	T	P	C
-	-	3	2

Prerequisites: A Course on "Database Management Systems"

Course Description**:** Hands on experience on developing ER Design, DDL,DML commands, DCL and TCL Commands, Query processing using Aggregate operators, Sub-queries, Joins, Date Manipulation functions, PL/SQL concepts: Triggers, Functions, Cursors, Stored Procedures and basic Programs.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Design and implement a database schema for the sales database.

CO2. Apply normalization on sales database.

CO3. Analyze and evaluate the databases using SQL DML/DDL commands.

CO4. Develop solutions to database problems using programming PL/SQL including stored procedures, stored functions, cursors and triggers.

DESCRIPTION OF SALES DATABASE:

ABC is a company operating in the country with a chain of shopping centers in various cities. Everyday large numbers of items are sold in different shopping centers. The Sales database comprises of various tables like CUST, PROD, SALES_DETAIL, STATE_NAME with the following schemas.

CUST TABLE

Name	Type	Remark
CID	VARCHAR2(6)	PRIMARY KEY
CNAME	VARCHAR2(10)	
CCITY	VARCHAR2(8)	

PROD TABLE

Name	Type	Remark
PID	VARCHAR2(6)	PRIMARY KEY
PNAME	VARCHAR2(6)	
PCOST	NUMBER(4,2)	
PROFIT	NUMBER(3)	

SALES DETAIL

Name	Type	Remark
CID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
PID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
SALE	NUMBER(3)	
SALEDT	DATE	COMPOSITE PRIMARY KEY

STATE NAME

Name	Type	Remark
CCITY	VARCHAR2(8)	PRIMARY KEY
STATE	VARCHAR2(15)	

1. Data Retrieval

a) Write a query to display all columns of CUST table.
b) Write a query to display pname of all records. Sort all records by pname. (use order by clause)
c) Write a query to display cname and ccity of all records. Sort by ccity in descending order.
d) Write a query to display cname, ccity who lives in mysore.
e) Write a query to display cname, pname, sale, saledt for all customers.
f) Write a query to display cname who have purchased Pen.
g) Write a query to display saledt and total sale on the date labeled as sale of all items sold after 01-sep-2010.
h) Write a query to display saledt and total sale on the date labeled as sale of all items other than DVD.
i) Write a query to display cname and ccity of all customers who live in Kolkata or Chennai.

2. Use of Distinct, between, in clause, like operator, Dual

a) Write a query to display the pname and pcost of all the customers where pcost lies between 5 and 25.
b) Find the product ids in sale_detail table (eliminating duplicates).
c) Write a query to display distinct customer id where product id is p3 or sale date is '18-mar-2011'.
d) Write a query to display cname, pid and saledt of those customers whose cid is in c1 or c2 or c4 or c5.
e) Write a query to display cname, pid, saledt of those customers whose pid is p3 or sale date is '20-dec-2009'.
f) Write a query to display system date.
g) Write a query to display all records of prod table in which first and third character of pname is any character and second character is 'E'.
h) Write a query to display all cname which includes two 'A' in the name.

3. Constraints

a) Implement table level and Column level constraints like NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK.

4. Single Row Functions: DATE Function

a) Write a query to display the system date by rounding it to next month.
b) Write a query to display the system date by rounding it to next year.
c) Write a query to display the last date of the system date.
d) Write a query to display the next date of system date which is Friday.
e) Write a query to display sale date and date after 02 months from sale date.
f) Write a query to display system date, sale date and months between two dates.
g) Write a query to display the greatest date between sale date and system date, name it as BIG, also display sale date and SYSDATE.
h) Write a query to display the least date between sale date and system date name it as SMALL, also display sale date and SYSDATE.

5. Single Row Functions: Numeric and Character Function

a) Write a query to display the product name along with the rounded value of product cost for product name is "Pencil".
b) Write a query to display product cost along with MOD value if divided by 5.
c) Write a query to display cname in uppercase, lowercase, titlecase from cust table where customer name is "rohan".
d) Write a query to display all concatenated value of cname, ccity by converting cname into titlecase and ccity into uppercase.
e) Write a query to display the first 3 characters of cname**.**
f) Write a query to display the position of 'M' in the cname of the customer whose name is "SAMHITA".
g) Write a query to display the length of all customer names.
h) PAD # character in left of product cost to a total width of 5 character position.

6. Group Functions and SET Functions

i) Write a query to display the total count of customer.
j) Write a query to display the minimum cost of product.
k) Write a query to display average value of product cost rounded to 2nd decimal places.

l) Write a query to display product name with total sale detail in descending order.
m) Write a query to display product name, sale date and total amount collected for the product.
f) Write a query to display sale date and total sale date wise which was sold after "14-jul-08".
g) Write a query to display the customer name who belongs to those places whose name is having I or P.
h) Write a query to display customer name who belongs to a city whose name contains characters 'C' and whose name contains character 'A'.
i) Write a query to display the customer name who does not belong to PUNE.

7. PL/SQL basic programs

a) Write a PL/SQL program to find largest number among three. (Hint: Use Conditional Statement)
b) Write a PL/SQL program to display the sum of numbers from 1 to N using for loop, loop…end and while…loop.

8. SQL Cursor based programs

c) Write a PL/SQL program to display the costliest and cheapest product in PROD table.
d) Write a PL/SQL program which will accept PID and display PID and its total sale value i.e. sum.

9. Functions

a) Write a function that accepts two numbers A and B and performs the following operations.
   i. Addition
   ii. Subtraction
   iii. Multiplication
   iv. Division
b) Write a function that accepts to find the maximum PCOST in PROD table.

10. Procedures

a) Write a procedure that accepts two numbers A and B, add them and print.
b) Write procedures to demonstrate IN, IN OUT and OUT parameter.

11. Triggers

a) Develop a PL/SQL program using BEFORE and AFTER triggers.
b) Create a row level trigger for the PROD table that would fire for INSERT or UPDATE or DELETE operations performed on the PROD table. This trigger will display the profit difference between the old values and new values.

12. Implicit and Explicit Cursors

Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

REFERENCE BOOKS:

1. Satish Ansari, "Oracle Database 11g: Hands-on SQL and PL/SQL" PHI Publishers, 2010.
2. Pranab Kumar Das Gupta, Database Management System Oracle SQL and PL/SQL", PHI Learning Private Limited, 2009

II B.Tech - II Semester

14BT41221: **OBJECT ORIENTED PROGRAMMING LAB**

(Common to CSE, CSSE & IT)

Int. Marks: 25 **Ext. Marks: 50** **Total Marks: 75**

L T P C

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Hands-on Programming using concepts of classes, objects, inheritance, Polymorphism, String API, Exception Handling mechanisms, Threads, Applets, AWT, Swings and Database Connectivity using JDBC and Servlets.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Design and develop real time applications using applets.

CO2. Demonstrate problem solving skills using classes, objects, inheritance, runtime polymorphism, AWT and Servlets to develop web/interactive applications.

List of Programming Exercises

1: a) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant b^2 -4ac is negative, display a message stating that there are no real solutions.

b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.

2: a) Write a Java program to find the average and sum of 1st N numbers using command line arguments

b) Write a Java program to multiply two given matrices.

c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

3: a) Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes containsonly the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.

b) Write a java program to design a class using the inheritance and static that show all function of bank (withdrawl, deposit) and generate account number dynamically.

c) Write a java program to design(Implement runtime polymorphism) using abstract methods and classes

4: a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java program to make frequency count of words in a given text.

5: a) Write a java program that import the Userdefine package and access the member variable of classes that contained by the package

b) Write a java program to handle ArithmeticException, ArrayIndexOutOfBoundsException using try and multiple catch statements

c) Write a java program to throw a user defined exception called Negative, if the entered input is a negative number and to handle the exception.

6: a) Develop an applet that displays a simple message.

b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named -Compute is clicked.

7: a) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.

b) Write a Java program for handling mouse events.

8: a) Write a Java program that creates three threads. First thread displays - Good Morning for every one second, the second thread displays - Hello for every two seconds and the third thread displays - Welcome for every three seconds.

b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

9: a) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.

b) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on ata time No light is on when the program starts.

c) Write a Java program that allows the user to draw lines, rectangles and ovals.

10: a) Write an applet that computes the payment of aloan, by taking the amount of the loan, the interest rate and the number of month's values in the text fields. it takes one parameter from the browser: monthly rate as a checkbox ,if it is true, the interest is calculated per month otherwise the interest is calculated per annual.

b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

11: Create a table which should contain at least the following fields: name, password, email-id, phone number. Write a java program to connect to the database (Ex: MS-Access) and extract data from the tables and display them

12: Assume four users user1, user2, user3 and user4 having passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following.

1) Create a Cookie and add these four user ids and passwords to this Cookie, read user id and password entered in the login form.

2) If he is valid user (i.e., user-name and password match) welcome him with his name, else display "You are not an authorized user".

REFERENCE BOOKS:

1. Herbert Schildt, "The complete reference Java," TMH, 7th edition, 2007.
2. Timothy Budd, Understanding Object-oriented Programming with Java, Addison-Wesley, updated edition, 2002.
3. Sachin Malhotra, Saurab Choudhary, "Programming in java," Oxford university press, 2nd edition, 2013

III B.Tech - I Semester

14BT5HS02: **Management Science**

(Common to CSE,CSSE,IT & CE)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PRE-REQUISITES: -

COURSE DESCRIPTION:

Concepts of Management, Evolution of thought of Management, Functions of Management, Environmental Scanning, SWOT analysis, Social Responsibility of Management, Operations Management, Forecasting Methods, Work study, Method Study, Work measurement, Statistical Quality Control, Inventory Management, Marketing, Marketing functions, Human Resource Management, Job evaluation, merit rating, Theories of motivation, Project Management, CPM, PERT, Project cost analysis, Project crashing, Entrepreneurship, Entrepreneur vs Manager, Contemporary Management practices, Just-in-time, Enterprise Resource Planning, Business Process Outsourcing, Intellectual property rights and Supply chain management.

COURSE OUTCOMES:

On successful completion of this course, the student will be able to:

CO1. Employ fundamental knowledge on 'Management Thought' and 'Management of a business organization'.

CO2. Apply various Managerial concepts & contexts to attain 'Optimum Utilization of available organizational resources'.

CO3. Contribute to the group, as an individual, in accomplishing the stated objective of the business organization.

CO4. Apply gained knowledge on Management to establish and run his/her own organization, if he/she deserve to be an 'Entrepreneur'.

CO5. Imbibe contemporary practices in applying Management and exercise discernment in implementing managerial decisions for ethical, safe, and sustainable operations of the business

DETAILED SYLLABUS

UNIT - I: INTRODUCTION TO MANAGEMENT AND ORGANIZATION (9 Periods)

Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills - Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management. Basic concepts related to organization- Objectives, Procedure and Principles; Types of organizations - Merits, demerits and adoptability to modern firms.

UNIT - II: OPERATIONS MANAGEMENT (12 Periods)

Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling. Materials management objectives; Inventory - Types of inventory - Classical EOQ model - - ABC analysis - Purchase procedure - Stores management. **Marketing:** Functions of marketing - Marketing mix - Channels of distribution.

UNIT - III: HUMAN RESOURCES MANAGEMENT (HRM) (6 Periods)

Nature and scope of HRM - Functions of HRM - Role of HR Manager in an organization, Job evaluation and merit rating - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT - IV: PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (9 Periods)

Network analysis - Program evaluation and review technique (PERT) - Critical path method (CPM) - Probability of completing the project within given time - Project cost analysis - Project crashing.

Introduction to entrepreneurship - Entrepreneurial traits - Entrepreneur vs. manager - Role of entrepreneurship in economic development - Women as an entrepreneur.

UNIT - V: CONTEMPORARY MANAGEMENT PRACTICES (9 Periods)

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) - Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making. **(Total Periods:45)**

TEXT BOOKS:

1. O.P. Khanna, "Industrial Engineering and Management," Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, "Management," 6th Edition, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, "Marketing Mangement," 12th Edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, "Essentials of Management," 6th Edition, TMH, New Delhi, 2007.
3. N.D. Vohra, "Quantitative Techniques in Management," 2nd Edition, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz, "Management- A Global Perspective," 10th Edition, McGraw-Hill International.

III B. Tech. I Semester

14BT4HS02**: PROFESSIONAL ETHICS**

(Common to CSE,CSSE,IT, CE & ME)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PRE-REQUISITES: -

COURSE DESCRPTION: Engineering Ethics, Moral autonomy and Moral dilemmas - Professional and Ideal Virtues, Professional Responsibility and Moral Leadership - Engineering as Social Experimentation, Conscientiousness and Law of Engineering - Responsibilities and Rights, Whistle Blowing - Global Issues, Managerial Ethics.

COURSE OUTCOMES:

On successful completion of the course, a successful student is able to:

1. Apply the principles of ethics to solve engineering problems
2. Analyze the problems in the implementation of moral autonomy and resolve through consensus
3. Responsible to follow the codes of ethics
4. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas
5. Function as a member, consultant, Manager, Advisor and Leader in multi-disciplinary teams
6. Write reports without bias and give instructions to follow ethics

DETAILED SYLLABUS:

UNIT I

ENGINEERING ETHICS (8 Periods)

Scope and Aim of Engineering Ethics-Senses of Engineering Ethics- Variety of Moral Issues-Types of Inquiry- Moral Dilemmas- Moral Autonomy- Kohlberg's Theory, Gilligan's theory, Consensus and Controversy,

UNIT II

PROFESSIONAL IDEALS AND VIRTUES (10 Periods)

Theories about Virtues, Professions, Professionalism - characteristics, expectations, Professional Responsibility, Integrity, Self-respect, Sense of "Responsibility". Self-interest, Customs and Religion- Self-interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories- resolving moral dilemmas and moral leadership.

UNIT III

ENGINEERING AS SOCIAL EXPERIMENTATION (9 Periods)

Engineering as experimentation- Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters-Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT IV

RESPONSIBILITIES AND RIGHTS (9 Periods)

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, the bart case, employee rights and discrimination.

UNIT V

GLOBAL ISSUES (9 Periods)

Multinational corporations-Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers - Managerial ethics applied to Engineering Profession, moral leadership.

(Total Periods: 45)

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, "Ethics in Engineering," 3rd Edition, Tata McGraw-Hill, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, "Engineering Ethics," Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, "Human Values and Professional Ethics," Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, "Fundamental of Ethics for Scientists and Engineers," 1st Edition, Oxford University Press, 2001.
3. Charles F. Fledderman, "Engineering Ethics," Pearson Education, 2004.
4. R. Subramanaian, "Professional Ethics," Oxford Higher Education, 2013

III B.Tech I Semester
14BT50501**: Theory of Computation**
(Commn to CSE & IT)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: A Course on "Discrete Mathematical Structures".

COURSE DESCRIPTION: Fundamentals of computation - Finite State Automaton, Push Down automaton, Turing Machine, and decidability of problems.

COURSE OUTCOMES:

On successful completion of the course, the student will be able to

CO1. Gain Knowledge on

- Finite State Automaton
- Regular Expression
- Push Down Automaton and Turing Machine.

CO2. Develop formal proofs for models of Computation.

CO3. Apply the concepts of automata in modeling abstract devices.

DETAILED SYLLABUS

UNIT-I: FINITE AUTOMATA (9 Periods)

Finite Automata: Introduction to Finite Automata, Structural Representations, Automata and Complexity, The Central Concepts of Automata Theory, An Informal Picture of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata with epsilon-Transitions.

UNIT-II: REGULAR EXPRESSIONS (9 Periods)

Regular Expressions: Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expression, Proving Languages not to be Regular, Closure Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT-III: CONTEXT-FREE GRAMMARS AND PUSH DOWN AUTOMATA (10 Periods)

Context-Free Grammars: Context-Free Grammars, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages, Normal Forms for Context-Free Grammars, The Pumping Lemma for Context-Free Languages.

Push Down Automata: Definition of the Pushdown Automaton, The Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.

UNIT-IV: TURING MACHINES AND LINEAR BOUNDED AUTOMATA (8 Periods)

Turing Machines: Types of Computational Problems, The Turing Machine, Programming Techniques for Turing Machine, Extensions to the Basic Turing Machine, Restricted Turing Machines, Turing Machines and Computers, The Model of Linear Bounded Automaton.

UNIT-V: UNDECIDABILITY (9 periods)

Undecidability: Language that is not Recursively Enumerable, An Undecidable Problem, Undecidable Problems About Turing Machines, Post's Correspondence Problem.

(Total: 45 periods)

TEXT BOOK:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D Ullman, "Introduction to Automata Theory, Languages and Computation", Third Edition, Pearson, 2011.

REFERENCE BOOKS:

1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science: Automata Languages and Computation", Third Edition, Phi Learning, 2009.
2. John C Martin, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2009.

III B. Tech (CSE) - I Semester

14BT50502**: UNIX INTERNALS**

(Common to CSE & IT)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES : A Course on "Operating Systems".

COURSE DESCRIPTION:

Concepts on internal structure of Unix Operating Systems, Utilities, Shell Programming, Process, Signals, File Locking to provide Security, Inter process Communications and Socket Programming for client server Interaction.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

CO1: Gain knowledge on

- Internal Structure of UNIX Operating System,
- Utilities and shell programming
- Processes management and handling signals,
- File Locking
- Sockets and IPC.

CO2: Analyze and identify the system calls to interact with Unix Environment.

CO3: Implement UNIX applications using Shell Scripting for simple problems and C programming for IPC and Sockets.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO UNIX AND UTILITIES (9 periods)

General Review of the System: History of UNIX, Architecture of Unix, User Perspective.

The Buffer Cache: Headers, Buffer Pool, Scenarios for Retrieval of a Buffer, Reading and Writing Disk Blocks, Advantages and Disadvantages.

Utilities: General Purpose Utilities, File Handling Utilities, Security by File Permissions, Process Utilities, Disk Utilities, Networking Commands.

UNIT-II: SHELL PROGRAMMING (8 periods)

Text Processing Utilities and Backup Utilities. Shell, Shell Responsibilities, Types of Shell, Pipes and I/O Redirection, Shell as a Programming Language, Shell Syntax: Variables, Conditions, Control Structures, Functions, Commands, Command Execution, Shell Scripts.

UNIT-III: FILE SYSTEM STRUCTURE AND SYSTEM CALLS (10 periods)

Introduction to Unix File System, File Descriptors, Inode Representation, Super Block, System Calls and Library Functions.

Low Level File Access: open, read, write, close, lseek, stat, fstat, lstat, ioctl, umask, dup and dup2. The Standard I/O Library: fopen, fread, fwrite, fclose, fflush, fseek, fgetc, fputc, fgets. Formatted Input and Output: printf, fprintf, sprint, scanf, fscanf, and sscanf. File and Directory Maintenance: chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir.

Scanning directories: opendir,readdir,telldir,seekdir,rewinddir,closedir.

UNIT-IV: PROCESS, SIGNALS AND FILE LOCKING (9 periods)

Process, Process Identifiers, Process Structure,Zombie Processes, Orphan Process,fork, vfork, exit, wait, waitpid, exec, Signals functions, Unreliable Signals, Interrupted System Calls, kill, raise, alarm, pause, abort, system, sleep Functions, Job Control Signals.

Data Management: Managing Memory: malloc, free, realloc, calloc, File Locking: Creating Lock Files, Locking Regions, Use of Read and Write with Locking, Competing Locks, Other Lock Commands- Advisory Locking,Mandatory Locking; Deadlocks.

UNIT-V: INTER-PROCESS COMMUNICATION AND SOCKETS (9 periods)

Pipe, Process Pipes, The Pipe Call, Parent and Child Processes, Named Pipes: FIFOs, Semaphores: semget, semop, semctl, Message Queues: msgget, msgsnd, msgrcv, msgctl, Shared Memory: shmget, shmat, shmdt, shmctl, IPC Status Commands. Socket, Socket Connections - Socket Attributes, Socket Addresses, socket, connect, bind, listen, accept, Socket Communications.

(Total periods: 45)

TEXT BOOKS:

1. Neil Matthew, Richard Stones, "Beginning Linux Programming," Wiley Dreamtech, 2004.
2. Maurice J. Bach, "The Design of the Unix Operating System," Pearson Education, 2002.

REFERENCE BOOKS:

1. Sumitabha Das, "Your Unix The Ultimate Guide," TMH, 2007.
3. W. Richard. Stevens, "Advanced Programming in the UNIX Environment," 2nd edition, Pearson Education, 2005.

III B.Tech - I Semester

14BT51202: **SOFTWARE ENGINEERING**

(Common to CSE,CSSE & IT)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Concepts of Software Engineering, software process models: Conventional and agile process models, software requirements engineering process, system analysis, architectural design, User interface design and re-engineering, software testing, risk and quality management.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Demonstrate knowledge in
- Fundamental concepts of software engineering.
- Process models.
- Software development life cycle.

CO2. Analyze software requirements and process models required to develop a software system.

CO3. Design and develop a quality software product using design engineering principles.

CO4. Demonstrate skills in applying risk and quality management principles for effective management of software projects.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO SOFTWARE ENGINEERING (9 Periods)

A Generic view of process: Evolving role of software, Software myths, Software engineering- A layered technology, A process framework, CMMI, Process patterns, Process assessment, Personal and team process models.

Process models: Waterfall model, Incremental process models, Evolutionary process models, the unified process, agile process models-Scrum, agile modeling.

UNIT II: REQUIREMENTS ENGINEERING (9 Periods)

Functional and non-functional requirements, the software requirements document, Requirements specifications, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management.

System modeling: Context models, Interaction models, Structural models, Behavioral models, Model driven engineering

UNIT III: DESIGN ENGINEERING (9 Periods)

Creating an architectural design: Design process and design quality, Design concepts, Software architecture, Data design, Architectural styles and patterns, Architectural design

Performing user interface design: The golden rules, User interface analysis and design, Interface analysis, Interface design steps, Re-engineering.

UNIT IV: SOFTWARE TESTING (10 Periods)

Testing strategies: A strategic approach to software testing, Strategic issues, Test strategies for conventional software, Test strategies for object oriented software , Validation testing, System testing, The art of debugging.

Testing tactics: Software testing fundamentals, white box testing, Basis path testing, Control structure testing, Black box testing, Object oriented testing methods.

UNIT V: RISK AND QUALITY MANAGEMENT (8 Periods)

Risk management: Reactive and proactive risk strategies, Software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM plan.

Quality management: Quality concepts, Software quality assurance, Software reviews, Formal technical reviews, Formal approaches to SQA, Statistical software quality assurance, Software reliability.

(Total Periods: 45)

TEXT BOOKS:

1. Roger S. Pressman, "Software Engineering, A practitioner's Approach", McGraw-Hill International Edition, 6th edition, 2010.
2. Ian Sommerville, "Software Engineering", Pearson Education, 9th edition, 2011.

REFERENCE BOOKS:

1. K. K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, 3rd edition, 2007.
2. Shely Cashman Rosenblatt, "Systems Analysis and Design", Thomson Publications, 6th edition, 2006.

III B.Tech - I Semester

14BT51501**: OPERATING SYSTEMS**

(Common to CSE & CSSE)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

Prerequisites: A course on "Computer Organization"

COURSE DESCRIPTION:

Operating systems operations, scheduling; Critical section problem, deadlocks; Paging, segmentation; File Concept, Disk scheduling;
I/O interface, concepts of protection.

COURSE OUTCOMES:

Onsuccessful successful completion of the course, the student will be able to:

CO1. Gain knowledge on Operating system operations, services, I/O management and protection.

CO2. Analyze

- CPU scheduling algorithms
- Synchronization issues
- Disk scheduling algorithms
- Memory allocation algorithms
- Page replacement algorithms
- File and Directory maintenance

DETAILED SYLLABUS:

UNIT I: OPERATING SYSTEMS OVERVIEW AND PROCESS MANAGEMENT (9 Periods)

Operating systems operations, Distributed systems, Special purpose systems, Operating systems services, Systems calls, Operating system structure.

Process Management: Process scheduling, Operations on process, Inter process communication, Multi threading models, Threading issues, Scheduling criteria, Scheduling algorithms - First come first served, Shortest-job-first, Priority, Round-robin, Multilevel queue, Multilevel feedback queue.

UNIT II: SYNCHRONIZATION AND DEADLOCKS (10 Periods)

Synchronization: The critical-section problem, Peterson's Solution, Synchronization hardware, Semaphores, Classic problems of synchronization, Monitors.

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock detection, Deadlock avoidance, Deadlock recovery.

UNIT III: MEMORY MANAGEMENT (9 Periods)

Memory-Management Strategies: Swapping, Contiguous memory allocation, Paging, Structure of the page table, Segmentation.

Virtual Memory Management: Demand paging, Copy-on-Write, Page replacement, Allocation of frames, Thrashing.

UNIT IV: STORAGE MANAGEMENT (8 Periods)

File System: File Concept, Access methods, Directory structure, File system structure, File system implementation, Directory implementation, Allocation methods.

Secondary Storage Structure: Disk structure, Disk attachment, Disk scheduling, Swap-space management, Stable-storage implementation, Tertiary storage structure.

UNIT V: I/O SYSTEMS AND PROTECTION (9 Periods)

I/O Systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem.

Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights.

(Total periods: 45)

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles," Seventh Edition, Wiley India Edition, 2011.

REFERENCE BOOKS:

1. William Stallings, "Operating Systems, Internals and Design Principles," Seventh Edition, Pearson Education, 2013.
2. Andrew S. Tanenbaum, "Modern Operating Systems," Third Edition, PHI, 2009.

III B. Tech. - I Semester

14BT50431**: MICROPROCESSORS AND INTERFACING**

(Common to CSE,CSSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: Courses on "Digital Logic Design"and "Computer Organization".

COURSE DESCRIPTION:

INTEL 8086 & 8031/51- Architectures; Instruction set; Programmable Interfacing Concepts; Serial Communication; Advanced peripheral Interfacing; Applications.

COURSE OUTCOMES: After completion of the course, students should be able to

CO1. Gain potential knowledge in
- Internal hardware details of Intel 8086,8051
- Interfacing various peripherals to build stand alone systems

CO2. Critically analyze various peripherals and interfacing techniques

CO3. Design and develop Microcomputer based system to suit a particular application.

CO4. Choose suitable Hardware and software components of a system that work together to solve engineering problems.

DETAILED SYLLABUS

UNIT I - INTEL 8086 ARCHITECTURE AND PROGRAMMING (11 periods)

Evolution of Microprocessors, Architecture of 8086 microprocessor, register organization - special functions of general purpose registers, Memory segmentation, Pin description, Minimum and Maximum mode operation of 8086, timing diagram, Addressing modes, Assembler directives, Instruction set of 8086, , Simple programs , Procedures and Macros.

UNIT II - MEMORY INTERFACING, PRIORITY INTERRUPT CONTROLLER AND DMA (7 periods)

Memory (static RAM and EPROM) and I/O interfacing, 8257 (DMA controller), Interrupt structure, Interrupt vector table, 8259 Programmable Interrupt Controller (PIC), importance of cascading of PICs.

UNIT III - 8255A AND ITS APPLICATIONS (7 periods)

Types of data communication - serial and parallel, Methods of parallel data transfer, 8255A (programmable peripheral interface) - Internal block diagram, Control words and initialization, interface of I/O devices: key board, stepper motor.

UNIT IV - SERIAL DATA COMMUNICATION AND STANDRADS (8 periods)

Types of serial data transmission - synchronous and asynchronous, 8251 (USART) - architecture, Simple programs for sending and receiving characters with an 8251 (polling & interrupt basis), serial communication standards- RS232C. RS232C to TTL and TTL to RS232C conversion.

UNIT V - 8031/51 Microcontroller Architecture and Programming (12 periods)

Microcontrollers Vs. general purpose processors, Criterion for choosing microcontroller, 8051 Architecture-Internal and external memories, Timers/Counters, Serial communication, Interrupts. Addressing modes, Instruction set of 8051, simple programs using 8051, Timer Programming, Serial port programming, Interrupts programming.

(Total Periods: 45)

TEXT BOOKS:

1. Douglas V.Hall, "Microprocessors and Interfacing: Programming and Hardware," revised 2nd Edition, TMH, 2006.
2. Mazidi and Mazidi, "The 8051 Microcontroller and Embedded Systems," PHI, 2000.

REFERENCE BOOKS:

1. A.K. Ray & K.M.Bhurchandi, "Advanced Microprocessors and Peripherals- Architecture, Programming and Interfacing," TMH, 2002.
2. Yu-cheng Liu, Glenn A. Gibson, "Microcomputer systems: The 8086/8088 Family architecture, Programming and Design," PHI, 2006.
3. Kenneth J. Ayala, "The 8051 Microcontroller-Architecture, Programming & Applications," Cengage learning, 3rd Edition, 2004.

III B. Tech (CSE) - I Semester

14BT50521: **OPERATING SYSTEMS and UNIX LABORATORY**

Int. Marks: 25; **Ext. Marks: 50;** **Total Marks: 75**

L	T	P	C
-	-	3	2

Prerequisites: Courses on "Operating Systems" and "Unix Internals"

OPERATING SYSTEMS LABORATORY:

COURSE DESCRIPTION:

Hands on practical experience on implementation of CPU scheduling algorithms; Bankers algorithm for Deadlock avoidance and detection; multi programming; page replacement algorithms and file allocation strategies.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1.Implement algorithms for

a. CPU Scheduling
b. Deadlock handling Mechanisms
c. Memory Management
d. File allocation

PRACTICAL EXCERCISES:

1. Implement the following CPU scheduling algorithms:

a) FCFS b) Round Robin (Time Quantum=3) c) SJF d) Priority

Use the following set of processes, compare the performance of above scheduling policies.

Process Name	Arrival Time	Processing Time	Priority (lower number has highest priority)
A	0	3	2
B	1	5	1
C	3	2	3
D	9	5	4
E	12	5	5

2. Implement Bankers algorithm for Deadlock avoidance and detection.

Consider number of resources are 03 and Jobs are 05.

The resource types A, B and C are 10, 5 and 7 instances are available respectively.

Process	Allocation	Max
	A B C	A B C
P0	0 1 0	7 5 3
P1	2 0 0	3 2 2
P2	3 0 2	9 0 2
P3	2 1 1	2 2 2
P4	0 0 2	4 3 3

Find the safe sequence. If Max. request of any one process is changed, detect whether deadlock is occurred or not.

3. Implement multi programming with fixed number of tasks and multi programming with variable number of tasks. Considering the size of the memory is 1000K. Operating system size is 200K. Processes are P1, P2, P3 with sizes 150K, 100K and 70K respectively.

4. Write a Program to simulate the following page replacement algorithms

a) FIFO b) LRU

Consider no. of Frames are three. Reference string is

2 3 2 1 5 2 4 5 3 2 4 2 4 5 3

5. Implement the following file allocation strategies

a) Sequential b) Indexed c) Linked

Consider the disk consists 20 blocks and file consists 5 records.

UNIX LABORATORY:

Course Description:

This Course Deals with the Practice on Utilities, shell Programming, System calls, Environment variables, working with Inter Process Communication, File System and Socket Programming

Course Outcomes:

On successful completion of this course, the students will be able to:-

1. Understand the usage of low level Unix commands, low level system calls, function calls and API.
2. Analyze the file system structure of the Unix operating system.
3. Gain knowledge on process management in an operating system.
4. Handle security measures at file and directory levels.

Practical Excercises

Exercise 1

a) Create two files source.txt and dest.txt using vi editor which contains some text and practice the following commands on that files.

cat, tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff,cp, mv, ln, rm, unlink, tty, script, clear, date, cal, mkdir, rmdir, du, df, find, umask, ps,who, w.

Exercise 2

a) Write a shell script that takes a command line argument and reports on whether it is directory, a file, or something else.

b)Write a shell script that accepts one or more file names as arguments and converts all of them to uppercase, provided they exist in the current directory.

Exercise 3

a) Write a shell script that accepts a file name,starting and ending line numbers as arguments and displays all the lines between the given line numbers.

b)Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

Exercise 4

a) Write an interactive file-handling shell program. Let it offer the user the choice of copying, removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.

b) Write a shell script that takes a login name and reports when that person logs in

c) Write a shell script to read two file names and it should check whether the two file contents are same or not. If they are same then second file should be deleted.

Exercise 5

a) Simulate Uniq command using C.

b) Simulate grep command using C.

Exercise 6

Write a C program that takes one or more file or directory names as input and reports the following information on the file:

i)File type

ii)Number of links

iii)Read, write and execute permissions

iv)Time of last access

(Note : Use stat/fstat system calls)

Exercise 7

a) Write a C Program to display Environment variables.

b) Write a C Program to implement Different types of exec functions.

Exercise 8

a) Write a Program to handle the Signals like SIGINT, SIGQUIT, and SIGFPE.

b) Write a Program to create a Zombie Process.

c) Create a Process using fork() and display Child and Parent Process Id's.

Exercise 9

Implement the Following IPC Forms

a) FIFO

b) PIPE

Exercise 10

Write a program to

a) Create the semaphores

b) Set values to semaphores

c) Get the values from the semaphores

d)Remove semaphore

Exercise 11

a)Implement file transfer using Message Queue form of IPC

b)Write a program to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use semaphores to avoid race conditions

Exercise 12

Perform client and server socket Programming for exchanging of data Using System calls.

REFERENCE BOOKS:

1. Sumitabha Das, "Your Unix The Ultimate Guide," Tata McGraw Hill, 2007.
2. B.A. Forouzan & R.F. Giberg, "Unix and Shell Programming," Thomson Learning.
3. Richard Stevens, "Advanced UNIX Programming," 2ed, Pearson Education.
4. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", Seventh Edition, Wiley India Edition, 2006.

III B.Tech. I Semester

14BT50424: **MICROPROCESSORS AND INTERFACING LAB**

(Common to CSE,CSSE &IT)

INT. MARKS: 25 **EXT. MARKS: 50** **TOTAL MARKS: 75**

L	T	P	C
-	-	3	2

Prerequisites: Courses on "Digital logic design" and "Microprocessors and Interfacing"

COURSE DESCRIPTION:

Assembly language Programming for Intel 8086 & 8051; Interfacing standard peripherals & Programming-DAC, Stepper Motor, ADC, Logic Controller, Keyboard, Seven Segment Display.

Course Outcomes:

On successful completion of the course students will be able to:

CO1.Analyze various programming alternatives & interfacing methods to build a typical microcomputer based system.

CO2. Design and develop microcomputer based system to solve various problems

List of Lab Experiments:

I Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

II Interfacing with 8086

1. Stepper motor
2. Logic controllers
3. A/D and D/A converter
4. Seven segment display
5. Keyboard interfacing

III Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory
3. Programs using special instructions like SWAP, bit/byte, set/ reset etc.

III- B. Tech II semester

14BT5HS01 **: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY**

(Common to CSE,CSSE, IT,CE & ME)

Int. Marks: 30;	**Ext. Marks: 70; Total**	**Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PRE-REQUISITE: Nil

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES: On successful completion of the course a successful student is able to

CO1 :Acquire Knowledge in

- Tools and concepts of Micro Economics.
- Basic Principles and concepts of Accountancy.
- Provides life skills for effective utilization of scarce resources.
- Financial Accounting.
- Using advanced tools like tally and SAP.
- Significance of Economics and Accountancy

CO2 Develop skills in analyzing problems for

a) Managerial decisions of an organization.
b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.

CO 3 Develop effective communication in Business and Accounting transactions.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS: (9 Periods)

Definition, Nature and Scope of Managerial Economics. Demand: Determinants of demand - Demand function - Law of demand, assumptions and exceptions - Elasticity of demand -Types of elasticity of demand -Demand forecasting and methods of demand forecasting, Supply- Determinants of Supply and Supply function.

UNIT - II : THEORY OF PRODUCTION AND COST ANALYSIS: (9 Periods)

Production Function: Isoquants and Isocosts - Input-output relationship - Law of returns. Cost Concepts: Total, Average and Marginal Cost - Fixed vs. Variable costs -Opportunity Costs Vs Outlay Costs- Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs- Avoidable Costs Vs Unavoidable Costs - Break Even Analysis (BEA)-Assumptions, Merits and demerits - Determination of Break Even Point (Simple problems).

UNIT - III : INTRODUCTION TO MARKETS AND PRICING: (9 Periods)

Market Structure: Types of Markets - Features of perfect competition - Monopoly and monopolistic competition - Price and Output determination in perfect competition and monopoly. Pricing : Objectives and policies of pricing - Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - Market penetration - Market skimming - Block pricing - Peak load pricing - Cross subsidization. Capital: Significance - Types of capital - Sources of Capital.

UNIT - IV : INTRODUCTION AND PRINCIPLES OF ACCOUNTING: (9 Periods)

Accountancy: Introduction - Concepts - Conventions - Accounting Principles - Double Entry Book Keeping - Journal - Ledger - Trial Balance (Simple problems).

UNIT - V : FINAL ACCOUNTS: (9 Periods)

Introduction to Final Accounts - Trading account - Profit and Loss account and Balance Sheet with simple adjustments (Simple problems).Computerization of Accounting System : Manual Accounting Vs Computerized Accounting - Advantages and Disadvantages of Computerized Accounting.

(Total periods: 45)

TEXT BOOKS:

1. A.R. Aryasri, "Managerial Economics and Financial Analysis," Tata Mc- Graw Hill, New Delhi, 3rd Edition, 2007.
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, "Managerial Economics," S. Chand and Company, New Delhi, 2nd Edition, 2010.

REFERENCE BOOKS:

1. Vershaney and Maheswari, "Managerial Economics," Sultan Chand and Sons,New Delhi, 19th Edition, 2005.
2. H. Craig Petersen and W. Cris Levis, "Managerial Economics," Pearson Education, 4th Edition, 2009
3. Lipsy and Chrystel, "Economics," Oxford University Press, New Delhi, 12th Edition, 2011.
4. S.P. Jain and K.L. Narang, "Financial Accounting," Kalyani Publishers, Ludhiana, 6th Edition, 2002.

III B. Tech. II-Semester

14BT60501**: OBJECT ORIENTED ANALYSIS AND DESIGN**

(Common to CSE,CSSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: Courses on "Software Engineering" and "Object Oriented Programming".

COURSE DESCRIPTION: Introduction to UML, basic structural modeling, advanced structural modeling, class and object diagrams, basic behavioral modeling, advanced behavioral modeling, architectural modeling.

COURSE OUTCOMES:

On successful completion of the course student will be able to

CO1: Gain knowledge on principles of Object Oriented analysis, design through UML Diagrams.

CO2: Analyze the concepts of high level & low level software design.

CO3: Draw UML models for real time software applications.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO UML, BASIC STRUCTURAL MODELING (11 periods)

Introduction to UML: Importance of modeling, Principles of modeling, Object Oriented Modeling, An overview of UML, conceptual model of the UML, Architecture, Software Development Life Cycle.

Basic Structural Modeling

Classes-Terms and concepts, Common modeling techniques, Relationships-modeling simple dependencies, single inheritance and structural relationships, common Mechanisms, and Diagrams.

UNIT-II: ADVANCEDSTRUCTURAL MODELING, CLASS AND OBJECT DIAGRAMS (7 periods)

Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Instances.

CLASS AND OBJECT DIAGRAMS

Terms and concepts, modeling techniques for Class Diagram-modeling Simple collaboration, Logical database Schema, Forward and reverse engineering, Introduction to Object Diagrams.

Unit-III: BASIC BEHAVIORAL MODELING (9 periods)

BASIC BEHAVIORAL MODELING-I

Interactions-Terms and concepts, modeling a flow of control, Interaction diagrams-terms and concepts, modeling flows of control by time ordering and control by organization, Forward and reverse engineering.

BASIC BEHAVIORAL MODELING-II

Use cases-terms and concepts, modeling the behavior of the element, Use case Diagrams-terms and concepts, modeling the context of a system, requirement of a system, Forward and reverse engineering, Activity Diagrams-terms and concepts, modeling a workflow, modeling an operation, Forward and reverse engineering.

Unit -IV: ADVANCED BEHAVIORAL MODELING (9 periods)

Events and signals-modeling a family of signals and exceptions, state machines-modeling the lifetime of an object, Introduction to Processes and Threads, time and space-modeling timing constraints, distribution of objects and objects that migrate, state chart diagrams-modeling reactive objects, Forward and reverse engineering.

Unit-V: ARCHITECTURAL MODELING (9 periods)

Component-Terms and concepts, modeling executables and libraries, modeling tables, file and documents, modeling an API, Deployment-modeling processors and devices, modeling the distribution of components, Component diagrams-modeling source code, executable release, physical database, adaptable Systems, Forward and reverse engineering, Deployment diagrams-modeling an embedded systems, Client/server System, fully distributed systems, Forward and reverse engineering.

(Total periods: 45)

TEXT BOOK:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide," 2nd edition, Pearson Education, 2009.

REFERENCE BOOKS:

1. Magnus Penker, Brian Lyons, David Fado, "Hans-Erik Eriksson," UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd., 2006.
2. Pascal Roques, "Modeling Software Systems Using UML2," WILEY-Dreamtech India Pvt. Ltd, 2004.

III B.Tech - II Semester

14BT51201**: COMPUTER NETWORKS**

(Common to CSE & CSSE)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on "Computer Organizations" and "Operating Sysems"

COURSE DESCRIPTION: Introduction to Computer Networks; The Physical Layer; The Data Link Layer; The Medium Access Sub layer; The Network Layer; The Transport Layer; The Application Layer; Network Security.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Demonstrate knowledge on :
- concepts of computer networks
- functionality of reference models layers
- 3G Mobile Phone Networks, 802.11

CO2. Analyze the issues in data link layer by using error detection and correction techniques, medium access sub layer by channel allocation schemes and transport layer by connection management schemes.

CO3. Acquire problem solving skills to assess the routing of the packet by selecting the appropriate routing algorithms.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND PHYSICAL LAYER (9 Periods)

Uses of Computer Networks, Network Hardware, Network Software, Reference Models: OSI, TCP/IP, Example Networks: Internet, 3G Mobile Phone Networks, 802.11.

Guided Transmission Media, Wireless Transmission.

UNIT-II: DATA LINK LAYER AND MEDIUM ACCESS SUBLAYER (10 Periods)

Data Link Layer Design Issues, Error detection and correction-CRC, Hamming codes, Elementary Data Link Protocols, Sliding Window Protocols. Channel Allocation problem, Multiple Access protocols: ALOHA, CSMA, CSMA/CD protocols, Collision free protocol, Limited contention protocol, Ethernet, DLL Switching.

UNIT-III: NETWORK LAYER (10 periods)

Network Layer Design Issues, Routing Algorithms: Shortest path, Flooding, Distance vector, Hierarchical, Broadcast, Multicast and Any cast, Congestion Control Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet

UNIT-IV: TRANSPORT LAYER (8 periods)

Transport Service, Elements of transport protocol, Internet Transport layer protocols: UDP, TCP;

UDP - Introduction, Remote Procedure Call, Real-Time Transport Protocol

TCP - Introduction, Service Model, Protocol, Segment Header, Connection Establishment, Connection Release, Connection Management Modeling, Sliding Window, Timer Management, Congestion Control, The Future of TCP.

UNIT-V: APPLICATION LAYER AND NETWORK SECURITY (8 periods)

Domain name system (DNS), Electronic Mail, World Wide Web: Architectural Overview, Dynamic Web Document, HTTP. Introduction to Network Security: Cryptography - Substitution Techniques, Transposition Techniques, One-Time Pads.

(Total Periods: 45)

TEXT BOOK:

1. Andrew S. Tanenbaum and David J. Wetherall, "Computer Networks", Pearson Education, 5th edition, 2012.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw-Hill, 4th edition, 2006.
2. James F. Kurose and Keith W. Ross, "Computer Networking A Top-Down Approach Featuring the Internet", Pearson Education, 2nd edition, 2003.

III B.Tech - II Semester

14BT61202**: WEB PROGRAMMING**

(Common to CSE,CSSE & IT)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hyper Text Markup Language (HTML); Features of HTML5; Cascading Style Sheets (CSS); JavaScript; JQuery; Hypertext Preprocessor (PHP); MySQL; Extensible Markup Language (XML); Asynchronous Java Script and XML (AJAX).

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Demonstrate knowledge on web technologies : HTML, HTML5, CSS, JavaScript, JQuery, XML, AJAX, PHP and MySQL database.

CO2. Design and develop web applications using HTML, CSS, JavaScript, JQuery, XML, AJAX and PHP.

CO3. Apply PHP and MySQL database concepts for developing interactive, dynamic and scalable web applications.

CO4. Gain problem solving skills to develop enterprise web applications.

DETAILED SYLLABUS:

UNIT-I: HTML **(11 Periods)**

Introduction: Fundamentals of HTML, Working with Text, Organizing Text in HTML, Working with Links and URLs, Creating Tables, Working with Images, Canvas, Forms, Frames and Multimedia.

HTML5: Introduction, HTML5 Document Structure, Creating Editable Content, Checking Spelling Mistakes, Exploring Custom Data Attributes, Client-Side Storage, Drag and Drop Feature, Offline Web Applications, Web Communications, Cross-Document Messaging and Desktop Notifications.

UNIT-II: CSS AND JAVASCRIPT: **(10 Periods)**

CSS: Introduction, CSS Selectors, Inserting CSS in an HTML document, Backgrounds, Fonts, and Text Styles, Creating Boxes, Displaying, Positioning and Floating Elements, Features of CSS3.

JAVASCRIPT: Overview of JavaScript, JavaScript Functions, Events,

Image Maps and Animations, JavaScript Objects, Working with Browser and Document Objects, JQuery - Introduction, JQuery Selectors, Events, Methods to access HTML elements and attributes.

UNIT-III: INTRODUCTION TO PHP **(7 periods)**

Introduction, Data Types, Variables, Constants, Expressions, String Interpolation, Control Structures, Functions, Arrays, Embedding PHP Code in Web Pages, Object Oriented PHP.

UNIT-IV: PHP AND MYSQL **(7 periods)**

PHP and Web Forms, Sending Form Data to a Server, Working with Cookies and Session Handlers, PHP with MySQL - Interacting with the Database, Prepared Statement, Database Transactions.

UNIT-V: XML AND AJAX **(10 periods)**

XML: Introduction, Structure of XML Document, Document Type Definition, XML Namespaces, XML Schema, Working with DOM and SAX Parser, Working with XSLT.

AJAX: Overview, Exploring AJAX, XMLHTTP Request object.

(Total Periods: 45)

TEXT BOOKS:

1. Kogent Learning Solutions Inc, "HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery," Dreamtech Press, 1st edition, 2011.
2. W. Jason Gilmore, "Beginning PHP and MySQL," APress, 4th Edition, 2011.

REFERENCE BOOKS:

1. Thomas A. Powell, "The Complete Reference: HTML and CSS," Tata McGraw Hill, 5th edition, 2010.
2. Andrea Tarr, "PHP and MySQL," Willy India, 1st Edition, 2012.

III B.Tech - II Semester

14BT71507: **SOFTWARE PROJECT MANAGEMENT**

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PRE-REQUISITES: A course on "Software Engineering"

COURSE DESCRIPTION:

Conventional Software Management ;Evolution of Software Economics; Improving Software Economics; Lifecycle Phases; Artifacts of the Process; Workflow of the Process; Checkpoints of the Process; Software Economics; Iterative Process Planning; Project Organization and Responsibilities; Process Automation ; Project Control and Project Instrumentation; Case study(CCPDS-R)

COURSE OUTCOMES

On successful completion of the course, the student will be able to:

CO1.Gain knowledge on software effort estimation techniques, life cycle phases, project control and instrumentation.

CO2.Analyze the major and minor milestones, artifacts and metrics from management and technical perspective

CO3.Design and develop software product using conventional and modern principles of software project management.

CO4.Adopt team effectiveness through Work Breakdown Structures by optimal cost and schedule estimates

DETAILED SYLLABUS

UNIT - I: SOFTWARE MANAGEMENT RENAISSANCE (8 periods)

Conventional software management: The waterfall model, conventional software Management performance.

Evolution of software economics: Software Economics, pragmatic software cost estimation.

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT - II: LIFE CYCLE PHASES (7 periods)

Conventional and Modern Software Management:

Principles of Modern software engineering, principles of modern software management, transitioning to an iterative process.

Life Cycle Phases: Engineering and Production Stages, Inception, Elaboration, construction, transition phases.

UNIT - III: ARTIFACTS OF THE PROCESS, WORKFLOWS OF THE PROCESS (9 periods)

ARTIFACTS OF THE PROCESS:

The Artifact Sets, Management Artifacts, Engineering Artifacts, Pragmatic Artifacts.

Model Based Software Architectures:

Architecture- Management Perspective, Technical Perspective.

Workflows of the Process:

Software Process Workflows, Iteration Workflows

UNIT - IV: CHECKPOINTS OF THE PROCESS, PROJECT ORGANIZATIONS AND RESPONSIBILITIES, PROCESS AUTOMATION (10 periods)

Checkpoints of a process: Major Milestones, Minor Milestones, Periodic Status Assessments.

Iterative Process Planning: Work Breakdown Structures, Planning Guidelines, the Cost and Schedule Estimating Process, Pragmatic Planning

Project Organizations and Responsibilities: Line of Business Organizations, Project organizations, Evolution of Organizations

Process Automation: Tools- Automation Building blocks, The Project Environment.

UNIT-V:PROJECT CONTROL AND PROCESS INSTRUMENTATION, TAILORING THE PROCESS, CCPDS-R(CASE STUDY) (11 periods)

Project control and process Instrumentation: The Seven Core Metrics, Management Indicators, Quality Indicators, Lifecycle Expectations, Pragmatic Software Metrics Automation

Tailoring the Process: Process Discriminants, Next generation cost models, Modern Software Economics

CCPDS-R Case Study: Context for Case Study, Common Subsystem Overview, Process Overview, Demonstration-Based Assessment, Core Metrics **(Total periods : 45)**

TEXT BOOK :

1. Walker Royce, "Software Project Management", Pearson Education, 1998.

R**EFERENCE BOOKS :**

1. Bob Hughes and Mike Cotterell, "Software Project Management", Tata McGraw- Hill Edition,2006.
2. Joel Henry, "Software Project Management", Pearson Education,2003.

III B.Tech. II Sem

14BT6HS01: **BANKING AND INSURANCE**

(OPEN ELECTIVE)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

Pre Requisite: A course on "Managerial Economics and Principles of Accountancy"

COURSE DESCRIPTION: Origin and growth of Banking, functions and importance, RBI; Debtor and Creditor relationship, Types of Accounts, Loans and Advances; e-payment, e-cash ,NEFT, RTGS, Credit and Debit cards; Insurance elements and risk; LIC, GIC, IRDA.

COURSE OUTCOMES: On sucessful completion of the course a successful student is able to

CO 1 Acquire Knowledge in

- Tools and concepts of Banking and Insurance.
- Basic Principles and concepts of Insurance and Banking.
- Provides life skills for effective utilization of Banking and Insurance facilities.
- e-fund transfers, e-payments and e-business models.

CO 2 Develop analytical skills in understanding problems pertaining to

- Online banking and e - payments..
- Risk Management through insurance benefits the society at large.
- money management by leveraging on technology, banking and insurance services.

DETAILED SYLLABUS:

UNIT - I : INTRODUCTION TO BANKING: **(9 Periods)**

Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT - II : BANK-CUSTOMER RELATIONSHIP: **(9 Periods)**

Debtor-creditor relationship, anti money laundering, products or services, payment and collection of cheques and other negotiable

instruments. Accounts - Types of accounts, procedure for opening and closing an account. Loans and Advances- principles of lending, types of loans,

UNIT - III : BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM: **(9 Periods)**

Features, types of e-payment system, e-cash ,NEFT,RTGS, Electronic purses, Credit and Debit cards. Business models- B2B, B2C, C2C, and B2G.

UNIT - IV : INTRODUCTION TO INSURANCE: **(9 Periods)**

Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT - V : INSURANCE OVERVIEW: **(9 Periods)**

Principles of insurance, insurance types, LIC & GIC insurance contract- nature, elements, functions, IRDA, Insurance Players in India.

(Total periods : 45)

TEXT BOOKS:

1. A.V. Ranganadha Chary, R.R. Paul- "Banking and Financial system," Kalyani Publisher, New Delhi, 2nd Edition.
2. P.K.Gupta- "Insurance and Risk Management," Himalaya Publishing House, New, Delhi, ISBN: 9789350516676

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma: 'Electronic Commerce- A Manager's Guide to E-Business', Vanity Books International, Delhi,2002.
2. Kalakota Ravi and Whinston Andrew B: "Frontiers of Electronic Commerce," Pearson Education India, 1996 New Delhi.
3. Schneider, Grey P: "Electronic Commerce, Course Technology," Cengage Learning, 2008, 8th Edition, New Delhi

III- B.Tech. II Semester

14BT6HS02: **COST ACCOUNTING AND FINANCIAL MANAGEMENT**

(OPEN ELETIVE)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

Pre-Requisites : Nil

COURSE DESCRIPTION: Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Returns on Investment..

COURSE OUTCOMES: On successful completion of the course a successful student is able to

CO 1 Acquire Knowledge in
- Elements of Costing.
- Basic concepts of Financial Management.
- Risk and Return
- Financial Accounting.
- Using advanced tools like tally and SAP.
- Significance of Economics and Accountancy

CO 2 Do cost, risk and return of investment analysis.

CO 3 Develop skills in providing solutions for
- Material, Labor, Overheads control.
- Excellence and ability to minimize the cost of the organization
- Effective investment decisions

CO 4 Prepare cost sheets pertaining to manufacturing of products.

DETAILED SYLLABUS:

Unit I : INTRODUCTION TO COST ACCOUNTING (9 Periods)

Cost and Cost Accounting, Scope, Objectives, Advantages and disadvantages -Cost Accounting Vs Management Accounting - Elements of Costing -Installation of costing system - Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

Unit II: COST ANALYSIS (9 Periods)

Analysis of Cost - Preparation of cost sheet, estimate, tender and quotation (Sample problems) - Importance of Costing while pricing the products.

Unit III: STANDARD COSTING (9 Periods)

Introduction to Standard Costing & Variances - Variance Analysis: Material variances, Labor variances (Simple Problems).

Unit IV : FINANCIAL MANAGEMENT (9 Periods)

Financial Management-Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

Unit V: RISK AND RETURNS ON INVESTMENT (9 Periods)

Investment-Meaning and Definition- concept of risk and returns-Investment Alternatives- Introduction to Behavioral Finance - Anomalies -Key Concepts -Anchoring - Mental Anchoring-Confirmation and Hindsight Bias-Gambler's Fallacy-Herd Behavior-Over Confidence-Overreaction and Availability Bias-Prospect Theory.

(Total periods : 45)

TEXT BOOKS:

1. S.P. Jain and K.L. Narang: "Cost Accounting," Kalyani Publishers, Ludhiana, 6th Edition, 2002
2. James C Van Horne, "Financial Management and Policy," Prentice-Hall of India/Pearson, 12th Edition, 2001

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, "Cost and Management Study Material," New Delhi.
2. I.M. Pandey, "Financial Management," Vikas Publishing House Pvt. Ltd., 10th Edition, 2010,

III B.Tech. II Sem

14BT6HS03**: ENTREPRENEURSHIP FOR MICRO SMALL AND MEDIUM ENTERPRISES**

(OPEN ELECTIVE)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

Pre requisites: Nil

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES: On successful completion of the course a successful student is able to

CO 1 Acquire Knowledge in
- Schemes and institutions encouraging entrepreneurship.
- Basic Principles and concepts of Accountancy.
- Significance of entrepreneurship.

CO 2 (i) Develop analytical skills in understanding problems pertaining to
- Personal excellence through financial and professional freedom.
- Women entrepreneurship acts as contrivance in the societal development

(ii) Develop Critical thinking and evaluation ability.

CO 3. Generate ideas for formulating business plans.

DETAILED SYLLABUS

UnitI: INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT (9 Periods)

Concept of Entrepreneurship - Growth of Entrepreneurship in India - Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur - Functions of Entrepreneur - Need for an Entrepreneur - Entrepreneurial Decision Process - Types of Entrepreneurs - Distinction between an Entrepreneur and a manager - Intrapreneur - Entrepreneur Vs Intrapreneur.

Unit - II: IDEA GENERATION AND FORMULATION OF BUSINESS PLANS : (9 Periods)

Sources of Ideas - Methods of idea generation - - Product Identification - Opportunity Selection - Steps in Setting up of a Small Business Enterprise - Contents Of Business Plans - Significance - Formulation of Business Plan - Business Opportunities in Various Sectors - Common Errors in Business Plan Formulation - Project Report Preparation

Unit - III: MICRO AND SMALL ENTERPRISES (9 Periods)

Meaning and Definition - Micro and Macro units - Essentials - Features - Characteristics - relationship between Micro and Macro Enterprises - Rationale behind Micro and Small Enterprises - Scope of Micro and Small Enterprises - Objectives of Micro Enterprises - Problems of Micro and Small Enterprises

Unit - IV: INSTITUTIONAL FINANCE AND SUPPORT TO ENTREPRENEUR (9 Periods)

Need for Institutional Finance - Commercial Banks - Industrial Development Bank of India (IDBI) - Industrial Finance Corporation of India Ltd. (IFCI) - Industrial Credit Investment Corporation of India Ltd. (ICICI)- State Financial Corporations (SFCs) - State Industrial Development Corporations (SIDCs) - Small Industries Development of Bank of India (SIDBI) -- Need For Institutional Support - National Small Industries Corporation Ltd (NSIC) - Small Industries Development Organisation (SIDO) - Small Industries Service Institutes (SISIs) - District Industries Centres (DICs) - National Institute of Entrepreneurship and Small Business Development (NIESBUD) - Technical Consultancy Organizations (TCOS)(Origin, Mission, and credit facility/support).

Unit -V: WOMEN ENTREPRENEURSHIP (9 Periods)

Concept of Women entrepreneur - Functions of Women entrepreneurs - Growth of women entrepreneurship in India - Challenges of Women entrepreneurs- Programmes supporting women entrepreneurship - Rural Entrepreneurship - Meaning, Need for Rural entrepreneurship, Problems of rural entrepreneurship, Role of NGOs.

(Total periods : 45)

TEXT BOOKS:

1. Dr.S.S.Khanka, "Entrepreneurial Development," S. Chand and Company Ltd, Revised Edition, 2012.
2. Madhurima Lall & Shikha Sahai, "Entrepreneurship," Excel Books India, 2nd Edition 2008.

REFERENCE BOOKS:

1. Nandan, H., "Fundamentals of Entrepreneurship," PHI Learning Pvt. Ltd., 2013, New Delhi, 3rd edition 2013.
2. Vasanth Desai, "The Dynamics of Entrepreneurial Development and Management", Himalaya Publishing House, 4th edition 2009. ISBN: 9788183184113
3. Bholanath Dutta, "Entrepreneurship Management" - Text and Cases, Excel Books, 1st edition 2009.

III B.Tech. II Semester

14BT70105: **DISASTER MITIGATION AND MANAGEMENT**

(Open Elective)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on "Environmental Sciences"

COURSE DESCRIPTION: Natural disasters and hazards - Earthquakes - Floods and cyclones, droughts - Landslides - Disaster management.

COURSE OUTCOMES:

On successful completion of the course, a successful student is able to:

CO 1 Explain various types of disasters and mitigation strategies

CO 2 Analyze and interpret the Guidelines for hazard assessment and vulnerability analysis

CO 3 Use historical data of disaster losses and inform the people over preparedness

CO 4 Address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society

CO 5 Function in multidisciplinary teams for the effective displacement of people during disasters

DETAILED SYLLABUS

UNIT I **(8 Periods)**

INTRODUCTION: Types of disasters - Natural disasters - Impact of disasters on environment - Infrastructure and development - Concepts of hazards and vulnerability analysis- Hazard Assessment - Guidelines for hazard assessment and vulnerability analysis - Basic principles and elements of disaster mitigation

UNIT II **(11 Periods)**

EARTHQUAKES : Introduction to earthquakes - Intensity scale (MSK-64) - Seismic activity in India - Seismic zones of India - Earthquakes in A.P. - Action plan for earthquake disaster preparedness - Elements at risk, recovery and rehabilitation after earthquake - Earthquake resistant design and construction of buildings. Tsunami - Onset, types and causes - Warning - Element at risk - Typical effects - Specific preparedness and mitigation strategies

UNIT III **(11 Periods)**

FLOODS AND CYCLONES: Onset, types, warnings - Elements at risk - Typical effects - Indian floods and cyclones - Hazard zones - Potential for reducing hazards - Mitigation strategies and community based mitigation.

DROUGHTS: Onset, types and warning - Kinds of droughts - Causes of droughts - Impact of droughts - Early warning and response mechanisms - Mitigation strategies - Droughts in India

UNIT IV **(7 Periods)**

LANDSLIDES: Onset, types and warning - Causes of landslides - Elements at risk - Indian land slides - Hazards zones - Typical effects - Mitigation strategies and community based mitigation

UNIT V **(8 Periods)**

DISASTER MANAGEMENT: Disaster management organization and methodology - Disaster management cycle - Disaster management in India - Typical cases - Cost-benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

(Total Periods: 45)

TEXT BOOKS

1. V.K. Sharma, Disaster "Management," National Centre for Disaster Management, IIPE, 1999.
2. A.S. Arya, Anup Karanth, and Ankush Agarwal, Hazards, "Disasters and Your Community: A Primer for Parliamentarians," GOI-UNDP Disaster Risk Management Programme, 2005.

REFERENCE BOOKS

1. Disaster Management in India, "A Status Report Publication of the Govt. of India," Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. R. B. Singh "Natural Hazards And Disaster Management," Rawat Publications, 2009.
3. Pardeep "sahni, Alka Dhameja, Uma Medury Disaster Mitigation," 4th Edition, PHI Learning Pvt. Ltd., 2011.
4. Sanjay K. Sharma "Environment Engineering and Disaster Management," 1st Edition, USP Publishers, 2011.

III B.Tech. II Semester

14BT70106**: ENVIRONMENTAL POLLUTION AND CONTROL**

(Open Elective)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on "Environmental Sciences"

COURSE DESCRIPTION: Introduction, Sources and Effects of Air Pollution - Dispersion of Pollutants and their control - Surface and Ground Water Pollution and control-Soil Pollution and remediation-Management of Municipal Solid Wastes.

COURSE OUTCOMES:

On successful completion of the course, a successful student is able to:

CO 1 Explain various pollutants, characteristics and their dispersion
CO 2 Analyze the major pollutants that causes environmental pollution.
CO 3 Conduct research and select suitable techniques to control pollution.
CO 4 Understand the effects of environmental pollutions on human beings and vegetation
CO 5 Communicate the methods of management and control of environmental pollution

DETAILED SYLLABUS:

UNIT I (8 Periods)

INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS: Scope - Air Pollutants - Classifications - Natural and Artificial - Primary and Secondary, Point and Non- Point, Line and Area Sources of Air Pollution - Stationary and Mobile Sources - Dispersion of Pollutants - Dispersion Models - Applications.

UNIT II (9 Periods)

EFFECTS AND CONTROL OF PARTICULATES: Effects of Air Pollutants on Man, Material and Vegetation - Global Effects of Air Pollution - Green House Effect, Heat Island, Acid Rains, Ozone Holes - Control of Particulates - Control at Sources - Process Changes - Equipment Modifications - Design and Operation of Control Equipment - Settling Chambers - Centrifugal Separators - Bag Filters, Dry and Wet Scrubbers - Electrostatic Precipitators.

UNIT III (10 Periods)

WATER POLLUTION: Introduction-Water Quality in Surface Waters - Nutrients - Controlling Factors in Eutrophication-Effects of Eutrophication - Ground Water Pollution - Thermal Pollution - Marine Pollution - Sewage Disposal in Ocean - Types of Marine Oil Pollution - Cleanup of Marine Oil Pollution - Control of Water Pollution - Case Study on Tanneries - Drinking Water Quality Standards.

UNIT IV (9 Periods)

SOIL POLLUTION: Soil Pollutants - Sources of Soil Pollution - Causes of Soil Pollution and their Control - Effects of Soil Pollution-Diseases Caused by Soil Pollution - Methods to Minimize Soil Pollution - Effective Measures to Control Soil Pollution - Case Study on Fertilizer.

UNIT V (09 Periods)

MUNICIPAL SOLID WASTE MANAGEMENT: Introduction - Types of Solid Wastes - Principles of Excreta Disposal - Domestic Solid Waste Production - Collection of Solid Wastes - Transport of Solid Wastes - Management of Solid Wastes - Methods of Land Disposal - Sanitary Landfill - Composting - Incineration.

(Total Periods: 45)

TEXT BOOKS

1. C.S.Rao, "Environmental Pollution Control Engineering," 2nd Edition, New Age International Pvt Ltd., 2007.
2. Y.Anjaneyulu, "Introduction to Environmental Science," 1st Edition, BS Publications., 2009.

REFERENCE BOOKS

1. M.N. Rao and H.V.N. Rao, "Air Pollution," 19th Edition, Tata McGraw-Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, "Fundamentals of Air Pollution," 5th Edition, Academic Press (Elsevier), 2014.
3. S.M.Khopkar , "Environmental Pollution Monitoring and Control," 2nd Edition, New Age International Pvt Ltd., 2007.
4. S.Deswal and K.Deswal, "Environmental Science," 2nd Edition, Dhanpat Rai & Co, 2011.

III B.Tech. II Semester

14BT70107: **CONTRACT LAWS AND REGULATIONS**

(Open Elective)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: NIL

COURSE DESCRIPTION: Construction Contracts - Tenders - Arbitration - Legal Requirements - Labour Regulations.

COURSE OUTCOMES:

On successful completion of this course, a successful student is able to:

CO 1 Explain contract documents and tendering processes

CO 2 Analyze the legal issues in arbitration and in contracts documents

CO 3 Address the legal issues in collecting taxes

CO 4 Follow ethics while bidding, sale and purchase of property CO 5 Develop and Prepare tender documents as per the standards

DEAILED SYLLABUS:

UNIT I **(9 Periods)**

CONSTRUCTION CONTRACTS: Indian Contracts Act - Elements of Contracts - Types of Contracts - Features - Suitability - Design of Contract Documents - International Contract Document and laws - Standard Contract Document - Law of Torts.

UNIT II **(9 Periods)**

TENDERS: Prequalification - Bidding - Accepting - Evaluation of Tender from Technical, Contractual and Financial Points of View - Two Cover System - Preparation of the Documentation - Contract Formation and Interpretation - Potential Contractual Problems - Price Variation Clause - Comparison of Actions and Laws - Subject Matter - Violations.

UNIT III **(9 Periods)**

ARBITRATION: Arbitration - Comparison of Actions and Laws - Agreements - Appointment of Arbitrators - Conditions of Arbitration - Powers and Duties of Arbitrator - Rules of Evidence - Enforcement of Award - Arbitration Disputes - Dispute Review Board.

UNIT IV **(9 Periods)**

LEGAL REQUIREMENTS: Legal Requirements for Planning - Property Law - Agency Law - Tax Laws - Income Tax, Sales Tax, Excise and Custom Duties - Local Government Approval - Statutory Regulations - Insurance and Bonding - Laws Governing Purchase and Sale - Use of Urban and Rural Land - Land Revenue Codes - EMD - Security Deposits - Liquidated Damages.

UNIT V **(9 Periods)**

LABOUR REGULATIONS: Social Security - Welfare Legislation - Laws Relating to Wages, Bonus and Industrial Disputes - Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act - Maternity Benefit Act - Child Labour Act - Other Labour Laws.

(Total Periods: 45)

TEXT BOOKS

1. G.C.V. Subba Rao "Law of Contracts I & II, 11th Edition," S. Gogia & Co., 2011.
2. Jimmie Hinze, "Construction Contracts, 2nd Edition, Mc Graw Hill, 2001.

REFERENCE BOOKS

1. Gajaria G.T, Kishore Gajaria, "Laws Relating to Building and Engineering Contracts in India," 4th Edition, Lexis Nexis Butterworths India, 2000.
2. B. S. Patil, "Civil Engineering Contracts and Estimates," 3rdEdition, University Press (India) Private Ltd., 2013.
3. Joseph T. Bockrath, "Contracts and the Legal Environment for Engineers and Architects," 7th Edition, McGraw Hill Education, 2010.
4. Akhileshwar Pathak, "Contract Law," 1st Edition, Oxford University Press, 2011.

III B.Tech. II Semester

14BT70108**: PLANNING FOR SUSTAINABLE DEVELOPMENT**

(Open Elective)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: NIL

COURSE DESCRIPTION: Introduction to Sustainable Development - Environment, Sciences and Sustainability - Sustainable Development Politics and Governance - Tools, Systems and Innovations for Sustainability - Communication and Learning for Sustainability.

COURSE OUTCOMES:

On successful the completion of the course, a successful student is able to:

CO 1 Demonstrate the knowledge of planning, environment, tools and systems for sustainable development

CO 2 Analyze the current challenges to sustainability

CO 3 Use theoretical frameworks and provide solutions to the real world sustainability issues

CO 4 Conduct awareness of contemporary issues on globalization in terms of sustainability

CO 5 Give recommendations for the sustainability issues and solutions using a holistic approach

CO 6 Explain a sense of civic responsibility, including reflection on the student's own role in developing and nurturing sustainable communities

CO 7 Participate in decision making as individual and responsible for collective decision

DETAILED SYLLABUS:

UNIT I (8 Periods)

INTRODUCTION TO SUSTAINABLE DEVELOPMENT: Definition and Concepts of Sustainable Development - Capitalization of Sustainability - National and Global Context - The Millennium Development Goals - Emergence and Evolution of Sustainability and Sustainable Development - Theories of Sustainability - Case Studies

UNIT II (8 Periods)

ENVIRONMENT, SCIENCES AND SUSTAINABILITY: Climate Change - Science, Knowledge and Sustainability - Unforeseen Environmental Impacts on Development - Challenges of Sustainable Development - Centrality of Resources in Sustainable Development - Case Studies

UNIT III (10 Periods)

SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE: Governance and Democracy and Eco-Welfare - Global Civil Society and World Civil Politics - Civic Environmentalism - Policy Responses to Sustainable Development - Economics of Sustainability - Social Responsibility in Sustainability - National Action

UNIT IV (11 Periods)

TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY: Need for System Innovation - Transition and Co-Evolution - Theories and Methods for Sustainable Development - Strategies for Eco-Innovation - Ecological Foot Print Analysis - Socio Ecological Indicators - Eco Labels- Policy Programmes for System Innovation - Case Studies

UNIT V (8 Periods)

COMMUNICATION AND LEARNING FOR SUSTAINABILITY: Role of Emerging Media - Remarkable Design and Communication Art, Activism and the Public Interest - Education for Sustainability - Participation in Decision Making - Critical Thinking and Reflection - Case Studies

(Total periods: 45)

TEXT BOOKS

1. John Blewitt, "Understanding Sustainable Development," Earth Scan Publications Ltd., 2nd Edition, 2008.
2. Jennifer A. Elliot, "An introduction to sustainable development," Earth Scan Publications Ltd., 4th Edition, 2006.

REFERENCE BOOKS

1. Peter Rogers, Kazi F Jalal , John A Boyd, "An introduction to sustainable development," Earth Scan Publications Ltd., 1st Edition, 2006.
2. Simon Dresner, "The Principles of Sustainability," Earth Scan Publications Ltd., 2nd Edition, 2008.
3. Peter Bartelmus, "Environment growth and development: The concepts and strategies of sustainability," Routledge, 3rd Edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, Mirilia Bonnes, Jose Antonio Corraliza, Maria Vittoria Giuliani, "People places and sustainability, Hogrefe & Huber Publishers," 2nd Edition, 2003.

III B.Tech. II Semester

14BT70109**: RURAL TECHNOLOGY**

(Open Elective)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: NIL

COURSE DESCRIPTION: Research & Development - Non Conventional Energy - Community Development - IT Management

COURSE OUTCOMES:

On successful completion of this course, a successful student is able to:

CO 1 Acquire the knowledge of various nonconventional energy systems and technologies for rural development.

CO 2 Apply the principles of IT for the rural development

CO 3 Responsible for the development of technologies in rural areas

CO 4 Understand the impact of technologies in societal and environmental aspects

DETAILED SYLLABUS:

UNIT I **(9 Periods)**

RESEARCH & DEVELOPMENT: India - Ancient Indian Technologies - Rural India Life - Indian Farmer - Role of Science and Technology in Rural Development - Rural Technology and Poverty Eradication - Rural Business Hubs - Technology in improving rural infrastructure - Various organizations related to innovation - Issues of technology transfer: CAPART, NABARD, CSIR, NIF.

UNIT II **(9 Periods)**

NON CONVENTIONAL ENERGY: Definition of Energy, Types of alternative sources of energy, Sources of non conventional energy - Solar energy - Solar Cooker - Solar Heater - Biogas - Recycling and Management and Wastes Conservation - Assessment & Production of biomass products & their utilization.

UNIT III **(9 Periods)**

TECHNOLOGIES FOR RURAL DEVELOPMENT: Food & Agro based technologies - Tissue culture - Building and Construction technologies - Cultivation and processing of economic plants - Cottage and social Industries.

UNIT IV **(9 Periods)**

COMMUNITY DEVELOPMENT: Water conservation - Rain water Harvesting - Drinking water - Environment and Sanitation - Bio fertilizers - Medical and Aromatic plants - Employment generating technologies - Apiculture - Piciculture - Aquaculture.

UNIT V **(9 Periods)**

IT IN RURAL DEVELOPMENT: The Role of Information Technology in Rural Areas - Impact of Information Technology in Rural development - Need and Necessity of Technology - Corporate Social Responsibilities - Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and Saansad Adarsh Gram Yojana (SAGY) - village adoptions schemes.

(Total periods: 45)

TEXT BOOKS

1. M.S Virdi, "Sustainable Rural Technologies," Daya Publishing House, New Delhi, 1st Edition, 2009.
2. S.V. Prabhath & P. Ch. Sita Devi, "Technology and Rural India," Serials Publications, New Delhi, 1st Edition, 2012.

REFERENCE BOOKS

1. P. R. S. Murthy, R.C. Chackravarthy, "Information Technology & Rural Development," Pacific Books International, 1st Edition, 2011.
2. Shivakanth Singh, "Rural Development Policies and Programmes," Northern book centre, New Delhi, 1st Edition, 2002.
3. L.M.Prasad, "Principles and Practice of Management," Sultan Chand & Sons, New Delhi, 8th Edition, 2014.
4. Venkata Reddy. K, "Agriculture and Rural Development Gandhian Perspective," Himalaya Publishing House, 1st Edition, 2001.

III B.Tech - II Semester

14BT60305**: Artificial Intelligence and Robotics**

(Open Elective)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: NIL

COURSE DESCRIPTION:

Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning;

COURSE OUTCOMES:

On successful completion of the course, a successful student will be able to:

CO1 Impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.

CO2 Employ effective methods to analyze a robot motion control while executing a specific task.

CO3 Design and Implement appropriate solutions for search Problems such as playing two person games and for planning problems which involve defining a sequence of actions of a robot.

CO4 Apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance.

UNIT-I ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING (10 periods)

The Underlying assumption of AI; AI Technique: simple Tic-Tac-Toe program; Problem solving: State space search; Production systems: control strategies, search space control: depth-first, breadth-first search; Heuristic search: Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT-II KNOWLEDGE REPRESENTATION & LEARNING (9 periods)

Knowledge Representation; Predicate Logic: Simple facts in logic, resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; slots; conceptual dependency; scripts; Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.

UNIT-III ROBOTICS -VISION & SENSING (8 periods)

Robotics: Robot Classification, Robot Specification, notation; Sensing: Range sensing: Triangulation; proximity sensing: Inductive, Capacitive and Ultrasonic sensing; touch sensing: tactile sensing, artificial skins; Force and torque sensing: Wrist force sensors; Vision: low-level vision, high-level vision.

UNIT-IV ROBOT PROGRAMMING & CONTROL (10 periods)

Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: characteristics, specifications; Task level languages; Language structure: VAL II.

UNIT-V ROBOT INTELLIGENCE & TASK PLANNING (8 periods)

Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; graph search technique; Problem solving and problem reduction; robot learning; Task planning: Modelling, task specification, obstacle avoidance, grasp planning; Expert system.

(Total Periods: 45)

Text Books:

1: E. Rich and K. Knight,"Artificial intelligence", Tata Mc Graw Hill, 2nd ed., 1992.

2: K.S. Fu, R.C. Gonzalez, C.S.G. Lee, Robotics: Control, Sensing, Vision, and Intelligence, Mc Graw Hill, International Edition, 1987.

Reference Books:

1: Mikell P. Groover, "Industrial Robotics, Technology, Programming, and Applications", Tata Mc Graw Hill, 9th reprint 2011.

2: D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992.

3: N.J. Nilsson, "Principles of AI", Narosa Publ. House, 2000.

4: George Luger, .Al-Structures and Strategies for and Strategies for Complex Problem solving, Pearson Educations, 4th edition, 2002.

III B.Tech - II Semester

14BT60306**: Global Strategy and Technology** (Open Elective)

(Common to CSE,CSSE, IT&ME)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PRE-REQUISITES: -Nil-

COURSE DESCRIPTION:

Introduction to strategic management, strategic management process, principles of good strategy, globalisation, globalisation strategies, research & development strategies, technology management and transfer, significance, elements of transfer process, corporate governance: the Indian scenario.

COURSE OUTCOMES:

On successful completion of the course, a successful student will be able to:

CO1. Decide upon a macroscopic management strategy to optimize the impact of decisions with limited resources.

CO2. Identify the impact of globalization in a given engineering scenario. Participate in elementary discussions on corporate governance.

CO3. Analyse an industrial Engineering problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION TO STRATEGIC MANAGEMENT (9 periods)

Definitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT II: GLOBALISATION (9 periods)

Meaning and dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouring Globalisation; Globalisation strategies.

UNIT III: RESEARCH & DEVELOPMENT STRATEGIES (9 periods)

Introduction, Concept, Evolution of R & D Management, R & D as a business, R & D and competitive advantage, Integration of R & D, Elements of R & D strategies, Selection of R & D strategies, Implementation strategies, R & D trends, Responses to changes.

UNIT IV: TECHNOLOGY MANAGEMENT AND TRANSFER (9 periods)

Technology Management: Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.

Technology Transfer: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT -V: CORPORATE GOVERNANCE: THE INDIAN SCENARIO (9 periods)

Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance - Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family - owned business in India, Corporate Governance and the Indian ethos,

(Total Periods: 45)

TEXT BOOKS:

1. Francis Cherunilam, "Stategic Management," Himalaya Publishing House, 3rd Edition, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan, "Management of Technology, Stategic Management," Himalaya Publishing House, 2nd Edition, 2012.

REFERENCE BOOKS:

1. White and Bruton, "The management of Technology and innovation; a strategic approach, Cengage Learning," 1st Edition, 2007.
2. S.K.Mandak, "Ethics in business and Corporate Governance," TMH, 2nd Edition, 2012.

III B.Tech - II Semester

14BT60307**: Intellectual Property Rights & Management**

(Open Elective)

(Common to CSE,CSSE, IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES:-Nil

COURSE DESCRIPTION:

Protection of ideas, innovation and artistic endeavors ; Acts and procedure related to patents, trademarks, passing off, copy right, design registration, trade secrets and cyber laws, case studies in each.

COURSE OUTCOMES:

On successful completion of course, a student will be able to:

CO1 : prepare documents and fill applications needed for filing a patent, design, copy right and trade mark

CO2 : ensure smooth transition from concept to final product.

CO3 : exercise discretion in following ethical aspects in dealing with intellectual property rights.

DETAILED SYLLABUS

UNIT - I: OVERVIEW OF INTELLECTUALPROPERTY RIGHTS (9 periods)

Introduction and importance of intellectual property rights (IPRs), types of intellectual property, International scenario in IPR: WIPO, WTO, TRIPS, international and national patent acts: United States of America patent act, United Kingdom patent act, India patent act, recent amendments in India patent act 1972.

UNIT - II: PATENTS (9 periods)

Introduction, Basic concepts, object and value of patent law, advantages of patent to inventor, patentable inventions, Not patentable inventions, overview of patent procedure, Bio technology patents, patents on computer program, patent rights on micro organism, plant breeding and breeders right, protection of bio diversity, protection of traditional knowledge, infringement of patents and remedy for infringement.

UNIT - III: TRADEMARKS (9 periods)

Trade Marks: Basic concepts, definition, functions, kinds of trademarks: service trademarks, collective trademarks, certification trademarks, textile trade marks, registrable and non registrable trademarks, registration of trademarks, examination process, establishing trade mark right, good will, infringement and action for trademarks, passing off, trade mark and eco label, comparison with patents industrial design and copy right.

UNIT IV INDUSTRIAL DESIGN, TRADE SECRETS, CYBER LAWS (9 periods)

Industrial Design: Basic concepts, scope and nature of rights, process of registration rights, rights after registration, transfer of interest or rights, reliefs and remedies and action for infringement of rights, appeals..

Trade Secrets: Definition, significance, tools to protect trade secrets in India Cyber laws: Co relation to intellectual property

UNIT V COPY RIGHTS (9 periods)

Copy Rights: Introduction, nature and scope, subject matter, related or allied rights, works in which copy rights subsists, registration of copy rights, conferred by copy right, copy right protection in India, transfer of copy rights, right of broad casing organizations and of performer, computer software.

(Total Periods: 45)

TEXT BOOKS:

1. P.Narayan, "Intellectual Property Law", Eastern Law House, New Delhi and Kolkata, 2005,
2. Deborah E. Bouchoux, "Intellectual Property Rights", Cengage Learning, India edition, 2011.

REFERENCE BOOKS:

1. Bainbridge David, "Intellectual Property Rights: Key to New Wealth, National Research Development Corporation, Pearson Education, New Delhi.
2. W.R.Cornesh, "Intellectual Property Rights: Patent, Copy Right, Trade Mark, Allied Rights", Universal law publishing private limited, Delhi, 2001.
3. S.R. Myneni, "Law of Intellectual Property", Asia law house, Hyderabad 2001.
4. Prabuddha Ganguly, "Intellectual Property Rights: Unleasing Knowledge Economy", TMH New Delhi, 1 st edition, 2001.

III B.Tech - II Semester

14BT60308**: Managing Innovation and Entrepreneurship**

(Open Elective)

(Common to CSE,CSSE,IT&ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: Nil

Course Description:

Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts Shifting Composition of the Economy Purposeful Innovation & 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

C**ourse Outcomes:**

On successful completion of this course, students will be able to:

CO1: Define, explain and illustrate theories of business innovation and entrepreneurship, the evolution of industries and economies, and the roles of Entrepreneurs.

CO2: Develop a comprehensive and well structured business plan for a new venture.

CO3: Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan; and,

CO4: Work effectively in multidisciplinary, cross-cultural teams, towards the development of a Team Project.

DETAILED SYLLABUS:

Unit-I: Entrepreneurship (07 Periods)

Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, entrepreneurial growth and development.

Unit-II: Creativity and Innovation (11 Periods)

Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies: Strategies that aim at introducing an innovation, innovation & entrepreneurship, planning -incompatible with Innovation & entrepreneurship.

Unit-III: The Individual Entrepreneur (7 Periods)

Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation Entrepreneurial motivation (nAch story); Achievement Motivation in Real life- Case Study. Entrepreneurs versus inventors.

Unit-IV: International Entrepreneurship Opportunities (11 Periods)

International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Entrepreneurial entry in to international business, strategic Issues in International Entrepreneurship.

U**nit-V: Creative Problem Solving (9 Periods)**

Problem Identification and Problem Solving: Problem Identification. Problem solving Innovation and Diversification.

(Total Periods: 45)

Text Books:

1 Martin, M.J. "Managing Innovation and Entrepreneurship in Technology based Firm", John Wiley Interscience, 1994.

2 Ettlie, J.E. "Managing Technology Innovation", John Wiley & Sons, 2000.

3 Robert D Hisrich., Michael P Peters., Dean A Shepherd, "Entrepreneurship" The McGraw-Hill Companies, 6th Edition, 2011

Reference Books:

1 Christensen, C. M. and Raynor, M. E. The Innovators Solution: Creating and Sustaining Successful Growth, Boston, MA: Harvard Business School Press, (2003).

2 Drucker, P. F., Innovation and Entrepreneurship, New York: Harper, 1985.

3 Harvard Business Review on Innovation (Collection of articles), Harvard Business School Press (2001).

4 Harvard Business Review on Entrepreneurship (Collection of articles), Harvard Business School Press (1999)

5 Rogers, E.M., "Diffusion of Innovations", New York: Simon and Schuster, 5th Edition, 2003.

6 Drucker, P. F. "The Discipline of Innovation," Harvard Business Review, May2000. (Originally published 1985, May-June)

III B.Tech - II Semester

14BT60309**: Materials Science**

(Open Elective)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: Courses on "Engineering Chemistry" and "Engineering Physics"

COURSE DESCRIPTION

Structure and Bonding in metals; Steels ,Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semi conductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics engineering, Material Selection and manufacturing of Optical fibers

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Understand how materials are formed and their classification based on atomic arrangement.

CO2. Illustrate how the design of the various types of steels, cast Irons and Non ferrous alloys influence various engineering applications.

CO3. Understand the basic difference in properties of various conductors,Insulators and Semiconductors and application of various advanced materials for different branches of Engineering

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO MATERIALS SCIENCE (7 periods)

Structure of metals: Bonds in Solids - Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys - determination of grain size.

Constitution of alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT - II CAST IRONS , STEELS & NON-FERROUS METALS (12 periods)

Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels. Structure and properties of Copper and its alloys, Aluminum and its alloys,

UNIT - III: ELECTRIC CONDUCTORS & INSULATORS (12 periods)

Type of materials selected for conductors, Insulators and semi conductors. Introduction to ceramics-Bonding and microstructure-DC properties of ceramic materials-AC properties- mechanical properties - Ceramics as Conductors, Insulators and capacitors, introduction to Plastics-DC properties-AC properties-mechanical properties.

UNIT - IV: SEMICONDUCTORS AND MAGNETIC MATERIALS (9 periods)

Fabrication of Semiconductors-Producing a silicon wafer-Lithography and Deposition-Packaging of semiconductors materials-Types of magnetic materials- Measuring magnetic properties-Application of soft magnetic materials in Electromagnets and relays, AC transformers, Generators and motors.

UNIT -V: ADVANCED MATERIALS AND APPLICATIONS (5 periods)

Composites - Fiber reinforced, Metal Matrix, Ceramic Matrix - properties and applications; Ceramics - Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Glasses- properties and applications, manufacturing of Optical fibers.

(Total periods : 45)

TEXT BOOKS:

1. Kodigre V D, Material Science and Metallurgy, Everest Publishing House, Pune, 31st edition, 2011.
2. Ian.P.Jones, Material Science for Electrical and Electronic Engineers, Oxford University Press, New Delhi,2000

REFERENCE BOOKS:

1. V. Raghavan, Physical Metallurgy: Principles and Practices, PHI, New Delhi, 2nd edition, 2006.
2. William. D. Callister, Materials Science & Engineering-An Introduction, John Wiley and sons, New Delhi, 6th edition, 2002.
3. A.J. DEKKAR, "Electrical Engineering Materials," PHI, New Delhi, 1970.

III B. Tech. - II Semester

14BT60502: **ENGINEERING SYSTEMS ANALYSIS AND DESIGN**

(Open-Elective)

(Common to CSE, CSSE, IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: NIL

COURSE DESCRIPTION:

Overview of the Systems Process, Technologies for systems, System Development Life Cycle, system Analysis and Modeling, levels of management, Project Management, Systems Implementation and importance of UML Prototyping, Maintaining and Managing the Systems output Process.

COURSE OUTCOMES:

On successful completion of this course, a student will be able to:

CO1 Gain knowledge on:

- Systems Process and System Design
- Systems Analysis and Modeling
- System Development Life Cycle
- Design Management and Maintenance Tools.

CO2 Apply the CASE Tools for System Processand estimation the given models.

CO3 Design, Develop and implement new Techniques for modeling thesystems.

CO4 Work effectively as team member on projects

CO5 Manage and Maintain the System Process.

DETAILED SYLLABUS

UNIT I- INTRODUCTION (9 periods)

Introduction- Systems, Types of systems,integrating technologies for systems, Need for system analysis and design, Role of the systems analyst, the system development life cycle, CASE tools for analysis and design.

UNIT II - ANALYSIS AND MODELING ORGANIZATIONAL SYSTEMS (9 periods)

Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, levels of management, organizational culture.

UNIT III - PROJECT MANAGEMENT (9 periods)

Project initiation, Problem in organization, Determining feasibilities, ascertaining hardware and software needs, identifying, forecasting, comparing costs and benefits, activity planning and control, managing the project.

UNIT IV - OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (9 periods)

Object oriented analysis and design- Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT V - DESIGNING EFFECTIVE OUTPUT (9 periods)

Output design objectives, relating output content to output method, realizing how output bias affects users, designing output for display, Case studies- Designing a web site management, online exam management. **(Total Periods: 45)**

TEXT BOOKS:

1. Kenneth E.Kendall and Julie E.Kendall, "System analysis and Design",8th Edition, Pearson Education India,2011.

REFERENCE BOOKS:

1. Dennis, Wixom, and Roth "Systems Analysis and Design"5th Edition, John Wiley. 2012.

2. Shelly and Rosenblatt, "Systems Analysis and Design" 9th Edition, Cengage Learning, 2012.

III B. Tech. - II Semester

14BT71005**: MICROELECTROMECHANICAL SYSTEMS**

(Open Elective)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

Pre-requisites: A course on "Basic knowledge in Physics".

Course Description: Overview of Micro Electro Mechanical Systems (MEMS), scaling laws, working principles of microsensors and microactuators, materials, microfabrication processes, packaging of Microsystems.

Course Outcomes: On successful completion of the course the student is able to

CO1: Demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators.

CO2: Identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.

DETAILED SYLLABUS

Unit-1: Overview of MEMS and Scaling Laws **(9 Periods)**

Introduction, MEMS and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.

Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid- body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

Unit -2: Working Principles of Microsystems **(9 Periods)**

Microsensors, acoustic wave sensors, biomedical and biosensors, chemical sensors, pressure sensors, thermal sensors. Microactuation: actuation using thermal forces, shape-memory alloys, piezoelectric crystals, electrostatic forces. MEMS with microactuators, microgrippers, micromotors, microvalves, micropumps. Microaccelerometers, microfludics.

U**nit-3: Materials for MEMS and Microsystems** **(9 Periods)**

Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

Unit-4: MEMS Fabrication Process and Micromanufacturing **(9 Periods)**

Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.

Unit-5: MEMS Packaging **(9 Periods)**

Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging.

(Total: 45 periods)

Text Book:

1. Tai-Ran Hsu, "MEMS & Microsystems, Design and Manufacture," McGraw Hill Education (India) Pvt. Ltd., 2002.

Reference Books:

1. G.K.Ananthasuresh, K.J.Vinoy, "Micro and Smart Systems," Wiley India, Ist edition, 2010
2. Nitaigour Premchand Mahalik, "MEMS," McGraw Hill Education (India) Pvt. Ltd., eighth reprint, 2013.

III B.Tech - II Semester

14BT61205**: BIO INFORMATICS**

(Open Elective)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES:

After successful completion of the course student will be able to:

CO1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.

CO2. Analyze biological database management system.

CO3. Create, select and apply appropriate techniques and tools to manage the biological data.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO BIOINFORMATICS (8 Periods)

Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

UNIT-II: BIOLOGY AND INFORMATION (7 Periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT-III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 Periods)

Heuristic alignment algorithms, global sequence alignments- Needleman-Wunsch algorithm, local sequence alignments- smith-waterman algorithm, amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.

UNIT-IV: PRIMARY DATABASES AND THEIR USE (11 Periods)

Introduction to biological databases- organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT-V: SECONDARY DATABASES (9 Periods)

Introduction to secondary databases- organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-organization and Management of databases, KEGG, ExPASy, BRENDA.

(Total Periods: 45)

TEXT BOOK:

1. David W. Mount "Bioinformatics: Sequence and Genome Analysis", CSHL Press, 2nd edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, "Bioinformatics Basics, Applications in Biological Science and Medicine", CRC Press, Taylor & Francis Group, 2nd edition,2005.
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, "Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery", PHI Learning Pvt. Ltd.,3rd edition, 2011.

III B.Tech - II Semester

14BT61206**: CYBER SECURITY AND LAWS**

(OPEN ELECTIVE)

(Common to CSE,CSSE,IT & ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION:Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

COURSE OUTCOMES:

On successful completion of the course student will be able to:

CO1. Demonstrate knowledge in Cyber security, Cyber crimes and its related laws in Indian and Global Act.

CO2. Analyze the legal perspectives and laws related to cyber crimes in Indian context.

CO3. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO CYBER CRIMES (9 periods)

Introduction, Definition, Origin, Cyber Crime and Information Security, Cyber Criminals, Classifications of Cyber Crimes, The Legal Perspectives and Indian Perspective, Cyber Crime and Indian ITA 2000, Global Perspective on Cyber Crimes.

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Café and Crimes, Botnets.

UNIT-II: TOOLS AND METHODS USED IN CYBER CRIME (9 periods)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT-III: CYBER CRIMES AND CYBER SECURITY-LEGAL PERSPECTIVES (8 periods)

Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT-IV: CYBER SECURITY-ORGANIZATIONAL IMPLICATIONS (10 periods)

Introduction, Cost of Cyber Crimes and IPR issues, Web Threats for Organizations - Evils and Perils, Security and Privacy Implications from Cloud Computing, Social Media Marketing-Security Risks and Perils for Organizations, Social Computing and Associated Challenges for Organizations, Protecting People's Privacy in Organization, Organizational Guidelines for Internet Usage, Safe Computing and Usage Policy, Incident Handling and Best Practices, Media and Asset Protection.

UNIT-V: CYBER TERRORISM AND INFORMATION WARFARE (9 periods)

Introduction, Intellectual Property in the Cyber Space, the Ethical Dimension of Cyber Crimes, the Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.

Cyber Crime Illustrations: Indian Banks lose Millions of Rupees, Justice vs. Justice, Parliament Attack, The Indian case of online Gambling, Bank and Credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam.

(Total Periods: 45)

TEXT BOOK:

1. Nina Gobole, Sunit Belapure, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives," Wiley India, 1st edition, 2011.

REFERENCE BOOKS:

1. Ferrara et al., "Cyber Law: Text and Cases," Cengage Learning, 3rd edition, 2012.
2. Vivek Sood, "Cyber Law Simplified", Tata McGraw-Hill, 1st edition, 2012.
3. Prashant Mali, "Cyber Law and Cyber Crimes," Snow White Publications Pvt. Ltd., 1st edition, 2013.

III B.Tech II-Semester

14BT60521: **OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY**

(Common to CSE,CSSE & IT)

Int. Marks: 25; **Ext. Marks: 50;** **Total Marks: 75**

L	T	P	C
-	-	3	2

PREREQUISITE: A Course on "Object Oriented Analysis & Design"

COURSE DESCRIPTION: Modeling case studies - Automated Teller Machine, Library Information System, Online Ticket Reservation system, Point of sales etc.,

COURSE OUTCOMES:

After successful completion of the course student will be able to

CO 1 Apply Unified Modeling Language to design software system.

CO 2 Analyze the static and dynamic aspects of software system.

CO 3 Model the design for given set of requirements.

CO 4 Develop UML models for real world applications.

Case studies given below should be Modeled using Visual Modeling tools in different views i.e Use case view, logical view, component view, Deployment view.

CASE STUDY 1:

AUTOMATED TELLER MACHINE (ATM)

Problem Statement:

Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

CASE STUDY 2:

LIBRARY INFORMATION SYSTEM

Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned back to the library, that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

CASE STUDY 3: ONLINE TICKET RESERVATION FOR RAILWAYS

Problem Statement:

Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, date of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes i.e. Sleeper class, First class and the AC compartment. Design the application for the above problem description.

C**ASE STUDY 4: A POINT OF SALE (POS) SYSTEM**

Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client - side terminals and interfaces such as browser, PDA's, touch - screens.

CASE STUDY 5: RECRUITMENT PROCEDURE FOR SOFTWARE INDUSTRY

Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company.The technical skill and the experience of the candidates are reviewed and the short listed candidates are called for the interview. There may be different rounds for interview like the written test, technical interview, and HR interview. After the successful completion of all rounds of interview, the selected candidates names are displayed. Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

C**ASE STUDY 6: ONLINE AUCTION SALES**

Problem Statement:

The online auction system is a design about a website where sellers collect and prepare a list of items they want to sell and place it on the website for visualizing. To accomplish this purpose the user has to access the site. Incase it's a new user he has to register. Purchaser's login and select items they want to buy and keep bidding for it. Interacting with the purchasers and sellers through messages does this. There is no need for customer to interact with the sellers because every time the purchasers bid, the details will be updated in the database. The purchaser making the highest bid for an item before the close of the auction is declared as the owner of the item. If the auctioneer or the purchaser doesn't want to bid for the product then there is fixed cutoff price mentioned for every product. He can pay that amount directly and own the product. The purchaser gets a confirmation of his purchase as an acknowledgement from the website. After the transition by going back to the main menu where he can view other items.

CASE STUDY 7: TWO FLOOR ELEVATOR SIMULATOR

The elevator has the basic function that all elevator systems have, such as moving up and down, open and close doors, and of course, pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to MaxFloor, where the first floor is the lobby. There are car call buttons in the car corresponding to each floor. For every floor except for the top floor and the lobby, there are two hall call buttons for the passengers to call for going

up and down. There is only one down hall call button at the top floor and one up hall call button in the lobby. When the car stops at a floor, the doors are opened and the car lantern indicating the current direction the car is going is illuminated so that the passengers can get to know the current moving direction of the car. The car moves fast between floors, but it should be able to slow down early enough to stop at a desired floor. When an elevator has no requests, it remains at its current floor with its doors closed.

In order to certificate system safety, emergency brake will be triggered and the car will be forced to stop under any unsafe conditions.

CASE STUDY 8: HOME APPLIANCE CONTROL SYSTEM

A home appliance control system (HACS) is a system which provides various services to remotely operate on home appliances, such as microwave oven, TV, and garage door etc through remote devices such as mobile phone, desktop and palm-top. A home appliance control system (HACS) is a system which is controlled by a remote system such as a mobile phone or a palm-top, and at the same time controls, monitors and coordinates home appliances such as air conditioner, microwave oven, garage doors, TV set, VCR, audio controller, indoor/outdoor lights, water sprinkler, home security system, bath tub controller, etc. In order to activate home appliances and to allow for different ways of cooking, the HACS needs mechanisms for communication between the different devices in the system, and for coordination among the various processes running on such devices. The system administrator of the HACS system has the ability to add a new appliance or delete an existing one. The system administrator has the ability to add a new remote device and configure it with HACS or delete an existing one when it is not used. Also the system administrator can create an account for a new user or delete existing account if it is no longer used.

REFERENCE BOOKS:

1. Grady Booch, James Rum Baugh, Ivar Jacobson, "The Unified Modeling Language User Guide," 2 ed, Pearson Education, 2009
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, "UML 2 Toolkit," WILEY-Dreamtech India Pvt. Ltd., 2003.
3. Meilir Page-Jones, "Fundamentals of Object Oriented Design in UML," Pearson Education, 2000.
4. Pascal Roques, "Modeling Software Systems Using UML2," WILEY-Dreamtech India Pvt. Ltd, 2004.
5. Craig Larman, "An introduction to Object - Oriented Analysis and Design and Unified Process Applying UML and Patterns," Pearson Education, 2002.

III B.Tech - II Semester
14BT61222**: WEB PROGRAMMING LAB**
(Common to CSE & IT)

Int. Marks: 25; **Ext. Marks: 50;** **Total Marks: 75**

L	T	P	C
-	-	3	2

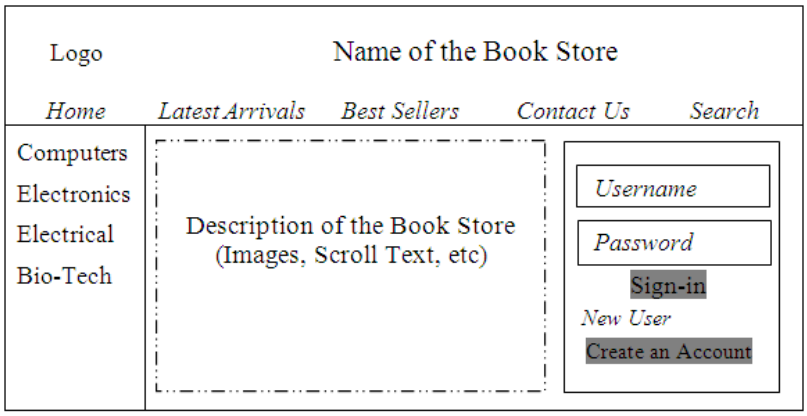
PREREQUISITES: Courses on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hands-on experience on HTML, HTML5, CSS, JavaScript, JQuery, PHP, MySQL, XML and AJAX.

COURSE OUTCOMES:
On successful completion of this course, the students will be able to:
CO1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript, JQuery, XML, AJAX, PHP and MySQL.
CO2. Apply client-server principles to develop scalable and enterprise web applications.

LIST OF EXPERIMENTS:
1. Design the following static web pages required for an online book store web site.

A. Home Page:



The Home page must have the following three frames:
Top frame: Logo and the book store name and links to Home page, Latest arrivals, Best sellers, Contact us and Search.
Left frame: At least four links for navigation, which will display the books catalogue relevant to engineering disciplines. For e.g. when the link "Computers" is clicked, the catalogue relevant to computer science books will be displayed in the right frame.
Right frame: The pages of navigated links in the left and top frame must be loaded in the right frame. Initially it will load the Home page that can include the description of the book store, sign-in and create account information.

B. Catalogue Page:
The catalogue page should display the following details of books available in the web site. The details are as follows:

a. Snap shot of cover page b. Title of the text book c. Author name
d. Publisher e. Price f. More details link.

Logo	Name of the Book Store			
Home	*Latest Arrivals*	*Best Sellers*	*Contact Us*	*Search*
Computers Electronics Electrical Bio-Tech		**HTML5 Black Book** Kogent Learning Solutions Dreamtech Press Rs. 570/-	More Details	
		Beginning PHP and MySQL 4th Edition W Jason Gilmore Apress Rs. 520/-	More Details	

C. Registration Page:

Design the Registration page with the following fields and link it to create an account link.

a. First Name	b. Last Name	c. Gender	d. Date of Birth
e. Username	f. Password	g. Confirm Password	h. Address
i. Postal Code	j. Mobile No.	k. Email-Id	

2. a. Design a web page to store username and password information using the local storage concept.
   b. Design a web page to store employee information including Name, Emp. Id, Department, Salary and Address on a client's machine using a real SQL database.
3. Apply the following styles to all web pages of online book store web site.
   a.Fonts and Styles: font-family, font-style, font-weight and font-size
   b. Backgrounds and colors: color, background-color, background-image and background-repeat
   c. Text: text-decoration, text-transformation, text-align and text-indentation, text-align
   d. Borders: border, border-width, border-color and border-style
   e. Styles for links: A: link, A: visited, A:active, A:hover
   f. Selectors, Classes, Layers and Positioning elements.
4. Write a JavaScript/JQuery code to validate the following fields of the Registration web page.
   a. First Name/Last Name - should contain only alphabets and the length should not be less than 8 characters.
   b. Username - It should contain combination of alphabets, numbers and _. It will not allow spaces and special symbols.
   c. Password - It should not less than 8 characters in length.
   d. Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.
   e. Postal Code: It must allow only 6 digit valid number.
   f. Mobile No. - It should allow only numbers and total number of digits should be equal to 10.
   g. E-mail id - It should allow the mail id with the following format:
   Ex. mailid@domainname.com

5. Design a web page with the following features using HTML5, JavaScript and JQuery
   a. Displaying of images with Custom animated effects
   b. Playing of selected video from the list of loaded videos
   c. Showing the animated text in increasing and decreasing font size
   d. Changing the size of the area in a web page using DIV tag
   e. Hides and Shows elements on web page.

6. a. Deploy and navigate web pages of online book store using WAMP/XAMPP web server.
   b. Write a PHP program to red user name and favorite color from the HTML form. Display the name of the user in green color and sets user favorite color as a background for the web page.
7. Write a PHP code to read the username and password entered in the Login form of the online book store and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.
8. Write a PHP code to read user details entered through the registration web page and store the same into MySQL database.
9. Write a PHP code for storing books details like Name of the book, author, publisher, edition, price, etc into MySQL database. Embed a PHP code in catalogue page of the online book store to extract books details from the database.
10. Write an XML file to store book details including:
    a. Title of the book b. Author of the book c. ISBN number
    d. Publisher Name e. Edition f. Price

i. Write a Document Type Definition (DTD) or XML Schema to validate the above XML file.

ii. Display the contents of the XML file with the following format using XSLT.
The contents should be displayed in a table format. The header of the table should be in color grey and the author names should be displayed in red color, bold and capitalized. Use appropriate colors for remaining fields.

11. Design a web page to reload some portion of the web page content using XMLHttpRequest object.

IV B. Tech. - I Semester

14BT70501: **Compiler Design**

(Common to CSE & IT)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PRE-REQUISITES: A Course on "Theory of Computation"

COURSE DESCRIPTION:

Concepts of Lexical analysis, Parsers, Run Time Environments, Syntax Directed Translation, Type checking, Code Optimization, Code Generation and Compiler tools

COURSE OUTCOMES:

On the successful completion of this course, student will be able to

CO1.: Gain knowledge on phases involved in design of compilers.

CO2: Acquire skills in code optimization.

CO3: Apply knowledge on LEX and YACC tools to develop scanner and parser.

DETAILED SYLLABUS

UNIT I- INTRODUCTION TO COMPILER AND LEXICAL ANALYSIS (9 periods)

Introduction to Compiler: Structure of a compiler.

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Specification of Tokens, The Lexical-Analyzer Generator Lex.

UNIT II - SYNTAX ANALYSIS (9 periods)

Introduction: The Role of the Parser, Eliminating Ambiguity, Eliminating of Left Recursion and Left Factoring.

Top-Down Parsing: Recursive descent parsing, Non Recursive Predictive parsing, LL (1) Grammars.

Bottom-Up Parsing: Shift reduce parsing, LR parsers - Simple LR parser, Canonical LR parser, LALR parser, Using Ambiguous Grammars, The Parser Generator Yacc .

UNIT III - SYNTAX DIRECTED TRANSLATION AND TYPE CHECKING (9 periods)

Syntax-Directed Translation: Syntax directed definition, S-attributed and L-attributed definitions, Construction of syntax trees.

Type Checking: Type Expressions, Type Equivalence, Rules for Type Checking, Type Conversions, Overloading of Functions and Operators**.**

UNIT IV - INTERMEDIATE CODE GENERATOR AND RUN TIME ENVIRONMENTS (9 periods)

Intermediate Code Generation: Variants of Syntax Trees, Three Address Code, Boolean expressions, Flow-of-Control Statements, Control- Flow Translation of Boolean Expressions.

Run time Environments: Storage organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack.

UNIT V - CODE OPTIMIZATION AND CODE GENERATION (9 periods)

Code Optimization: Basic Blocks and Flow Graphs, Optimization of Basic Blocks, The principal sources of optimization, Introduction to data flow analysis.

Code Generation: Issues in the Design of a Code Generator, The Target Language, A Simple Code Generator, Peephole optimization, Register allocation and assignment.

(Total Periods: 45)

TEXT BOOKS:

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D. Ullman, "Compilers-Principles, Techniques and Tools," 2nd edition, Pears on Education, 2012.

REFERENCE BOOKS:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, "Compilers-Principles, Techniques and Tools, Low price edition," Pearson Education, 2004.

2. K.L.P Mishra and N. Chandrashekaran, "Theory of computer science-Automata Languages and computation," 2nd edition, PHI, 2003.

IVB. Tech I-Semester
14BT70502**: MOBILE COMPUTING**
(Common to CSE & CSSE)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PRE-REQUISITES:
A Course on "Computer Networks"

COURSE DESCRIPTION
Concepts of GSM, Wireless MAC,CDMA Systems,3G,4G,Mobile IP Network Layer, Mobile Transport Layer, Databases, Data Dissemination, Broadcasting Systems, Mobile Synchronization and Mobile Devices.

COURSE OUTCOMES:
On successful completion of the course , students will be able to
CO 1 Gain knowledge in
- GSM and CDMA Systems.
- Mobile IP, and Mobile TCP
- Databases and Data Dissemination
- Mobile data Synchronization

CO 2 Analyze data delivery mechanisms in data dissemination and broadcasting systems
CO 3 Design of Mobile File Systems for Mobile Devices.

DETAILED SYLLABUS

UNIT- I: OVERVIEW and GSM ARCHITECTURE (8 periods)
Overview: Mobile Computing, Mobile Computing Architecture, Mobile Devices, Mobile System Networks
GSM and Other 2G Architectures: GSM, Radio Interfaces of GSM, Protocols of GSM, Localization, Call Handling, Handover, Security, New Data Services, General Packet Radio Service.

UNIT- II: WIRELESS MEDIUM ACCESS CONTROL, CDMA, 3G, AND4G COMMUNICATION: (9 Periods)
Multiplexing, Controlling the Medium Access, , Frequency Hopping Spread Spectrum ,Coding Methods , Code Division Multiple Access, IMT -2000 3G Wireless Communication Standard, WCDMA 3G Communication Standards, I-mode, OFDM, Long-term Evolution, WiMaxRel 1.0 IEEE 802.16e, 4G Networks.

UNIT- III: MOBILE IP NETWORK LAYER & MOBILE TRANSPORT LAYER (9 periods)
Mobile IP Network Layer: IP and Mobile IP Network Layer, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, Dynamic Host Configuration Protocol.
Mobile Transport Layer: Conventional TCP/IP Transport Layer Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Methods for Mobile TCP -layer Transmission, TCP over 2.5G/3G Mobile Networks.

UNIT -IV: DATABASESAND DATA DISSEMINATION AND BROADCASTING SYSTEMS (10 periods)
Databases: Database Hoarding Techniques, Data Caching, Client-Server Computing and Adaptation, Transaction Models, Query Processing, Data Recovery Process, Issues Relating to Quality Of Service.
Data Dissemination and Broadcasting Systems: Communication Asymmetry, Classification of Data-Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Techniques.

UNIT - V: MOBILE SYNCHRONIZATION AND MOBILE DEVICES (9 periods)
Mobile Synchronization in Mobile Computing Systems: Synchronization, Synchronization Software for Mobile Devices, Synchronization Protocols, SyncML- Synchronization Language for Mobile Computing, Sync4J (Funambol), Synchronized Multimedia Markup Language (SMIL).
Mobile Devices: Server and Management- Mobile Agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems, Security.

(Total periods: 45)

TEXT BOOK:
1. Raj Kamal,"Mobile Computing," Oxford University Press, Second Edition,2007

REFERENCE BOOKS:
1. Jochen H. Schiller,"Mobile Communications," Pearson Education, Second Edition,2004
2. AsokeTalukder, Roopa Yavagal,"Mobile Computing," Tata McGraw Hill, Second Edition 2010.

IV B.Tech - I Semester

14BT61201**: DATA WAREHOUSING AND DATA MINING**

(Common to CSE&CSSE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on "Database Management Systems"

COURSE DESCRIPTION: Data Warehouse Design, Data Mining Fundamentals, Data Preprocessing, Mining Frequent Patterns, Classification and Prediction, Clustering Techniques.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Demonstrate knowledge on
- Concepts of data mining and data warehousing
- Data preprocessing and association rule mining
- Classification and Prediction techniques
- Clustering techniques

CO2. Analyze data mining techniques for finding necessary useful and potential knowledge.

CO3. Apply machine learning techniques to discover and measure interesting patterns from large databases.

DETAILED SYLLABUS:

UNIT-I: DATA WAREHOUSING AND DATA MINING (12 Periods)

Data Warehouse: Basic Concepts, Modeling, Design and Usage, Data Generalization by Attribute-oriented Induction Data Mining: Why Data Mining, What is Data Mining, Kinds of data can be mined, Kinds of patterns can be mined, Kinds of applications targeted, Major Issues in Data Mining.

UNIT-II: DATA PREPROCESSING (10 Periods)

Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

UNIT-III: MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS (7 Periods)

Basic Concepts, Frequent Itemset Mining Methods, pattern mining in Multilevel and Multidimensional Space

UNIT-IV: CLASSIFICATION AND PREDICTION TECHNIQUES (9 Periods)

Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule Based Classification, Techniques to improve classification accuracy: Bagging and Boosting, Bayesian Belief Networks, Classification using frequent patterns.

UNIT-V: CLUSTER ANALYSIS (7 Periods)

Cluster Analysis, Partitioning Methods: K-Means; Hierarchical Methods: AGNES Vs DIANA; Density based Methods: DBSCAN, Outlier Analysis and Detection Methods.

(Total Periods: 45)

TEXT BOOK:

1. Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining: Concepts and Techniques," 3rd edition, Elsevier, 2013.

REFERENCE BOOKS:

1. Margaret H Dunham, "Data Mining Introductory and Advanced Topics," 2nd edition, Pearson Education, 2006.
2. Tan P.N, Steinbach M. and Kumar V. "Introduction to Data Mining," Addison-Wesley, 2006.

IV B.Tech - I Semester

14BT71204**: SOFTWARE TESTING TECHNIQUES**

(Common to CSE,CSSE&IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on "Software Engineering".

COURSE DESCRIPTION: Basic & Advance concepts of Software Testing and Techniques: STLC in SDLC, Coverage, Verification & Validation Models, Workbenches, Defects management, White box testing, Black box testing, Integration testing, System testing, Automation tools.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate in-depth knowledge in software testing methodologies, test strategies.
CO2. Analyzing testing circumstances and their resultants in software development.
CO3. Design & develop the best tests strategies in accordance to the development model.
CO4. Acquire problem solving skills to ensure quality software development meeting the industry standards.
CO5. Conduct tests with latest testing tools to address critical and complex areas of the software testing and achieve quality with ease.

DETAILED SYLLABUS:

UNIT-I: BASIC CONCEPTS OF SOFTWARE TESTING (9 periods)

Software Testing Fundamentals: Definition, Approaches, Testing during SDLC, Traceability Matrix, Essentials of Software Testing, Workbench, Features of Test Process, Misconceptions about Testing, Principles of Software Testing, Salient features of Good Testing, Test Policy, Test Strategy, Test Planning, Challenges in Testing, Categories of Defect, Defect, Error/Mistake in Software, Test Process, Skills required by Tester

UNIT-II: ADVANCED CONCEPTS OF SOFTWARE TESTING (9 periods)

Software Verification & Validation: Verification, Verification Workbench, Methods of Verification, Types of Reviews, Reviews in STLC, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Management of Verification & Validation.

V-Test Model: V-model for Software, Testing during - Proposal Stage, Requirement Stage, Test-Planning Stage, Design Phase, Coding. VV Model, Critical Roles and Responsibilities.

Defect Management: Defect Classification, Management Process, Lifecycle, Template, Fixing & Root Cause of Defect, Estimating impact of Defect, Defect Management needing the Risk, Techniques for finding Defects, Reporting a Defect.

UNIT-III: TESTING TECHNIQUES -I (9 periods)

Flow Graphs and Path Testing: Path-Testing Basics, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Implement and Application of Path Testing.

Transaction-Flow Testing and Data-Flow Testing: Transact ion Flows, Transaction-Flow Testing Techniques, Dataflow Testing Basics, Data-Flow Testing Strategies, Application, Tools, Effectiveness.

UNIT-IV: TESTING TECHNIQUES -II (10 periods)

Logic Based Testing: Motivational Overview, Decision Tables, Path Expressions Again, KV Charts, Specifications.

State Graphs And Transition Testing: State Graphs, Good State Graphs and Bad, State Testing, Testability Tips.

UNIT-V: TESTING TOOLS AND TEST PLANNING (8 periods)

Testing Tools: Features of Test Tool, Guidelines for selecting Test Tools, Tools and Skills of Tester, Static & Dynamic Testing Tools, Advantages & Disadvantages of using Test Tools, When to use Automated Test Tools, Testing using Automated Tools, Difficulties while introducing New Tools.

Test Planning: Test Policy & its contents, Strategy & its contents, Test Plan, Quality Plan & Test Plan, Quality Plan Template, System Test Plan Template, Guidelines for developing a Test Plan, Test Estimation, Test Standards, Test Scenarios & Test cases, Template for Test cases, Test Scripts, Building Test Data, Generation of Test Data, Roles & Responsibilities in STLC.

(Total periods: 45)

TEXT BOOKS:

1. M.G.Limaye, "Software Testing: Principles and Techniques and Tools," Tata Mc Graw - Hill Education, 1ST Edition, 2009.
2. Boris Beizer, "Software Testing Techniques," Dream Tech Press, 2nd Edition, 2004.

REFERENCE BOOKS:

1. Ilene Burnstein,"Practical Software Testing," Springers Verilog International Edition, 2003.
2. Dr.K.V.K.K.Prasad, "Software Testing Tools," Dreamtech, 1st Edition, 2004.

IV B.Tech. - I Semester

14BT70503**: ADVANCED COMPUTER ARCHITECTURE (PE-I)**

(Common to CSE & CSSE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITE: A course on "Computer Organization".

COURSE DESCRIPTION

Quantitative design and analysis, memory hierarchy design; parallel computer models and network properties; pipe lining, superscalar techniques, multiprocessors and multi computers; Multi-Vector, SIMD and Multi-Core computers

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge of:
- Computational models and Computer Architectures.
- Concepts of parallel computer models.
- Scalable Architectures.
- Pipelining, Superscalar processors, multiprocessors, SIMD and Multi core Computers.

CO2. Analyze the architectures of parallel computers and their interconnection structures.

CO3. Design modern computer architectures and hardware systems

DETAILED SYLLABUS

UNIT-I:

FUNDAMENTALS OF QUANTITATIVE DESIGN AND ANALYSIS, MEMORY HIERARCHY DESIGN (9 periods)

Fundamentals of Quantitative Design and Analysis: Introduction, Classes of computers, Defining Computer Architecture, Trends in technology, Trends in power and energy in ICs, Trends in cost, Dependability, Quantitative Principles of Computer Design.

Memory Hierarchy Design: Introduction, Advanced optimizations of cache performance, Memory technology and optimizations, Cross cutting issues-The design of memory hierarchies.

UNIT-II: PARALLEL COMPUTER MODELS AND NETWORKS PROPERTIES (9 periods)

Parallel Computer Models: The state of computing, Multiprocessors and multi-computers, Multi vector and SIMD computers,

Program and Networks Properties: Conditions of Parallelism, Program partitioning and scheduling, Program flow mechanisms, System interconnect architectures.

Examples: Detection of Parallelism in a program using Bernstein's conditions.

UNIT-III: PRINCIPLES OF SCALABLE PERFORMANCE AND MEMORY (9 periods)

Principles of Scalable Performance: Performance metrics and measures, Parallel Processing applications, Speedup performance laws.

Bus, Cache and Shared memory: Bus systems, Cache memory organizations, Shared memory organizations.

UNIT-IV: PIPELINING AND SUPERSCALAR TECHNIQUES, MULTIPROCESSORS AND MULTICOMPUTERS (9 periods)

Pipelining and Superscalar Techniques: Linear pipeline processors, nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design.

Multiprocessors and Multi-computers: Multiprocessor system interconnects Cache Coherence and synchronization mechanisms.

UNIT-V: MULTIVECTOR AND SIMD COMPUTERS, MULTICORE COMPUTERS (9 periods)

Multi-Vector and SIMD computers: Vector processing principles, Multi-vector multiprocessors, SIMD computer organizations- Implementation Models, CM2 Architecture; The Connection Machine CM5: As synchronized MIMD Machine, The CM5 Network architecture, Control Processor and processing nodes, Inter processor communications.

Case Studies: CRAY line of Computer Systems, Power PC architecture

(Total Periods: 45)

TEXT BOOKS:

1. Kai Hwang and Naresh Jotwani, "Advanced Computer Architecture," Second Edition, New Delhi, McGraw Hill, 2011.
2. John L. Hennessy and David A. Patterson, "Computer Architecture-A Quantitative Approach," Fifth Edition, Elsevier, 2012

REFERENCE BOOKS:

1. Kai Hwang "AdvancedComputer Architecture," First Edition, New Delhi, Tata McGraw Hill, 2001.
3. Anantha Grama, Anshul Gupta, George Karypis and Vipin Kumar, "Introduction to Parallel Computing," Second Edition, New Delhi, Pearson Education, 2003.

IV B.Tech - I Semester

14BT71205**: MACHINE LEARNING (PE-I)**

(Common to CSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on "Probability & Statistics", "Engineering Mathematics" and "Design and Analysis of Algorithms".

COURSE DESCRIPTION:

Basic concepts of machine learning and decision trees, neural networks and genetic algorithms, Bayesian techniques, instant based learning, and analytical learning and reinforced learning.

COURSE OUTCOMES:

On successful completion of the course student will be able to:

CO1 Demonstrate knowledge on supervised, unsupervised, reinforcement machine learning techniques and applications of machine learning.

CO2 Analyze skills on machine learning algorithms and its application

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION, CONCEPT LEARNING AND DECISION TREES (9 periods)

Learning Problems, Designing Learning systems, Perspectives and Issues, Concept Learning, Version Spaces and Candidate Elimination Algorithm, Inductive bias, Decision Tree learning, Representation, Algorithm, Heuristic Space Search.

UNIT - II: NEURAL NETWORKS AND GENETIC ALGORITHMS (9 periods)

Neural Network Representation, Problems, Perceptrons, Multilayer Networks and Back Propagation Algorithms, Advanced Topics, Genetic Algorithms, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning.

UNIT - III: BAYESIAN AND COMPUTATIONAL LEARNING (9 periods)

Bayes Theorem, Concept Learning, Maximum Likelihood, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier, Bayesian Belief Network, EM(Expectation-Maximization) Algorithm, Probably Learning, Sample Complexity for Finite and Infinite Hypothesis Spaces, Mistake Bound Model.

UNIT-IV: INSTANT BASED LEARNING AND LEARNING SET OF RULES (9 periods)

k- Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Sequential Covering Algorithms, Learning Rule Sets, Learning First Order Rules, Learning Sets of First Order Rules, Induction as Inverted Deduction, Inverting Resolution.

UNIT-V: ANALYTICAL LEARNING AND REINFORCED LEARNING (9 periods)

Perfect Domain Theories, Explanation Based Learning, Inductive-Analytical Approaches, FOCL (First Order Combined Learner) Algorithm, Reinforcement Learning, Task, Q-Learning, Temporal Difference Learning.

(Total periods: 45)

TEXT BOOK:

1. Tom M. Mitchell,"Machine Learning", McGraw-Hill, 1st Edition, 2013

REFERENCE BOOKS:

1. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, 2nd Edition, 2009.
2. Kevin P. Murphy, "Machine Learning," A Probabilistic Perspective, MIT Press, 2012.

IV B.Tech - I Semester

14BT71501**: EMBEDDED SYSTEM PROGRAMMING**

(Professional Elective -I)

(Common to CSE & CSSE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: Courses on "Computer Organization" and "Operating Systems".

COURSE DESCRIPTION: Embedded Systems, Design process; 8051 - Microcontroller; Program Modeling; Real Time Operating systems principles; Embedded system development tools.

COURSE OUTCOMES:

On successful completion of thecourse, student will be able to:

CO1. Gain knowledge in the following:
- Embedded system components.
- 8051 Microcontroller.
- Principles of Real Time Operating Systems.
- Embedded System design and development Process.

CO2. Acquire programming skills to develop software for embedded systems development.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION (9 periods)

Embedded Systems, Processor Embedded into a system, Hardware units and devices in a system, software, Examples, SoC and VLSI technology, Complex System design and processors, System Design process, Design Formalization, Examples, Classification, Designer skills.

UNIT-II: MICROCONTROLLER (10 periods)

8051 Micro controller Hardware, Input/output Ports and Circuits, Assembly language programming-PC, ROM space, data types, flags and register banks. Jump, loop and call instructions, Addressing modes, I/O ports, Arithmetic and logic instructions and programs, programming in C.

UNIT-III: PROCESSES AND REAL-TIME OPERATING SYSTEMS (9 periods)

Threads and Tasks: Tasks, Task States, Task and Data, Concept of Semaphores, Shared Data, Inter-process Communication, Signal Function, Semaphore Functions, Message Queue Functions, Mailbox Functions, Pipe Functions.

Real-Time Operating Systems: OS Services, Process Management, Timer Functions, Event Functions, Memory Management, Device, File and I/O subsystems management, Interrupt routines.

UNIT-IV: EMBEDDED PROGRAMMING (9 periods)

Program Modeling Concepts and Embedded Programming: Program Models, DFG Models, State Machine Programming Models for Event-controlled Program Flow, Modeling of Multiprocessor Systems, UML Modeling. Software Programming in Assembly Language (ALP) and in High-Level Language 'C', 'C' & Program Elements, Object-Oriented Programming, Embedded Programming in C++ & Java.

UNIT-V: EMBEDDED SYSTEM DEVELOPMENT (8 periods)

Embedded Software Development Process and Testing: Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware-Software Design and Co-design, Testing on Host Machine, Simulators and Laboratory Tools.

(Total periods: 45)

TEXT BOOKS

1. Rajkamal, "Embedded Systems Architecture, Programming and Design," Tata McGraw Hill, Second Edition, 2008.
2. Mazidi and Mazidi, " The 8051 Microcontroller and Embedded Systems," Pearson, Second Edition, 2014.

REFERENCE BOOKS:

1. Kenneth J.Ayala, "The 8051 Microcontroller," Cengage India, Third Edition, 2009.
2. David E. Simon, "An Embedded Software Primer", Pearson Education, First Indian Reprint 2000.

IV B.Tech - I Semester

14BT71504: **SIMULATION AND MODELING**

(Professional Elective -I)

(Common to CSE & CSSE)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

Prerequisites: A course on "Probability and Statistics"

COURSE DESCRIPTION:

Discrete event simulation; useful statistical models; queueing systems; properties of random numbers, test for random numbers; data collection, types of simulations with respect to output analysis.

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO1. Gain knowledge on functional modeling of system design.

CO2. Analyze the performance of queueing systems in real world applications.

CO3. Design dynamic system operations using simulation results.

DETAILED SYLLABUS

UNIT I: INTRODUCTION TO DISCRETE EVENT SIMULATION **(9 Periods)**

Simulation of queueing systems, Simu lation of inventory systems, Concepts in discrete-event simulation, List processing, Selection of simulation software.

UNIT II: STATISTICAL MODELS **(9 Periods)**

Review of terminology and concepts, Useful statistical models, Discrete distributions, Continuous distributions, Poisson process, Empirical distributions.

UNIT III: QUEUEING MODELS **(9 Periods)**

Characteristics of queueing systems, Queueing notation, Long-run measures of performance of queueing systems, Steady-state behavior of infinite-population Markovian models, Steady-state behavior of finite-population models, Networks of queues.

UNIT IV: RANDOM NUMBERS **(9 Periods)**

Properties of random numbers, Generation of pseudo-random numbers, Techniques for generating random numbers, Tests for random numbers, Inverse-transform technique, Acceptance-rejection technique, Special properties

UNIT V: ANALYSIS OF SIMULATION DATA **(9 Periods)**

Data collection, Identifying the distribution with data, Parameter estimation, Goodness-of-fit tests, Fitting a nonstationary Poisson process, Selecting input models without data, Multivariate and time series input models.

Types of simulations with respect to output analysis, Stochastic nature of output data, Measures of performance and their estimation, Output analysis of terminating Simulations and steady state simulations.

(Total periods: 45)

TEXT BOOK:

1. Jerry Banks, John S. Carson II, Barry L.Nelson and David M.Nicol, "Discrete-Event System Simulation," Fourth Edition PHI Learning Private Ltd. New Delhi, 2009.

REFERENCE BOOKS:

1. Geoffrey Gordon, "System Simulation," Second Edition, PHI, 2006.
2. Averill M. Law, "Simulation Modeling and Analysis," Fourth Edition, McGraw Hill Education (India) Private Limited, 2007.

IV B.Tech - I Semester

14BT71202**: MULTIMEDIA AND APPLICATION DEVELOPMENT**

(Professional Elective -II)

(Common to CSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on "Object Oriented Programming" and "Computer Graphics"

COURSE DESCRIPTION: Introduction to Multimedia; Fundamental Concepts in Audio and Video; Action Script 2.0; Multimedia Data Compression; Multimedia Network Communications and Applications.

COURSE OUTCOMES:

On successful completion of the course, student will be able to:

CO1. Demonstrate fundamental knowledge on image, audio, video representations & standards and multimedia network communications.

CO2. Analyze ActionScript principles, functions and components for developing multimedia authoring applications.

CO3. Apply various lossy/lossless coding techniques on text and images for compression and ecompression

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO MULTIMEDIA (10 Periods)

Definition of Multimedia, Multimedia and Hypermedia, Multimedia Software Tools, Graphics and Image Data representations-Graphics and Image Data types, File Formats, Color models in Images, Color models in Video.

Definition of sound, Digitization, Nyquist theorem, Signal to Noise Ratio, Signal to Quantization-Noise Ratio, Types of Video Signals, Analog Video, Digital Video.

UNIT-II: ACTIONSCRIPT-I (9 Periods)

ActionScript 2.0 Features, Data Types and Type Checking: Static Typing, Type Syntax, Compatible Types, Casting, ActionScript 2.0 Type checking, Classes-Defining classes, Constructor functions, Properties, Methods.

Inheritance: A Primer on inheritance, Subclasses as subtypes, Overriding Methods and Properties, Constructor functions in Subclasses, Polymorphism and Dynamic binding.

UNIT-III: ACTIONSCRIPT-II (9 Periods)

Interfaces: Introduction, Syntax and Use.

Packages: Syntax, Defining Packages, Package Access and Classpath.

Exceptions: The Exception Handling Cycle, Exception bubbling, finally block, Nested Exceptions, Limitations.

Authoring an ActionScript 2.0 class, An OOP Application Development, Using Components with ActionScript 2.0, MovieClip Subclasses.

UNIT-IV: MULTIMEDIA DATA COMPRESSION (10 Periods)

Lossless compression algorithms- Introduction, Basics of Information Theory, Run Length Coding, Variable Length Coding, Dictionary Based Coding,Arithmetic Coding. Lossy Compression Algorithms- Quantization, Introduction to Transform Coding-DCT,DFT.

Image Compression Techniques: JPEG Standard, JPEG 2000.Audio Compression Techniques-ADPCM in Speech Coding Introduction to Video Compression, Video Compression Based on Motion Compensation, MPEG-1, MPEG-2.

UNIT-V: MULTIMEDIA NETWORK COMMUNICATIONS AND APPLICATIONS (7 Periods)

Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MoD).

(Total Periods:45)

TEXT BOOKS:

1. Ze-Nian Li and Mark S. Drew, "Fundamentals of Multimedia", Pearson Education,2nd edition, 2008.
2. Colin Moock, "Essentials ActionScript 2.0", SPD O'Reilly, 1st edition, 2005.

REFERENCE BOOKS:

1. Nigel Chapman and Jenny Chapman, "Digital Multimedia",Wiley Dreamtech, 2nd edition, 2004.
2. Brian Underdahl, "Macromedia Flash MX", TMH, 1st edition, 2002.
3. Fred Halsall, "Multimedia Communications", Pearson, 1st edition, 2004
4. K.R.Rao, Zoram S. Bojkovic, "Multimedia Communication Systems", Pearson Education, 1st edition, 2002.

IV B.Tech - I Semester

14BT71206**: SERVICE ORIENTED ARCHITECTURE**

(Professional Elective -II)

(Common to CSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on "Software Engineering".

COURSE DESCRIPTION: Web Services, Principles of SOA; Service Layers; Simple Object Access Protocol (SOAP); Web Services Description Language (WSDL).

COURSE OUTCOMES:

On successful completion of the course, student will be able to:

CO1. Demonstrate knowledge on:
- Fundamentals of web services
- Principles, services and policies of service orientation.
- XML, WSDL related to SOA

CO2. Analyze complex business process critically in identifying appropriate service model logic.

DETAILED SYLLABUS:

UNIT - I: SOA AND WEB SERVICES FUNDAMENTALS (10 Periods)

Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common pitfalls of adopting SOA.

The Evolution of SOA: An SOA Timeline, The continuing evolution of SOA, The roots of SOA.

Web Services and Primitive SOA: The Web Services framework, Services, Service descriptions, messaging.

UNIT - II: SOA AND WS-* EXTENSIONS (8 Periods)

WS-* and Contemporary SOA (Part I): Message Exchange Patterns, Service Activity, Coordination, Atomic transactions, Business Activities.

WS-* and Contemporary SOA (Part-II): Addressing, Reliable messaging, Correlation, Policies, Metadata exchange.

UNIT - III: PRINCIPLES, SERVICE LAYERS AND PLANNING (10 Periods)

Principles of Service-Orientation: Anatomy of SOA, Common principles of Service Orientation, Inter relationship of Service Orientation Principles, Service Orientation and Object Orientation.

Service Layers: Service-Orientation and Contemporary SOA, Service Layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

SOA Delivery Strategies: SOA delivery lifecycle phases, The Top-down strategy, the bottom-up strategy, the agile strategy.

UNIT - IV: BUILDING SOA AND SERVICE MODELING (8 Periods)

Service Oriented Analysis: Benefits of a Business Centric SOA and Deriving Business Services.

Service Modeling: Service Modeling, Service Modeling guidelines, Classifying Service model logic, Contrasting Service modeling approaches.

UNIT - V: BUILDING SOA AND SERVICE DESIGN (9 Periods)

Service-Oriented Design: WSDL related XML Schema language basics, WSDL language basics, SOAP language basics, Service interface design tools.

Service Design: Service Design overview, Entity-centric business Service Design, Application Service Design, Task-centric business Service Design, Service Design guidelines.

(Total Periods: 45)

TEXT BOOK:

1. Thomas Erl, "Service-Oriented Architecture - Concepts, Technology, and Design", Pearson, 1st Edition, 2011.

REFERENCE BOOKS:

1. Shankar Kambhampaty, "Service Oriented Architecture for Enterprise and Cloud Applications", Wiley-India, 2nd edition, 2010
2. Eric Newcomer, "Understanding SOA with Web Services",Pearson Education, 2nd edition, 2005.

IV B.Tech - I Semester
14BT81503: HUMAN COMPUTER INTERACTION
(Professional Elective -II)
(Common to CSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

Prerequisites: -NIL-

COURSE DESCRIPTION: Importance of user interface; Graphical user interface; Design process; Screen Designing; Windows; Components; Software Tools and Interaction Devices.

COURSE OUTCOMES:

On successful completion of the course, student will be able to

CO1: Acquire knowledge on principles and components of HCI.

CO2: Analyze product usability evaluations and testing methods.

DETAILED SYLLABUS

UNIT I - INTRODUCTION (9 Periods)

Importance of user Interface - definition, Importance of good design, Benefits of good design, A brief history of Screen design, The graphical user interface - popularity of graphics, The concept of direct manipulation, Graphical system, Characteristics, Web user - Interface popularity, characteristics- Principles of user interface.

UNIT II - DESIGN PROCESS (8 Periods)

Design process - Human interaction with computers, Importance of human characteristics, human consideration in design, Human interaction speeds, and understanding business functions.

UNIT III - SCREEN DESIGN (10 Periods)

Design goals - Screen planning and purpose, Organizing screen elements, Ordering of screen data and content - screen navigation and flow - Visually pleasing composition - amount of information - focus and emphasis - presentation information simply and meaningfully - information retrieval on web - statistical graphics - Technological consideration in interface design.

UNIT IV - WINDOWS AND MULTIMEDIA (8 Periods)

Windows - New and Navigation schemes selection of window, selection of devices based and screen based controls; Components - text and messages, Icons and increases - Multimedia, colors, uses problems, choosing colors.

UNIT V- SOFTWARE TOOLS AND DEVICES (10 Periods)

Software tools - Specification methods, interface - Building Tools - Interaction Devices - Keyboard and function keys pointing devices - speech recognition digitization and generation - image and video displays - drivers.

(Total periods: 45)

TEXT BOOKS:

1. Wilbert O Galitz, "The Essential Guide to user Interface Design", Second Edition, Wiley India Education.
2. Ben Schneiderman, "Designing the User Interface", Fourth Edition, Pearson Education, Asia.

REFERENCE BOOKS:

1. A Dix, Janet Finlay, G D Abowd and R Beale, "Human-Computer Interaction", Third Edition, Pearson Publishers,2008.
2. Jonathan Wolpaw and Elizabeth Winter Wolpaw, "Brain-Computer Interfaces", Principles and Practice, First Edition, Oxford Publishers, 2012.

IV B.Tech - I Semester

14BT81505**: SOFTWARE ARCHITECTURE**

(Professional Elective -II)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: A course on "Software Engineering"

COURSE DESCRIPTION: Architecture Business Cycle; Layered Systems; Heterogeneous architectures; Architectural structures for shared information systems; Inter-operability; Patterns for distribution; Architectural design space; Applications of ADL; Tools for Architectural Design;

COURSE OUTCOMES

On successful completion of the course,student will be able to:

CO1: Acquire knowledge in software architecture, styles, patterns and frameworks

CO2: Design software architectures.

CO3: Gain Skills to describe software architecture using Architectural Description Languages.

DETAILED SYLLABUS

UNIT - I: INTRODUCTION TO SOFTWARE ARCHITECTURE AND ARCHITECTURAL STYLES (9 periods)

Introduction to software architecture: An Engineering Discipline for software, status of software architecture. Architecture Business Cycle: Where does Architecture comes from,Software process and Architecture Business cycle, what makes a good Architecture

Architecture styles:

Pipes and filters ,data abstraction and object oriented organization , Event-based Implicit Invocation, Layered Systems, Repositories, Interpreters, process control, Other Familiar Architectures, Heterogeneous Architectures.

UNIT - II: SHARED INFORMATION SYSTEMS AND ARCHITECTURE DESIGN GUIDANCE (9 periods)

Database Integration, Interpretation in Software Development Environments, Architectural Structures for Shared Information Systems. Guidance for User Interface Architectures, Case Study in Inter-operability: World Wide Web

UNIT-III : ARCHITECTURAL PATTERNS (8 periods)

Introduction

From Mud to Structure: Layers, pipes and Filters, Blackboard

Distributed Systems: Broker

UNIT - IV: FORMAL MODELS AND SPECIFICATION (10 periods)

Formalizing the Architecture of a Specific System, Formalizing an Architectural Styles, Formalizing Architectural Design Space, Case Study of an Industry Standard Computing Infrastructure: J2EE\EJB

UNIT - V: ARCHITECTURE DESCRIPTION LANGUAGES AND TOOLS FOR ARCHITECTURE DESIGN (9 periods)

Architectural Description Languages: Requirements for Architecture Description Languages, First class Connectors, Adding Implicit Invocation to Traditional programming Languages.

Tools for Architectural Design:

UniCon- A universal Connector Language, Exploiting Style in Architecture Design Environments, Beyond Definition/Use: Architectural Interconnection

(Total Periods: 45)

TEXT BOOKS:

1. Mary Shaw, David Garlan, " Software Architecture Perspective: on an Emerging Discipline", PHI,1996 .
2. Len Bass, Paul Elements, Rick Kazman, "Software Architecture in Practice", SEI Series, 2012.

REFERENCE BOOKS:

1. Buschmann," Pattern Oriented Software Architecture", Wiley, 1996.
2. Gamma, Shaw, "An Introduction to Software Architecture", World Scientific, 1995

IV B.Tech I Sem

14BT70521**: Software Testing Techniques Lab**

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	-	3	2

Prerequisite: A course on "Software Testing Techniques"

Course Description: Test cases development for: Unit, Integration, System, and Acceptance test; Functional Tests, Performance Tests, Defect reporting.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO 1. Analyzing testing circumstances and their resultants in software development.

CO 2. Design & develop the best tests strategies in accordance to the development model.

CO 3. Conduct tests with latest testing tools to address critical and complex areas of the software testing and achieve quality with ease.

L**IST OF PROGRAMMING EXCERSICES**

1. Generate Unit test cases for the Project module-wise and test them for defects, identify the defects from the code and correct them. Try Identify the various unit test metrics studied already to identify module stability. Fill the unit test report supplied by the instructor.
2. Generate Integration test cases for the Project and test them for defects, identify the defects and correct them. Try Identify the various Integration test metrics studied already to identify module stability. Fill the Integration test report supplied by the instructor.
3. Generate System test cases for the Project and test them for defects, identify the defects and correct them. Try Identify the various System test metrics studied already to identify system stability. Fill the System test report supplied by the instructor.
4. Generate User Acceptance cases for the Project and test them for defects, identify the defects and correct them. Try Identify the various System test metrics studied already to identify system stability. Fill the System test report supplied by the instructor.
5. Conduct a Functional Test on the given Web portal with any Functional Testing Tool.
6. Generate Performance Test Reports for the given Web portal and estimate its performance.
7. Conduct a Functional Test on the given Desktop application with any Functional Testing Tool.
8. Generate Performance Test Reports for the given Desktop application and estimate its performance.

REFERENCE BOOKS:

1. Dr.K.V.K.K.Prasad, "Software Testing Tools", Dreamtech, 1st Edition, 2004.
2. M.G.Limaye, "Software Testing: Principles and Techniques and Tools", Tata Mc Graw - Hill Education, 1st Edition, 2012.
3. Ilene Burnstein, "Practical Software Testing", Springers-Verilog Internation Edition, 2003.

IV B.Tech. - I semester

14BT71521**: DATA WAREHOUSING AND DATA MINING LAB**

(Common to CSE & CSSE)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	-	3	2

PREREQUISITE: A Course on "Data warehousing and data mining"

COURSE DESCRIPTION: Hands on practical experience on Data transformations like aggregation, filter, joiner transformations using INFORMATICA; Data preprocessing techniques; Mining frequent patterns, classification and clustering techniques using WEKA open source machine learning tool.

COURSE OUTCOMES:

On successful completion of the course, the student will be able to:

CO1. Design warehouse and develop mining algorithms to solve real-time problems.

CO2. Apply warehouse and mining tools to store and extract data from large databases.

L**IST OF PROGRAMMING EXCERSICES:**

I. Experiments on Informatica

For the given data tables,

1. Implement mapping of warehouse server on Employee table.
2. Display the list of employees whose salary is greater than 5000 by designing filter transformation.
3. Find the maximum and minimum salaried employee using aggregate transformation.
4. Join Employee and Dept table using joiner transformation.

Employee table

Name	datatype	Size
Eno	number	10
Ename	varchar	7
Sal	number	7
Job	varchar	10
Deptno	number	4

Dept table

Name	datatype	size
Eno	number	10
Ename	varchar	7
Deptno	number	5
Deptname	varchar	7
Sal	number	7
Job	varchar	10

II. Experiments on Weka 3.7.5:

Credit Risk Assessment:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. **Knowledge Engineering**. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. **Books**. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. **Common Sense.** Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. **Case Histories**. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

   The German Credit Data: Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data (Down load from web).In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer!)

   A few notes on the German dataset:

   " **DM** stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).

   " **Owns_telephone.** German phone rates are much higher than in Canada so fewer people own telephones.

   " **Foreign_worker**. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.

   " There are **20 attributes** used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks:

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
5. Is testing on the training set as you did above a good idea? Why or Why not?
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what cross-validation is briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?

7. Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)
9. sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?
12. (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

Reference Book:

1. Ian. H. Witton and Eibe Frank "Data Mining: Practical Machine Learning Tools and techniques," Second Edition, Elsevier Publication, 2005.

IV B. Tech. - I Semester
14BT70522**: SEMINAR**

Int. Marks: -; **Ext. Marks: 50;** **Total Marks: 50**

L	T	P	C
-	-	-	2

PREREQUISITES: All the courses of the program up to III B. Tech. - I Semester.

COURSE DESCRIPTION:

Identification of the topic for seminar; Literature survey; Perform critical study and analysis of the topic identified; Preparation of report and oral presentation.

COURSE OUTCOMES:

On completion of the seminar work the student will be able to

CO1. Demonstrate in-depth knowledge on the chosen seminar topic.
CO2. Analyze critically, the seminar topic for deriving conclusions.
CO3. Investigate issues related to seminar topic providing valid conclusions.
CO4. Perform effectively as individual on the chosen seminar topic.
CO5. Develop oral and written communication skills for preparing and presenting seminar report.
CO6. Continue to improve knowledge and competence in the chosen field of seminar.

IV B. Tech- II Semester
14BT80501**: DESIGN PATTERNS**

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITE : Courses on "Software Engineering", "OOP concepts" and OOAD"

COURSE DESCRIPTION: Introduction to Design Pattern, Creational Patterns, Structural Patterns, Behavioral Patterns and Case Study.

COURSE OUTCOMES:
On Successful completion of this course, student will be able to:

CO1 Gain knowledge on various design patterns to solve design problems in software
CO2 Analyze various object oriented design problems the patterns solves
CO3 Implement this pattern in Java or C++ to a real world problem.
CO4 Apply each pattern to the overall software quality of a system.

DETAILED SYLLABUS

UNIT-I: INTRODCTION: **(9 periods)**

Introduction: Introduction to Design Pattern, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT-II: CREATIONAL PATTERNS **(8 periods)**

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns. Discussion of Various applications of Creational Patterns.

UNIT-III: STRUCTURAL PATTERNS **(8 periods)**

Structural Patterns : Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy. Discussion of Various applications of Structural Patterns.

"**UNIT-IV: BEHAVIORAL PATTERNS** **(11 periods)**

Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Various applications of Behavioral Patterns.

UNIT-V: A CASE STUDY: **(9 periods)**

A Case Study: Designing a Document Editor, Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Case Studies in UML using Class, Object and Interaction diagrams.

(Total periods: 45)

TEXT BOOK:

1. Gamma, Vlissides, Helm, Johnson, "Design Patterns: Elements of Reusable Object Oriented Software," person education, 1995

REFERENCE BOOK:

1. James W- Cooper, Addison-Wesley,"Java Design Patterns - A Tutorial", 2000

IV B.Tech - II Semester

14BT81201**: CLOUD COMPUTING**

(Common to CSE,CSSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on "Computer Networks" and "Operating Systems"

COURSE DESCRIPTION: Cloud computing fundamentals; cloud computing architecture; cloud computing mechanisms; cloud security; working with clouds, virtualization and case studies.

COURSE OUTCOMES:

On successful completion of the course, student will be able to:

CO1. Demonstrate knowledge on services, architecture, types of infrastructural models, disaster recovery and Virtualization.

CO2. Analyze the issues in cloud computing

DETAILED SYLLABUS:

UNIT I: FUNDAMENTAL CLOUD COMPUTING (9 Periods)

Understanding Cloud Computing: Origins and Influences, Basic Concepts and Terminology, Goals and Benefits, Risks and Challenges.

Fundamental Concepts and Models: Roles and Boundaries, Cloud Characteristics, Cloud Delivery Models, Cloud Deployment Models.

UNIT II: CLOUD COMPUTING MECHANISMS AND ARCHITECTURE (9 Periods)

Cloud-Enabling Technology: Broadband Networks and Internet Architecture, Data Center Technology, Virtualization Technology, Web Technology, Multitenant Technology, Service Technology.

Fundamental Cloud Architectures: Architecture - Workload Distribution, Resource Pooling, Dynamic Scalability, Elastic Resource Capacity, Service Load Balancing, Cloud Bursting, Elastic Disk Provisioning, Redundant Storage.

UNIT III: CLOUD COMPUTING ADVANCED ARCHITECTURES (10 Periods)

Advanced Cloud Architectures: Architecture-Hypervisor Clustering, Load Balanced Virtual Server Instances, Non-Disruptive Service Relocation, Zero Downtime, Cloud Balancing, Resource Reservation, Dynamic Failure Detection and Recovery,Bare-Metal Provisioning,Rapid Provisioning,Storage Workload Management

"Specialized Cloud Architectures: Architecture - Direct I/O Access,Direct LUN Access,Dynamic Data Normalization,Elastic Network Capacity,Cross-Storage Device Vertical Tiering,Intra-Storage Device Vertical Data Tiering,Load Balanced Virtual Switches,Multipath Resource Access,Persistent Virtual Network Configuration,Redundant Physical Connection for Virtual Servers,Storage Maintenance Window.

UNIT IV: WORKING WITH CLOUDS (9 Periods)

Cloud Delivery Model Considerations: Cloud Delivery Models: The Cloud Provider, Cloud Delivery Models: The Cloud Consumer, Case Study Example.

Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations.

UNIT V: INTRODUCTION TO VIRTUALIZATION (8 Periods)

History of Virtualization, Objectives of virtualization, Benefits of Virtualized Technology, VMware, Microsoft Hyper-V and Ubuntu.

(Total Periods: 45)

TEXT BOOK:

1. Thomas Erl and RicardoPuttini "Cloud Computing- Concepts, Technology & Architecture," Pearson, 1st edition 2013.
2. Ivanka Menken, "Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book", 1st edition, 2009.

REFERENCE BOOKS:

1. Barrie Sosinsky, "Cloud Computing Bible," Wiley India Pvt Ltd, 1st edition, 2011.
2. Rajkumar Buyya, James Broberg and Andrzej Goscinski, "Cloud computing principles and paradigms," john Wiley and sons, 2011.
3. John W. Rittinghouse, James F. Ransome, "Cloud Computing implementation, Management and Security," CRC Press, ISBN: 9788120341609, Taylor & Francis group, 1st edition 2010.

IV B. Tech. - II Semester

14BT80502**: BIG DATA**

(Professional Elective -III)

(Common to CSE, CSSE & IT)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

PRE-REQUISITES: Courses on "Data Base Management Systems" and "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Introduction to Big Data, Types of Data Sources, Hadoop Frameworks and HDFS, Map Reduce, Hadoop Ecosystem Components.

COURSE OUTCOMES:

On successful completion of this course, the student will be able to:

CO1. Gain knowledge in
- Big data Characteristics
- Hadoop Framework.
- Hadoop Ecosystem Components
- Map Reduce.

CO2. Analyze the need for database systems for storing the large data

CO3. Design and model an effective and sustainable database for better performance using Big data tools

UNIT I - INTRODUCTION TO BIG DATA **(9 Periods)**

Big Data Characteristics: Volume-Variety-Velocity-Veracity, Analytics, Basic Nomenclature, Analytics Process Model, Analytical Model Requirements, Types of Data Sources, Sampling, Types of Data Elements, Missing Values, Standardizing Data, Outlier Detection and Treatment, Categorization.

UNIT II - HADOOP FRAMEWORKS AND HDFS **(8 Periods)**

Frameworks: A Brief History of Hadoop, The Hadoop Ecosystem, Hadoop Releases, The Building Blocks of Hadoop: Name Node-Data Node-Secondary Name Node-Job Tracker-Task Tracker.

The Hadoop Distributed File system: The Design of HDFS, HDFS Concepts, Hadoop File Systems .

UNIT III - MAP REDUCE **(9 Periods)**

Map Reduce: Anatomy of a Map Reduce: Map Reduce1-Map Reduce 2. Failures: Failures in Classic MapReduce, Failures in YARN. Job Scheduling: The Fair Scheduler, the Capacity Scheduler. Shuffle and Sort, Input Formats, Output Formats.

UNIT IV -HIVE AND PIG **(10 Periods)**

Hive: The Hive Shell, Hive Services, Comparison with Traditional Databases, HiveQL, Tables, Querying Data, User-Defined Functions.

Pig: Installing and Running Pig, Comparison with Databases, Pig Latin, User-Defined Functions, Data Processing Operators.

UNIT V -CASE STUDY **(8 Periods)**

Case Study: Hadoop Usage at Last.fm, Hadoop and Hive at Facebook, Nutch Search Engine, Log Processing at Rackspace, Mahout,Sqoop.

(Total Periods: 44)

TEXT BOOKS:

1. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications,"Wiley Publications, 2014.
2. Tom White, "Hadoop:The Definitive Guide," 3rd Edition, O'REILLY Publications, 2012.

REFERENCE BOOKS:

1. Paul Zikopoulos, IBM, Chris Eaton, Paul Zikopoulos "Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data", The McGraw-Hill Companies, 2012.
2. Chuck Lam "Hadoop in action," Manning Publications, 2011.

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IV B. Tech II-Semester
14BT80503: COMPUTER FORENSICS
(Professional Elective -III)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PRE-REQUISITES:
A Course on"Information Security"
COURSE DESCRIPTION: This course deals with the concepts of computer forensics Services, Evidence collection and data seizure, Law Enforcement crime and Incident scenes, forensic technologies and usage of Forensic tools recognized in computer forensics field.
COURSE OUTCOMES:
On successful completion of this course, students will be able to:
CO 1. Gain knowledge in
- Computer Forensic Fundamentals and forensic Technologies
- Evidence, Data Capture and Computer Forensic Analysis
- Law Enforcement and crime incident scenes

CO 2. Analyze and validate Forensic data.
CO 3. Apply forensic tools and technologies to capture the evidence and investigate crimes.

DETAILED SYLLABUS

UNIT-I: OVERVIEW OF COMPUTER FORENSICS TECHNOLOGY (9 periods)
Computer Forensics Fundamentals: Introduction to computer Forensics, Use of computer Forensics in Law Enforcement, Benefits of Professional Forensics Methodology,Steps taken by Computer Forensics Specialists.
Types of Computer Forensics Technologies: Types of Military Computer Forensic Technology, Types of Law Enforcement: preservation of Evidence, Data Hiding Techniques, and Types of Business Computer Forensic Technology.
Computer Forensic Services: Occurrence ofCybercrime, Cyber Detectives, Forensic Process Improvement, Tools: Dig - x /nslookup, Whois, Ping

UNIT - II: COMPUTER FORENSICS EVIDENCE AND CAPTURE (9 periods)
Data Recovery: Data back-up and Recovery, Role of Back-Up in Recovery, Data-Recovery Solution.
Evidence Collection and Data Seizure: Collect Evidence, Collection Options, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure - Collection and Archiving, Methods of Collection, Artifacts, Collection Steps, Controlling Contamination: The Chain of Custody .

UNIT -III: COMPUTER FORENSIC TOOLS AND ANALYSIS (9 periods)
Current Computer Forensic Tools: Types of Computer Forensic Tools, Computer Forensic Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensic Software.
Data Analysis and Validation: Determining what data to collect and analyze, Validating forensic data, Addressing Datahiding techniques, performing remote acquisitions.

UNIT - IV: LAW ENFORCEMENT CRIME AND INCIDENT SCENES (9 periods)
Processing Crime and Incident Scenes: Identifying digital evidence, collecting the Evidence in private-Sector Incident scenes, processing law enforcement crime scenes, Preparing for a search, Seizing a Computer Incident or Crime Scene, Seizing and storing digital Evidence, obtaining a digital Hash.

UNIT - V: COMPUTER FORENSICS AREAS (9 periods)
E-Mail Investigation: Exploring the role of E-Mail in Investigations, Exploring the role of the Client and Server in E-Mail, Investigating E-Mail Crimes and Violations, Understanding E-Mail Servers, Specialized E-Mail Forensic Tools - FINALeMAIL, AccessData FTK.
Cell Phone and Mobile Devices Forensics: Understanding Mobile Device Forensics, Understanding Acquisition Procedures for Cell phone and mobile Devices

(Total periods: 45)

TEXT BOOKS:

1. John R.Vacca, "Computer Forensics, Computer Crime Investigation, "First Edition,: Firewall Media, New Delhi 2009.
2: Nelson, Amelia Phillips, Christopher Steuart,"Computer Forensics and Investigations,"Fourth Edition, Cengage Learning, 2009.

REFERENCE BOOKS:

1. SunitBelapure, Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,"FirstEdition, Wiley India Pvt Ltd, 2011.
2. Eoghan Casey, "Handbook Computer Crime Investigation's Forensic Tools and Technology,"FirstEdition, Academic Press, 2001

IV B. Tech - II Semester

14BT80504: **DISTRIBUTED SYSTEMS**

(Professional Elective -III)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITE: A Course on "Operating Systems"

COURSE DESCRIPTION:

Characterization of distributed systems, system models, inter-process communication, distributed objects and remote invocation, name services, peer-to-peer systems, transactions and concurrency control and distributed shared memory and CORBA case study.

COURSE OUTCOMES:

On successful completion of this course, the student will be able to:

CO1 Gain knowledge on concepts of distributed systems, system models, Inter-process communication, and RMI.

CO2 Apply the concepts of distributed systems to solve the real time problems

CO3 Design and implement distributed application

DETAILED SYLLABUS

UNIT I: CHARACTERIZATION OF DISTRIBUTED SYSTEMS& SYSTEM MODELS (9 periods)

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges.

System models-Introduction, Architectural and Fundamental models

Unit II: Inter process Communication and Distributed Objects (9 periods)

Inter process Communication - Introduction, The API for the Internet Protocols, External data representation and marshalling, Client-server communication, Group communication.

Distributed Objects and Remote Invocation-Introduction, communication between distributed objects, Remote procedure call, events and notifications .

UNIT III: DISTRIBUTED FILE SYSTEMS&PEER-TO-PEER SYSTEMS (10 periods)

Distributed File Systems- Introduction, File Server Architecture.

Name Services- Introduction, Name Services and the Domain Name System, Directory Services, Case Study of Global Name Service, Case Study of the X.500 Directory Service.

Peer-to-Peer Systems-Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays.

UNIT IV: TRANSACTIONS AND CONCURRENCY CONTROL&DISTRIBUTED TRANSACTIONS (9 periods)

Transactions and Concurrency control-Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Controls.

Distributed Transactions -Introduction, Flat and Nested Distributed Transactions, Atomic

Commit Protocols, Concurrency control in Distributed Transactions, Distributed Deadlocks, and Transaction Recovery

UNIT V: DISTRIBUTED SHARED MEMORY & CORBA CASE STUDY (8 periods)

D**istributed Shared Memory**- Design and Implementation Issues, Sequential Consistency and Ivy Case Study, Release Consistency and Munin Case Study, Other Consistency Models.

CORBA Case Study- CORBA RMI, CORBA Services

(Total periods: 45)

TEXT BOOK:

1. G. Coulouris, J. Dollimore, and T. Kindberg "Distributed Systems: Concepts and Design," Pearson Education, 4th Edition, 2013

REFERENCE BOOKS:

1. Andrew S. Tanenbaum and Maarten Van Steen, "Distributed Systems: Principles and Paradigms," 2ndEdition, Pearson, 2007
2. M.L.Liu Distributed Computing, Principles and Applications, Pearson Education, 3rd Edition, 2013

IV B.Tech - II Semester

14BT81202: **CRYPTOGRAPHY AND NETWORK SECURITY**

(Professional Elective -III)

(Common to CSE, ECE & IT)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: A Course on "Computer Networks".

COURSE DESCRIPTION: Principles and practice of cryptography and network security: classical systems, symmetric block ciphers-DES; public-key cryptography-RSA, Diffie-Hellman; hash functions, authentication, key management, key exchange, signature schemes, E-mail, web security, and firewalls.

COURSE OUTCOMES:

On successful completion of the course, student will be able to:

CO1. Demonstrate knowledge on Cryptographic algorithms, their mathematical models, Message Authentication, Digital Signatures and firewall.

CO2. Analyze vulnerabilities and threats on information systems based on various security parameters.

DETAILED SYLLABUS:

Unit-I: CLASSICAL ENCRYPTION TECHNIQUES (8 Periods)

Introduction: Services, Mechanisms, and Attacks Concepts, The OSI Security Architecture, Model for Network Security.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques.

Unit-II: BLOCK CIPHERS AND PUBLIC-KEY CRYPTOGRAPHY (9 Periods)

Block Ciphers and the Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Block Cipher Design Principles, Block Cipher Modes of Operation.

Public-Key Cryptography: Principles of Public-Key Cryptosystems, the RSA Algorithm, Diffie-Hellman Key Exchange

UNIT-III:

MESSAGE AUTHENTICATION CODES, HASH FUNCTIONS, AND DIGITAL SIGNATURES (9 Periods)

Message authentication codes: Message Authentication Requirements, Message Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, Hash algorithms-SHA, HMAC.

Digital Signatures: Digital Signatures, Digital Signature Standard (DSS), Authentication applications-Kerberos, X.509 Authentication Service.

UNIT-IV: ELECTRONIC MAIL SECURITY, IP SECURITY AND WEB SECURITY (10 Periods)

Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME-Multipurpose Internet Mail Extensions (MIME), S/MIME Functionality, Messages, Certificate Processing.

IP Security: IP Security Overview, Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations.

Web Security: Web security Considerations, Secure Sockets Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction.

Unit-V: INTRUDERS, MALICIOUS SOFTWARE, AND FIREWALLS (9 Periods)

Intruders: Intrusion Detection, Password Management-Password Protection, Password selection.

Malicious Software: Viruses and Related Threats, Virus Countermeasures.

Firewalls: Firewall Design Principles, Trusted Systems.

(Total Periods: 45)

TEXT BOOK:

1. William Stallings, "Cryptography and network Security principles and Practice", Pearson Education, 3rd edition, 2003.

REFERENCE BOOKS:

1. William Stallings, "Network Security Essentials Applications and Standards", , Pearson Education, 3rd edition.
2. Behrouz A Forouzan and Debdeed Mukhopadhyay, "Cryptography and Network Security", McGraw Hill Education, 2nd edition, 2010.

IV B. Tech - II Semester

14BT80505**: NETWORK MANAGEMENT**

(Professional Elective -IV)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITE: Courses on "Computer Networks" and "Network Security"

COURSE DESCRIPTION:

Principles of Network Management; SNMPv1, SNMPv2, SNMPv3 Network management and Communication; Remote Monitoring and Telecommunication management Network; Broadband and Advanced Management

COURSE OUTCOMES:

On Successful Completion of this course, a student will be able to:

CO1: Gain Knowledge on SNMP, Telecommunications Networks and Remote monitoring

CO2: Analyze Traffic Management Problems in Network through Remote Monitoring

CO3: Apply Advanced Management tools in web based Enterprise Management

DETAILED SYLLABUS

UNIT-I: DATA COMMUNICATIONS AND NETWORK MANAGEMENT OVERVIEW (9 periods)

Data Communications Foundations: Analogy of Telephone Network Management, Communication Protocols and standards, Networks, Systems, and Services, case histories of Network, System, and Service Management, Challenges of IT Managers.

Network Management Overview: Network Management Goals, Organization and functions, Network Management Architecture and Organization , Current Status and Future of Network Management.

UNIT-II: BASIC FOUNDATIONS & SNMPV1: ORGANIZATION AND INFORMATION MODELS (9 periods)

Basic Foundations: Network Management Standards, Network Management Models, Organizational Model, Information Model, Communication Model, Functional Model, ASN.1, Encoding Structure

SNMPV1: History of SNMP Management, internet organization and standard, SNMPV1Architecture, Organization and Information models.

UNIT-III:

SNMPV1: COMMUNICATION AND FUNCTIONAL MODELS & SNMPV2NETWORK MANAGEMENT (9 periods)

SNMPV1: SNMP Architecture, Administrative Model, SNMP Protocol Specifications, SNMP Operations, SNMP MIB Group, Functional Model

SNMPV2: Major changes in SNMPV2, System Architecture, SNMPV2 structure of Management Information, SNMPV2 Management Information Base, SNMPV2 protocol, Compatibility with SNMPV1.

UNIT-IV: SNMPV3 NETWORK MANAGEMENT AND RMON

(9 periods)

SNMPV3: Key features, SNMPV3 architecture, applications, Management Information BaseUser based security model, Access control

Remote Monitoring: Introduction to Remote monitoring, RMON Structure of Management Information and Management Information Base, RMON1, RMON2, ATM Remote monitoring and Case study.

UNIT-V: TELECOMMUNICATIONS MANAGEMENT NETWORK AND ADVANCEDMANAGEMENT (9 periods)

Tele Communications Management Network: Introduction to TMN, Operations Systems, TMN conceptual model, TMN Architecture, TMN integrated view.

Advanced Management: Next Generation NM Requirements, Limitations of SNMP Management, Evolutionary Approaches, Web Interface and Web Management, Web-based Enterprise Management, Web-based interface Management Architecture, XML based NM Technology

(Total periods: 45)

TEXT BOOK:

1. Mani Subramanian, "Network Management: Principles and Practice", Second Edition, New Delhi: Pearson Education, 2012

REFERENCE BOOKS:

1. William Stallings , "SNMP, SNMPV2,SNMPV3 and RMON 1 and 2," Third Edition, New Delhi: Pearson Education, 2009
2. Stephen BMorris, "Network Management, MIBS and MPLS: Principles, Design and Implementation", New Delhi: Pearson Education 2008

IV B.Tech - II Semester

14BT71201**: MOBILE APPLICATION DEVELOPMENT**

(Professional Elective -IV)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: A Course on "Object Oriented Programming through Java".

COURSE DESCRIPTION: Knowledge on Mobile platforms, Designing of Mobile User Interface and tools for developing user interface, Introduction to Android, Understanding Activities, Linking Activities using Intents, Creating the User Interface Programmatically, Views, Menus, Database Storage, SMS, e-mail, Displaying Maps, Building a Location Tracker Web Services Using HTTP, Sockets Programming, Communication between a Service and an Activity, Introduction to iOS and Windows Phone 7.

COURSE OUTCOMES:

On Successful completion of the course, student will be able to:

CO1. Demonstrate knowledge on
- Mobile platforms and Mobile User Interface
- Android Activities and Intents
- Messaging, Networking, Location based Services, Android Services
- Basics of iOS and Windows phone 7

CO2. Demonstrate problem solving skills to design and develop solutions for real world problems with android mobile applications.

DETAILED SYLLABUS:

UNIT-I MOBILE APP OR WEBSITE, MOBILE USER INTERFACE DESIGN, ANDROID PROGRAMMING (8 Periods)

Mobile Web Presence, Mobile Applications, Marketing, App as a Mobile Web App, Effective Use of Screen Real Estate, Understanding Mobile Application Users, Understanding Mobile Information Design, Understanding Mobile Platforms, Using the Tools of Mobile Interface Design.

What is android, obtaining the required tools, First Android Application, Anatomy of an Android Application.

UNIT - II ACTIVITIES, INTENTS AND ANDROID USER INTERFACE (9 Periods)

Understanding Activities, Linking Activities using Intents, Calling Built-In Applications using Intents, Displaying Notifications, Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Listening for UI Notifications

UNIT - III DESIGNING USER INTERFACE WITH VIEWS, DISPLAYING PICTURES AND MENUS WITH VIEWS, DATA PERSISTENCE (10 Periods)

Basic Views, Picker Views, List Views, Using Menus with Views, Some Additional Views, Saving and Loading User Preferences, Persisting Data to Files, Creating and Using Databases.

UNIT - IV MESSAGING, LOCATION-BASED SERVICES, AND NETWORKING (9 Periods)

SMS Messaging, Sending e-mail, Displaying Maps, Getting Location Data, Monitoring a Location, Consuming Web Services Using HTTP.

UNIT - V DEVELOPING ANDROID SERVICES, GETTING STARTED WITH IOS, AND WINDOWS PHONE 7 (9 Periods)

Creating Your Own Services, Establishing Communication between a Service and an Activity, Binding Activities to Services, Understanding Threading.

iOS Tools, iOS Project, Debugging iOS Apps, Objective-C Basics, Hello World App, Building the Derby App in iOS. Windows Phone 7 Metro, Application Bar, Tiles, Tombstoning, Tools, Windows Phone 7 Project, Building the Derby App in Windows Phone 7

(Total Periods: 45)

TEXT BOOKS:

1. Wei-Meng Lee, John, "Beginning Android™ 4 Application Development", Wiley & Sons Inc., 1st edition, 2012.
2. Jeff McWherter, Scott Gowell, "Professional Mobile Application Development", Wiley & Sons Inc., 1st edition, 2012.

REFERENCE BOOKS:

1. Paul Deital and Harvey Deital, "Android How to Program," Detial Associates Publishers, 1st edition, 2013.
2. Zigurd Mednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura, "Programming Android Java Programming for the New Generation of Mobile Devices", O'Reilly Media, 1st Edition, 2011.

IV B.Tech - II Semester

14BT81204**: INFORMATION RETRIEVAL SYSTEMS**

(Professional Elective -IV)

(Common to CSE,CSSE&IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on "Data Structures and Database Management Systems"

COURSE DESCRIPTION: Architecture of Information Retrieval Systems; Functional Capabilities; Data Structures; Mathematical Algorithms; Indexing; Similarity and Clustering; Human Perception and Presentation; Text Search Techniques and Evaluation Measures.

COURSE OUTCOMES:

On successful completion of the course, student will be able to:

CO1. Demonstrate knowledge on Information Retrieval Systems including architecture, functional capabilities, indexing and data presentation methods.

CO2. Analyze clustering algorithms to group similar data items and text search techniques for efficient search.

CO3. Design and develop data structures used to store/retrieve data items, mathematical algorithms and measures to evaluate retrieval systems.

DETIALED SYLLABUS:

UNIT I: INTRODUCTION (11 Periods)

Primary Information Retrieval Problems, Objectives of Information Retrieval System, Functional Overview, Understanding the Search Functions, Relationship to DBMS, Digital libraries and Data Warehouses, Data structures and Mathematical Algorithms.

UNIT II: INGEST AND INDEXING (09 Periods)

Introduction, Item Receipt, Duplicate Detection, Item Normalization, Zoning and Creation of Processing Tokens, Stemming, Entity Processing, Categorization, Citational Metadata, Manual Indexing Process, Automatic Indexing of Text and Multimedia.

UNIT III: SEARCH AND CLUSTERING (9 Periods)

Similarity measures and Ranking, Hidden Markov Models Techniques, Ranking Algorithms, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches for Boolean Systems, Multimedia Searching, Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters.

UNIT IV: INFORMATION PRESENTATION (8 Periods)

Introduction, Presentation of the Hits, Display of the Item, Collaborative Filtering, Multimedia Presentation, Human Perception and Presentation.

UNIT V: SEARCH ARCHITECTURE AND EVALUATION (8 Periods)

Index Search Optimization, Text Search Optimization, GOOGLE Scalable multiprocessor architecture, Information System Evaluation, Measures used in system evaluation

(Total Periods: 45)

TEXT BOOK:

1. Gerald Kowalski, "Information Retrieval Architecture and Algorithms," Springer, 1st edition, 2013.

REFERENCE BOOKS:

1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, "An Introduction to Information Retrieval," Cambridge University Press, 1st edition, 2012.
2. Ricardo Baeza-Yates and Berthier Ribiero-Neto, "Modern Information Retrieval the concepts and technology behind search," Addison Wesley, 2nd edition, 2010.

IV B.Tech - II Semester
14BT81206**: SEMANTIC WEB**
(Professional Elective -IV)
(Common to CSE&IT)

Int. Marks: 30; **Ext. Marks: 70;** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on "Web Programming"

COURSE DESCRIPTION: Semantic web fundamentals; Semantic web technology; Ontology web language; Swoogle; Semantic web services.

COURSE OUTCOMES:
After successful completion of the course, student will be able to:
CO1. Demonstrate knowledge on:
- •Semantic web search
- •RDF , SWOOGLE
- •Semantic web services
- •RDFS, OWL

CO2. Acquire analysis skills on semantic web search engines and ontology engineering.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION: **(9 Periods)**
The world of the semantic web: WWW, Internet usage, Meta data-Search engine, Search engine for traditional web-Semantic web.

UNIT II: SEMANTIC WEB TECHNOLOGY: **(9 Periods)**
RDF(Resource Description Framework), Rules of RDF, Aggregation-Distributed information, core elements of RDF, Ontology and Taxonomy, Inferencing based on RDF schema, RDF tools

UNIT III: ONTOLOGY WEB LANGUAGE -OWL: **(8 Periods)**
OWL (Ontology Web Language), Using OWL to define classes, Set operators and Enumerations, Define properties ontology matching, Three faces of OWL, Validate OWL, Protégé editor.

UNIT IV: SWOOGLE: **(10 Periods)**
Swoogle Architecture, FOAF, Semantic markup, Issues, prototype system, Design of Semantic web search engine, Discovery and indexation strategy, Need for Semantic Web Services.

UNIT V: SEMANTIC WEB SERVICES: **(9 Periods)**
Semantic web services and applications, OWL-S: Upper ontology, WSDL-S, OWL-S to UDDI mapping Design of the search engine, implementations.

(Total Periods: 45)

TEXT BOOK:
1. Liyang Yu, "Introduction to the Semantic Web and Semantic web services" Chapman & Hall/CRC, Taylor & Francis Group, U.K,2007

REFERENCE BOOKS:

1. Johan Hjelm, "Creating the Semantic Web with RDF, " Wiley, 2001
2. Grigoris Antoniou and Frank van Harmelen, "A Semantic Web Primer," MIT Press, 2004.

IV B.Tech II-Semester
14BT80521**: COMPREHENSIVE VIVA-VOCE**

Int. Marks: NIL; **Ext. Marks: 100;** **Total Marks: 100**

L	T	P	C
-	-	-	2

COURSE DESCRIPTION:

Assessment of student learning outcomes.

COURSE OUTCOMES:

Comprehensive Viva-Voce enables a successful student to:

CO1. Demonstrate knowledge in the program domain.

CO2. Exhibit professional etiquette suitable for career progression.

CO3. Present views cogently and precisely.

IV B. Tech- II Semester

14BT80522: **PROJECT WORK**

Int. Marks: 60; **Ext. Marks: 140;** **Total Marks: 200**

L	T	P	C
-	-	20	10

PREREQUISITES: --

COURSE DESCRIPTION:

Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and Techniques; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES:

On completion of project work the student will be able to:

CO1. Demonstrate in-depth knowledge on the chosen project topic.

CO2. Identify and analyze the problem to derive substantiated conclusions.

CO3. Design solutions to the chosen problem.

CO4. Conduct investigations on the chosen problem to provide valid conclusions.

CO5. Use appropriate techniques, algorithms and software/ hardware tools necessary for the project work.

CO6. Understand professional and ethical responsibilities while implementing the project work.

CO7. Function effectively as individual and as a team member in the project

CO8. Develop communication skills, both oral and written for preparing and presenting project report.

CO9. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.

CO10. Continue to learn and improve knowledge and competence in the chosen area of the project.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

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COURSE STRUCTURE (2014-2015)

INFORMATION TECHNOLOGY

I Year B.Tech. (Yearly Pattern)

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT1HS01	Technical English	2	-	-	4	30	70	100
14BT1BS01	Engineering Physics	2	1	-	4	30	70	100
14BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
14BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
14BT1BS04	Mathematical Methods	3	1	-	6	30	70	100
14BT1ES02	Problem Solving and Computer Programming	3	1	-	6	30	70	100
14BT1ES03	Computer-Aided Engineering Drawing	-	1	3	3	25	50	75
14BT1BS05	Engineering Physics and Engineering Chemistry Lab.	-	-	3	3	25	50	75
14BT1ES05	Problem Solving and Computer Programming Lab.	-	-	3	3	25	50	75
14BT1ES06	Engineering and IT Workshop	-	-	3	3	25	50	75
14BT1HS02	English Language Communication Skills Lab.	-	-	3	3	25	50	75
	TOTAL	15	6	15	45	305	670	975

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COURSE STRUCTURE (2014-2015)

INFORMATION TECHNOLOGY

II Year B.Tech. I Semester

Course Code	Course Title	Periods per week			Credits	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS03	Probability and Statistics	3	1	-	3	30	70	100
14BT31201	Discrete Mathematical Structures	3	1	-	3	30	70	100
14BT30235	Basic Electrical Engineering	3	1	-	3	30	70	100
14BT30431	Electronic Devices and Circuits	3	1	-	3	30	70	100
14BT30501	Data Structures	3	1	-	3	30	70	100
14BT30502	Digital Logic Design	3	1	-	3	30	70	100
14BT30422	Analog and Digital Electronics Lab	-	-	3	2	25	50	75
14BT30521	Data Structures Lab	-	-	3	2	25	50	75
	Total:	**18**	**6**	**6**	**22**	**230**	**520**	**750**

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COURSE STRUCTURE (2014-2015)

INFORMATION TECHNOLOGY

II Year B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3HS01	Environmental Sciences	3	1	-	3	30	70	100
14BT4HS01	Business Communication and Presentation Skills	3	1	-	3	30	70	100
14BT41201	Object Oriented Programming	3	1	-	3	30	70	100
14BT40432	Data Communications	3	1	-	3	30	70	100
14BT40501	Computer Organization	3	1	-	3	30	70	100
14BT40502	Database Management Systems	3	1	-	3	30	70	100
14BT51501	Operating Systems	3	1	-	3	30	70	100
14BT41221	Object Oriented Programming Lab	-	-	3	2	25	50	75
14BT40521	Database Management Systems Lab	-	-	3	2	25	50	75
	Total:	**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

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COURSE STRUCTURE (2014-2015)

INFORMATION TECHNOLOGY

III Year B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT4HS02	Professional Ethics	3	1	-	3	30	70	100
14BT5HS02	Management Science	3	1	-	3	30	70	100
14BT51201	Computer Networks	3	1	-	3	30	70	100
14BT51202	Software Engineering	3	1	-	3	30	70	100
14BT50431	Microprocessors and Interfacing	3	1	-	3	30	70	100
14BT50501	Theory of Computation	3	1	-	3	30	70	100
14BT50502	Unix Internals	3	1	-	3	30	70	100
14BT51221	Unix & Computer Networks Lab	-	-	3	2	25	50	75
14BT50424	Microprocessors and Interfacing Lab	-	-	3	2	25	50	75
	Total:	**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

INFORMATION TECHNOLOGY

III Year B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS01	Managerial Economics and Principles of Accountancy	3	1	-	3	30	70	100
14BT61201	Data Warehousing and Data Mining	3	1	-	3	30	70	100
14BT61202	Web Programming	3	1	-	3	30	70	100
14BT40503	Design and Analysis of Algorithms	3	1	-	3	30	70	100
14BT60501	Object Oriented Analysis and Design	3	1	-	3	30	70	100
	Open Elective	3	1	-	3	30	70	100
14BT61221	OOAD & Data Mining Lab	-	-	3	2	25	50	75
14BT61222	Web Programming Lab	-	-	3	2	25	50	75
	Total:	**18**	**6**	**6**	**22**	**230**	**520**	**750**

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COURSE STRUCTURE (2014-2015)
INFORMATION TECHNOLOGY
IV Year B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT71201	Mobile Application Development	3	1	-	3	30	70	100
14BT71202	Multimedia and Applications Development	3	1	-	3	30	70	100
14BT70501	Compiler Design	3	1	-	3	30	70	100
14BT41501	Computer Graphics	3	1	-	3	30	70	100
Professional Elective-I		3	1	-	3	30	70	100
14BT71203	Scripting Languages							
14BT71204	Software Testing Techniques							
14BT70431	Image Processing and Pattern Recognition							
14BT71502	Network Programming							
14BT71506	Soft Computing							
Professional Elective-II		3	1	-	3	30	70	100
14BT71205	Machine Learning							
14BT71206	Service Oriented Architecture							
14BT80504	Distributed Systems							
14BT80505	Network Management							
14BT81503	Human Computer Interaction							
14BT71221	Mobile Application Development Lab	-	-	3	2	25	50	75
14BT71222	Multimedia and Applications Development Lab	-	-	3	2	25	50	75
14BT71223	Seminar	-	-	-	2	--	50	50
	Total:	**18**	**6**	**6**	**24**	**230**	**570**	**800**

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COURSE STRUCTURE (2015-2016)

INFORMATION TECHNOLOGY

IV Year B.Tech. II Semester (Yearly Pattern)

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT81201	Cloud Computing	3	1	-	3	30	70	100
14BT81202	Cryptography and Network Security	3	1	-	3	30	70	100
Professional Elective-III		3	1	-	3	30	70	100
14BT81203	.Net Technologies							
14BT70503	Advanced Computer Architecture							
14BT80532	Ad-hoc and Wireless Sensor Networks							
14BT71501	Embedded System Programming							
14BT81501	High Performance Computing							
Professional Elective-IV		3	1	-	3	30	70	100
14BT81204	Information Retrieval Systems							
14BT81205	Mobile Communications							
14BT81206	Semantic Web							
14BT80502	Big Data							
14BT71507	Software Project Management							
14BT81221	Comprehensive Viva-Voce	-	-	-	2	-	100	100
14BT81222	Project Work	-	-	20	10	60	140	200
	Total:	**12**	**4**	**20**	**24**	**180**	**520**	**700**
	Grand Total:	**123**	**42**	**65**	**187**	**1695**	**3980**	**5675**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

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COURSE STRUCTURE (2014-2015)

INFORMATION TECHNOLOGY

IV B.Tech. I Semester
Open Electives

Offering Dept	Course Code	Course Title
BS&H	14BT6HS01	Banking and Insurance
BS&H	14BT6HS02	Cost Accounting and Financial Management
BS&H	14BT6HS03	Entrepreneurship for Micro, Small and Medium Enterprises
CE	14BT70105	Disaster Mitigation and Management
CE	14BT70106	Environmental Pollution and Control
CE	14BT70107	Contract Laws and Regulations
CE	14BT70108	Planning for Sustainable Development
CE	14BT70109	Rural Technology
ME	14BT60305	Artificial Intelligence and Robotics
ME	14BT60306	Global Strategy and Technology
ME	14BT60307	Intellectual Property Rights and Management
ME	14BT60308	Managing Innovation and Entrepreneurship
ME	14BT60309	Material Science
CSE	14BT60502	Engineering Systems Analysis and Design
EIE	14BT71005	Microelectromechanical Systems
IT	14BT61203	Bio-Informatics
IT	14BT61204	Cyber Security and Laws

B.Tech I Year

14BT1HS01: **TECHNICAL ENGLISH**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

DETAILED SYLLABUS:

UNIT – I: (10 periods)

My Early Days by **A. P. J. Abdul Kalam** from **All About English** by Cambridge University Press India Pvt Ltd. 2014.

Communication: Importance of Communication – Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-Verbal Communication.

UNIT – II: (10 periods)

A Speech by N. R. Narayana Murthy from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: (10 periods)

The Town by the Sea by Amitav Ghosh from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: (10 periods)

Sir. C. V. Raman: The Celebrated Genius from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Reading: Reading and Interpretation – Intensive and Extensive Reading–Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: (10 periods)

The Model Millionaire by **Oscar Wilde** from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Writing: Characteristics – Language – Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism - Referencing and Styling.

Total Periods: 50

TEXT BOOKS:

1. *All About English,* Cambridge University Press India Pvt. Ltd., First Edition, 2014.
2. Meenakshi Raman and Sangeetha Sharma, *Technical Communication,* Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, *Effective Technical Communication,* Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.
2. Martin Hewings, *Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,* Cambridge University press, First South Asian Edition, New Delhi, 1999.

B.Tech. I Year

14BT1BS01**: ENGINEERING PHYSICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

COURSE OUTCOMES :

After completion of the course a successful student will be able to

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context.

DETAILED SYLLABUS:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, Ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: (16 periods)

SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III : (17 periods)

PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative treatment), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: (17 periods)

DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V : (17 periods)

MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS

Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total Periods: 85

TEXTBOOKS:

1. S. Mani Naidu*, Engineering Physics*, Pearson Education, 2013.

2. P. K. Palaniswamy, *Engineering Physics,*Scitech Publications

REFERENCE BOOKS:

1. R. K. Gaur and S. L. Gupta*, Engineering Physics,* DhanpatRai Publications (P) Ltd., 8th Edition, 2001.

2. M. R. Srinivasan, *Engineering Physics,* New Age International (P) Limited, Publishers, 1st Edition,2010.

B.Tech. I Year

14BT1BS02 **: ENGINEERING CHEMISTRY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.

COURSE OUTCOMES:

After successful completion of the course the student is able to:

1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.
2. Develop analytical skills in:
   a. Determination of hardness of water.
   b. Determination of viscosity, flame and fire points, cloud and pour points.
   c. Determination of calorific value of fuels.
3. Develop skills in design of:
   a. Methods for control of corrosion
   b. Chemical methods for the synthesis of Nanomaterials.
4. Develop skills for providing solutions through:
   a. Mitigation of hardness of water.
   b. Control of corrosion
   c. Newer Nanomaterials for specific applications
5. Acquire awareness to societal issues on:
   a. Chemical materials utility and their impact.
   b. Quality of water.
   c. Phenomenon of corrosion.
6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:
   a. Green computing
   b. Green construction
   c. Green manufacturing systems

DETAILED SYLLABUS:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.

Conducting Polymers – Definition, types of conducting polymers and their engineering applications. **Composites** – Introduction, advantages of composites, constituents of composites, types of composites, applications of composites. **Sensors** - Introduction, types of sensors, electrochemical sensors, applications. **Insulators** – Definition, characteristic properties of insulators and classification of insulators.

UNIT–II: WATER TECHNOLOGY (15 periods)

Introduction, types of water, impurities in water and their consequences. Hardness of water, units of hardness, measurement of hardness by EDTA method, disadvantages of hardness. Softening methods – Ion exchange process, Zeolite process-Municipal water treatment. Boiler Troubles. Desalination of brackish water by Electro dialysis and Reverse osmosis. Numerical problems on measurement of hardness of water.

UNIT–III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst's equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, H_2 – O_2 fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT–IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY (17 periods)

Nano Chemistry: Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

Green Chemistry: Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems.

Total periods: 85

TEXT BOOKS:

1. P.C.Jain & Monika Jain*, Engineering Chemistry,* Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah *Engineering Chemistry,* Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2013.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, *Hand book of Nanostructured materials and Nanotechnology,* New Age international publishers, 2nd edition, 2010.
2. Paul T. Anastas, John C Warner, *Green Chemistry: Theory and practice,* Oxford University Press, 2000.

B.Tech. I Year

14BT1BS03 **: ENGINEERING MATHEMATICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas , surfaces and volumes of revolutions.
3. Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton's Law of cooling and heat transfer.
4. Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

DETAILED SYLLABUS:

UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS (20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton's Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for Q(x) = e^{ax}, *sin ax*, *cos ax*, x^n, e^{ax} *V(x)*, *x V(x)*. Method of variation of parameters . Applications to L-R-C circuits.

UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES (22 periods)

Functions of two or more variables – Homogeneous functions – total derivatives – derivatives of implicit function – Jacobian – maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers. Radius ,centre and circle of curvature, tracing of curves in cartesian, parametric and polar forms.

UNIT-III: APPLICATIONS OF INTEGRATION (18 periods)

Applications of integration to – length of curves, area of surfaces of revolution and volume of solids of revolution – Double integrals – change of variables and change of order of integration. Evaluation of Triple integrals -volume as double integral.

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS (20 periods)

Laplace transforms of standard functions – Properties of Laplace transforms–First and second shifting Theorems. Laplace transforms of derivatives and integrals–Laplace transforms of periodic functions – Unit step function – Dirac delta function – Inverse transforms–Convolution theorem. Applications of Laplace transforms to linear differential equations with constant coefficients.

UNIT-V : VECTOR CALCULUS (20 periods)

Vector differentiation – gradient, divergence, curl and vector identities. Laplacian Operator. **Vector integration**: Line integrals independent of path – work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals. Verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

Total periods: 100

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, *Engineering Mathematics,* Vol. 1, S. Chand & Company, 12thedition, 2013.

REFERENCE BOOKS:

1. Grewal, B.S., *Higher Engineering Mathematics*, Khanna Publishers, 42nd edition, 2012.
2. Kreyszig, E., *Advanced Engineering Mathematics*, John Wiley and Sons, 8th edition, 2006.

B.Tech. I Year

14BT1BS04 **: MATHEMATICAL METHODS**

(Common to CSE, CSSE, IT, ECE, EIE and EEE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: This course deals with obtaining the numerical solutions for algebraic and transcendental equations. Fundamentals of matrix theory including introduction to Eigen values, Cayley-Hamilton's theorem, numerical solutions to differential equations, transformation techniques for solving engineering problems and applications of partial differential equations are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire basic knowledge in
   (a) solving linear equations through matrix methods.
   (b) solving algebraic and transcendental equations by various mathematical methods.
   (c) fitting of various types of curves to the given data
   (d) finding the numerical values to derivatives and integrals through different mathematical methods.
   (e) solving differential equations numerically through various methods.
   (f) solving difference equations using z –transforms.
2. Develop analytical skills in
   (a) evaluating the properties of functions through Fourier series and Fourier transforms.
   (b) solving boundary value problems in engineering using Fourier transform
3. Design novel mathematical methods for
   (a) fitting geometrical curves to the given data.
   (b) for solving the differential equations.
   (c) the problems involving heat transformations.
   (d) constructing the interpolating polynomials to the given data and drawing inferences.

DETAILED SYLLABUS:

UNIT–I: MATRIX THEORY AND APPLICATIONS (20 periods)

Rank of a matrix, echelon form, normal form, inverse of a matrix by normal form. Homogenous and non-homogenous linear systems, consistency and solutions of linear system of equations. Solutions of equations by Gauss elimination method. Eigen values, Eigen vectors and properties. Cayley– Hamilton Theorem (without proof), inverse and powers of a matrix using Cayley– Hamilton Theorem, diagonalization of a matrix, quadratic forms, nature of quadratic form and reduction of quadratic form to its normal form.

UNIT-II: NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION (19 periods)

Solutions of Algebraic and Transcendental equations by bisection method, Regula – Falsi method, Newton – Raphson method. Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves. Interpolation, forward difference operator, backward difference operator, central difference operator. Relationship between different operators. Interpolation using Newton's forward formula, Newton's backward formula, Lagrange's interpolation formula.

UNIT-III:

NUMERICAL DIFFERENTIATION AND INTEGRATION, SOLUTIONS OF O D E (20 periods)

Numerical differentiation using Newton's forward formula, Newton's backward formula. Numerical integration using trapezoidal rule, Simpsons 1/3 rule, Simpsons 3/8 rule. Numerical solutions of first order ordinary differential equations using Taylor series, Euler's method modified Euler's method, Runge – Kutta method (4^{th} order only).

UNIT-IV : TRANSFORMATION TECHNIQUES (25 periods)

Fourier series , Dirichlets conditions, determination of Fourier coefficients (Euler's formulae), even and odd functions. Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, inverse transforms. Z – transforms, inverse Z– transform, properties, damping rule, shifting rule, initial and final value theorems. Convolution theorem, solution of difference equations by Z– transforms.

UNIT – V: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS (16 periods)

Formation of partial differential equations . Method of separation of variables for second order partial differential equations – solutions of one dimensional wave equation – heat equation -Laplace equation.

Total periods: 100

TEXTBOOK:

1. T.K.V. Iyenger, B. Krishna Gandhi, S. Ranganadham and M.V.S.S.N. Prasad, *Mathematical Methods,* S.Chand and Company, 8^{th} edition, 2013.

REFERENCE BOOKS:

1. B.S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 42^{nd} edition, 2012.
2. S.S.Sastry, *Introductory Methods of Numerical Analysis*, Prentice Hall of India, 4^{th} edition, 2005.

B.Tech. I Year

14BT1ES02**: PROBLEM SOLVING AND COMPUTER PROGRAMMING**

(Common to CSE, CSSE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100 **L T P C**

3 1 — 6

PREREQUISITE: A course on "Aptitude and Logical Thinking"

COURSE DESCRIPTION: This course deals with the concepts of problem solving, algorithms and program design, elements of 'C' programming language, data types, selection, multi-way selection, repetition, arrays, strings, functions, derived data types, structures, pointers, files and basic data structures of stacks, and queues.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1. Gain knowledge in
- Problem solving Methods and Fundamental Algorithms.
- Elements of C Language
- Selection and Repetition statements.
- Arrays, Strings and Functional statements.
- Derived data types, Files and Pointers.
- Basic data Structures-Stacks and Queues.

CO2. Analyze the problems and develop appropriate algorithms.
CO3. Implement various searching and sorting techniques
CO4. Apply basic data structures such as arrays, stacks and queues in application programs.
CO5. Engage in lifelong learning to develop programming competence.

DETAILED SYLLABUS

UNIT – I: **(20 periods)**

Introduction to Problem Solving: Algorithm and flowchart, the problem solving aspect, top- down design, implementation of algorithms, program verification and efficiency of algorithms.

Introduction to the C Language: C programs, identifiers, types, variables, types of operators, constants, coding constants, type casting and conversion, formatted input and output. Structure of a C program - expressions, precedence and associativity, evaluation of expressions, mixed type expressions.

UNIT – II: **(22 periods)**

Selection - Making Decisions - Two way selection: if, if-else and nested if-else.

Multi-way selection: else-if ladder and switch statements.

Repetition: concept of loop, pre-test and post-test loops, initialization and updating, event and counter controlled loops, loops in C, break, continue and goto statements.

Fundamental Algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, generation of the Fibonacci sequence, reversing the digits of an integer, number base conversion, character to number conversion, the smallest divisor of an integer, greatest common divisor of two integers and generating prime numbers.

UNIT -III: **(20 periods)**

Arrays: Arrays in C, one, two and multidimensional arrays, linear search, binary search, bubble sort, selection sort and insertion sort.

Strings: Concepts, strings in C, string input/output functions, array of strings and string manipulation functions.

Functions: Designing structured programs, functions in C, user- defined functions, types of functions, Recursion and factorial using recursion, standard library functions, scope, storage classes and pre-processor directives

UNIT – IV: **(20 periods)**

Derived Types: Type definition (typedef), enumerated types, structure, accessing structures.

Complex Structures: Nested structures, structures containing arrays, array of structures.

Structures and Functions: Sending individual members, sending the whole structure, unions and bit fields.

Pointers: Concepts, pointer variables, accessing variables through pointers, pointer declaration and definition, initialization, pointer arithmetic, array of pointers, pointers to arrays, pointers and functions, call-by-value and call-by-reference, pointers to pointers, pointers to structures and memory allocation functions.

UNIT – V: **(18 periods)**

Files: Introduction and classification of files, opening and closing of files, read and write operations, conversion of files and command line arguments.

Basic Data Structures: Overview of data structures, implementation of stack operations (push, pop), implementation of linear and Circular queue operations (insertion, deletion) using arrays.

(Total periods: 100)

TEXT BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "A Structured Programming Approach using C," Third Edition, Cengage Learning, NewDelhi, 2007.
2. R.G. Dromey, "How to Solve it by Computer," First Edition, Pearson Education, NewDelhi, 1982.

REFERENCE BOOKS:

1. Pradip Dey and Manas Ghosh, "Programming in C," Second Edition, Oxford University Press, NewDelhi, 2007.
2. Jeri R Hanly and Elliot B. Koffman, "Problem Solving and Program design in C," Seventh Edition, Pearson Education, NewDelhi, 2014.

B.Tech. I Year

14BT1ES03**: COMPUTER AIDED ENGINEERING DRAWING**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	1	3	3

PREREQUISITE: Nil

COURSE DESCRIPTION: This course deals with the concepts of computer-aided sketching, and orthographic and isometric projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES: After completion of the course, a successful student is able to :

1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general audience.

DETAILED SYLLABUS:

UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING (20 periods)

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, Different types of lines, Material conventions and free hand practicing, Definitions of Principle planes and other planes. Computer screen, layout of the software, Creation of 2D/3D environment, Selection of drawing size and scale, Standard tool bar/menus, Coordinate system, and description of most commonly used toolbars, Navigational tools, Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS (20 periods)

Introduction, Definitions- Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), Projection of lines inclined to one plane, inclined to both the planes, finding true lengths and true inclinations (No application problems).

UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES (20 periods)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS (20 periods)

Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS (20 periods)

Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.

Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts.

Total periods: 100

TEXT BOOKS:

1. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, *Engineering Graphics with Auto CAD*, PHI Learning Private Limited, Revised Edition, August 2010.
2. N D Bhat & V M Panchal, *Engineering Drawing,* Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, *AutoCAD 2013 For Engineers And Designers,* Dreamtech Press, 2013
2. T Jeyapoovan, *Engineering Drawing and Graphics Using Autocad,* Vikas Publishing House, 3rd Edition, 2010.
3. Jolhe, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2007.
4. Basant Aggarwal, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

B.Tech. I Year

14BT1BS05: **ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wave length of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:

After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.

Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of $^{P^H}$ of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments :

Engineering Physics:

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
4. Characteristics of LED source.
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee's method
9. Melde's experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
12. Characteristics of laser source.
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum

Engineering Chemistry:

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Conductometric titration of strong acid Vs strong base
6. Determination of P^H of a given solution by P^H metry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
10. Synthesis of Nano metal-oxide using sol– gel process.
11. Determination of the capacity of the given cation-exchange Resin.
12. Measurement of viscosity by Redwood viscometer.

Duration: 3 Periods for each experiment

TEXT BOOKS:

1. *Physics Laboratory Manual*
2. K. Mukkanti, *Practical Engineering Chemistry*, BS Publications, 2013.
3. K.N. Jayaveera, K.B. Chandra Sekhar, *Chemistry laboratory manual,* S.M. Enterprises Limited, 2013.

B.Tech. I Year

14BT1ES05**: PROBLEM SOLVING & COMPUTER PROGRAMMING LAB**

(Common to CSE,CSSE and IT)

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	**-**	**3**	**3**

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with hands on experience in developing simple programs and implementing basic data structures – stack and queue, searching and sorting in C language.

COURSE OUTCOMES:

On successful completion of this course, a successful student will be able to:

CO1. Select the appropriate data structure and algorithm design method for a specified problem.

CO2. Design, code, test, debug, and execute programs in C.

CO3. Implement and use common features found in C programs arrays, pointers, strings, stacks and Queues.

Week 1:

a. Let a and b are two integer variables whose values are 10 and 13 respectively. Write a program to evaluate the following arithmetic expressions.

i) a + b ii) a – b iii) a * b iv) a / b v) a % b

b. Write a program evaluate the following algebraic expressions after reading necessary values from keyword.

i) (ax + b)/(ax – b) ii) 2.5 log x + Cos 32^0+ | $x^2 + y^2$| + v2xy

iii) $x^5 + 10\ x^4 + 8, x^3 + 4\ x + 2$ iv) ae^{kt}

Week 2:

a. Mr. Gupta deposited Rs.1000 in a bank. The bank gives simple interest at the rate of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I = P T R / 100)

b. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 00. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

c. In a town, the percentage of men is 52. The percentage of total literacy is 48.If total percentage of literate men is 35 of the total population; write a program to find the total number of illiterate men and women if the population of the town is 8000.

Week 3:

a. Write a program that prints the given 3 integers in ascending order using if - else.

b. Write a program to calculate commission for the input value of sales amount.

Commission is calculated as per the following rules:

i) Commission is **NIL** for sales amount Rs. 5000.

ii) Commission is 2% for sales when sales amount is >Rs. 5000 and <= Rs. 10000.

iii) Commission is 5% for sales amount >Rs. 10000.

c. A character is entered through keyboard. Write a program to determine whether the Character entered is a capital letter, a small case letter, a digit or a special symbol.

The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127

Week 4:

a. If cost price and selling price of an item is input through the keyboard, write program to determine whether the seller has made profit or incurred loss. Also determine how much profit or loss he incurred in percentage.

b. An insurance company calculates premium as follows:

i) If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lacks.

ii) If a person satisfies all the above conditions and is female then the premium is Rs.3 per thousand and the policy amount cannot exceed Rs.1 lack.

iii) If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then premium is Rs.6 per thousand and the policy cannot exceed Rs. 10000.

iv) In all other cases the person is not insured.

Write a program to determine whether the person should be insured or not, his/her premium rate and maximum amount for which he/she can be insured.

Week 5:

a. Write a program, which takes two integer operands and one operator as input from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %. Use switch statement)

b. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following rules:

i) If the student gets first class and the number of subjects failed is >3, then no grace marks are awarded. If the number of subjects failed is less than or equal to '3' then the grace is 5 marks per subject.

ii) If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in less than or equal to '3' then the grace is 4 marks per subject.

iii) If the student gets third class and the number of subjects failed in is >1, then no grace marks are awarded. If the number of subjects failed in is equal to '1' then the grace is 5 marks per subject.

Week 6:

a. Write a program to find the sum of individual digits of a positive integer.

b. A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

c. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to calculate the following: Sum=$1-x^2/2!+ x^4/4!-x\ 6!+x^8/8!-x^{10}/10!$

i) A perfect number is a number that is the sum of all its divisors except itself. Six is the perfect number. The only numbers that divide 6 evenly are 1,2,3 and 6
(i.e., 1+2+3=6).

ii) An abundant number is one that is less than the sum of its divisors
(Eg: 12 <1+2+3+4+6).

iii) A deficient number is one that is greater than the sum of its divisors (Ex: 9 > 1+3).

Write a program to classify N integers (Read N from keyboard) each as perfect, abundant or deficient.

Week 8:

a. Write a program to find the largest and smallest number in a given list of integers.

b. Write a program to perform the following:

i) Addition of two matrices. ii) Multiplication of two matrices.

Week 9:'

Write a program to perform the following:

i) Linear search ii) Binary search

Week 10:

Write a program to perform the following:

i) Bubble sort ii) Selection sort

iii) Insertion sort

Week 11:

a. Write a program to convert a given octal number into binary form.
b. Write a program to convert a given decimal number into binary form.
c. Write a program to convert a given decimal number into octal form.

Week 12:

a. Write a program that uses functions to perform the following operations:
   i) To insert a sub-string in main string at a specified position.
   ii) To delete N characters from a given string from a specified position.

b. Write a program to determine whether the given string is palindrome or not.

Week 13:

Any number **x** is called colored number if it does not contain any substring **y** with the property that the product **z** of all the digits of **y** is not equal to any of the substrings of **x** (for example, take x=263, then its substrings are 2,6,3,26,63,263 only. Now, take any substring y= 26 then z=2*6=12 or y=63 then z=6*3=18. Neither **z** is the substring of 263). Write a C program to check whether the given any three digit number is colored number or not.

Week 14:

a. Write a program to display the position or index in the main string S where the sub string T begins. Display –1 if S does not contain T.

b. Write a program to count the number of lines, words and characters in a given text.

Week 15:

a. Write a program to read list of student names and perform the following operations using functions.
   i) to print list of names
   ii) to sort them in ascending order
   iii) to print the list after sorting.

b. Write a menu driven program to read list of student names and perform the following operations using array of character pointers.
   i) to insert a student name
   ii) to delete a name
   iii) to print the name

Week 16:

a. Two's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of 1. Eg: 2's complement of 11100 is 00100. Write a program to find the 2's complement of a given binary number using functions.

b. Write a program to convert a roman number (Eg: I,II,III…) in to its decimal equivalent using functions

Week 17:

Write programs to perform the following using recursion
   i) To find the factorial of a given integer.
   ii)To solve Towers of Hanoi problem.

Week 18:

Write a program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers

(**Note**: Represent complex number using a structure.)

Week 19:

a. Write a program to implement the following
   i) Call by value
   ii) Call by reference.
b. Write a program to swap the given two numbers without using additional variable. (using pointers)

Week 20:

a. Write a program which copies one 'text file' to another 'text file'.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

Week 21:

Write a program to implement stack operations using arrays.

Week 22:

Write a program to implement linear queue operations using arrays.

Mini Project 1: Students are allowed to select a lab exercise, which includes arrays, functions, pointer concepts and submit the report in Two weeks.

Mini Project 2: Students are allowed to select a lab exercise, which includes Structures, Files ,Stacks and Queues concepts and submit the report in Two weeks.

i) If the student gets first class and the number of subjects failed is >3, then no grace marks are awarded. If the number of subjects failed is less than or equal to '3' then the grace is 5 marks per subject.

ii) If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in less than or equal to '3' then the grace is 4 marks per subject.

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b. Write a program to convert a given decimal number into binary form.

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Mini Project 1: Students are allowed to select a lab exercise, which includes arrays, functions, pointer concepts and submit the report in Two weeks.

Mini Project 2: Students are allowed to select a lab exercise, which includes Structures, Files ,Stacks and Queues concepts and submit the report in Two weeks.

REFERENCE BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "A Structured Programming Approach using C," Third Edition, Cengage Learning, New Delhi, 2007.
2. PradipDey and Manas Ghosh, "Programming in C," Second Edition, Oxford University Press, New Delhi, 2007.

B.Tech. I Year

14BT1ES06**: ENGINEERING & IT WORKSHOP**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

After completion of the course, a successful student is able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a) Carpentry Shop : Cross lap joint, mortise and tenon, T-joint, dove tail joint.

b) Fitting Shop : Square fit and V-fit, semi circular fit, dove tail fit.

c) Sheet Metal Shop : Trapezoidal tray, square tin, funnel, cylinder.

d) House wiring : Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.

(e) Foundry : Preparation of casting using single piece pattern,
Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) Welding
b) Metal Cutting
c) Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

TWORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

I

b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources.

Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.

Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.

Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.

Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, *Engineering Work shop practice,* VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, *Work shop Manua***l**, SciTech Publishers, 2009.
3. K. Venkata Reddy, *Workshop Practice Manual, B*S Publications, 2008

IT WORKSHOP:

1. Vikas Gupta, *Comdex Information Technology Course Tool Kit,* 2nd edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, *Introduction to Information Technology*, 2nd edition, Pearson Education, New Delhi, 2005.
3. *IT Workshop Laboratory Manual,* Department of IT, SVEC, 2014.

B.Tech. I Year

14BT1HS02: **ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which are classified into software based learning, grammar and activities. English Speech Sounds and Phonemic Transcription, Word Stress and Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features, Vocabulary Building, are aided by software. Grammar sessions include Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays, Telephonic Etiquette, Listening Skills, Describing People, Places and Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to

1. Gain practical knowledge in
   - English Speech Sounds
   - Stress Patterns in word and sentence
   - Intonation Patterns
   - Paralinguistic Features
   - Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts.
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.
6. Demonstrate various language functions by participating in
   - Just A Minute
   - Impromptu Speech
   - Elocution
   - Role Plays
   - Presentations
7. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes c. Idioms and Phrases–Homophones–Homonyms–Homographs.
6. Functional Grammar
   a. Parts of Speech b. Tenses
   c. Change of Speech d. Change of Voice
   e. Word Order and Error Correction f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India.

II B.Tech. I Semester

14BT3BS03: **PROBABILITY AND STATISTICS**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Engineering Mathematics"

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to**:**

1. Demonstrate basic knowledge on
   (a) Probability distributions, correlation and regressions.
   (b) Statistical quality control and testing of hypotheses.
   (c) Finding regression coefficients ,elucidating relationships in bi-variate data.
   (d) Tests of significance for small and large samples.
2. Develop analytical skills in providing solutions for the problems involving
   (a) means, probability distributions and standard deviations
   (b) sampling techniques for decision making in uncertain environments Develop skills for analyzing the data with
   (a) Suitable tests of significance for practical situations.
   (b) Through probability distributions for practical situations.
3. Develop skills in applying
   (a) Statistical techniques employed for quality control and maintenance of uniform quality in the manufacturing processes.

Detailed Syllabus:

UNIT – I: PROBABILITY & MATHEMATICAL EXPECTATIONS (09 periods)

Probability- Conditional probability. Bayes theorem. Random Variables: Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density function, Mathematical expectation, Properties of Mathematical expectations, Mean and Variance.

UNIT – II: PROBABILITY DISTRIBUTIONS (09 periods)

Discrete Distributions: Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and Standard Deviations of Poisson Distribution.

Continuous Distributions: Normal Distribution, Mean, Variance and area properties.

UNIT – III: STATISTICAL QUALITY CONTROL AND CORRELATION- REGRESSION (09 periods)

Introduction, Advantages and limitations of statistical quality control, Control charts, specification limits, X , R, p, np and c charts. Definition of correlation, correlation coefficient, Rank correlation. Simple linear regression, regression lines and properties.

UNIT – IV: SAMPLING DISTRIBUTIONS AND TESTS OF SIGNIFI-CANCE FOR LARGE SAMPLES (09 periods)

Population and Sample, Parameter and Statistic, Sampling Distribution of Statistic, Standard Error of Statistic, Null and Alternative Hypothesis, Type I and II errors, Level of Significance, Critical region, Degrees of freedom. Test of Significance for Single Proportion, Difference of Proportions, Single Mean, Difference of Means.

UNIT – V: STESTS OF SIGNIFICANCE FOR SMALL SAMPLES (09 periods)

Student's t-test: single mean, difference of means, F-test for equality of population variance, Chi-Square Test for Goodness of fit, contingency table, Chi-Square Test for Independence of Attributes.

Total Periods: 45

TEXT BOOKS:

1. T.K.V. Iyengar, B. Krishna Gandhi..etal., **"Probability and Statistics,"** S. Chand & Company, Third Edition, 2011.
2. S.P.Gupta, **"Statistical Methods,"** Sultan and Chand, New Delhi, Thirty Fourth Edition, 2005.

REFERENCE BOOKS:

1. Shahnaz Bathul, **"A text book of Probability and Statistics,"** Ridge Publications, Second Edition.
2. S.C.Gupta and V.K.Kapoor, **"Fundamentals of Applied Statistics,"** Sultan and Chand, New Delhi. 1998.

II B.Tech. I Semester

14BT31201: **DISCRETE MATHEMATICAL STRUCTURES**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Engineering Mathematics".

COURSE DESCRIPTION: Mathematical Logic; Predicates; Relations; Algebra Structures; Mathematical Reasoning; Recurrence Relations; Graphs; Graph Theory and its applications.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to**:**

1. Demonstrate knowledge on mathematical logic, algebraic structures, relations, recurrence relations and mathematical reasoning.
2. Analyze and prove given statement by contradiction and automatic theorem.
3. Design network applications using Prim's and Kruskal's algorithms.
4. Apply the concepts of graph theory, permutation, combinations, counting principle and graph theory in solving real-time problems.

Detailed Syllabus:

UNIT – I: MATHEMATICAL LOGIC AND PREDICATES (11 periods)

Mathematical Logic: Statements and notations, Connectives, Well formed formulae, Truth Tables, Tautology, Equivalence of formulae, Normal forms.

Predicates: Predicate Calculus, Free and Bound variables, Rules of inference, Consistency, Proof of contradiction and Automatic Theorem Proving.

UNIT – II: FUNCTIONS AND RELATIONS (09 periods)

Relations: Properties of binary relations, Equivalence relations, Compatibility relations, Partial ordering relations, Hasse diagram and related applications.

Functions: Inverse Functions, Composition of functions, Recursive functions, Lattice and its Properties.

UNIT – III: ALGEBRAIC STRUCTURES (06 periods)

Algebraic System: Examples and General Properties SemiGroups and Monoids, Groups, Subgroups, Homomorphism and Isomorphism.

UNIT – IV: MATHEMATICAL REASONING AND RECURRENCE RELATIONS (10 periods)

Mathematical Reasoning: Methods of Proof, Mathematical Induction, Basics of counting, The Inclusion-Exclusion Principle, The Pigeon hole principle, Permutations and Combinations, Generalized Permutations and Combinations.

Recurrence Relations: Generating Functions of Sequences, Calculating coefficients of Generating function, Recurrence relation, solving recurrence relations by substitution and Generating functions, Methods of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relation.

UNIT – V: GRAPH THEORY AND ITS APPLICATION (09 periods)

Graphs: Introduction to Graphs, Types of Graphs, Graph basic terminology and Special types of simple graphs, Representation of Graphs and graph Isomorphism, Euler Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs, Euler's Formula and Graph Coloring.

Trees: Introduction to Trees, Properties of Trees, Applications of Trees, Spanning Trees, Counting trees, Depth-First Search, Breadth-First Search, Minimum Spanning Trees, Kruskal's Algorithm and Prim's Algorithm. **Total Periods: 45**

TEXT BOOKS:

1. J.P. Trembly and R. Manohar, **"Discrete Mathematical Structures with Applications to Computer Science,"** Tata McGraw Hill, 2001.
2. Kenneth H. Rosen, **"Discrete Mathematics and its Applications,"** Tata McGraw Hill, Sixth Edition, 2007.

REFERENCE BOOKS:

1. Joe L.Mott and Abraham Kandel, **"Discrete Mathematics for Computer Scientists and Mathematicians,"** Prentice Hall of India Private Limited, Second Edition, 2004.
2. Ralph P. Grimaldi and B.V.Ramana, **"Discrete and Combinatorial Mathematics- an Applied Introduction",** Pearson Education, Fifth Edition, 2006.

II B.Tech. I Semester

14BT30235: BASIC ELECTRICAL ENGINEERING

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Engineering Physics".

COURSE DESCRIPTION: Basics of electrical circuits and measuring instruments, principle of operation, characteristics and applications of DC machines, transformers, three phase induction motors and special machines.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to**:**

1. Demonstrate knowledge on
   a) Basics of electrical circuits.
   b) Constructionand working principle of various electrical machinesand various measuring instruments.
2. Analyze the behavior of electrical circuits and operation of several electrical measuring instruments.
3. Develop skills to evaluate various circuit parameters and performance characteristics of various machines.

Detailed Syllabus:

UNIT - I: ELECTRICAL CIRCUITS (13 periods)

Essence of electricity, basic circuit components, electric current, potential difference, EMF, electric power, Ohm's law, resistive networks, inductive networks, capacitive networks, Kirchhoff's laws, series-parallel circuits, star to delta and delta to star transformations. Mesh analysis, nodal analysis, source transformation technique, numerical problems.

UNIT - II: ALTERNATING QUANTITIES (09 periods)

Principle of AC voltages, wave forms and basic definitions, RMS and average values of alternating currents and voltages for sinusoidal waveform, form factor and peak factor, power factor and concept of power triangle. Polyphase systems, advantages, voltages and currents in balanced star and delta connections, numerical problems, advantages of star and delta connections.

UNIT - III: DC MACHINES (09 periods)

DC Generators-constructional details, principle of operation, EMF equation, types and applications.

DC Motors - principle of operation, significance of back EMF, types, torque equation, losses, efficiency and applications.

UNIT - IV: AC MACHINES (Periods: 08)

Transformers - principle of operation, constructional details, losses, efficiency and regulation. Three phase Induction motors -constructional details, operatingprinciple and applications. Principle of operation and applications-splitphase induction motors, AC servomotor and stepper motor.

UNIT - V: MEASURING INSTRUMENTS AND SPECIAL APPARATUS (Periods:06)

Classification of instruments, operating principles, essential features of measuring instruments, permanent magnet moving coil and moving iron instruments (voltmeters and ammeters), digital multi-meters, voltage stabilizers, uninterruptible power supply (UPS). **Total Periods: 45**

TEXT BOOKS:

1. V.K.Mehta, Rohit Mehta, **"Principles of Electrical Engineering,"** S. Chand and Company Ltd., New Delhi, 2006.
2. T.K. Nagasarkar, M.S. Sukhija, **"Basic Electrical Engineering,"** Oxford University Press, New Delhi, 2010.

REFERENCE BOOKS:

1. B.L. Theraja, A.K. Theraja, **"A text book of Electrical Technology in SI Units,"** Vol.2, S.Chand and Company Ltd., New Delhi, 2013.
2. D P Kothari, I J Nagarath, **"Basic Electrical Engineering,"** Third Edition Tata McGraw Hill Education private Limited, New Delhi, 2012.
3. Ali Emadi, AbdolhoseinNasiri, Stoyan B.Bekiarov, **"Uninterruptible Power Supplies and Active Filters,"** CRC Press, USA, 2005.
4. R.K.Rajput, **"Basic Electrical and Electronics Engineering,"** Laxmi Publications (P) Ltd., New Delhi, 2007.

II B.Tech. I Semester

14BT30431: **ELECTRONIC DEVICES AND CIRCUITS**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Engineering Physics".

COURSE DESCRIPTION: Characteristics of general and special purpose electronic devices; Rectifiers and regulators; Biasing and small signal analysis of BJT and FET, Feedback Amplifiers, Oscillator.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to**:**

1. Demonstrate knowledge in
   a) P-N junction diode, Zener diode and their characteristics.
   b) Rectifiers, Filters and Regulators.
   c) Characteristics of BJT, FET, MOSFET and special purpose electronic devices.
   d) Amplifiers and Oscillators.
2. Analyze numerical and analytical problems in
   a) Regulated Power Supply,
   b) Transistor biasing circuits,
   c) Transistor amplifiers,
   d) Feedback amplifiers and,
   e) Oscillators,
3. Design the electronic circuits like
   a) Transistor biasing circuits,
   b) Transistor amplifiers,
   c) Feedback amplifiers and,
   d) Oscillators.
4. Solve engineering problems and arrive at solutions pertaining to Electronic circuits.

Detailed Syllabus:

UNIT - I: DIODE, RECTIFIERS AND REGULATORS (11 periods)

PN JUNCTION DIODE:

PN Junction Diode Equation, Volt-Ampere (V-I) Characteristics, Temperature Dependence of V-I Characteristics, Ideal Versus Practical, Static and Dynamic Resistances, Diode Equivalent circuits, Junction capacitances, Break down mechanisms in semiconductor Diodes, Zener Diode Characteristics.

RECTIFIERS AND REGULATORS:

Halfwave rectifier and Fullwave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter, n - section filter,comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT - II: BIPOLAR JUNCTION TRANSISTOR (11 periods)

CHARACTERISTICS:

Transistor construction, BJT Operation, Transistor as an amplifier, Transistor currents and their relations, Input and Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications.

BIASING:

Transistor biasing, Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Emitter Feedback Bias, Voltage Divider Bias.

AMPLIFIER:

BJT Hybrid Modeling, Determination of h-Parameters from Transistor Characteristics,

Measurement of h-Parameters, Analysis of CE, CB and CC configurations using simplified Hybrid Model. Comparison of CB, CE and CC configurations.

UNIT - III: FIELD EFFECT TRANSISTOR (09 periods)

Construction, Principle of Operation and Characteristics of JFET and MOSFET (Enhancement & Depletion), Biasing of FET, Small Signal Model of JFET & MOSFET. Common Source and Common Drain Amplifiers using FET, Generalized FET Amplifier, FET as Voltage Variable Resistor, Comparison between BJT and FET.

UNIT - IV: FEEDBACK AMPLIFIERS AND OSCILLATORS (07 periods)

Concepts, Types of Feedback Circuits (block diagram representation), General characteristics of negative feedback amplifier, Effect of Feedback on Amplifier characteristics. Barkhausen criterion, Hartley & Colpitts oscillators, Phase Shift Oscillators and Crystal Oscillator.

UNIT - V: SPECIAL PURPOSE ELECTRONIC DEVICES (07 periods)

Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR). Principle of operation of Schottky Barrier Diode.

Total Periods: 45

TEXT BOOKS:

1. Millman, Christos C. Halkias and Satyabrata Jit, **"Electronic Devices and Circuits,"** TMH, Third Edition, 2010.

REFERENCE BOOKS:

1. R.L. Boylestad and Louis Nashelsky, **"Electronic Devices and Circuits,"** PHI, Tenth Edition, 2009.
2. S. Salivahana, N. Suresh Kumar, **"Electronic Devices and Circuits,"** Mc-Graw Hill, Third Edition, 2008.
3. David A. Bell, **"Electronic Devices and Circuits,"** Oxford University press, Fifth Edition, 2008.

II B.Tech. I Semester

14BT30501: **DATA STRUCTURES**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Concepts of Data Structures- Linked Lists, Stacks, Queues, Trees Graphs, Sorting, and Hashing.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to**:**

1. Gain Knowledge in
   - Principles of Data Structures.
   - Abstract Data Type.
   - Linear and Non-linear Data Structures.
2. Analyze and identify suitable data structure design techniques for problem solving.
3. Develop programs to implement linear and non linear data structures.

Detailed Syllabus:

UNIT - I: LINKED LISTS **(09 periods)**

Linked Lists: Introduction To Data Structures, Pointers, Basic Operations, Implementation, Application, Circular Linked Lists, Doubly Linked List.

UNIT - II: STACKS AND QUEUES **(08 periods)**

Stacks: Basic Stack Operations, Stack Linked List, Implementation, Stack Applications.

Queues: Queue Operations, Queue Linked List Design, Queue Applications.

UNIT - III: TREES, SEARCH TREES, AND HEAPS **(10 periods)**

Trees: Basic Tree Concepts, Binary Trees.

Binary Search Trees (BST): Basic Concepts, BST Operations, BST Applications.

AVL Search Trees: Basic Concepts, AVL Tree Implementations.

Heaps: Basic Concepts, Heap Implementation, Heap Application.

UNIT - IV: MULTIWAY TREES AND GRAPHS **(09 periods)**

Multiway Trees: B-Trees, Simplified B-Trees, B-Tree Variations.

Graphs: Basic Concepts, Operations, Graph Storage Structures.

Graph Algorithms: Create Graph, Insert Vertex, Delete Vertex, Retrieve Vertex, Depth-first Traversal, Breadth-first Traversal.

UNIT - V: SORTING AND HASHING **(09 periods)**

Sorting: Sorting by Exchange-Shell Sort, Quick Sort. Sorting By Distribution-Counting Sort, Bucket Sort, Radix Sort. Sorting By Merging-Merge Sort.

Hashing: Introduction, Hash Table Structure, Hash Functions, Linear Open Addressing, Chaining, Applications.

Total Periods: 45

TEXT BOOKS

1. Richard Gileberg, Behrouz A. Forouzan, **"Data Structures: A Pseudocode Approach with C,"** Second Edition, 2007.
2. Debasis Samanta, **"Classic Data Structures,"** PHI Learning, Second Edition, 2009.

REFERENCE BOOKS:

1. G.A.V. Pai, **"Data Structures and Algorithms,"** Tata McGraw Hill, Second Edition, 2009.
2. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J.Augenstein, **"Data Structures Using C,"** Pearson Education, 2005.

II B.Tech. I Semester

14BT30502: **DIGITAL LOGIC DESIGN**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Introduction to number systems; logic gates; simplification of Boolean functions; Design of combinational circuits; Design of sequential circuits, Memory and Programmable Logic.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to**:**

1. Gain knowledge on Boolean algebra, Minimization of Boolean functions using Map method.
2. Design combinational and sequential logic circuits for digital systems.
3. Apply simplification techniques for simplifying Boolean functions.

Detailed Syllabus:

UNIT - I: BINARY SYSTEMS AND BOOLEAN ALGEBRA (09 periods)

Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, Signed binary numbers, complements, Boolean Algebra, Boolean functions, Canonical and standard forms, Digital logic gates.

UNIT - II: GATE LEVEL MINIMIZATION (09 periods)

The k-map method - Four-variable map, Five-Variable map, product of sums simplification, Don't-care conditions, NAND and NOR implementation, other Two-level implementations, Exclusive - OR function.

UNIT - III: COMBINATIONAL LOGIC (09 periods)

Combinational Circuits, Analysis procedure, Design procedure, Binary Adder-Subtractor, BCD Adder, Binary multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-Multiplexers.

UNIT - IV: SEQUENTIAL LOGIC (09 periods)

Latches, Flip-Flops, Analysis of clocked sequential circuits, Design of synchronous sequential circuits, registers, shift registers, Ripple counters, Synchronous counters, Ring Counter and Johnson Counter.

UNIT - V: MEMORY AND PROGRAMMABLE LOGIC (09 periods)

Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-only memory, Programmable logic Array, programmable Array logic, Sequential Programmable Devices.

Total Periods: 45

TEXT BOOK:

1. M. Morris Mano, **"Digital Design,"** Third Edition, Pearson Education/PHI, 1999.

REFERENCE BOOKS:

1. David J Comer, **"Digital Logic & State Machine Design,"** Third Edition, Oxford University Press, 2012.
2. Charles H.Roth Jr, **"Fundamentals of Logic Design,"** Fifth Edition, Cengage Learning, 2008.

II B.Tech. I Semester

14BT30422: **ANALOG AND DIGITAL ELECTRONICS LAB**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on "Electronic Devices & Circuits and Digital Logic Design".

COURSE DESCRIPTION: Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; BJT and FET characteristics; UJT and SCR characteristics; BJT amplifiers; Realization of FFs, Combinational Circuits, sequential Circuits; Demonstration on VHDL Programme.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to**:**

1. Analyze the characteristics of different electronic devices and circuits like
   - Diodes-PN Junction Diodes, Zener Diodes, SCR
   - Transistors-BJT,FET,UJT
   - Flip Flops-JK FF,D FF
   - Combinational Circuits-HA,FA
   - Sequential Circuits -Counters
2. Design and analyze the electronic circuits like BJT Amplifiers, Oscillators, Combinational Circuits and Sequential Circuits.
3. Solve engineering problems by proposing potential solutions leading to Design of better electronic circuits.

List of Experiments:

PART A

ELECTRONIC WORKSHOP PRACTICE (Only for Viva-Voce)

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, Low-power JFETs, MOSFETs, LEDs, LCDs, SCR, UJT, Linear and Digital ICs.

PART B

ANALOG DEVICES AND CIRCUITS (Minimum seven experiments to be conducted)

1. PN Junction and Zener diodes characteristics
2. Ripple Factor and Load Regulations of Rectifier with and without filters (Full wave or Half wave)
3. Input and Output characteristics of Transistor in CE configuration
4. Drain and Transfer Characteristics of JFET
5. Gain and Frequency response of CE Amplifier
6. Gain and Frequency response of Feedback Amplifier (Voltage series or current series)
7. Frequency of oscillations of Hartley and Colpitts Oscillator
8. UJT relaxation oscillator
9. SCR characteristics

PART C

DIGITAL CIRCUITS

Realization of

1. Flip Flops using Logic Gates
2. Two Problems on Combinational Circuits
3. Asynchronous Counter
4. Synchronous Counter

Demonstration of

5. VHDL Program

II B.Tech. I Semester
14BT30521: **DATA STRUCTURES LAB**
(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hands-=on programming on concepts of data structures - Linked lists, Stacks, Queues, Trees, Search trees, Sorting, and Hashing.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate practical knowledge on C Programming and Linear and Non-Linear Data Structures.
2. Analyze and identify suitable data structure techniques to solve problems.
3. Develop programs to implement linear and non linear data structures.

List of Experiments:

1. Write program to implement the following data structures:

   (a) Single linked list. (b) Double linked list.

   (c) Circular linked list.
2. Write a program to implement stack and queue using linked list.
3. Write a program to evaluate a given postfix expression using stack.
4. Write a program to convert a given infix expression to postfix form using stacks.
5. Write a program to implement

   (a) stack using two queues. (b) queue using two stacks.
6. Write a program to implement In-order, pre-order, post-order tree traversal of binary trees.
7. Write a program to perform operations on a binary search tree(BST) .
8. Write programs for implementation of graph traversals by applying:

   (a) Breadth First Search. (b) Depth First Search.
9. Implement the following sorting algorithms:

   (a) Merge sort. (b) Heap sort. (c) Quick Sort. (d) Radix Sort.
10. Write a program to implement hashing with

    (a) Separate Chaining (b) Open addressing methods.

REFERENCE BOOKS:

1. Richard Gileberg, Behrouz A. Forouzan, **"Data Structures: A Pseudocode Approach with C,"** Second Edition, 2007.
2. Debasis Samanta, **"Classic Data Structures",** Phi Learning, Second Edition, 2009.

II B.Tech. II Semester

14BT3HS01: **ENVIRONMENTAL SCIENCES**

(Common to CSE, CSSE, IT, CE and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Engineering Physics and Engineering Chemistry".

COURSE DESCRIPTION: Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on
   a) Diverse components of environment and natural resources
   b) Ecosystem and biodiversity & its conservation methods
   c) Population growth and human health
   d) Green technology
2. Identify and resolve the issues related to sources of different types of pollutions.
3. Provide solutions to individuals, industries and government for sustainable development of natural resources.
4. Create awareness on environmental degradation and to bring best management practices to protect environment.
5. Develop skills in analyzing reports on environment for sustainable development.
6. Apply environmental ethics in protection of diversified ecosystems.

Detailed Syllabus:

UNIT- I:MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES (11 periods)

Multidisciplinary nature of environment: Definition, scope and importance of multidisciplinary nature of environment, segments of environment-lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness.

Natural Resources: Renewable and Non-renewable resources and associated problems- (a) forest resources: use and over exploitation, deforestation-causes, effects and remedies, case studies, (b) water resources-use and over utilization of surface & ground water, conflicts over water-benefits and problems of large dams, case studies, (c) mineral resources- mining, adverse effects, case studies, (d) food resources-world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging and salinity, case studies, (e) energy resources-growing needs, renewable energy resources-solar, wind, hydropower, hydrogen fuel and non-renewable energy resources-coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT - II: ECOSYSTEMS AND BIODIVERSITY (10 periods)

Ecosystems: Definition and concept of an ecosystem, structure and function of an ecosystem-producers, consumers and decomposers, food chains, food webs and ecological pyramids-introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem-ponds, lakes & oceans, energy flow in the ecosystem, ecological succession.

Biodiversity: Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity-habitat loss, poaching of wildlife, man-wild life conflicts, endemic, endangered and extinct species of India, conservation of biodiversity-in-situ and ex-situ.

UNIT - III: ENVIRONMETAL POLLUTION AND CONTROL **(08 periods)**

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management-causes, effects and control measures of urban and industrial wastes, hazards and disaster management-floods, earthquakes, tsunamis, case studies.

UNIT - IV: SOCIAL ISSUES AND THE ENVIRONMENT **(08 periods)**

From unsustainable to sustainable development, urban problems related to energy, environmental ethics-issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

UNIT - V: HUMAN POPULATION AND THE ENVIRONMENT

(08 periods)

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies.

Field work: visit to a local area to document environmental assets-pond/ forest/ grassland/ hill/ mountain/ Environment Impact Assessment procedures for local environmental issues or assignment/seminar.

Total periods: 45

TEXT BOOKS:

1. A.Kaushik and C.P. Kaushik, **"Environmental Studies,"** New Age International (P) Ltd Publications, Fourth Edition, 2014.
2. Erach Barucha, **"Environmental Studies,"** Orient Blackswan, Second Edition, 2013.

REFERENCE BOOKS:

1. R. Rajagopalan, **"Environmental Studies,"** Oxford University Press, Second Edition, 2011.
2. Benny Joseph, **"Environmental Studies,"** Tata McGraw-Hill, Second Edition, 2009.
3. Dr. B S Chauhan, **"Environmental Studies,"** University Science Press, First Edition, 2008.
4. M. Anji Reddy, **"Textbook of Environmental Sciences and Technology,"** BS Publications, 2007.
5. Larry W Canter, **"Environmental Impact Assessment,"** McGraw-Hill Education, Second Edition, 1996.

II B.Tech. II Semester

14BT4HS01: **BUSINESS COMMUNICATION AND PRESENTATION SKILLS**

(Common to CSE, CSSE, IT, CE and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Basic grammar and fundamentals of Listening, Speaking, Reading and Writing skills"

COURSE DESCRIPTION: Nature and Scope of Communication; Non-Verbal Communication; Writing Business Documents; Business Presentations and Public Speaking; Careers and Résumé.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in
   a) Managerial Communication
   b) Corporate Communication
   c) Business Writing
   d) Presentation Skills
   e) Career Building
2. Analyze and judge the situation through non-verbal communication for effective organizational communication.
3. Achieve personal excellence and ability to work in groups.
4. Develop effective communication to meet professional needs.

Detailed Syllabus:

UNIT - I: NATURE AND SCOPE OF COMMUNICATION (09 periods)

Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks - Informal Communication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication.

UNIT - II: NON-VERBALCOMMUNICATION (09 periods)

Introduction - Significance of Non-verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non-verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross-cultural Communication Strategies - Corporate Communication: Introduction - Crisis Management / Communication - Case Study.

UNIT - III : WRITING BUSINESS DOCUMENTS (10 periods)

Business Writing: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters - Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT - IV : BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 periods)

Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non-functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT - V : CAREERS AND RESUME (07 periods)

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - Résumé Writing: Résumé Formats; Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non-verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

Total Periods: 45

TEXT BOOK:

1. Meenakshi Raman and Prakash Singh, **"Business Communication,"** Oxford University, Press, New Delhi, Second Edition, 2012.

REFERENCE BOOKS:

1. M K Sehgal and Vandana Khetarpal, **"Business Communication,"** Excel Books, New Delhi, 2011.
2. M Ashraf Rizvi, **"Effective Technical Communication,"** Tata McGraw-Hill, 2009.

II B.Tech. II Semester

14BT41201: **OBJECT ORIENTED PROGRAMMING**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Object Oriented Concepts; Basics of Java; Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling, Applets, AWT, Database Connectivity and Servlets.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate Knowledge on:
   - Object Oriented Programming concepts-classes, objects, inheritance, polymorphism, encapsulation and abstraction.
   - Packages, interfaces, multithreading, exception handling, event handling.
2. Apply AWT and Applets to design and develop interactive Graphical User Interfaces.
3. Gain problem solving skills to provide effective solutions for real world problems.

Detailed Syllabus:

UNIT - I: OBJECT ORIENTED THINKING (09 periods)

Need for OOP paradigm, OOP concepts

History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting.

Classes and Objects: concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT - II: INHERITANCE, PACKAGES AND INTERFACES (09 periods)

Understanding Inheritance: Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, using super, Creating multi-level hierarchy, Method overriding, abstract classes, using final with inheritance.

Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

Interfaces: Defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT - III: EXCEPTION HANDLING AND MULTITHREADING (09 periods)

Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Java thread model, thread life cycle, creating threads, thread priority, synchronizing threads, inter thread communication.

UNIT - IV: APPLETS, EVENT HANDLING AND AWT (09 periods)

Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class.

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes.

The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scrollpane, dialogs, menubar, graphics, layout manager - boarder, grid, flow, card and grid bag.

UNIT - V: JDBC and SERVLETS (09 periods)

Database Connectivity: Loading the driver, Establishing connection, Create statement, Execute query, Iterate result set, Scrollable Results, and Transactions.

Servlets: The Life Cycle of a Servlet, Using Tomcat for Servlet Development, Create and Compile the Servlet Source Code, Start Tomcat, Start a Web Browser and Request the Servlet, The Servlet API, The Javax.Servlet Package, The javax.Servlet.http Package. **Total Periods: 45**

TEXT BOOKS:

1. Herbert Schildt, **"Java the complete reference,"** TMH, Seventh Edition, 2007.
2. Timothy Budd, **"Understanding Object-oriented Programming with Java,"** Addison-Wesley, Updated Edition, 2002.

REFERENCE BOOKS:

1. Sachin Malhotra, Saurab Choudhary, **"Programming in java,"** Oxford university press, Second Edition, 2014.

II B.Tech. II Semester

14BT40432: DATA COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Engineering Physics".

COURSE DESCRIPTION: Fundamentals of data communication; Transmission media; Digitization techniques - PCM; Multiplexing; Telephone circuit concepts; Cellular Telephone concepts; Channel coding.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in:
   - Understanding the concepts of data communication
   - Modulation and Demodulation of signals.
   - Metallic and optical fibre transmission.
   - Digital transmission
   - Data communication codes and formats
2. Analyze engineering problems critically in the domain of data communications and systems.
3. Solve engineering problems in data communications domain.

Detailed Syllabus:

UNIT - I: FUNDAMENTALS OF DATA COMMUNICATION (09 periods)

Data communication Network Architecture, Protocols and Standards, Standards Organizations for Data Communications, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements, Data communications Networks.

Signals, Noise, Modulation and Demodulation: Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud and M-ary Encoding, Digital Modulation.

UNIT - II: TRANSMISSION MEDIA (09 periods)

Metallic Transmission Lines, Characteristics of Electromagnetic Waves, Transmission Line Classifications, Metallic Transmission Line Types, Metallic Transmission Line Equivalent Circuit, Metallic Transmission Line Losses.

Optical Fiber Transmission Media: Advantages and Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block Diagram, Optical Fiber construction, Velocity of Propagation, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Optical Fiber Comparison, Losses in Optical Fiber Cables.

UNIT - III: DIGITAL TRANSMISSION (09 periods)

Pulse Modulation, Pulse Code Modulation (PCM), Dynamic Range, Signal Voltage -to-Quantization Noise Voltage Ratio, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed.

Multiplexing and T Carriers: Time- Division Multiplexing, T1 Digital Carrier System, Digital Line Encoding, Statistical Time - Division Multiplexing, Frame Synchronization, Introduction to Frequency Division Multiplexing and Wavelength- Division Multiplexing.

UNIT - IV: TELEPHONE INSTRUMENTS AND SIGNALS (08 periods)

The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Introduction to Electronic Telephones and Paging systems.

Telephone Circuit: The Local Subscriber Loop, Telephone Message- Channel Noise and Noise Weighting, Units of Powers Measurement, Transmission Parameters and Private-Line Circuits, Crosstalk.

UNIT - V: CELLULAR TELEPHONE CONCEPTS (10 periods)

Mobile Telephone Service, Cellular Telephone, Interference, Cell Splitting, Sectoring, Segmentation, Dualization, Topology, Roaming and handoff, Network Components, First- Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular Telephone Systems.

Data Communications Codes, Error Control, Data Formats:

Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization. **Total Periods:45**

TEXT BOOK:

1. Wayne Tomasi, **"Introduction to Data Communications and Networking,"** Pearson Education, 2005.

REFERENCE BOOKS:

1. Behrouz A Forouzan, **"Data Communications and Networking,"** TMH, Fourth Edition, 2006.
2. Fred Halsall, **"Data Communications, Computer Networks and Open Systems,"** Pearson Education, Fourth Edition, 1999.

II B.Tech. II Semester

14BT40501: **COMPUTER ORGANIZATION**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Digital Logic Design".

COURSE DESCRIPTION: Basic structure of a digital computer, organization of the arithmetic, and logical unit, control unit, memory and I/O unit.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Computer Arithmetic and Register Transfer Language.
   - Microprogrammed Control Unit
   - Input Output Organization and Memory system
   - Pipelining, Multiprocessors and interconnection structures.
2. Analyze functioning of Central Processing Unit .
3. Design the Microprogrammed Control Unit, Memory and I/O.

Detailed Syllabus:

UNIT-I:

COMPUTER ARITHMETIC, REGISTER TRANSFER LANGUAGE & MICROOPERATIONS (09 periods)

Computer Arithmetic: Data Representation, Fixed Point Representation, Floating Point Representation, Addition and subtraction, Binary multiplication Algorithms, Binary Division Algorithms, Floating point Arithmetic operations.

Register Transfer Language And Microoperations: Register Transfer, Bus and memory transfers, Arithmetic Microoperations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

UNIT - II:

BASIC COMPUTER ORGANIZATION AND DESIGN, MICRO PROGRAMMED CONTROL (09 periods)

Basic Computer Organization And Design: Instruction codes, Computer Registers, Computer instructions, Timing and control, Instruction cycle, Memory Reference Instructions, Input - Output and Interrupt.

Micro Programmed Control: Control memory, Address sequencing, Design of control unit, Hard wired control, Micro-programmed control.

UNIT - III: INPUT-OUTPUT ORGANIZATION (09 periods)

Input-Output Organization: Peripheral Devices, Input-Output Interface, Modes of Transfer, Priority Interrupt, Direct memory Access, Input -Output Processor (IOP), Serial communication, Introduction to Peripheral Component Interconnect (PCI) bus.

UNIT - IV: THE MEMORY SYSTEM (09 periods)

The Memory System: Semiconductor RAM memories, Read-only memories, Cache memory, Performance considerations, Virtual memory, Secondary storage.

UNIT - V: PIPELINE & VECTOR PROCESSING AND MULTI PROCESSORS (09 periods)

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline ,Vector Processing, Array Processors.

Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-Processor Communication and Synchronization. **Total Periods: 45**

TEXT BOOKS:

1. Morris Mano, **"Computer System Architecture,"** Third Edition, Pearson Education, New Delhi.
2. Carl V Hamacher, Zvonko G. Varanesic and Safat G. Zaky, **"Computer Organisation,"** Fifth Edition, McGraw-Hill, New Delhi.

REFERENCE BOOKS:

1. W. Stallings, **"Computer Organization and Architecture Designing For Performance,"** Eighth Edition, Prentice Hall, India, 2012.
2. John P.Hayes, **"Computer architecture and Organisation,"** Third Edition, Tata McGraw-Hill.

II B.Tech. II Semester

14BT40502: **DATABASE MANAGEMENT SYSTEMS**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Data Structures".

COURSE DESCRIPTION: Introduction to Database Systems; Database Design; Relational Model; SQL Quries, Constraints and Triggers; Schema Refinement and Normal Forms; Transaction Management; Concurrency Control; Overview of Storage and Indexing.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Fundamentals of DBMS
   - Database design
   - Normal forms
   - Storage and Indexing
2. Apply Structured Query Language (SQL) in retrieval and management of data in real time applications.
3. Develop skills in designing, managing databases and its security.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO DATABASE SYSTEMS&DATABASE DESIGN (09 periods)

Introduction to Database Systems: Database System Applications, Purpose of Database Systems, View of Data-Data Abstraction, Instances and Schemas, Data Models, Database Languages-DDL,DML, Database Architecture, Database Users and Administrators.

Introduction to Database design: ER diagrams, Beyond ER design, Entities, Attributes and Entity Sets, Relationships and Relationship sets, Additional features of ER model, Conceptual Design with the ER model.

UNIT - II: THE RELATIONAL MODEL&RELATIONAL ALGEBRA AND CALCULUS (08 periods)

Relational Model: Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical database Design, Introduction to Views-Destroying/altering Tables and Views.

Relational Algebra and Calculus: Preliminaries, Relational Algebra Operators, Relational Calculus - Tuple and Domain Relational Calculus, Expressive Power of Algebra and calculus.

UNIT - III: SQL & SCHEMA REFINEMENT (10 periods)

SQL: Form of Basic SQL Query- Examples of Basic SQL Queries, Introduction to Nested Queries, correlated Nested Queries, Set- Comparison Operators, Aggregate Operators, NULL values-Comparison using Null values- Logical connectives- AND, OR and NOT- Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL ,Triggers and Active Databases.

Schema Refinement: Problems Caused by redundancy Decompositions - Problem related to decomposition, Functional Dependencies- Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms- BCNF, Multi valued Dependencies- FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT - IV: TRANSACTIONS AND CONCURRENCY CONTROL (09 periods)

Transactions: Transaction Concept- Transaction State- Implementation of Atomicity and Durability- Concurrent Executions- Serializability- Recoverability - Implementation of Isolation - Testing for serializability.

Concurrency Control: Lock Based Protocols - Timestamp Based Protocols- Validation Based Protocols - Multiple Granularity, Deadlock Handling.

UNIT - V: STORAGE AND INDEXING (09 periods)

Storage and Indexing: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete. **Total Periods: 45**

TEXT BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke,**"Database Management Systems,"** Tata McGraw Hill, Third Edition, 2007.
2. A.Silberschatz, H.F.Korth, S.Sudarshan,**"Database System Concepts,"** Tata McGraw hill , Fifth Edition, 2005.

REFERENCE BOOKS:

1. RamezElmasri,, Shamkant B.Navathe, **"Database Systems,"** Sixth Edition, Pearson Education, 2013.
2. Peter Rob and Carlos Coronel, **"Database Systems Design, Implementation and Management,"** Cengage Learing, Seventh Edition,2009.

II B.Tech. II Semester

14BT51501: **OPERATING SYSTEMS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Computer Organization".

COURSE DESCRIPTION: Operating systems operations, scheduling; Critical section problem, deadlocks; Paging, segmentation; File Concept, Disk scheduling; I/O interface, concepts of protection.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on operating system operations and services, I/O Management and protection.
2. Analyze
   - CPU scheduling algorithms
   - Synchronization issues
   - Disk scheduling algorithms
   - Memory allocation algorithms
   - Page replacement algorithms
   - File and Directory maintenance

Detailed Syllabus:

UNIT - I: OPERATING SYSTEMS OVERVIEW AND PROCESS MANAGEMENT (09 periods)

Operating systems operations, Distributed systems, Special purpose systems, Operating systems services, Systems calls, Operating system structure.

Process Management: Process scheduling, Operations on process, Inter process communication, Multi threading models, Threading issues, Scheduling criteria, Scheduling algorithms - First come first served, Shortest-job-first, Priority, Round-robin, Multilevel queue, Multilevel feedback queue.

UNIT - II: SYNCHRONIZATION AND DEADLOCKS (10 periods)

Synchronization: The critical-section problem, Peterson's Solution, Synchronization hardware, Semaphores, Classic problems of synchronization, Monitors.

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock detection, Deadlock avoidance, Deadlock recovery.

UNIT - III: MEMORY MANAGEMENT (09 periods)

Memory-Management Strategies: Swapping, Contiguous memory allocation, Paging, Structure of the page table, Segmentation.

Virtual Memory Management: Demand paging, Copy-on-Write, Page replacement, Allocation of frames, Thrashing.

UNIT - IV: STORAGE MANAGEMENT (08 periods)

File System: File Concept, Access methods, Directory structure, File system structure, File system implementation, Directory implementation, Allocation methods.

Secondary Storage Structure: Disk structure, Disk attachment, Disk scheduling, Swap-space management, Stable-storage implementation, Tertiary storage structure.

UNIT - V: I/O SYSTEMS AND PROTECTION (09 periods)

I/O Systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem.

Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights. **Total periods: 45**

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, **"Operating System Principles,"** Seventh Edition, Wiley India Edition, 2011.

REFERENCE BOOKS:

1. William Stallings, **"Operating Systems, Internals and Design Principles,"** Seventh Edition, Pearson Education, 2013.
2. Andrew S. Tanenbaum, **"Modern Operating Systems,"** Third Edition, PHI, 2009.

II B.Tech. II Semester

14BT41221: **OBJECT ORIENTED PROGRAMMING LAB**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Hands-on Programming using concepts of classes, objects, inheritance, Polymorphism, String API, Exception Handling mechanisms, Threads, Applets, AWT, Swings and Database Connectivity using JDBC and Servlets.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Design and develop real time applications using applets.
2. Demonstrate problem solving skills using classes, objects, inheritance, runtime polymorphism, AWT and Servlets to develop web/interactive applications.

List of Experiments:

1:

a) Write a Java program that prints all real solutions to the quadratic equation ax2 + bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminant b2 -4ac is negative, display a message stating that there are no real solutions.

b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.

2:

a) Write a Java program to find the average and sum of 1st N numbers using command line arguments

b) Write a Java program to multiply two given matrices.

c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

3:

a) Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes containsonly the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.

b) Write a java program to design a class using the inheritance and static that show all function of bank (withdrawl, deposit) and generate account number dynamically.

c) Write a java program to design(Implement runtime polymorphism) using abstract methods and classes.

4:

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java program to make frequency count of words in a given text.

5:

a) Write a java program that import the Userdefine package and access the member variable of classes that contained by the package

b) Write a java program to handle ArithmeticException, ArrayIndexOutOfBoundsException using try and multiple catch statements

c) Write a java program to throw a user defined exception called Negative, if the entered input is a negative number and to handle the exception.

6:

a) Develop an applet that displays a simple message.

b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named - Compute is clicked.

7:

a) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.

b) Write a Java program for handling mouse events.

8:

a) Write a Java program that creates three threads. First thread displays - Good Morning for every one second, the second thread displays - Hello for every two seconds and the third thread displays - Welcome for every three seconds.

b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

9:

a) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.

b) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on ata time No light is on when the program starts.

c) Write a Java program that allows the user to draw lines, rectangles and ovals.

10:

a) Write an applet that computes the payment of a loan, by taking the amount of the loan, the interest rate and the number of month's values in the text fields. it takes one parameter from the browser: monthly rate as a checkbox ,if it is true, the interest is calculated per month otherwise the interest is calculated per annual.

b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

11: Create a table which should contain at least the following fields: name, password, email-id, phone number. Write a java program to connect to the database (Ex: MS-Access) and extract data from the tables and display them

12:Assume four users user1, user2, user3 and user4 having passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following.

a) Create a Cookie and add these four user ids and passwords to this Cookie, read user id and password entered in the login form.

b) If he is valid user (i.e., user-name and password match) welcome him with his name, else display "You are not an authorized user".

TEXT BOOKS:

1. Herbert Schildt, **"The complete reference Java,"** TMH, Seventh Edition, 2007.
2. Timothy Budd, Understanding **"Object-oriented Programming with Java,"** Addison-Wesley, Updated Edition, 2002.

REFERENCE BOOK:

1. Sachin Malhotra, Saurab Choudhary, **"Programming in Java,"** Oxford university press, Second Edition, 2013.

II B.Tech. II Semester

14BT40521: **DATABASE MANAGEMENT SYSTEMS LAB**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE REQUISITES: A Course on "Database Management Systems"

COURSE DESCRIPTION: Hands on experience on developing ER Design, DDL, DML commands, DCL and TCL Commands, Query processing using Aggregate operators, Subqueries, Joins, Date Manipulation functions, PL/SQL concepts: Triggers, Functions, Cursors, Stored Procedures and basic Programs.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Design and implement a database schema for the sales database.
2. Apply normalization on sales database.
3. Analyze and evaluate the databases using SQL DML/DDL commands.
4. Develop solutions to database problems using programming PL/SQL including stored procedures, stored functions, cursors and triggers.

List of Experiments:

DESCRIPTION OF SALES DATABASE:

ABC is a company operating in the country with a chain of shopping centers in various cities. Everyday large numbers of items are sold in different shopping centers. The Sales database comprises of various tables like CUST, PROD, SALES_DETAIL, STATE_NAME with the following schemas.

CUST TABLE

Name	Type	Remark
CID	VARCHAR2(6)	PRIMARY KEY
CNAME	VARCHAR2(10)	
CCITY	VARCHAR2(8)	

PROD TABLE

Name	Type	Remark
PID	VARCHAR2(6)	PRIMARY KEY
PNAME	VARCHAR2(6)	
PCOST	NUMBER(4,2)	
PROFIT	NUMBER(3)	

SALES DETAIL

Name	Type	Remark
CID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
PID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
SALE	NUMBER(3)	
SALEDT	DATE	COMPOSITE PRIMARY KEY

STATE NAME

Name	Type	Remark
CCITY	VARCHAR2(8)	PRIMARY KEY
STATE	VARCHAR2(15)	

1. Data Retrieval

a) Write a query to display all columns of CUST table.

b) Write a query to display pname of all records. Sort all records by pname. (use order by clause)

c) Write a query to display cname and ccity of all records. Sort by ccity in descending order.

d) Write a query to display cname, ccity who lives in mysore.
e) Write a query to display cname, pname, sale, saledt for all customers.
f) Write a query to display cname who have purchased Pen.
g) Write a query to display saledt and total sale on the date labeled as sale of all items sold after 01-sep-2010.
h) Write a query to display saledt and total sale on the date labeled as sale of all items other than DVD.
i) Write a query to display cname and ccity of all customers who live in Kolkata or Chennai.

2. Use of Distinct, between, in clause, like operator, Dual

a) Write a query to display the pname and pcost of all the customers where pcost lies between 5 and 25.
b) Find the product ids in sale_detail table (eliminating duplicates).
c) Write a query to display distinct customer id where product id is p3 or sale date is '18-mar-2011'.
d) Write a query to display cname, pid and saledt of those customers whose cid is in c1 or c2 or c4 or c5.
e) Write a query to display cname, pid, saledt of those customers whose pid is p3 or sale date is '20-dec-2009'.
f) Write a query to display system date.
g) Write a query to display all records of prod table in which first and third character of pname is any character and second character is 'E'.
h) Write a query to display all cname which includes two 'A' in the name.

3. Constraints

a) Implement table level and Column level constraints like NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK.

4. Single Row Functions: DATE Function

a) Write a query to display the system date by rounding it to next month.
b) Write a query to display the system date by rounding it to next year.
c) Write a query to display the last date of the system date.
d) Write a query to display the next date of system date which is Friday.
e) Write a query to display sale date and date after 02 months from sale date.
f) Write a query to display system date, sale date and months between two dates.
g) Write a query to display the greatest date between sale date and system date, name it as BIG, also display sale date and SYSDATE.
h) Write a query to display the least date between sale date and system date name it as SMALL, also display sale date and SYSDATE.

5. Single Row Functions: Numeric and Character Function

a) Write a query to display the product name along with the rounded value of product cost for product name is "Pencil".
b) Write a query to display product cost along with MOD value if divided by 5.
c) Write a query to display cname in uppercase, lowercase, titlecase from cust table where customer name is "rohan".
d) Write a query to display all concatenated value of cname, ccity by converting cname into titlecase and ccity into uppercase.
e) Write a query to display the first 3 characters of cname.
f) Write a query to display the position of 'M' in the cname of the customer whose name is "SAMHITA".
g) Write a query to display the length of all customer names.
h) PAD # character in left of product cost to a total width of 5 character position.

6. Group Functions and SET Functions

i) Write a query to display the total count of customer.

j) Write a query to display the minimum cost of product.

k) Write a query to display average value of product cost rounded to 2nd decimal places.

l) Write a query to display product name with total sale detail in descending order.

m) Write a query to display product name, sale date and total amount collected for the product.

f) Write a query to display sale date and total sale date wise which was sold after "14-jul-08".

g) Write a query to display the customer name who belongs to those places whose name is having I or P.

h) Write a query to display customer name who belongs to a city whose name contains characters 'C' and whose name contains character 'A'.

i) Write a query to display the customer name who does not belong to PUNE.

7. PL/SQL basic programs

a) Write a PL/SQL program to find largest number among three. (Hint: Use Conditional Statement)

b) Write a PL/SQL program to display the sum of numbers from 1 to N using for loop, loop…end and while…loop.

8. SQL Cursor based programs

c) Write a PL/SQL program to display the costliest and cheapest product in PROD table.

d) Write a PL/SQL program which will accept PID and display PID and its total sale value i.e. sum.

9. Functions

a) Write a function that accepts two numbers A and B and performs the following operations.

i. Addition

ii. Subtraction

iii. Multiplication

iv. Division

b) Write a function that accepts to find the maximum PCOST in PROD table.

10. Procedures

a) Write a procedure that accepts two numbers A and B, add them and print.

b) Write procedures to demonstrate IN, IN OUT and OUT parameter.

11. Triggers

a) Develop a PL/SQL program using BEFORE and AFTER triggers.

b) Create a row level trigger for the PROD table that would fire for INSERT or UPDATE or DELETE operations performed on the PROD table. This trigger will display the profit difference between the old values and new values.

12.Implicit and Explicit Cursors

Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

REFERENCE BOOKS:

1. Satish Ansari, **"Oracle Database 11g: Hands-on SQL and PL/SQL,"** PHI Publishers, 2010.
2. Pranab Kumar Das Gupta, **"Database Management System Oracle SQL and PL/SQL,"** PHI Learning Private Limited, 2009.

III B.Tech. I Semester

14BT4HS02: **PROFESSIONAL ETHICS**

(Common to CSE, CSSE, IT, CE and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Engineering Ethics, Moral autonomy and Moral dilemmas - Professional and Ideal Virtues, Professional Responsibility and Moral Leadership - Engineering as Social Experimentation, Conscientiousness and Law of Engineering - Responsibilities and Rights, Whistle Blowing - Global Issues, Managerial Ethics.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Apply the principles of ethics to solve engineering problems.
2. Analyze the problems in the implementation of moral autonomy and resolve through consensus.
3. Responsible to follow the codes of ethics.
4. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas.
5. Function as a member, consultant, Manager, Advisor and Leader in multi-disciplinary teams.
6. Write reports without bias and give instructions to follow ethics.

Detailed Syllabus:

UNIT - I: ENGINEERING ETHICS (08 periods)

Scope and Aim of Engineering Ethics-Senses of Engineering Ethics- Variety of Moral Issues-Types of Inquiry- Moral Dilemmas- Moral Autonomy- Kohlberg's Theory, Gilligan's theory, Consensus and Controversy,

UNIT - II: PROFESSIONAL IDEALS AND VIRTUES (10 periods)

Theories about Virtues, Professions, Professionalism - characteristics, expectations, Professional Responsibility, Integrity, Self-respect, Sense of "Responsibility". Self-interest, Customs and Religion- Self-interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories- resolving moral dilemmas and moral leadership.

UNIT - III: ENGINEERING AS SOCIAL EXPERIMENTATION (09 periods)

Engineering as experimentation- Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters-Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT - IV: RESPONSIBILITIES AND RIGHTS (09 periods)

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, the bart case, employee rights and discrimination.

UNIT - V: GLOBAL ISSUES (09 periods)

Multinational corporations-Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers - Managerial ethics applied to Engineering Profession, moral leadership.

Total Periods: 45

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, **"Ethics in Engineering,"** Tata McGraw-Hill, Third Edition, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V. S, **"Engineering Ethics,"** Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, **"Human Values and Professional Ethics,"** Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, **"Fundamental of Ethics for Scientists and Engineers,"** Oxford University Press, 1st edition, 2001.
3. Charles F. Fledderman, **"Engineering Ethics,"** Pearson Education, 2004.
4. R. Subramanaian, **"Professional Ethics,"** Oxford Higher Education, 2013.

III B.Tech. I Semester
14BT5HS02: **MANAGEMENT SCIENCE**
(Common to CSE, CSSE, IT and CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Concepts of Management, Evolution of thought of Management, Functions of Management, Environmental Scanning, SWOT analysis, Social Responsibility of Management, Operations Management, Forecasting Methods, Work study, Method Study, Work measurement, Statistical Quality Control, Inventory Management, Marketing, Marketing functions, Human Resource Management, Job evaluation, merit rating, Theories of motivation, Project Management, CPM, PERT, Project cost analysis, Project crashing, Entrepreneurship, Entrepreneur vs Manager, Contemporary Management practices, Just-in-time, Enterprise Resource Planning, Business Process Outsourcing, Intellectual property rights and Supply chain management.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Employ fundamental knowledge on 'Management Thought' and 'Management of a business organization'.
2. Apply various Managerial concepts & contexts to attain 'Optimum Utilization of available organizational resources'.
3. Contribute to the group, as an individual, in accomplishing the stated objective of the business organization.
4. Apply gained knowledge on Management to establish and run his/her own organization, if he/she deserve to be an 'Entrepreneur'.
5. Imbibe contemporary practices in applying Management and exercise discernment in implementing managerial decisions for ethical, safe, and sustainable operations of the business.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO MANAGEMENT AND ORGANIZATION

(Periods:09)

Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills - Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management. Basic concepts related to organization- Objectives, Procedure and Principles; Types of organizations - Merits, demerits and adoptability to modern firms.

UNIT - II: OPERATIONS MANAGEMENT **(12 Periods)**

Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling. Materials management objectives; Inventory - Types of inventory - Classical EOQ model - ABC analysis - Purchase procedure - Stores management. Marketing: Functions of marketing - Marketing mix - Channels of distribution.

UNIT - III: HUMAN RESOURCES MANAGEMENT (HRM) **(06 periods)**

Nature and scope of HRM - Functions of HRM - Role of HR Manager in an organization, Job evaluation and merit rating - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT - IV: PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (09 periods)

Network analysis - Program evaluation and review technique (PERT) - Critical path method (CPM) - Probability of completing the project within given time - Project cost analysis - Project crashing.

Introduction to entrepreneurship - Entrepreneurial traits - Entrepreneur vs. manager - Role of entrepreneurship in economic development - Women as an entrepreneur.

UNIT - V: CONTEMPORARY MANAGEMENT PRACTICES (09 periods)

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) - Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making.

Total Periods: 45

TEXT BOOKS:

1. O.P. Khanna, **"Industrial Engineering and Management,"** Dhanpat Rai and Sons, 2010.
2. Stoner, **"Freeman and Gilbert, Management,"** Sixth Edition, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, **"Marketing Mangement,"** Twelth Edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, **"Essentials of Management,"** Sixth Edition, TMH, New Delhi, 2007.
3. N.D. Vohra, **"Quantitative Techniques in Management,"** Second Edition, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz, **"Management- A Global Perspective,"** Tenth Edition, McGraw-Hill International.

III B.Tech. I Semester
14BT51201: **COMPUTER NETWORKS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil
COURSE DESCRIPTION: Introduction to Computer Networks; The Physical Layer; The Data Link Layer; The Medium Access Sub layer; The Network Layer; The Transport Layer; The Application Layer; Network Security.
COURSE OUTCOMES:
After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - concepts of computer networks.
   - functionality of reference models layers.
   - 3G Mobile Phone Networks, 802.11.
2. Analyze the issues in data link layer by using error detection and correction techniques, medium access sub layer by channel allocation schemes and transport layer by connection management schemes.
3. Acquire problem solving skills to assess the routing of the packet by selecting the appropriate routing algorithms.

Detailed Syllabus:
UNIT - I: INTRODUCTION AND PHYSICAL LAYER (09 periods)
Uses of Computer Networks, Network Hardware, Network Software, Reference Models: OSI, TCP/IP, Example Networks: Internet, 3G Mobile Phone Networks, 802.11.
Guided Transmission Media, Wireless Transmission.
UNIT - II: DATA LINK LAYER AND MEDIUM ACCESS SUBLAYER (10 periods)
Data Link Layer Design Issues, Error detection and correction-CRC, Hamming codes, Elementary Data Link Protocols, Sliding Window Protocols.
Channel Allocation problem, Multiple Access protocols: ALOHA, CSMA, CSMA/CD protocols, Collision free protocol, Limited contention protocol, Ethernet, DLL Switching.
UNIT - III: NETWORK LAYER (10 periods)
Network Layer Design Issues, Routing Algorithms: Shortest path, Flooding, Distance vector, Hierarchical, Broadcast, Multicast and Any cast, Congestion Control Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet.
UNIT - IV: TRANSPORT LAYER (08 periods)
Transport Service, Elements of transport protocol, Internet Transport layer protocols: UDP, TCP;
UDP - Introduction, Remote Procedure Call, Real-Time Transport Protocol
TCP - Introduction, Service Model, Protocol, Segment Header, Connection Establishment, Connection Release, Connection Management Modeling, Sliding Window, Timer Management, Congestion Control, The Future of TCP.
UNIT - V: APPLICATION LAYER AND NETWORK SECURITY (08 periods)
Domain name system (DNS), Electronic Mail, World Wide Web: Architectural Overview, Dynamic Web Document, HTTP.
Introduction to Network Security: Cryptography - Substitution Techniques, Transposition Techniques, One-Time Pads.

Total Periods: 45

TEXT BOOK:

1. Andrew S. Tanenbaum and David J. Wetherall, **"Computer Networks,"** Pearson Education, Fifth Edition, 2012.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "**Data communication and Networking,"** Tata McGraw-Hill, Fifth Edition, 2006.
2. James F. Kurose and Keith W. Ross, **"Computer Networking A Top-Down Approach Featuring the Internet,"** Pearson Education, Second Edition, 2003.

III B.Tech. I Semester

14BT51202: **SOFTWARE ENGINEERING**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Concepts of Software Engineering, software process models: Conventional and agile process models, software requirements engineering process, system analysis, architectural design, User interface design and re-engineering, software testing, risk and quality management.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in:
   - Fundamental concepts of software engineering.
   - Process models.
   - Software development life cycle.
2. Analyze software requirements and process models required to develop a software system.
3. Design and develop a quality software product using design engineering principles.
4. Demonstrate skills in applying risk and quality management principles for effective management of software projects.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO SOFTWARE ENGINEERING (09 periods)

A Generic view of process: Evolving role of software, Software myths, Software engineering- A layered technology, A process framework, CMMI, Process patterns, Process assessment, Personal and team process models.

Process models: Waterfall model, Incremental process models, Evolutionary process models, the unified process, agile process models-Scrum, agile modeling.

UNIT - II: REQUIREMENTS ENGINEERING (09 periods)

Functional and non-functional requirements, the software requirements document, Requirements specifications, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management.

System modeling: Context models, Interaction models, Structural models, Behavioral models, Model driven engineering.

UNIT - III: DESIGN ENGINEERING (09 periods)

Creating an architectural design: Design process and design quality, Design concepts, Software architecture, Data design, Architectural styles and patterns, Architectural design

Performing user interface design: The golden rules, User interface analysis and design, Interface analysis, Interface design steps, Re-engineering.

UNIT - IV: SOFTWARE TESTING (10 periods)

Testing strategies: A strategic approach to software testing, Strategic issues, Test strategies for conventional software, Test strategies for object oriented software , Validation testing, System testing, The art of debugging.

Testing tactics: Software testing fundamentals, white box testing, Basis path testing, Control structure testing, Black box testing, Object oriented testing methods.

UNIT - V: RISK AND QUALITY MANAGEMENT (08 periods)

Risk management: Reactive and proactive risk strategies, Software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM plan.

Quality management: Quality concepts, Software quality assurance, Software reviews, Formal technical reviews, Formal approaches to SQA, Statistical software quality assurance, Software reliability.

Total Periods: 45

TEXT BOOKS:

1. Roger S. Pressman, **"Software Engineering, A practitioner's Approach,"** McGraw-Hill International Edition, Sixth Edition, 2010.
2. Ian Sommerville, **"Software Engineering,"** Pearson Education, Nineth Edition, 2011.

REFERENCE BOOKS:

1. K. K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, Third Edition, 2007.
2. Shely Cashman Rosenblatt, **"Systems Analysis and Design,"** Thomson Publications, Sixth Edition, 2006.

III B.Tech. I Semester

14BT50431: **MICROPROCESSORS AND INTERFACING**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Digital Logic Design and Computer Organization".

COURSE DESCRIPTION: INTEL 8086 & 8031/51- Architectures; Instruction set; Programmable Interfacing Concepts; Serial Communication; Advanced peripheral Interfacing; Applications.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate potential knowledge in:
   - Internal hardware details of Intel 8086,8051
   - Interfacing various peripherals to build stand alone systems
2. Critically analyze various peripherals and interfacing techniques
3. Design and develop Microcomputer based system to suit a particular application.
4. Choose suitable Hardware and Software components of a system that work together to solve engineering problems.

Detailed Syllabus:

UNIT - I - INTEL 8086 ARCHITECTURE AND PROGRAMMING (11 periods)

Evolution of Microprocessors, Architecture of 8086 microprocessor, register organization - special functions of general purpose registers, Memory segmentation, Pin description, Minimum and Maximum mode operation of 8086, timing diagram, Addressing modes, Assembler directives, Instruction set of 8086, Simple programs , Procedures and Macros.

UNIT - II - MEMORY INTERFACING, PRIORITY INTERRUPT CONTROLLER AND DMA (07 periods)

Memory (static RAM and EPROM) and I/O interfacing, 8257 (DMA controller), Interrupt structure, Interrupt vector table, 8259 Programmable Interrupt Controller (PIC), importance of cascading of PICs.

UNIT - III - 8255A AND ITS APPLICATIONS (07 periods)

Types of data communication - serial and parallel, Methods of parallel data transfer, 8255A (programmable peripheral interface) - Internal block diagram, Control words and initialization, interface of I/O devices: key board, stepper motor.

UNIT - IV - SERIAL DATA COMMUNICATION AND STANDRADS (08 periods)

Types of serial data transmission - synchronous and asynchronous, 8251 (USART) - architecture, Simple programs for sending and receiving characters with an 8251 (polling & interrupt basis), serial communication standards- RS232C. RS232C to TTL and TTL to RS232C conversion.

UNIT - V - 8031/51 MICROCONTROLLER ARCHITECTURE AND PROGRAMMING (12 periods)

Microcontrollers Vs. general purpose processors, Criterion for choosing microcontroller, 8051 Architecture- Internal and external memories, Timers/Counters, Serial communication, Interrupts. Addressing modes, Instruction set of 8051, simple programs using 8051, Timer Programming, Serial port programming, Interrupts programming.

Total Periods: 45

TEXT BOOKS:

1. Douglas V.Hall, **"Microprocessors and Interfacing: Programming and Hardware,"** revised Second Edition, TMH, 2006.
2. Mazidi and Mazidi, **"The 8051 Microcontroller and Embedded Systems,"** PHI, 2000.

REFERENCE BOOKS:

1. A.K. Ray & K.M.Bhurchandi, **"Advanced Microprocessors and Peripherals- Architecture, Programming and Interfacing,"** TMH, 2002.
2. Yu-cheng Liu, Glenn A. Gibson, **"Microcomputer systems: The 8086/8088 Family architecture, Programming and Design,"** PHI, 2006.
3. Kenneth J. Ayala, **"The 8051 Microcontroller-Architecture, Programming & Applications,"** Cengage learning, Third Edition, 2004.

III B.Tech. I Semester

14BT50501: **THEORY OF COMPUTATION**

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Discrete Mathematical Structures".

COURSE DESCRIPTION: Fundamentals of computation - Finite State Automaton; Push Down automaton; Turing Machine; and decidability of problems.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate Knowledge on:
   - Finite State Automaton
   - Regular Expression
   - Push Down Automaton and Turing Machine.
2. Develop formal proofs for models of Computation.
3. Apply the concepts of automata in modeling abstract devices.

Detailed Syllabus:

UNIT - I: FINITE AUTOMATA (09 periods)

Finite Automata: Introduction to Finite Automata, Structural Representations, Automata and Complexity, The Central Concepts of Automata Theory, An Informal Picture of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata with epsilon-Transitions.

UNIT - II: REGULAR EXPRESSIONS (09 periods)

Regular Expressions: Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expression, Proving Languages not to be Regular, Closure Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT - III: CONTEXT-FREE GRAMMARS AND PUSH DOWN AUTOMATA (10 periods)

Context-Free Grammars: Context-Free Grammars, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages, Normal Forms for Context-Free Grammars, The Pumping Lemma for Context-Free Languages.

Push Down Automata: Definition of the Pushdown Automaton, The Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.

UNIT - IV: TURING MACHINES AND LINEAR BOUNDED AUTOMATA (08 periods)

Turing Machines: Types of Computational Problems, The Turing Machine, Programming Techniques for Turing Machine, Extensions to the Basic Turing Machine, Restricted Turing Machines, Turing Machines and Computers, The Model of Linear Bounded Automaton.

UNIT - V: UNDECIDABILITY (09 periods)

Undecidability: Language that is not Recursively Enumerable, An Undecidable Problem, Undecidable Problems about Turing Machines, Post's Correspondence Problem.

Total Periods: 45

TEXT BOOK:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D Ullman, **"Introduction to Automata Theory, Languages and Computation,"** Third Edition, Pearson, 2011.

REFERENCE BOOKS:

1. K.L.P. Mishra and N.Chandrasekaran, **"Theory of Computer Science: Automata Languages and Computation,"** Third Edition, PHI Learning, 2009.
2. John C Martin, **"Introduction to Languages and the Theory of Computation,"** Third Edition, TMH, 2009.

III B.Tech. I Semester

14BT50502: **UNIX INTERNALS**

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Operating Systems".

COURSE DESCRIPTION: Concepts of Unix Operating Systems; Utilities; Shell Programming; Process; Signals; File Locking to provide Security; Inter process Communications and Socket Programming for client server Interaction.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Internal Structure of UNIX Operating System,
   - Utilities and shell programming
   - Processes management and handling signals,
   - File Locking
   - Sockets and IPC
2. Analyze and identify the system calls to interact with Unix Environment.
3. Implement UNIX applications using Shell Scripting for simple problems and C programming for IPC and Sockets.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO UNIX AND UTILITIES (09 periods)

General Review of the System: History of UNIX, Architecture of UNIX, User Perspective.

The Buffer Cache: Headers, Buffer Pool, Scenarios for Retrieval of a Buffer, Reading and Writing Disk Blocks, Advantages and Disadvantages.

Utilities: General Purpose Utilities, File Handling Utilities, Security by File Permissions, Process Utilities, Disk Utilities, Networking Commands.

UNIT - II: SHELL PROGRAMMING (08 periods)

Text Processing Utilities and Backup Utilities, Shell, Shell Responsibilities, Types of Shell, Pipes and I/O Redirection, Shell as a Programming Language, Shell Syntax: Variables, Conditions, Control Structures, Functions, Commands, Command Execution, Shell Scripts.

UNIT - III: FILE SYSTEM STRUCTURE AND SYSTEM CALLS (10 periods)

Introduction to Unix File System, File Descriptors, Inode Representation, Super Block, System Calls and Library Functions.

Low Level File Access: open, read, write, close, lseek, stat, fstat, lstat, ioctl, umask, dup and dup2. The Standard I/O Library: fopen, fread, fwrite, fclose, fflush, fseek, fgetc, fputc, fgets. Formatted Input and Output: printf, fprintf, sprint, scanf, fscanf, and sscanf. File and Directory Maintenance: chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir.

Scanning directories: opendir,readdir,telldir,seekdir,rewinddir,closedir.

UNIT - IV: PROCESS, SIGNALS AND FILE LOCKING (09 periods)

Process, Process Identifiers, Process Structure, Zombie Processes, Orphan Process, fork, vfork, exit, wait, waitpid, exec, Signals functions, Unreliable Signals, Interrupted System Calls, kill, raise, alarm, pause, abort, system, sleep Functions, Job Control Signals.

Data Management: Managing Memory - malloc, free, realloc, calloc, File Locking - Creating Lock Files, Locking Regions, Use of Read and Write with Locking, Competing Locks, Other Lock Commands - Advisory Locking, Mandatory Locking; Deadlocks.

UNIT - V: INTER-PROCESS COMMUNICATION AND SOCKETS (09 periods)

Pipe, Process Pipes, The Pipe Call, Parent and Child Processes, Named Pipes: FIFOs, Semaphores - semget, semop, semctl, Message Queues - msgget, msgsnd, msgrcv, msgctl, Shared Memory - shmget, shmat, shmdt, shmctl, IPC Status Commands. Socket, Socket Connections - Socket Attributes, Socket Addresses, socket, connect, bind, listen, accept, Socket Communications. **Total periods: 45**

TEXT BOOKS:

1. Neil Matthew, **"Richard Stones, Beginning Linux Programming,"** Wiley Dreamtech, 2004.
2. Maurice J. Bach, **"The Design of the Unix Operating System,"** Pearson Education, 2002.

REFERENCE BOOKS:

1. Sumitabha Das, **"Your Unix The Ultimate Guide,"** TMH, 2007.
2. W. Richard. Stevens, **"Advanced Programming in the UNIX Environment,"** Second Edition, Pearson Education, 2005.

III B.Tech. I Semester

14BT51221: **UNIX & COMPUTER NETWORKS LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on "Unix Internals", "Computer Networks", "Object Oriented Programming" and "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hands-on Experience on Unix Commands; Shell Scripting; IPC; Sockets; data link Framing methods; CRC; Routing algorithms; Congestion Control Algorithms; Substitution Techniques.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate analysis skills on:
   a. Framing mechanisms for data link layer
   b. CRC
   c. Unix utilities and shell scripting
2. Simulate routing algorithms:
   a. Shortest path using Dijkstra's
   b. Distance vector
3. Apply IPC techniques in Unix Environment to establish communication among the processes.

List of Experiments:

PART-A: UNIX INTERNALS

1. Create two files source.txt and dest.txt using vi editor which contains some text and practice the following commands on that files cat, tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, cp, mv, ln, rm, unlink.
2. a) Write a shell script that takes a command line argument and reports on whether it is directory, a file, or something else.
   b) Write a shell script that accepts one or more file names as arguments and converts all of them to uppercase, provided they exist in the current directory.
3. a) Simulate Uniq command using C.
   b) Simulate grep command using C.
4. a) Write a Program to handle the Signals like SIGINT, SIGQUIT, and SIGFPE.
   b) Write a Program to create a Zombie Process.
   c) Create a Process using fork() and display Child and Parent Process Id's.
5. Implement the Following IPC Forms:
   a) FIFO.
   b) PIPE.
6. Write a program to:
   a) Create the semaphore.
   b) Set values to semaphores.
   c) Get the values from the semaphore.
   d) Remove semaphore.
7. a) Implement file transfer using Message Queue form of IPC.
   b) Write a program to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use semaphores to avoid race conditions.
8. Perform Socket Programming using:
   a) UDP socket.
   b) TCP socket.

PART-B: COMPUTER NETWORKS

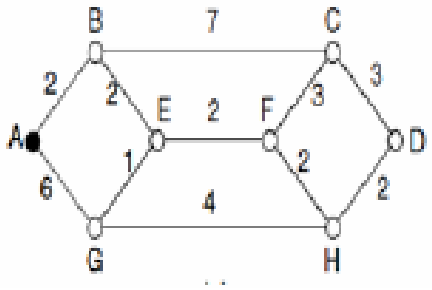
1. Implement the following data link layer framing methods:

a. Character Count.

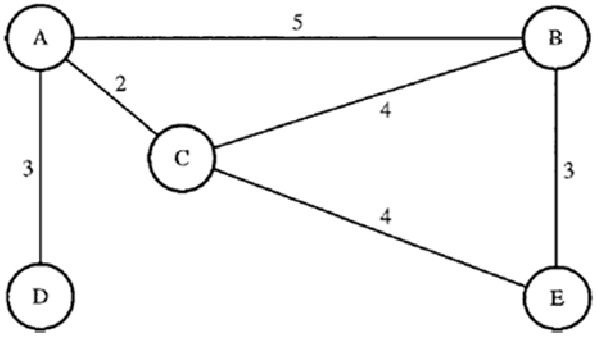
b. Character stuffing.

c. Bit stuffing.

2. Design a program to compute checksum for the given frame 1101011011 with the generator Polynomial of CRC 12, CRC 16 and CRC CCIP. Display the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receivers end.
3. Implement Dijkstra 's algorithm to compute the Shortest path through the following graph.



4. Design a program to obtain routing table for each node using distance vector routing algorithm by considering the given subnet with weights indicating delay between nodes.



5. Simulate Random Early Detection congestion control algorithm.
6. Encrypt the message "COMPUTER NETWORKS LAB" using Caesar cipher with a key of 20. Ignore the space between words. Decrypt the message to get the original plain text.

REFERENCE BOOKS:

1. B.A. Forouzan and R.F. Giberg, Thomson, **"Unix and shell Programming -A text book,"** Pearson Education, 2009.
2. Andrew S. Tanenbaum and David J. Wetherall, **"Computer Networks,"** Pearson Education, Fifth Edition, 2012.
3. Richard Stevens, **"Advance UNIX Programming in the UNIX Environment,"** Pearson Education, Second Edition, 2005.
4. Behrouz A. Forouzan, **"Data communication and Networking,"** Tata McGraw-Hill, Fourth Edition, 2006.

III B.Tech. I Semester

14BT50424: **MICROPROCESSORS AND INTERFACING LAB**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on "Digital logic design", and "Micro processors and Micro controllers".

COURSE DESCRIPTION: Assembly language Programming for Intel 8086 & 8051; Interfacing standard peripherals & Programming-DAC; Stepper Motor; ADC; Logic Controller; Keyboard; Seven Segment Display.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Analyze various programming alternatives & interfacing methods to build a typical microcomputer based system.
2. Design and develop microcomputer based system to solve various problems.

List of Experiments:

I Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

II Interfacing with 8086

1. Stepper motor
2. Logic controllers
3. A/D and D/A converter
4. Seven segment display
5. Keyboard interfacing

III Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory
3. Programs using special instructions like SWAP, bit/byte, set/ reset etc.

III B.Tech. II Semester

14BT5HS01: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY

(Common to CSE, CSSE, IT, CE and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in:
a) Tools and concepts of Micro Economics.
b) Basic Principles and concepts of Accountancy.
c) Provides life skills for effective utilization of scarce resources.
d) Financial Accounting.
e) Using advanced tools like tally and SAP.
f) Significance of Economics and Accountancy
2. Develop skills in providing solutions for
a) Managerial decisions of an organization.
b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.
3. Develop effective communication in Business and Accounting transactions.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS: (09 periods)

Definition, Nature and Scope of Managerial Economics.

Demand: Determinants of demand - Demand function - Law of demand, assumptions and exceptions - Elasticity of demand -Types of elasticity of demand -Demand forecasting and methods of demand forecasting, Supply- Determinants of Supply and Supply function.

UNIT - II : THEORY OF PRODUCTION AND COST ANALYSIS: (09 periods)

Production Function: Isoquants and Isocosts, Input-output relationship - Law of returns. Cost Concepts, Total, Average and Marginal Cost, Fixed vs. Variable costs, Opportunity Costs Vs Outlay Costs, Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs, Avoidable Costs Vs Unavoidable Costs, Break Even Analysis (BEA)-Assumptions, Merits and demerits, Determination of Break Even Point (Simple problems).

UNIT - III : INTRODUCTION TO MARKETS AND PRICING: (09 periods)

Market Structure: Types of Markets, Features of perfect competition, Monopoly and monopolistic competition, Price and Output determination in perfect competition and monopoly.

Pricing : Objectives and policies of pricing, Sealed bid pricing, Marginal cost pricing, Cost plus pricing, Going rate pricing, Market penetration, Market skimming, Block pricing, Peak load pricing, Cross subsidization. **Capital:** Significance, Types of capital, Sources of Capital.

UNIT - IV : INTRODUCTION AND PRINCIPLES OF ACCOUNTING (Periods:09)

Accountancy: Introduction, Concepts, Conventions, Accounting Principles, Double Entry Book Keeping, Journal, Ledger, Trial Balance (Simple problems).

UNIT - V : FINAL ACCOUNTS: (09 periods)

Introduction to Final Accounts, Trading account, Profit and Loss account and Balance Sheet with simple adjustments (Simple problems).

Computerization of Accounting System: Manual Accounting Vs Computerized Accounting, Advantages and Disadvantages of Computerized Accounting. **Total periods: 45**

TEXT BOOKS:

1. A.R. Aryasri, **"Managerial Economics and Financial Analysis,"** Tata Mc- Graw Hill, New Delhi, Third Edition, 2007.
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, **"Managerial Economics,"** S. Chand and Company, New Delhi, Second Edition, 2010.

REFERENCE BOOKS:

1. Vershaney and Maheswari, **"Managerial Economics,"** Sultan Chand and Sons,New Delhi, Nineteenth Edition, 2005.
2. H. Craig Petersen and W. Cris Levis, **"Managerial Economics,"** Pearson Education, Fourth Edition, 2009.
3. Lipsy and Chrystel, **"Economics,"** Oxford University Press, New Delhi, Twelfth Edition, 2011.
4. S.P. Jain and K.L. Narang, **"Financial Accounting,"** Kalyani Publishers, Ludhiana, Sixth Edition, 2002.

III B.Tech. II Semester

14BT61201: DATAWAREHOUSING AND DATA MINING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES:A course on "Database Management Systems"

COURSE DESCRIPTION: Data Warehouse Design; Data Mining Fundamentals; Data Preprocessing; Mining Frequent Patterns; Classification and Prediction; Clustering Techniques.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Concepts of data mining and data warehousing
   - Data preprocessing and association rule mining
   - Classification and Prediction techniques
   - Clustering techniques
2. Analyze data mining techniques for finding necessary useful and potential knowledge.
3. Apply machine learning techniques to discover and measure interesting patterns from large databases.

Detailed Syllabus:

UNIT - I: DATA WAREHOUSING AND DATA MINING (12 periods)

Data Warehouse: Basic Concepts, Modeling, Design and Usage, Data Generalization by Attribute-oriented Induction Data Mining: Why Data Mining, What is Data Mining, Kinds of data can be mined, Kinds of patterns can be mined, Kinds of applications targeted, Major Issues in Data Mining.

UNIT - II: DATA PREPROCESSING (10 periods)

Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

UNIT - III: MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS (07 periods)

Basic Concepts, Frequent Itemset Mining Methods, pattern mining in Multilevel and Multidimensional Space.

UNIT - IV: CLASSIFICATION AND PREDICTION TECHNIQUES (09 periods)

Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule Based Classification, Techniques to improve classification accuracy: Bagging and Boosting, Bayesian Belief Networks, Classification using frequent patterns.

UNIT - V: CLUSTER ANALYSIS (07 periods)

Cluster Analysis, Partitioning Methods: K-Means; Hierarchical Methods: AGNES Vs DIANA; Density based Methods: DBSCAN, Outlier Analysis and Detection Methods.

Total Periods: 45

TEXT BOOK:

1. Jiawei Han, Micheline Kamber and Jian Pei, **"Data Mining: Concepts and Techniques,"** Third Edition, Elsevier, 2013.

REFERENCE BOOKS:

1. Margaret H Dunham, **"Data Mining Introductory and Advanced Topics,"** Second Edition, Pearson Education, 2006.
2. Tan P.N, Steinbach M. and Kumar V.: **"Introduction to Data Mining",** Addison-Wesley, 2006.

III B.Tech. II Semester

14BT61202: **WEB PROGRAMMING**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hyper Text Markup Language (HTML); Features of HTML5; Cascading Style Sheets (CSS); JavaScript; JQuery; Hypertext Preprocessor (PHP); MySQL; Extensible Markup Language (XML); Asynchronous Java Script and XML (AJAX).

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on web technologies : HTML, HTML5, CSS, JavaScript, JQuery, XML, AJAX, PHP and MySQL database.
2. Design and develop web applications using HTML, CSS, JavaScript, JQuery, XML, AJAX and PHP.
3. Apply PHP and MySQL database concepts for developing interactive, dynamic and scalable web applications.
4. Gain problem solving skills to develop enterprise web applications.

Detailed Syllabus:

UNIT - I: HTML (11 periods)

Introduction: Fundamentals of HTML, Working with Text, Organizing Text in HTML, Working with Links and URLs, Creating Tables, Working with Images, Canvas, Forms, Frames and Multimedia.

HTML5: Introduction, HTML5 Document Structure, Creating Editable Content, Checking Spelling Mistakes, Exploring Custom Data Attributes, Client-Side Storage, Drag and Drop Feature, Offline Web Applications, Web Communications, Cross-Document Messaging and Desktop Notifications.

UNIT - II: CSS AND JAVASCRIPT: (10 periods)

CSS: Introduction, CSS Selectors, Inserting CSS in an HTML document, Backgrounds, Fonts, and Text Styles, Creating Boxes, Displaying, Positioning and Floating Elements, Features of CSS3.

JAVASCRIPT: Overview of JavaScript, JavaScript Functions, Events, Image Maps and Animations, JavaScript Objects, Working with Browser and Document Objects, JQuery - Introduction, JQuery Selectors, Events, Methods to access HTML elements and attributes.

UNIT - III: INTRODUCTION TO PHP (07 periods)

Introduction, Data Types, Variables, Constants, Expressions, String Interpolation, Control Structures, Functions, Arrays, Embedding PHP Code in Web Pages, Object Oriented PHP.

UNIT - IV: PHP AND MYSQL (07 periods)

PHP and Web Forms, Sending Form Data to a Server, Working with Cookies and Session Handlers, PHP with MySQL - Interacting with the Database, Prepared Statement, Database Transactions.

UNIT - V: XML AND AJAX (10 periods)

XML: Introduction, Structure of XML Document, Document Type Definition, XML Namespaces, XML Schema, Working with DOM and SAX Parser, Working with XSLT.

AJAX: Overview, Exploring AJAX, XMLHttpRequest object. **Total Periods: 45**

TEXT BOOKS:

1. Kogent Learning Solutions Inc, **"HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery,"** Dreamtech Press, First Edition, 2011.
2. W. Jason Gilmore, **"Beginning PHP and MySQL,"** APress, Fourth Edition, 2011.

REFERENCE BOOKS:

1. Thomas A. Powell, **"The Complete Reference: HTML and CSS,"** Tata McGraw Hill, Fifth Edition, 2010.
2. Andrea Tarr, **"PHP and MySQL,"** Willy India, First Edition, 2012.

III B.Tech. II Semester

14BT40503: DESIGN AND ANALYSIS OF ALGORITHMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES:A course on "Problem Solving & Computer Programming".

COURSE DESCRIPTION: Introduction to algorithms and notations; Disjoint sets and graphs; Divide and conquer; Greedy method; Dynamic programming; Backtracking; Branch and bound; and NP-hard and NP-complete problems.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Algorithm Complexities and Asymptotic notations.
   - Algorithm Design techniques-Divide and Conquer, Greedy Method, dynamic programming, Back tracking, Branch and Bound.
   - NP-Hard and NP-Complete problems.
2. Analyze the performance of algorithms with time and Space complexities.
3. Design the algorithms for solving real world problems.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO ALGORITHMS & DISJOINT SETS (09 periods)

Introduction-Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big O notation, Omega notation, Theta notation and Little O notation, Recurrences.

Disjoint Sets - Disjoint set operations, union and find algorithms.

UNIT - II: GRAPHS & DIVIDE AND CONQUER (10 periods)

Graphs-Breadth First search and Traversal, Depth First Search and Traversal, spanning trees, connected components and biconnected components.

Divide and Conquer-General method, Applications- Analysis of Binary search, Quick sort, Merge sort, Strassen's matrix multiplication, Finding the Maxima and Minima.

UNIT - III : GREEDY METHOD & DYNAMIC PROGRAMMING (09 periods)

Greedy Method - General method, Applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Dynamic Programming- General method, Applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem.

UNIT - IV: BACKTRACKING & BRANCH AND BOUND (09 periods)

General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. General method, applications - Travelling sales person problem, 0/ 1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT - V: NP-HARD AND NP-COMPLETE PROBLEMS (08 periods)

NP-Hard and NP-Complete Problems- Basic concepts, non-deterministic algorithms, NP-Hard and NP-Complete classes, Cook's theorem, NP-hard scheduling Problems.

Total Periods: 45

TEXT BOOK:

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, **"Fundamentals of Computer Algorithms,"** Galgotia publications Pvt. Ltd, New Delhi, Second Edition ,2007.

REFERENCE BOOKS:

1. M.T.Goodrich and R. Tomassia, **"Algorithm Design: Foundations, Analysis and Internet examples,"** John Wiley and sons, 2002.
2. S.Sridhar, **"Design and Analysis of Algorithms,"** Oxford Press, First Edition, 2015.

III B.Tech. II Semester

14BT60501: **OBJECT ORIENTED ANALYSIS & DESIGN**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Software Engineering" and "Object Oriented Programming".

COURSE DESCRIPTION: Introduction to UML; basic structural modeling; advanced structural modeling; class and object diagrams; basic behavioral modeling; advanced behavioral modeling; architectural modeling.

COURSE OUTCOMES:

After the successful completion of the course the student will be able to:

1. Demonstrate knowledge on principles of Object Oriented analysis, design through UML Diagrams.
2. Analyze the concepts of high level & low level software design.
3. Draw UML models for real time software applications.

Detailed Syllabus:

UNIT-I: INTRODUCTION TO UML, BASIC STRUCTURAL MODELING (11 periods)

Introduction to UML: Importance of modeling, Principles of modeling, Object Oriented Modeling, An overview of UML, conceptual model of the UML, Architecture, Software Development Life Cycle.

Basic Structural Modeling:

Classes-Terms and concepts, Common modeling techniques, Relationships-modeling simple dependencies, single inheritance and structural relationships, common Mechanisms, and Diagrams.

UNIT - II: ADVANCED STRUCTURAL MODELING,CLASS AND OBJECT DIAGRAMS (07 periods)

Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Instances.

Class and Object Diagrams:

Terms and concepts, modeling techniques for Class Diagram-modeling Simple collaboration, Logical database Schema, Forward and reverse engineering, Introduction to Object Diagrams.

UNIT - III: BASIC BEHAVIORAL MODELING (09 periods)

Basic Behavioral Modeling-I

Interactions-Terms and concepts, modeling a flow of control, Interaction diagrams-terms and concepts, modeling flows of control by time ordering and control by organization, Forward and reverse engineering.

Basic Behavioral Modeling-II

Use cases-terms and concepts, modeling the behavior of the element, Use case Diagrams-terms and concepts, modeling the context of a system, requirement of a system, Forward and reverse engineering, Activity Diagrams-terms and concepts, modeling a workflow, modeling an operation, Forward and reverse engineering.

UNIT - IV: ADVANCED BEHAVIORAL MODELING (09 periods)

Events and signals-modeling a family of signals and exceptions, state machines-modeling the lifetime of an object, Introduction to Processes and Threads, time and space-modeling timing constraints, distribution of objects and objects that migrate, state chart diagrams-modeling reactive objects, Forward and reverse engineering.

UNIT - V: ARCHITECTURAL MODELING (09 periods)

Component-Terms and concepts, modeling executables and libraries, modeling tables, file and documents, modeling an API, Deployment-modeling processors and devices, modeling the distribution of components, Component diagrams-modeling source code, executable release, physical database, adaptable Systems, Forward and reverse engineering, Deployment diagrams-modeling an embedded systems, Client/server System, fully distributed systems, Forward and reverse engineering.

Total Periods: 45

TEXT BOOK:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, **"The Unified Modeling Language User Guide,"** Second Edition, Pearson Education, 2009.

REFERENCE BOOKS:

1. Magnus Penker, Brian Lyons, David Fado, Hans-Erik Eriksson, **"UML 2 Toolkit,"** WILEY-Dreamtech India Pvt. Ltd., 2006.
2. Pascal Roques, **"Modeling Software Systems Using UML2,"** WILEY-Dreamtech India Pvt. Ltd, 2004.

III B.Tech. II Semester

14BT6HS01: **BANKING AND INSURANCE**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Managerial Economics and Principles of Accountancy

COURSE DESCRIPTION: Origin and growth of Banking; functions and importance; RBI; Debtor and Creditor relationship; Types of Accounts; Loans and Advances; e-payment; e-cash; NEFT; RTGS; Credit and Debit cards; Insurance elements and risk; LIC; GIC; IRDA.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Acquire Knowledge in:

a) Tools and concepts of Banking and Insurance.

b) Basic Principles and concepts of Insurance and Banking.

c) Provides life skills for effective utilization of Banking and Insurance facilities.

d) e-fund transfers, e-payments and e-business models.

2. Develop analytical skills in understanding problems pertaining to

a) Online banking and e - payments.

b) Risk Management through insurance benefits the society at large.

c) money management by leveraging on technology, banking and insurance services.

Detailed Syllabus:

UNIT – I: INTRODUCTION TO BANKING (09 periods)

Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT – II: BANK-CUSTOMER RELATIONSHIP (09 periods)

Debtor-creditor relationship, anti money laundering, products or services, payment and collection of cheques and other negotiable instruments. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances- principles of lending, types of loans,

UNIT – III: BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM (09 periods)

Features, types of e-payment system, e-cash ,NEFT,RTGS, Electronic purses, Credit and Debit cards, Business models- B2B, B2C, C2C, and B2G.

UNIT – IV : INTRODUCTION TO INSURANCE (09 periods)

Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT – V: INSURANCE OVERVIEW: **09 periods)**

Principles of insurance, insurance types, LIC & GIC insurance contract- nature, elements, functions, IRDA, Insurance Players in India. **Total Periods: 45**

TEXT BOOKS:

1. A.V. Ranganadha Chary, R.R. Paul- **Banking and Financial system**, Kalyani Publisher, New Delhi, Second Edition.
2. P.K.Gupta- **Insurance and Risk Management**, Himalaya Publishing House, New Delhi.

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma: **"Electronic Commerce- A Manager's Guide to E-Business,"** Vanity Books International, Delhi, 2002.
2. Kalakota Ravi and Whinston Andrew B: **'Frontiers of Electronic Commerce,"** Pearson Education India, 1996 New Delhi.
3. Schneider, Grey P: **"Electronic Commerce, Course Technology', Cengage Learning,"** 2008, Fighth Edition, New Delhi.

III B.Tech. II Semester

14BT6HS02: **COST ACCOUNTING AND FINANCIAL MANAGEMENT**

(OPEN ELETIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Returns on Investment.

COURSE OUTCOMES:

After the successful completion of the course the student will be able to:

1. Acquire Knowledge in
   a) Elements of Costing.
   b) Basic concepts of Financial Management.
   c) Risk and Return
   d) Financial Accounting.
   e) Using advanced tools like tally and SAP.
   f) Significance of Economics and Accountancy
2. Do cost, risk and return of investment analysis.
3. Develop skills in providing solutions for
   a) Material, Labor, Overheads control.
   b) Excellence and ability to minimize the cost of the organization.
   c) Effective investment decisions.
4. Prepare cost sheets pertaining to manufacturing of products.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO COST ACCOUNTING (09 periods)

Cost and Cost Accounting, Scope, Objectives, Advantages and disadvantages –Cost Accounting Vs Management Accounting – Elements of Costing –Installation of costing system – Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

UNIT - II: COST ANALYSIS (09 periods)

Analysis of Cost – Preparation of cost sheet, estimate, tender and quotation (Simple problems) – Importance of Costing while pricing the products.

UNIT - III: STANDARD COSTING (09 periods)

Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labor variances (Simple Problems).

UNIT - IV: FINANCIAL MANAGEMENT (09 periods)

Financial Management-Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

UNIT - V: RISK AND RETURNS ON INVESTMENT (09 periods)

Investment-Meaning and Definition- concept of risk and returns- Investment Alternatives- Introduction to Behavioral Finance – Anomalies –Key Concepts –Anchoring – Mental Anchoring-Confirmation and Hindsight Bias-Gambler's Fallacy-Herd Behavior-Over Confidence-Overreaction and Availability Bias-Prospect Theory.

Total Periods: 45

TEXT BOOKS:

1. S.P. Jain and K.L. Narang: **"Cost Accounting**," Kalyani Publishers, Ludhiana, Sixth Edition, 2002.
2. James C Van Horne, **"Financial Management and Policy,"** Prentice-Hall of India/Pearson, Twelfth Edition, 2001.

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, **"Cost and Management Study Material**," New Delhi.
2. I.M. Pandey, **"Financial Management,"** Vikas Publishing House Pvt. Ltd., Tenth Edition, 2010.

III B.Tech. II Semester

14BT6HS03: **ENTREPRENEURSHIP FOR MICRO, SMALL AND MEDIUM ENTERPRISES**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Acquire Knowledge in:
   a) Schemes and institutions encouraging entrepreneurship.
   b) Basic Principles and concepts of Accountancy.
   c) Significance of entrepreneurship.
2. (i) Develop analytical skills in understanding problems pertaining to
   a) Personal excellence through financial and professional freedom.
   b) Women entrepreneurship acts as contrivance in the societal development
   (ii) Develop Critical thinking and evaluation ability.
3. Generate ideas for formulating business plans.

Detailed Syllabus:

UNIT – I: INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT (09 periods)

Concept of Entrepreneurship – Growth of Entrepreneurship in India **-** Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur – Functions of Entrepreneur – Need for an Entrepreneur – Entrepreneurial Decision Process – Types of Entrepreneurs – Distinction between an Entrepreneur and a manager – Intrapreneur - Entrepreneur Vs Intrapreneur.

UNIT – II: IDEA GENERATION AND FORMULATION OF BUSINESS PLANS : (09 periods)

Sources of Ideas – Methods of idea generation - Product Identification – Opportunity Selection – Steps in Setting up of a Small Business Enterprise - Contents Of Business Plans – Significance – Formulation of Business Plan – Business Opportunities in Various Sectors – Common Errors in Business Plan Formulation – Project Report Preparation.

UNIT – III: MICRO AND SMALL ENTERPRISES (09 periods)

Meaning and Definition – Micro and Macro units – Essentials – Features – Characteristics – relationship between Micro and Macro Enterprises – Rationale behind Micro and Small Enterprises – Scope of Micro and Small Enterprises – Objectives of Micro Enterprises - Problems of Micro and Small Enterprises

UNIT – IV: INSTITUTIONAL FINANCE AND SUPPORT TO ENTREPRENEUR (09 periods)

Need for Institutional Finance **-** Commercial Banks – Industrial Development Bank of India (IDBI) – Industrial Finance Corporation of India Ltd. (IFCI) – Industrial Credit Investment Corporation of India Ltd. (ICICI)– State Financial Corporations (SFCs) - State Industrial Development Corporations (SIDCs) – Small Industries Development of Bank of India (SIDBI) –– Need For Institutional Support – National Small Industries Corporation Ltd (NSIC) – Small Industries Development Organisation (SIDO) – Small Industries Service Institutes (SISIs) –District Industries Centres (DICs) – National Institute of Entrepreneurship and Small Business Development (NIESBUD) – Technical Consultancy Organizations (TCOS)(Origin, Mission, and credit facility/support).

UNIT –V: WOMEN ENTREPRENEURSHIP (09 periods)

Concept of Women entrepreneur - Functions of Women entrepreneurs - Growth of women entrepreneurship in India - Challenges of Women entrepreneurs- Programmes supporting women entrepreneurship – Rural Entrepreneurship – Meaning, Need for Rural entrepreneurship, Problems of rural entrepreneurship, Role of NGOs.

Total Periods: 45

TEXT BOOKS:

1. Dr.S.S.Khanka, **"Entrepreneurial Development,"** S. Chand and Company Ltd, Revised Edition, 2012.
2. Madhurima Lall & Shikha Sahai, **"Entrepreneurship,"** Excel Books India, Second Edition 2008.

REFERENCE BOOKS:

1. Nandan, H., **"Fundamentals of Entrepreneurship,"** PHI Learning Pvt. Ltd., 2013, New Delhi, Third Edition 2013.
2. Vasanth Desai, **"The Dynamics of Entrepreneurial Development and Management,"** Himalaya Publishing House, Fourth Edition 2009.
3. Bholanath Dutta, **"Entrepreneurship Management,"** – Text and Cases, Excel Books, First Edition 2009.

III B.Tech. II Semester

14BT70105: **DISASTER MITIGATION AND MANAGEMENT**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Natural disasters and hazards; Earthquakes; Floods and cyclones; droughts; Landslides; Disaster management.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Explain various types of disasters and mitigation strategies.
2. Analyze and interpret the Guidelines for hazard assessment and vulnerability analysis.
3. Use historical data of disaster losses and inform the people over preparedness.
4. Address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society.
5. Function in multidisciplinary teams for the effective displacement of people during disasters.

Detailed Syllabus:

UNIT - I: INTRODUCTION (08 periods)

Types of disasters – Natural disasters – Impact of disasters on environment – Infrastructure and development – Concepts of hazards and vulnerability analysis– Hazard Assessment **–** Guidelines for hazard assessment and vulnerability analysis – Basic principles and elements of disaster mitigation

UNIT - II: EARTHQUAKES (11 periods)

Introduction to earthquakes – Intensity scale (MSK–64) – Seismic activity in India – Seismic zones of India – Earthquakes in A.P. – Action plan for earthquake disaster preparedness – Elements at risk, recovery and rehabilitation after earthquake – Earthquake resistant design and construction of buildings. Tsunami – Onset, types and causes – Warning – Element at risk – Typical effects – Specific preparedness and mitigation strategies.

UNIT - III: FLOODS AND CYCLONES: (11 periods)

Onset, types, warnings – Elements at risk – Typical effects – Indian floods and cyclones – Hazard zones – Potential for reducing hazards – Mitigation strategies and community based mitigation.

DROUGHTS: Onset, types and warning – Kinds of droughts – Causes of droughts – Impact of droughts – Early warning and response mechanisms – Mitigation strategies – Droughts in India

UNIT - IV: LANDSLIDES (07 periods)

Onset, types and warning – Causes of landslides – Elements at risk – Indian land slides – Hazards zones – Typical effects – Mitigation strategies and community based mitigation

UNIT - V: DISASTER MANAGEMENT: (08 periods)

Disaster management organization and methodology – Disaster management cycle – Disaster management in India – Typical cases – Cost–benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Total Periods: 45

TEXT BOOKS:

1. V.K. Sharma, **"Disaster Management,"** National Centre for Disaster Management, IIPE, 1999.
2. A.S. Arya, Anup Karanth, and Ankush Agarwal, **"Hazards, Disasters and Your Community: A Primer for Parliamentarians,"** GOI-UNDP Disaster Risk Management Programme, 2005.

TEXT BOOKS:

1. **"Disaster Management in India,"** A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. R. B. Singh **"Natural Hazards and Disaster Management,"** Rawat Publications, 2009.
3. Pardeep sahni, Alka Dhameja, Uma Medury **"Disaster Mitigation,"** Fourth Edition, PHI Learning Pvt. Ltd., 2011.
4. Sanjay K. Sharma **"Environment Engineering and Disaster Management,"** First Edition, USP Publishers, 2011.

III B.Tech. II Semester

14BT70106: **ENVIRONMENTAL POLLUTION AND CONTROL**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Introduction; Sources and Effects of Air Pollution; Dispersion of Pollutants and their control; Surface and Ground Water Pollution and control; Soil Pollution and remediation; Management of Municipal Solid Wastes.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Explain about environmental pollution and control.
2. Analyze the major pollutants that causes environmental pollution.
3. Conduct research and select suitable techniques to control pollution.
4. Understand the effects of environmental pollutions on human beings and vegetation.
5. Communicate the methods of management and control of environmental pollution.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS (08 periods)

Scope – Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, Point and Non–Point, Line and Area Sources of Air Pollution – Stationary and Mobile Sources – Dispersion of Pollutants – Dispersion Models – Applications.

UNIT - II: EFFECTS AND CONTROL OF PARTICULATES (09 periods)

Effects of Air Pollutants on Man, Material and Vegetation – Global Effects of Air Pollution – Green House Effect, Heat Island, Acid Rains, Ozone Holes – Control of Particulates – Control at Sources – Process Changes – Equipment Modifications – Design and Operation of Control Equipment – Settling Chambers – Centrifugal Separators – Bag Filters, Dry and Wet Scrubbers – Electrostatic Precipitators.

UNIT - III: WATER POLLUTION: (10 periods)

Introduction–Water Quality in Surface Waters – Nutrients – Controlling Factors in Eutrophication–Effects of Eutrophication – Ground Water Pollution – Thermal Pollution – Marine Pollution – Sewage Disposal in Ocean – Types of Marine Oil Pollution – Cleanup of Marine Oil Pollution – Control of Water Pollution – Case Study on Tanneries – Drinking Water Quality Standards.

UNIT - IV: SOIL POLLUTION (09 periods)

Soil Pollutants – Sources of Soil Pollution – Causes of Soil Pollution and their Control – Effects of Soil Pollution–Diseases Caused by Soil Pollution – Methods to Minimize Soil Pollution – Effective Measures to Control Soil Pollution – Case Study on Fertilizer.

UNIT - V: MUNICIPAL SOLID WASTE MANAGEMENT (09 periods)

Introduction – Types of Solid Wastes – Principles of Excreta Disposal – Domestic Solid Waste Production – Collection of Solid Wastes – Transport of Solid Wastes – Management of Solid Wastes – Methods of Land Disposal – Sanitary Landfill – Composting – Incineration.

Total Periods: 45

TEXT BOOKS:

1. C.S.Rao, **"Environmental Pollution Control Engineering,"** Second Edition, New Age International Pvt Ltd., 2007.
2. Y.Anjaneyulu, **"Introduction to Environmental Science,"** First Edition, BS Publications., 2009.

REFERENCE BOOKS:

1. M.N. Rao and H.V.N. Rao, **"Air Pollution,** Nineteenth Edition, Tata McGraw-Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, **"Fundamentals of Air Pollution,"** Fifth Edition, Academic Press (Elsevier), 2014.
3. S.M.Khopkar, **"Environmental Pollution Monitoring and Control,"** Second Edition, New Age International Pvt Ltd., 2007.
4. S.Deswal and K.Deswal, **"Environmental Science,"** Second Edition, Dhanpat Rai & Co, 2011.

III B.Tech. II Semester

14BT70107: **CONTRACT LAWS AND REGULATIONS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Construction Contracts; Tenders; Arbitration; Legal Requirements; Labour Regulations.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Explain contract documents and tendering processes.
2. Analyze the legal issues in arbitration and in contracts documents.
3. Address the legal issues in collecting taxes.
4. Follow ethics while bidding, sale and purchase of property.
5. Develop and Prepare tender documents as per the standards.

Detailed Syllabus:

UNIT - I: CONSTRUCTION CONTRACTS (09 periods)

Indian Contracts Act – Elements of Contracts – Types of Contracts – Features – Suitability – Design of Contract Documents – International Contract Document and laws – Standard Contract Document – Law of Torts.

UNIT - II: TENDERS (09 periods)

Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Financial Points of View – Two Cover System – Preparation of the Documentation – Contract Formation and Interpretation – Potential Contractual Problems – Price Variation Clause – Comparison of Actions and Laws – Subject Matter – Violations.

UNIT - III: ARBITRATION (09 periods)

Arbitration – Comparison of Actions and Laws – Agreements – Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Arbitration Disputes – Dispute Review Board.

UNIT - IV: LEGAL REQUIREMENTS: (09 periods)

Legal Requirements for Planning – Property Law – Agency Law – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties – Local Government Approval – Statutory Regulations – Insurance and Bonding – Laws Governing Purchase and Sale – Use of Urban and Rural Land – Land Revenue Codes – EMD – Security Deposits – Liquidated Damages.

UNIT - IV: LEGAL REQUIREMENTS: (09 periods)

Legal Requirements for Planning – Property Law – Agency Law – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties – Local Government Approval – Statutory Regulations –Insurance and Bonding – Laws Governing Purchase and Sale – Use of Urban and Rural Land – Land Revenue Codes – EMD – Security Deposits – Liquidated Damages.

UNIT - V: LABOUR REGULATIONS: (09 periods)

Social Security – Welfare Legislation – Laws Relating to Wages, Bonus and Industrial Disputes – Labour Administration – Insurance and Safety Regulations – Workmen's Compensation Act – Maternity Benefit Act – Child Labour Act – Other Labour Laws.

Total Periods: 45

TEXT BOOKS:

1. G.C.V. Subba Rao **"Law of Contracts I & II,"** Elevennth Edition, S. Gogia & Co., 2011.
2. Jimmie Hinze, **"Construction Contracts,"** Second Edition, Mc Graw Hill, 2001.

REFERENCE BOOKS:

1. Gajaria G.T, Kishore Gajaria, **"Laws Relating to Building and Engineering Contracts in India,"** Fourth Edition, Lexis Nexis Butterworths India, 2000.
2. B. S. Patil, **"Civil Engineering Contracts and Estimates,"** Third Edition, University Press (India) Private Ltd., 2013.
3. Joseph T. Bockrath, **"Contracts and the Legal Environment for Engineers and Architects,"** Seventh Edition, McGraw Hill Education, 2010.
4. Akhileshwar Pathak, **"Contract Law,"** First Edition, Oxford University Press, 2011.

III B.Tech. II Semester

14BT70108: **PLANNING FOR SUSTAINABLE DEVELOPMENT**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Introduction to Sustainable Development; Environment; Sciences and Sustainability; Sustainable Development Politics and Governance; Tools, Systems and Innovations for Sustainability; Communication and Learning for Sustainability.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate the knowledge of planning, environment, tools and systems for sustainable development.
2. Analyze the current challenges to sustainability.
3. Use theoretical frameworks and provide solutions to the real world sustainability issues.
4. Conduct awareness of contemporary issues on globalization in terms of sustainability.
5. Give recommendations for the sustainability issues and solutions using a holistic approach.
6. Explain a sense of civic responsibility, including reflection on the student's own role in developing and nurturing sustainable communities.
7. Participate in decision making as individual and responsible for collective decision.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO SUSTAINABLE DEVELOPMENT (08 periods)

Definition and Concepts of Sustainable Development – Capitalization of Sustainability – National and Global Context – The Millennium Development Goals – Emergence and Evolution of Sustainability and Sustainable Development – Theories of Sustainability – Case Studies.

UNIT - II: ENVIRONMENT, SCIENCES AND SUSTAINABILITY (08 periods)

Climate Change – Science, Knowledge and Sustainability – Unforeseen Environmental Impacts on Development – Challenges of Sustainable Development – Centrality of Resources in Sustainable Development – Case Studies.

UNIT - III: SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE: (10 periods)

Governance and Democracy and Eco–Welfare – Global Civil Society and World Civil Politics – Civic Environmentalism – Policy Responses to Sustainable Development – Economics of Sustainability – Social Responsibility in Sustainability – National Action

UNIT - IV: TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY (11 periods)

Need for System Innovation – Transition and Co–Evolution – Theories and Methods for Sustainable Development – Strategies for Eco–Innovation – Ecological Foot Print Analysis – Socio Ecological Indicators – Eco Labels– Policy Programmes for System Innovation – Case Studies

UNIT - V: COMMUNICATION AND LEARNING FOR SUSTAINABILITY (08 periods)

Role of Emerging Media – Remarkable Design and Communication Art, Activism and the Public Interest – Education for Sustainability – Participation in Decision Making – Critical Thinking and Reflection – Case Studies

Total Periods: 45

TEXT BOOKS:

1. John Blewitt, **"Understanding Sustainable Development,"** Earth Scan Publications Ltd., Second Edition, 2008.
2. Jennifer A. Elliot, **"An introduction to sustainable development,"** Earth Scan Publications Ltd., Fourth Edition, 2006.

REFERENCE BOOKS:

1. Peter Rogers, Kazi F Jalal, John A Boyd, **"An introduction to sustainable development,"** Earth Scan Publications Ltd., First Edition, 2006.
2. Simon Dresner, **"The Principles of Sustainability,"** Earth Scan Publications Ltd., Second Edition, 2008.
3. Peter Bartelmus, **"Environment growth and development: The concepts and strategies of sustainability,"** Routledge, Third Edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, Mirilia Bonnes, Jose Antonio Corraliza, Maria Vittoria Giuliani, **"People places and sustainability,"** Hogrefe & Huber Publishers, Second Edition, 2003.

III B.Tech. II Semester

14BT70109: **RURAL TECHNOLOGY**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Research & Development; Non Conventional Energy; Community Development; IT Management

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Acquire the knowledge of various nonconventional energy systems and technologies for rural development.
2. Apply the principles of IT for the rural development.
3. Responsible for the development of technologies in rural areas.
4. Understand the impact of technologies in societal and environmental aspects.

Detailed Syllabus:

UNIT - I: RESEARCH & DEVELOPMENT (09 periods)

India – Ancient Indian Technologies – Rural India Life – Indian Farmer – Role of Science and Technology in Rural Development – Rural Technology and Poverty Eradication – Rural Business Hubs – Technology in improving rural infrastructure – Various organizations related to innovation – Issues of technology transfer: CAPART, NABARD, CSIR, NIF.

UNIT - II: NON CONVENTIONAL ENERGY (09 periods)

Definition of Energy, Types of alternative sources of energy, Sources of non conventional energy – Solar energy – Solar Cooker – Solar Heater – Biogas – Recycling and Management and Wastes Conservation – Assessment & Production of biomass products & their utilization.

UNIT - III: TECHNOLOGIES FOR RURAL DEVELOPMENT (09 periods)

Food & Agro based technologies – Tissue culture – Building and Construction technologies – Cultivation and processing of economic plants – Cottage and social Industries.

UNIT - IV: COMMUNITY DEVELOPMENT (09 periods)

Water conservation – Rain water Harvesting – Drinking water – Environment and Sanitation – Bio fertilizers – Medical and Aromatic plants – Employment generating technologies – Apiculture – Piciculture – Aquaculture.

UNIT - V: IT IN RURAL DEVELOPMENT (09 periods)

The Role of Information Technology in Rural Areas – Impact of Information Technology in Rural development – Need and Necessity of Technology – Corporate Social Responsibilities – Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and Saansad Adarsh Gram Yojana (SAGY) – village adoptions schemes.

Total Periods: 45

TEXT BOOKS:

1. M.S Virdi, **"Sustainable Rural Technologies,"** Daya Publishing House, New Delhi, First Edition, 2009.
2. S.V. Prabhath & P. Ch. Sita Devi, **"Technology and Rural India,"** Serials Publications, New Delhi, First Edition, 2012.

REFERENCE BOOKS:

1. P. R. S. Murthy, R.C. Chackravarthy, **"Information Technology & Rural Development,"** Pacific Books International, First Edition, 2011.
2. 2. Shivakanth Singh, **"Rural Development Policies and Programmes,"** Northern book centre, New Delhi, First Edition, 2002.
3. L.M.Prasad, **"Principles and Practice of Management,"** Sultan Chand & Sons, New Delhi, Fighth Edition, 2014.
4. Venkata Reddy. K, **"Agriculture and Rural Development Gandhian Perspective,"** Himalaya Publishing House, First Edition, 2001.

III B.Tech. II Semester

14BT60305: **ARTIFICIAL INTELLIGENCE AND ROBOTICS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning*;*

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.
2. Employ effective methods to analyze a robot motion control while executing a specific task.
3. Design and Implement appropriate solutions for search Problems such as playing two person games and for planning problems which involve defining a sequence of actions of a robot.
4. Apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance.

Detailed Syllabus:

UNIT - I: ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING (10 periods)

The Underlying assumption of AI; AI Technique: simple Tic-Tac-Toe program; Problem solving: State space search; Production systems: control strategies, search space control: depth-first, breadth-first search; Heuristic search: Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT - II: KNOWLEDGE REPRESENTATION & LEARNING (09 periods)

Knowledge Representation; Predicate Logic: Simple facts in logic, resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; slots; conceptual dependency; scripts; Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.

UNIT - III: ROBOTICS –VISION & SENSING (08 periods)

Robotics: Robot Classification, Robot Specification, notation; Sensing: Range sensing: Triangulation; proximity sensing: Inductive, Capacitive and Ultrasonic sensing; touch sensing: tactile sensing, artificial skins; Force and torque sensing: Wrist force sensors; Vision: low-level vision, high-level vision.

UNIT - IV: ROBOT PROGRAMMING & CONTROL (10 periods)

Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: characteristics, specifications; Task level languages; Language structure: VAL II.

UNIT - V: ROBOT INTELLIGENCE & TASK PLANNING (08 periods)

Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; graph search technique; Problem solving and problem reduction; robot learning; Task planning: Modelling, task specification, obstacle avoidance, grasp planning; Expert system.

Total Periods: 45

TEXT BOOKS:

1. E. Rich and K. Knight, **"Artificial intelligence,"** Tata Mc Graw Hill, Second Edition, 1992.
2. K.S. Fu, R.C. Gonzalez, C.S.G. Lee, **"Robotics: Control, Sensing, Vision, and Intelligence,"** Mc Graw Hill, International Edition, 1987.

REFERENCE BOOKS:

1. Mikell P. Groover, **"Industrial Robotics, Technology, Programming, and Applications,"** Tata Mc Graw Hill, Nineth reprint 2011.
2. D.W. Patterson, **"Introduction to AI and Expert Systems,"** PHI, 1992.
3. N.J. Nilsson, **"Principles of AI,"** Narosa Publ. House, 2000.
4. George Luger, **"AI-Structures and Strategies for and Strategies for Complex Problem solving,"** Pearson Educations, Fourth Edition, 2002.

III B.Tech. II Semester

14BT60306: **GLOBAL STRATEGY AND TECHNOLOGY**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Introduction to strategic management; strategic management process; principles of good strategy; globalisation; globalisation strategies; research & development strategies; technology management and transfer; significance; elements of transfer process; corporate governance; the Indian scenario.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Decide upon a macroscopic management strategy to optimize the impact of decisions with limited resources.
2. Identify the impact of globalization in a given engineering scenario. Participate in elementary discussions on corporate governance.
3. Analyze an industrial Engineering problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO STRATEGIC MANAGEMENT (09 periods)

Definitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT - II: GLOBALISATION (09 periods)

Meaning and dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouring Globalisation; Globalisation strategies.

UNIT - III: RESEARCH & DEVELOPMENT STRATEGIES (09 periods)

Introduction, Concept, Evolution of R & D Management, R & D as a business, R & D and competitive advantage, Integration of R & D, Elements of R & D strategies, Selection of R & D strategies, Implementation strategies, R & D trends, Responses to changes.

UNIT - IV: TECHNOLOGY MANAGEMENT AND TRANSFER (09 periods)

TECHNOLOGY MANAGEMENT: Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.

TECHNOLOGY TRANSFER: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT – V: CORPORATE GOVERNANCE: THE INDIAN SCENARIO (09 periods)

Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance – Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family – owned business in India, Corporate Governance and the Indian ethos.

Total periods: 45

TEXT BOOKS:

1. Francis Cherunilam, **"Stategic Management,"** Himalaya Publishing House, Third Edition, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan , **"Management of Technology, Stategic Management,"** Himalaya Publishing House, Second Edition, 2012.

REFERENCE BOOKS:

1. White and Bruton, **"The management of Technology and innovation; a strategic approach,"** Cengage Learning, First Edition, 2007.
2. S.K.Mandak, **"Ethics in business and Corporate Governance,"** TMH, Second Edition, 2012.

III B.Tech. II Semester

14BT60307: **INTELLECTUAL PROPERTY RIGHTS & MANAGEMENT**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Protection of ideas; innovation and artistic endeavors; Acts and procedure related to patents; trademarks; passing off; copy right; design registration; trade secrets and cyber laws; case studies in each.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. prepare documents and fill applications needed for filing a patent, design, copy right and trade mark.
2. ensure smooth transition from concept to final product.
3. exercise discretion in following ethical aspects in dealing with intellectual property rights.

Detailed Syllabus:

UNIT - I: OVERVIEW OF INTELLECTUALPROPERTY RIGHTS (09 periods)

Introduction and importance of intellectual property rights (IPRs), types of intellectual property, International scenario in IPR: WIPO, WTO, TRIPS, international and national patent acts: United States of America patent act, United Kingdom patent act, India patent act, recent amendments in India patent act 1972.

UNIT - II: PATENTS (09 periods)

Introduction, Basic concepts, object and value of patent law, advantages of patent to inventor, patentable inventions, Not patentable inventions, overview of patent procedure, Bio technology patents, patents on computer program, patent rights on micro organism, plant breeding and breeders right, protection of bio diversity, protection of traditional knowledge, infringement of patents and remedy for infringement.

UNIT - III: TRADEMARKS (09 periods)

Trade Marks: Basic concepts, definition, functions, kinds of trademarks: service trademarks, collective trademarks, certification trademarks, textile trade marks, registrable and non registrable trademarks, registration of trademarks, examination process, establishing trade mark right, good will, infringement and action for trademarks, passing off, trade mark and eco label, comparison with patents industrial design and copy right.

UNIT - IV: INDUSTRIAL DESIGN, TRADE SECRETS, CYBER LAWS (09 periods)

Industrial Design: Basic concepts, scope and nature of rights, process of registration rights, rights after registration, transfer of interest or rights, reliefs and remedies and action for infringement of rights, appeals..

Trade Secrets: Definition, significance, tools to protect trade secrets in India

Cyber laws: Co relation to intellectual property

UNIT - V: COPY RIGHTS (09 periods)

Copy Rights: Introduction, nature and scope, subject matter, related or allied rights, works in which copy rights subsists, registration of copy rights, conferred by copy right, copy right protection in India, transfer of copy rights, right of broad casing organizations and of performer, computer software.

Total Periods: 45

TEXT BOOKS:

1. P.Narayan, **"Intellectual Property Law,"** Eastern Law House, New Delhi and Kolkata, 2005,
2. Deborah E. Bouchoux, **"Intellectual Property Rights,"** Cengage Learning, India Edition, 2011.

REFERENCE BOOKS:

1. Bainbridge David, **"Intellectual Property Rights: Key to New Wealth, National Research Development Corporation,"** Pearson Education, New Delhi.
2. W.R.Cornesh, **"Intellectual Property Rights: Patent, Copy Right, Trade Mark, Allied Rights,"** Universal law publishing private limited, Delhi, 2001.
3. S.R. Myneni, **"Law of Intellectual Property,"** Asia law house, Hyderabad 2001.
4. Prabuddha Ganguly, **"Intellectual Property Rights: Unleasing Knowledge Economy,"** TMH New Delhi, First Edition, 2001.

III B.Tech. II Semester

14BT60308: **MANAGING INNOVATION AND ENTREPRENEURSHIP**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts Shifting Composition of the Economy Purposeful Innovation & 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Define, explain and illustrate theories of business innovation and entrepreneurship, the evolution of industries and economies, and the roles of Entrepreneurs.
2. Develop a comprehensive and well structured business plan for a new venture.
3. Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan; and
4. Work effectively in multidisciplinary, cross-cultural teams, towards Development of a Team Project.

Detailed Syllabus:

UNIT - I: ENTREPRENEURSHIP (07 periods)

Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, entrepreneurial growth and development.

UNIT - II: CREATIVITY AND INNOVATION (11 periods)

Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies: Strategies that aim at introducing an innovation, innovation & entrepreneurship, planning - incompatible with Innovation & entrepreneurship.

UNIT - III: THE INDIVIDUAL ENTREPRENEUR (07 periods)

Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation Entrepreneurial motivation (nAch story); Achievement Motivation in Real life- Case Study. Entrepreneurs versus inventors.

UNIT - IV: INTERNATIONAL ENTREPRENEURSHIP OPPORTUNITIES (11 periods)

International Entrepreneurship: Concepts and Nature of International Entrepreneurship, The changing International environment, Ethics and International Entrepreneurship, Entrepreneurial entry into international business, strategic issues in International Entrepreneurship.

UNIT - V: CREATIVE PROBLEM SOLVING (09 periods)

Problem Identification and Problem Solving: Problem Identification. Problem solving Innovation and Diversification. **Total Periods: 45**

TEXT BOOKS:

1. Martin, M.J. **"Managing Innovation and Entrepreneurship in Technology based Firm,"** John Wiley Interscience, 1994.
2. Ettlie, J.E. **"Managing Technology Innovation,"** John Wiley & Sons, 2000.
3. Robert D Hisrich., Michael P Peters., Dean A Shepherd,**"Entrepreneurship,"** The McGraw-Hill Companies, Sixth Edition, 2011.

REFERENCE BOOKS:

1. Christensen, C. M. and Raynor, **"M. E. The Innovators Solution: Creating and Sustaining Successful Growth,"** Boston, MA: Harvard Business School Press, (2003).
2. Drucker P. F., **"Innovation and Entrepreneurship,"** New York: Harper, 1985.
3. Harvard Business Review on Innovation (Collection of articles), Harvard Business School Press (2001).
4. Harvard Business Review on Entrepreneurship (Collection of articles), Harvard Business School Press (1999).
5. Rogers E.M., **"Diffusion of Innovations,"** New York: Simon and Schuster, Fifth Edition, 2003.
6. Drucker P. F. **"The Discipline of Innovation,"** Harvard Business Review, May2000. (Originally published 1985, May-June).

III B.Tech. II Semester

14BT60309: **MATERIAL SCIENCE**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Engineering Chemistry" and "Engineering Physics".

COURSE DESCRIPTION: Structure and Bonding in metals; Steels ,Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semi conductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics engineering, Material Selection and manufacturing of Optical fibers.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Understand how materials are formed and their classification based on atomic arrangement.
2. Illustrate how the design of the various types of steels, cast Irons and Non ferrous alloys influence various engineering applications.
3. Understand the basic difference in properties of various conductors, Insulators and Semiconductors and application of various advanced materials for different branches of Engineering.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO MATERIALS SCIENCE (07 periods)

Structure of metals: Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size.

Constitution of alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT - II: CAST IRONS , STEELS & NON-FERROUS METALS (12 periods)

Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels. Structure and properties of Copper and its alloys, Aluminum and its alloys.

UNIT - III: ELECTRIC CONDUCTORS & INSULATORS (12 periods)

Type of materials selected for conductors, Insulators and semiconductors. Introduction to ceramics-Bonding and microstructure-DC properties of ceramic materials–AC properties– mechanical properties - Ceramics as Conductors, Insulators and capacitors, introduction to Plastics-DC properties-AC properties-mechanical properties.

UNIT - IV: SEMICONDUCTORS AND MAGNETIC MATERIALS (09 periods)

Fabrication of Semiconductors-Producing a silicon wafer-Lithography and Deposition-Packaging of semiconductors materials-Types of magnetic materials- Measuring magnetic properties-Application of soft magnetic materials in Electromagnets and relays, AC transformers, Generators and motors.

UNIT - V: ADVANCED MATERIALS AND APPLICATIONS (05 periods)

Composites – Fiber reinforced, Metal Matrix, Ceramic Matrix – properties and applications; Ceramics – Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Glasses– properties and applications, manufacturing of Optical fibers.

Total Periods: 45

TEXT BOOKS:

1. Kodigre V D, **"Material Science and Metallurgy,"** Everest Publishing House, Pune, Thirty First Edition, 2011.
2. Ian.P.Jones, **"Material Science for Electrical and Electronic Engineers,"** Oxford University Press, New Delhi,2000

REFERENCE BOOKS:

1. V. Raghavan, **"Physical Metallurgy: Principles and Practices,"** PHI, New Delhi, Second Edition, 2006.
2. William. D. Callister, **"Materials Science & Engineering-An Introduction,"** John Wiley and sons, New Delhi, Sixth Edition, 2002.
3. A.J. Dekkar, **"Electrical Engineering Materials,"** PHI, New Delhi, 1970.

III B.Tech. II Semester

14BT60502: **ENGINEERING SYSTEMS ANALYSIS AND DESIGN**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Overview of theSystems Process; Technologies for systems; System Development Life Cycle; system Analysis and Modeling; levels of management; Project Management; Systems Implementation and importance of UMLPrototyping; Maintaining and Managing the Systems output Process.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Gain knowledge on:
   - Systems Process and System Design
   - Systems Analysis and Modeling
   - System Development Life Cycle
   - Design Management and Maintenance Tools.
2. Apply the CASE Tools for System Process and estimation the given models.
3. Design, Develop and implement new Techniques for modeling the systems.
4. Work effectively as team member on projects
5. Manage and Maintain the System Process.

Detailed Syllabus:

UNIT - I: INTRODUCTION (09 periods)

Introduction - Systems, Types of systems, integrating technologies for systems, Need for system analysis and design, Role of the systems analyst, the system development life cycle, CASE tools for analysis and design.

UNIT - II: ANALYSIS AND MODELING ORGANIZATIONAL SYSTEMS (09 periods)

Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, levels of management, organizational culture.

UNIT - III: PROJECT MANAGEMENT (09 periods)

Project initiation, Problem in organization, Determining feasibilities, ascertaining hardware and software needs,identifying, forecasting, comparing costs and benefits, activity planning and control, managing the project.

UNIT - IV: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (09 periods)

Object oriented analysis and design- Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT - V: DESIGNING EFFECTIVE OUTPUT (09 periods)

Output design objectives, relating output content to output method, realizing how output bias affects users, designing output for display, Case studies- Designing a web site management, online exam management.

Total Periods: 45

TEXT BOOK:

1. Kenneth E.Kendall and Julie E. Kendall, **"System analysis and Design,"** Eighth Edition, Pearson Education, India, 2011.

REFERENCE BOOKS:

1. Dennis, Wixom, Roth **"systems analysis and Design,"** Fifth Edition, John Wiley. 2012.
2. Shelly, Rosenblatt, **"Systems analysis and Design,"** Eighth Edition, Cengage Learning, 2012.

III B.Tech. II Semester

14BT71005: **MICROELECTRO MECHANICAL SYSTEMS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Basic knowledge in Physics.

COURSE DESCRIPTION:

Overview of Micro Electro Mechanical Systems (MEMS); scaling laws; working principles of microsensors and microactuators; materials; microfabrication processes; packaging of Microsystems.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators.
2. Identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.

Detailed Syllabus:

UNIT - I: OVERVIEW OF MEMS AND SCALING LAWS (09 periods)

Introduction, MEMS and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.

Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid- body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT - II: **WORKING PRINCIPLES OF MICROSYSTEMS (09 periods)**

Microsensors, acoustic wave sensors, biomedical and biosensors, chemical sensors, pressure sensors, thermal sensors. Microactuation: actuation using thermal forces, shape-memory alloys, piezoelectric crystals, electrostatic forces. MEMS with microactuators, microgrippers, micromotors, microvalves, micropumps. Microaccelerometers, microfludics.

UNIT - III: MATERIALS FOR MEMS AND MICROSYSTEMS (09 Periods)

Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

UNIT - IV: MEMS FABRICATION PROCESS AND MICRO-MANUFACTURING (09 periods)

Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.

UNIT - V: MEMS PACKAGING (09 periods)

Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging.

Total Periods: 45

TEXT BOOK:

1. Tai-Ran Hsu, **"MEMS & Microsystems, Design and Manufacture,"** McGraw Hill Education (India) Pvt. Ltd., 2002.

REFERENCE BOOKS:

1. G.K.Ananthasuresh, K.J.Vinoy, **"Micro and Smart Systems,"** Wiley India, First Edition, 2010
2. Nitaigour Premchand Mahalik, **"MEMS,"** McGraw Hill Education (India) Pvt. Ltd., eighth reprint, 2013.

III B.Tech. II Semester

14BT61205: **BIO INFORMATICS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases; Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.
2. Analyze biological database management system.
3. Create, select and apply appropriate techniques and tools to manage the biological data.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO BIOINFORMATICS (08 periods)

Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

UNIT - II: BIOLOGY AND INFORMATION (07 periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT - III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 periods)

Heuristic alignment algorithms, global sequence alignments- Needleman-Wunsch algorithm, local sequence alignments- smith-waterman algorithm, amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.

UNIT - IV: PRIMARY DATABASES AND THEIR USE (11 periods)

Introduction to biological databases- organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT - V: SECONDARY DATABASES (09 periods)

Introduction to secondary databases- organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-organization and Management of databases, KEGG, ExPASy, BRENDA.

Total Periods: 45

TEXT BOOKS:

1. David W. Mount **"Bioinformatics: Sequence and Genome Analysis,"** CSHL Press, Second Edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, **"Bioinformatics Basics, Applications in Biological Science and Medicine,"** CRC Press, Taylor & Francis Group, Second Edition,2005.
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, **"Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery,"** PHI Learning Pvt. Ltd., Third Edition, 2011.

III B.Tech. II Semester

14BT60502: **ENGINEERING SYSTEMS ANALYSIS AND DESIGN**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Overview of theSystems Process; Technologies for systems; System Development Life Cycle; system Analysis and Modeling; levels of management; Project Management; Systems Implementation and importance of UMLPrototyping; Maintaining and Managing the Systems output Process.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Gain knowledge on:
   - Systems Process and System Design
   - Systems Analysis and Modeling
   - System Development Life Cycle
   - Design Management and Maintenance Tools.
2. Apply the CASE Tools for System Process and estimation the given models.
3. Design, Develop and implement new Techniques for modeling the systems.
4. Work effectively as team member on projects
5. Manage and Maintain the System Process.

Detailed Syllabus:

UNIT - I: INTRODUCTION (09 periods)

Introduction - Systems, Types of systems, integrating technologies for systems, Need for system analysis and design, Role of the systems analyst, the system development life cycle, CASE tools for analysis and design.

UNIT - II: ANALYSIS AND MODELING ORGANIZATIONAL SYSTEMS (09 periods)

Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, levels of management, organizational culture.

UNIT - III: PROJECT MANAGEMENT (09 periods)

Project initiation, Problem in organization, Determining feasibilities, ascertaining hardware and software needs, identifying, forecasting, comparing costs and benefits, activity planning and control, managing the project.

UNIT - IV: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (09 periods)

Object oriented analysis and design- Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT - V: DESIGNING EFFECTIVE OUTPUT (09 periods)

Output design objectives, relating output content to output method, realizing how output bias affects users, designing output for display, Case studies- Designing a web site management, online exam management.

Total Periods: 45

TEXT BOOK:

1. Kenneth E.Kendall and Julie E. Kendall, **"System analysis and Design,"** Eighth Edition, Pearson Education, India, 2011.

REFERENCE BOOKS:

1. Dennis, Wixom, Roth **"systems analysis and Design,"** Fifth Edition, John Wiley. 2012.
2. Shelly, Rosenblatt, **"Systems analysis and Design,"** Eighth Edition, Cengage Learning, 2012.

III B.Tech. II Semester

14BT71005: **MICROELECTRO MECHANICAL SYSTEMS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Basic knowledge in Physics.

COURSE DESCRIPTION:

Overview of Micro Electro Mechanical Systems (MEMS); scaling laws; working principles of microsensors and microactuators; materials; microfabrication processes; packaging of Microsystems.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators.
2. Identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.

Detailed Syllabus:

UNIT - I: OVERVIEW OF MEMS AND SCALING LAWS (09 periods)

Introduction, MEMS and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.

Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid- body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT - II: **WORKING PRINCIPLES OF MICROSYSTEMS (09 periods)**

Microsensors, acoustic wave sensors, biomedical and biosensors, chemical sensors, pressure sensors, thermal sensors. Microactuation: actuation using thermal forces, shape-memory alloys, piezoelectric crystals, electrostatic forces. MEMS with microactuators, microgrippers, micromotors, microvalves, micropumps. Microaccelerometers, microfludics.

UNIT - III: MATERIALS FOR MEMS AND MICROSYSTEMS (09 Periods)

Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

UNIT - IV: MEMS FABRICATION PROCESS AND MICRO-MANUFACTURING (09 periods)

Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.

UNIT - V: MEMS PACKAGING (09 periods)

Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging.

Total Periods: 45

TEXT BOOK:

1. Tai-Ran Hsu, **"MEMS & Microsystems, Design and Manufacture,"** McGraw Hill Education (India) Pvt. Ltd., 2002.

REFERENCE BOOKS:

1. G.K.Ananthasuresh, K.J.Vinoy, **"Micro and Smart Systems,"** Wiley India, First Edition, 2010
2. Nitaigour Premchand Mahalik, **"MEMS,"** McGraw Hill Education (India) Pvt. Ltd., eighth reprint, 2013.

III B.Tech. II Semester

14BT61205: **BIO INFORMATICS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases; Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.
2. Analyze biological database management system.
3. Create, select and apply appropriate techniques and tools to manage the biological data.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO BIOINFORMATICS (08 periods)

Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

UNIT - II: BIOLOGY AND INFORMATION (07 periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT - III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 periods)

Heuristic alignment algorithms, global sequence alignments- Needleman-Wunsch algorithm, local sequence alignments- smith-waterman algorithm, amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.

UNIT - IV: PRIMARY DATABASES AND THEIR USE (11 periods)

Introduction to biological databases- organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT - V: SECONDARY DATABASES (09 periods)

Introduction to secondary databases- organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-organization and Management of databases, KEGG, ExPASy, BRENDA.

Total Periods: 45

TEXT BOOKS:

1. David W. Mount **"Bioinformatics: Sequence and Genome Analysis,"** CSHL Press, Second Edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, **"Bioinformatics Basics, Applications in Biological Science and Medicine,"** CRC Press, Taylor & Francis Group, Second Edition,2005.
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, **"Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery,"** PHI Learning Pvt. Ltd., Third Edition, 2011.

III B.Tech. II Semester

14BT61206: **CYBER SECURITY AND LAWS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in Cyber security, Cyber crimes and its related laws in Indian and Global Act.
2. Analyze the legal perspectives and laws related to cyber crimes in Indian context.
3. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO CYBER CRIMES (09 periods)

Introduction, Definition, Origin, Cyber Crime and Information Security, Cyber Criminals, Classifications of Cyber Crimes, The Legal Perspectives and Indian Perspective, Cyber Crime and Indian ITA 2000, Global Perspective on Cyber Crimes.

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Café and Crimes, Botnets.

UNIT - II: TOOLS AND METHODS USED IN CYBER CRIME (09 periods)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT - III: CYBER CRIMES AND CYBER SECURITY - LEGAL PERSPECTIVES (08 periods)

Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT - IV: CYBER SECURITY-ORGANIZATIONAL IMPLICATIONS (10 periods)

Introduction, Cost of Cyber Crimes and IPR issues, Web Threats for Organizations – Evils and Perils, Security and Privacy Implications from Cloud Computing, Social Media Marketing-Security Risks and Perils for Organizations, Social Computing and Associated Challenges for Organizations, Protecting People's Privacy in Organization, Organizational Guidelines for Internet Usage, Safe Computing and Usage Policy, Incident Handling and Best Practices, Media and Asset Protection.

UNIT - V: CYBER TERRORISM AND INFORMATION WARFARE (09 periods)

Introduction, Intellectual Property in the Cyber Space, the Ethical Dimension of Cyber Crimes, the Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.

Cyber Crime Illustrations: Indian Banks lose Millions of Rupees, Justice vs. Justice, Parliament Attack, The Indian case of online Gambling, Bank and Credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam.

Total Periods: 45

TEXT BOOK:

1. Nina Gobole, Sunit Belapure, **"Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,"** Wiley India, First Edition, 2011.

REFERENCE BOOKS:

1. Ferrara et al., **"Cyber Law: Text and Cases,"** Cengage Learning, Third Edition, 2012.
2. Vivek Sood, **"Cyber Law Simplified,"** Tata McGraw-Hill, First Edition, 2012.
3. Prashant Mali, **"Cyber Law and Cyber Crimes,"** Snow White Publications Pvt. Ltd., First Edition, 2013.

III B.Tech. II Semester

14BT61221: **OOAD AND DATA MINING LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PART-A: OOAD

PREREQUISITES:A Course on "Object Oriented Analysis & Design"

COURSE DESCRIPTION: Modeling case studies; Automated Teller Machine; Library Information System; Online Ticket Reservation system; Point of sales etc.,

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Apply Unified Modeling Language to design software system.
2. Analyze the static and dynamic aspects of software system.
3. Model the design for given set of requirements.
4. Develop UML models for real world applications.

Case studies given below should be Modeled using Visual Modeling tools in different views i.e Use case view, logical view, component view, Deployment view.

List of Experiments:

CASE STUDY 1:

AUTOMATED TELLER MACHINE (ATM)

Problem Statement:

Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

CASE STUDY 2:

LIBRARY INFORMATION SYSTEM

Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned back to the library, that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

CASE STUDY 3: ONLINE TICKET RESERVATION FOR RAILWAYS

Problem Statement:

Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, date of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes i.e. Sleeper class, First class and the AC compartment. Design the application for the above problem description.

CASE STUDY 4: A POINT OF SALE (POS) SYSTEM

Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software

to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client - side terminals and interfaces such as browser, PDA's, touch - screens.

CASE STUDY 5: RECRUITMENT PROCEDURE FOR SOFTWARE INDUSTRY

Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company.The technical skill and the experience of the candidates are reviewed and the short listed candidates are called for the interview. There may be different rounds for interview like the written test, technical interview, and HR interview. After the successful completion of all rounds of interview, the selected candidates names are displayed. Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

CASE STUDY 6: ONLINE AUCTION SALES

Problem Statement:

The online auction system is a design about a website where sellers collect and prepare a list of items they want to sell and place it on the website for visualizing. To accomplish this purpose the user has to access the site. Incase it's a new user he has to register. Purchaser's login and select items they want to buy and keep bidding for it. Interacting with the purchasers and sellers through messages does this. There is no need for customer to interact with the sellers because every time the purchasers bid, the details will be updated in the database. The purchaser making the highest bid for an item before the close of the auction is declared as the owner of the item. If the auctioneer or the purchaser doesn't want to bid for the product then there is fixed cutoff price mentioned for every product. He can pay that amount directly and own the product. The purchaser gets a confirmation of his purchase as an acknowledgement from the website. After the transition by going back to the main menu where he can view other items.

CASE STUDY 7: TWO FLOOR ELEVATOR SIMULATOR

The elevator has the basic function that all elevator systems have, such as moving up and down, open and close doors, and of course, pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to MaxFloor, where the first floor is the lobby. There are car call buttons in the car corresponding to each floor. For every floor except for the top floor and the lobby, there are two hall call buttons for the passengers to call for going up and down. There is only one down hall call button at the top floor and one up hall call button in the lobby. When the car stops at a floor, the doors are opened and the car lantern indicating the current direction the car is going is illuminated so that the passengers can get to know the current moving direction of the car. The car moves fast between floors, but it should be able to slow down early enough to stop at a desired floor. When an elevator has no requests, it remains at its current floor with its doors closed.

In order to certificate system safety, emergency brake will be triggered and the car will be forced to stop under any unsafe conditions.

CASE STUDY 8: HOME APPLIANCE CONTROL SYSTEM

A home appliance control system (HACS) is a system which provides various services to remotely operate on home appliances, such as microwave oven, TV, and garage door etc through remote devices such as mobile phone, desktop and palm-top. A home appliance control system (HACS) is a system which is controlled by a remote system such as a mobile phone or a palm-top, and at the same time controls, monitors and coordinates home appliances such as air conditioner, microwave oven, garage doors, TV set, VCR, audio controller, indoor/outdoor lights, water sprinkler, home security system, bath tub controller, etc. In order to activate home appliances and to allow for different ways of cooking, the HACS needs mechanisms for communication between the different devices in the system, and for coordination among the various processes running on such devices. The system administrator of the HACS system has the ability to add a new appliance or delete an existing one. The system administrator has the ability to add a new remote device and configure it with HACS or delete an existing one when it is not used. Also the system administrator can create an account for a new user or delete existing account if it is no longer used.

PART-B: DATA MINING

PREREQUISITES: Courses on "Database Management Systems Lab and Data warehousing and data mining".

COURSE DESCRIPTION: Hands-on experience on Data preprocessing techniques; Mining frequent patterns; classification and clustering techniques using R and Weka open source machine learning tools.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Analyze and predict the information for forecasting applications.
2. Identify and design suitable algorithms to mine knowledge from real-time databases.
3. Apply Weka and R tools to extract interesting patterns from large databases.

List of Experiments:

I. Experiments on Weka 3.7.5:

Credit Risk Assessment: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. **Knowledge Engineering.** Find a loan officer who is willing to talk. Interview her and try To represent her knowledge in the form of production rules.
2. **Books.** Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. **Common Sense.** Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. **Case Histories.** Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data (Down load from web).In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer!)

A few notes on the German dataset:

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- Owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- Foreign_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks:

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
5. Is testing on the training set as you did above a good idea? Why or Why not?

6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what cross-validation is briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?
7. Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)
9. sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?
12. (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

II. Experiments on R 2.15.1:

13. Create an EMP Dataset in R environment and perform the following functions
    i. Display the EMP dataset with all rows and columns
    ii. Edit the dataset and perform few manipulations and display the updated dataset
    iii. Perform Data Exploration functions on EMP Dataset.
    iv. Generate various visualizations such as Plot, Scatter plot matrix etc.

REFERENCE BOOKS:

1. Grady Booch, James Rum Baugh, Ivar Jacobson, **"The Unified Modeling Language User Guide,"** Second Edition, Pearson Education, 2009
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, **"UML 2 Toolkit,"** WILEY-Dreamtech India Pvt. Ltd., 2003.
3. Meilir Page-Jones, **"Fundamentals of Object Oriented Design in UML,"** Pearson Education, 2000.
4. Pascal Roques, **"Modeling Software Systems Using UML2,"** WILEY-Dreamtech India Pvt. Ltd, 2004.
5. Craig Larman, **"An introduction to Object - Oriented Analysis and Design and Unified Process Applying UML and Patterns,"** Pearson Education, 2002.
6. Ian. H. Witton and Eibe Frank **"Data Mining: Practical Machine Learning Tools and techniques,"** Second Edition, Elsevier Publication, 2005.
7. Joseph Adler, **"R in a Nutshell,"** First Edition, O'Reily Publishers, 2010.

III B.Tech. II Semester

14BT61222: **WEB PROGRAMMING LAB**

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hands-on experience on HTML; HTML5; CSS; JavaScript; JQuery; PHP; MySQL; XML and AJAX.

COURSE OUTCOMES:

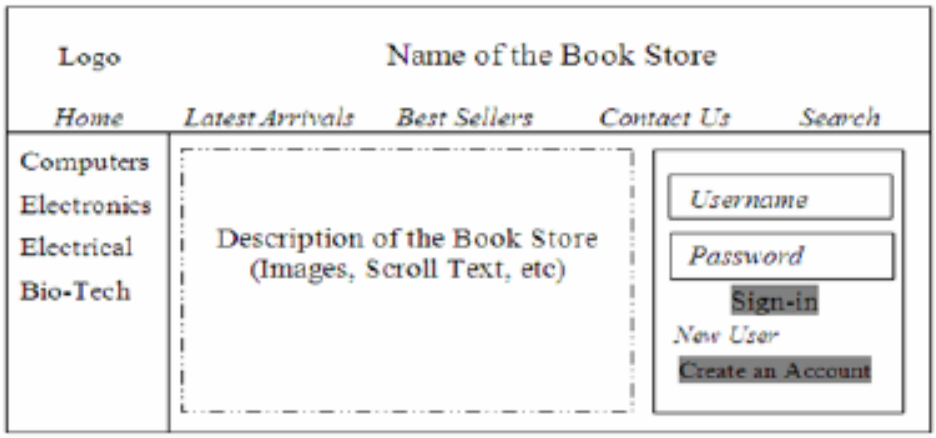
After the successful completion of the course, the student will be able to:

1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript, JQuery, XML, AJAX, PHP and MySQL.
2. Apply client-server principles to develop scalable and enterprise web applications.

List of Experiments:

1. Design the following static web pages required for an online book store web site.

A. Home Page:



The Home page must have the following three frames:

Top frame: Logo and the book store name and links to Home page, Latest arrivals, Best sellers, Contact us and Search.

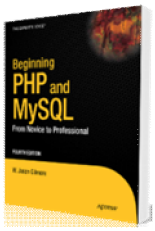
Left frame: At least four links for navigation, which will display the books catalogue relevant to engineering disciplines. For e.g. when the link "Computers" is clicked, the catalogue relevant to computer science books will be displayed in the right frame.

Right frame: The pages of navigated links in the left and top frame must be loaded in the right frame. Initially it will load the Home page that can include the description of the book store, sign-in and create account information.

B. Catalogue Page:

The catalogue page should display the following details of books available in the web site. The details are as follows:

a. Snap shot of cover page
b. Title of the text book
c. Author name
d. Publisher
e. Price
f. More details link.

Logo	Name of the Book Store			
Home	*Latest Arrivals*	*Best Sellers*	*Contact Us*	*Search*
Computers Electronics Electrical Bio-Tech	 	**HTML5 Black Book** Kogent Learning Solutions Dreamtech Press Rs. 570/-	More Details	
	 	Beginning PHP and MySQL 4th Edition W Jason Gilmore Apress Rs. 520/-	More Details	

C. Registration Page:

Design the Registration page with the following fields and link it to create an account link.

a. First Name	b. Last Name	c. Gender
d. Date of Birth	e. Username	f. Password
g. Confirm Password	h. Address	i. Postal Code
j. Mobile No.	k. Email-Id	

2.

a. Design a web page to store username and password information using the local storage concept.

b. Design a web page to store employee information including Name, Emp. Id, Department, Salary and Address on a client's machine using a real SQL database.

3. Apply the following styles to all web pages of online book store web site.

a. Fonts and Styles: font-family, font-style, font-weight and font-size

b. Backgrounds and colors: color, background-color, background-image and background-repeat

c. Text: text-decoration, text-transformation, text-align and text-indentation, text-align

d. Borders: border, border-width, border-color and border-style

e. Styles for links: A: link, A: visited, A:active, A:hover

f. Selectors, Classes, Layers and Positioning elements.

4. Write a JavaScript/JQuery code to validate the following fields of the Registration web page.

a. First Name/Last Name - should contain only alphabets and the length should not be less than 8 characters.

b. Username - It should contain combination of alphabets, numbers and _. It will not allow spaces and special symbols.

c. Password - It should not less than 8 characters in length.

d. Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.

e. Postal Code: It must allow only 6 digit valid number.

e. Mobile No. - It should allow only numbers and total number of digits should be equal to 10.

f. E-mail id - It should allow the mail id with the following format:

Ex. mailid@domainname.com

5. Design a web page with the following features using HTML5, JavaScript and JQuery

a. Displaying of images with Custom animated effects

b. Playing of selected video from the list of loaded videos

c. Showing the animated text in increasing and decreasing font size

d. Changing the size of the area in a web page using DIV tag

d. Hides and Shows elements on web page.

6.

a. Deploy and navigate web pages of online book store using WAMP/XAMPP web server.

b. Write a PHP program to red user name and favorite color from the HTML form. Display the name of the user in green color and sets user favorite color as a background for the web page.

7. Write a PHP code to read the username and password entered in the Login form of the online book store and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.

8. Write a PHP code to read user details entered through the registration web page and store the same into MySQL database.

9. Write a PHP code for storing books details like Name of the book, author, publisher, edition, price, etc into MySQL database. Embed a PHP code in catalogue page of the online book store to extract books details from the database.

10. Write an XML file to store book details including:

a. Title of the book b. Author of the bookc. ISBN number

d. Publisher Name e. Edition f. Price

i. Write a Document Type Definition (DTD) or XML Schema to validate the above XML file.

ii. Display the contents of the XML file with the following format using XSLT.

The contents should be displayed in a table format. The header of the table should be in color grey and the author names should be displayed in red color, bold and capitalized. Use appropriate colors for remaining fields.

11. Design a web page to reload some portion of the web page content using XMLHttpRequest object.

IV B.Tech. I Semester

14BT71201: MOBILE APPLICATION DEVELOPMENT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Object Oriented Programming through Java".

COURSE DESCRIPTION: Knowledge on Mobile platforms; Designing of Mobile User Interface and tools for developing user interface; Introduction to Android; Understanding Activities; Linking Activities using Intents; Creating the User Interface Programmatically; Views; Menus; Database Storage; SMS; e-mail; Displaying Maps; Building a Location Tracker Web Services Using HTTP, Sockets Programming, Communication between a Service and an Activity; Introduction to iOS and Windows Phone 7.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on
   a. Mobile platforms and Mobile User Interface
   b. Android Activities and Intents
   c. Messaging, Networking, Location based Services, Android Services
   d. Basics of iOS and Windows phone 7.
2. Demonstrate problem solving skills to design and develop solutions for real world problems with android mobile applications.

Detailed Syllabus:

UNIT - I: (08 periods)

MOBILE APP OR WEBSITE, MOBILE USER INTERFACE DESIGN, ANDROID PROGRAMMING

Mobile Web Presence, Mobile Applications, Marketing, App as a Mobile Web App, Effective Use of Screen Real Estate, Understanding Mobile Application Users, Understanding Mobile Information Design, Understanding Mobile Platforms, Using the Tools of Mobile Interface Design. What is android, obtaining the required tools, First Android Application, Anatomy of an Android Application.

UNIT - II: ACTIVITIES, INTENTS AND ANDROID USER INTERFACE (09 periods)

Understanding Activities, Linking Activities using Intents, Calling Built-In Applications using Intents, Displaying Notifications, Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Listening for UI Notifications.

UNIT - III: DESIGNING USER INTERFACE WITH VIEWS, DISPLAYING PICTURES AND MENUS WITH VIEWS, DATA PERSISTENCE (10 periods)

Basic Views, Picker Views, List Views, Using Menus with Views, Some Additional Views, Saving and Loading User Preferences, Persisting Data to Files, Creating and Using Databases.

UNIT - IV: MESSAGING, LOCATION-BASED SERVICES, AND NETWORKING (09 periods)

SMS Messaging, Sending e-mail, Displaying Maps, Getting Location Data, Monitoring a Location, Consuming Web Services Using HTTP.

UNIT - V: (09 periods)

DEVELOPING ANDROID SERVICES, GETTING STARTED WITH IOS, AND WINDOWS PHONE 7

Creating Your Own Services, Establishing Communication between a Service and an Activity, Binding Activities to Services, Understanding Threading. iOS Tools, iOS Project, Debugging iOS Apps, Objective-C Basics, Hello World App, Building the Derby App in iOS. Windows Phone 7 Metro, Application Bar, Tiles, Tombstoning, Tools, Windows Phone 7 Project, Building the Derby App in Windows Phone 7.

Total Periods: 45

TEXT BOOKS:

1. Wei-Meng Lee, John, **"Beginning Android™ 4 Application Development",** Wiley & Sons Inc., First Edition, 2012.
2. Jeff McWherter, Scott Gowell, **"Professional Mobile Application Development,"** Wiley & Sons Inc., First Edition, 2012.

REFERENCE BOOKS:

1. Paul Deital and Harvey Deital, **"Android How to Program,"** Detial associates publishers, First Edition, 2013.
2. Zigurd Mednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura, **"Programming Android Java Programming for the New Generation of Mobile Devices,"** O'Reilly Media, First Edition, 2011.

IV B.Tech. I Semester

14BT71202: **MULTIMEDIA AND APPLICATIONS DEVELOPMENT**

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Object Oriented Programming" and "Computer Graphics"

COURSE DESCRIPTION: Introduction to Multimedia; Fundamental Concepts in Audio and Video; Action Script 2.0; Multimedia Data Compression; Multimedia Network Communications and Applications.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate fundamental knowledge on image, audio, video representations & standards and multimedia network communications.
2. Analyze ActionScript principles, functions and components for developing multimedia authoring applications.
3. Apply various lossy/lossless coding techniques on text and images for compression and decompression.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO MULTIMEDIA (10 periods)

Definition of Multimedia, Multimedia and Hypermedia, Multimedia Software Tools, Graphics and Image Data representations-Graphics and Image Data types, File Formats, Color models in Images, Color models in Video. Definition of sound, Digitization, Nyquist theorem, Signal to Noise Ratio, Signal to Quantization-Noise Ratio, Types of Video Signals, Analog Video, Digital Video.

UNIT - II: ACTIONSCRIPT-I (09 periods)

ActionScript 2.0 Features, Data Types and Type Checking: Static Typing, Type Syntax, Compatible Types, Casting, ActionScript 2.0 Type checking, Classes-Defining classes, Constructor functions, Properties, Methods.

Inheritance: A Primer on inheritance, Subclasses as subtypes, Overriding Methods and Properties, Constructor functions in Subclasses, Polymorphism and Dynamic binding.

UNIT - III: ACTIONSCRIPT-II (09 periods)

Interfaces: Introduction, Syntax and Use.

Packages: Syntax, Defining Packages, Package Access and Classpath.

Exceptions: The Exception Handling Cycle, Exception bubbling, finally block, Nested Exceptions, Limitations.

Authoring an ActionScript 2.0 class, An OOP Application Development, Using Components with ActionScript 2.0, MovieClip Subclasses.

UNIT - IV: MULTIMEDIA DATA COMPRESSION (10 periods)

Lossless compression algorithms- Introduction, Basics of Information Theory, Run Length Coding, Variable Length Coding, Dictionary Based Coding,Arithmetic Coding. Lossy Compression Algorithms- Quantization, Introduction to Transform Coding-DCT,DFT.

Image Compression Techniques: JPEG Standard, JPEG 2000.Audio Compression Techniques-ADPCM in Speech Coding Introduction to Video Compression, Video Compression Based on Motion Compensation, MPEG-1, MPEG-2.

UNIT - V: MULTIMEDIA NETWORK COMMUNICATIONS AND APPLICATIONS (07 periods)

Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MoD).

Total Periods: 45

TEXT BOOKS:

1. Ze-Nian Li and Mark S. Drew, **"Fundamentals of Multimedia,"** Pearson Education, Second Edition, 2008.
2. Colin Moock, **"Essentials ActionScript 2.0,"** SPD O'Reilly, First Edition, 2005.

REFERENCE BOOKS:

1. Nigel Chapman and Jenny Chapman, **"Digital Multimedia,"**Wiley Dreamtech, Second Edition, 2004.
2. Brian Underdahl, **"Macromedia Flash MX,"** TMH, First Edition, 2002.
3. Fred Halsall, **"Multimedia Communications,"** Pearson, First Edition, 2004.
4. K.R.Rao, Zoram S. Bojkovic, **"Multimedia Communication Systems,"** Pearson Education, First Edition, 2002.

IV B.Tech. I Semester

14BT70501: **COMPILER DESIGN**

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Theory of Computation ".

COURSE DESCRIPTION: concepts of Lexical analysis, Parsers, Run Time Environments, Type checking, Code Optimization, Code Generation and Compiler tools.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Gain knowledge on phases involved in design of compilers.
2. Acquire skills in code optimization.
3. Apply the knowledge on LEX and YACC tools to develop scanner and parser.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO COMPILER AND LEXICAL ANALYSIS (09 periods)

Introduction to Compiler:
Structure of a compiler.

Lexical Analysis:
The Role of the Lexical Analyzer, Input Buffering, Specification of Tokens, The Lexical-Analyzer Generator Lex.

UNIT - II: SYNTAX ANALYSIS (09 periods)

Introduction: The Role of the Parser, Eliminating Ambiguity, Eliminating of Left Recursion and Left Factoring.

Top-Down Parsing: Recursive descent parsing, Non Recursive Predictive parsing, LL (1) Grammars.

Bottom-Up Parsing: Shift reduce parsing, LR parsers - Simple LR parser, Canonical LR parser, LALR parser, Using Ambiguous Grammars, The Parser Generator Yacc.

UNIT - III: SYNTAX DIRECTED TRANSLATION AND TYPE CHECKING (09 periods)

Syntax-Directed Translation: Syntax directed definition, S-attributed and L-attributed definitions, Construction of syntax trees.

Type Checking: Type Expressions, Type Equivalence, Rules for Type Checking, Type Conversions, Overloading of Functions and Operators.

UNIT- IV: INTEMEDIATE CODE GENERATOR AND RUN TIME ENVIRONMENTS (09 periods)

Intermediate Code Generation: Variants of Syntax Trees, Three Address Code, Boolean expressions, Flow-of-Control Statements, Control- Flow Translation of Boolean Expressions.

Run time Environments: Storage organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack.

UNIT - V: CODE OPTIMIZATION AND CODE GENERATION (09 periods)

Code Optimization: Basic Blocks and Flow Graphs, Optimization of Basic Blocks, The principal sources of optimization, Introduction to data flow analysis.

Code Generation: Issues in the Design of a Code Generator, The Target Language, A Simple Code Generator, Peephole optimization, Register allocation and assignment.

Total Periods: 45

TEXT BOOK:

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D. Ullman, **"Compilers-Principles, Techniques and Tools,"** Second Edition, Pearson Education, 2012.

REFERENCE BOOKS:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, **"Compilers-Principles, Techniques and Tools",** Low price Edition, Pearson Education, 2004.
2. K.L.P Mishra and N. Chandrashekaran, **"Theory of computer science- Automata Languages and computation,"** Second Edition, PHI, 2003.

IV B.Tech. I Semester

14BT41501: **COMPUTER GRAPHICS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES:A Course on "Engineering Mathematics", "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Introduction to Computer Graphics; Output Primitives; 2-D Geometric Transformations and Viewing; 3-D Geometric Transformations and Viewing; 3-D object representation; and Visible Surface Detection Methods.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Gain knowledge on graphical interactive devices, viewing transformations, 3-D object representations, surface detection methods.
2. Design algorithms to generate points, lines, polygons for 2-D, 3-D objects.
3. Apply Transformations and Clipping algorithms for 2-D and 3-D objects.

Detailed Syllabus:

UNIT - I: INTRODUCTION AND OUTPUT PRIMITIVES (10 periods)

Raster-scan systems, Random scan systems, Graphics monitors and work stations and input devices.

Output Primitives: Points and lines, Line drawing algorithms, Mid-point circle and ellipse algorithms.

Filled area primitives: Scan line polygon fill algorithm, Boundary-fill and flood-fill algorithms.

UNIT - II: 2-D GEOMETRICAL TRANSFORMS AND 2-D VIEWING (10 periods)

Translation, scaling, rotation, reflection and shear transformations, homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, Viewing coordinate reference frame, Window to view-port coordinate transformation, Viewing functions, Cohen-Sutherland line clipping algorithms, Sutherland -Hodgeman polygon clipping algorithm.

UNIT - III: 3-D OBJECT REPRESENTATION (08 periods)

Polygon surfaces, Quadric surfaces, Spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces.

UNIT - IV: 3-D GEOMETRIC TRANSFORMATIONS (08 periods)

Translation, Rotation, Scaling, Reflection and shear transformations, Composite transformations.

3-D Viewing: Viewing pipeline, Viewing coordinates, Projections and clipping.

UNIT - V: VISIBLE SURFACE DETECTION METHODS (09 periods)

Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods, Shading: Gouraud Shading, Phong shading.

Total Periods:45

TEXT BOOK:

1. Donald Hearn and M. Pauline Baker, **"Computer Graphics C version,"** Pearson Education, 2006.

REFERENCE BOOKS:

1. Steven Harrington, **"Computer Graphics,"** TMH, 1982.
2. Neuman and Sproul, **"Principles of Interactive Computer Graphics,"** TMH, 2005.

IV B.Tech. I Semester

14BT71203: **SCRIPTING LANGUAGES**

(Professional Elective-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Object Oriented Programming through Java" and "Unix Internals".

COURSE DESCRIPTION: Scripts and scripting; perl; core python, Files and input/output and modules.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on: Scripting, Perl, Python.
2. Design and develop software systems using perl and python scripting languages.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO SCRIPTS AND SCRIPTING (08 periods)

Scripts and programs, Origins of Scripting, Scripting today, Characteristics of Scripting languages, Uses for scripting languages, Web scripting, The universe of scripting languages;

Introducing Perl: Perl phenomenon, Names and values in Perl, Variables and assignment, Scalar expressions, Control structures, Built-in functions, Collections of data, Working with arrays and lists, Working with hashes, Simple input and output, Strings, Patterns and regular expressions, Subroutines, Scripts with arguments, Operators and precedence.

UNIT - II: ADVANCED PERL (09 periods)

Finer points of looping, Finer points of subroutines, Using pack and unpack, Working with files, Navigating the file system, Typeglobs, eval, References, Data structure, Packages, Libraries and modules, Objects, Objects and modules in action, Tied variables, Interfacing to the operating system, Creating Internet-aware applications, Dirty hands internet programming, Security issues.

Introduction to Python: History and Features, Python Basics, Comments, Operators, Variables and Assignment. Lists and Tuples.

UNIT - III: CORE PYTHON (10 periods)

Syntax and style, Statements and Syntax, Variable Assignment, Identifiers Basic Style Guidelines, Memory Management, First Python Application; Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Unsupported Types; Numbers, Integers, Floating Point Real Numbers, Complex Numbers.

UNIT - IV: CONTROL STRUCTURES AND FILES (09 periods)

Conditionals and Loops, if statement, else Statement, elif (a.k.a. else-if) Statement, while Statement, for Statement, break Statement, continue Statement, pass Statement.

File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage, Modules; Errors and Exceptions, Exceptions in Python, Detecting and Handling Exceptions, Raising Exceptions, Assertions Standard Exceptions;

UNIT-V: FUNCTIONS AND MODULES (09 periods)

Functions and Functional Programming, Calling Functions, Creating Functions, Passing Functions, Formal Arguments, Positional Arguments, Default Arguments, Variable-length Arguments, Variable Scope.

Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules; Execution Environment, Callable Objects, Code Objects, Executable Object Statements and Built-in Functions, Executing Other (Python) Programs, Executing Other (Non-Python) Programs, Restricted Execution, Terminating Execution, Extending Python.

Total periods: 45

TEXT BOOKS:

1. David W. Barron, **"The World of Scripting Languages,"** WILEY India, First Edition, 2010.
2. Wesley J. Chun, **"Core Python Programming,"** Pearson publications, Second Edition, 2007.

REFERENCE BOOKS:

1. Martin C. Brown, **"Perl: The Complete Reference,"** McGraw Hill Education (India) Private Limited, Second Edition, 2001.
2. Mark Lutz, **"Programming Python,"** Shroff Publishers, First Edition, 2011.

IV B.Tech. I Semester

14BT71204: SOFTWARE TESTING TECHNIQUES

(Professional Elective-I)

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Software Engineering".

COURSE DESCRIPTION: Basic & Advance concepts of Software Testing and Techniques; STLC in SDLC; Coverage; Verification & Validation Models; Workbenches; Defects management; White box testing; Black box testing; Integration testing; System testing; Automation tools.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate in-depth knowledge in software testing methodologies, test strategies.
2. Analyzing testing circumstances and their resultants in software development.
3. Design & develop the best tests strategies in accordance to the development model.
4. Acquire problem solving skills to ensure quality software development meeting the industry standards.
5. Conduct tests with latest testing tools to address critical and complex areas of the software testing and achieve quality with ease.

Detailed Syllabus:

UNIT-I: BASIC CONCEPTS OF SOFTWARE TESTING (09 periods)

Software Testing Fundamentals: Definition, Approaches, Testing during SDLC, Traceability Matrix, Essentials of Software Testing, Workbench, Features of Test Process, Misconceptions about Testing, Principles of Software Testing, Salient features of Good Testing, Test Policy, Test Strategy, Test Planning, Challenges in Testing, Categories of Defect, Defect, Error/Mistake in Software, Test Process, Skills required by Tester.

UNIT-II: ADVANCED CONCEPTS OF SOFTWARE TESTING (09 periods)

Software Verification & Validation: Verification, Verification Workbench, Methods of Verification, Types of Reviews, Reviews in STLC, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Management of Verification & Validation.

V-Test Model: V-model for Software, Testing during - Proposal Stage, Requirement Stage, Test-Planning Stage, Design Phase, Coding. VV Model, Critical Roles and Responsibilities.

Defect Management: Defect Classification, Management Process, Lifecycle, Template, Fixing & Root Cause of Defect, Estimating impact of Defect, Defect Management needing the Risk, Techniques for finding Defects, Reporting a Defect.

UNIT-III: TESTING TECHNIQUES -I (09 periods)

Flow Graphs and Path Testing: Path-Testing Basics, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Implement and Application of Path Testing.

Transaction-Flow Testing and Data-Flow Testing: Transaction Flows, Transaction-Flow Testing Techniques, Data-Flow Testing Basics, Data-Flow Testing Strategies, Application, Tools, Effectiveness.

UNIT - IV: TESTING TECHNIQUES -II (10 periods)

Logic Based Testing: Motivational Overview, Decision Tables, Path Expressions Again, KV Charts, Specifications.

State Graphs and Transition Testing: State Graphs, Good State Graphs and Bad, State Testing, Testability Tips.

UNIT - V: TESTING TOOLS AND TEST PLANNING (08 periods)

Testing Tools: Features of Test Tool, Guidelines for selecting Test Tools, Tools and Skills of Tester, Static and Dynamic Testing Tools, Advantages and Disadvantages of using Test Tools, When to use Automated Test Tools, Testing using Automated Tools, Difficulties while introducing new Tools.

Test Planning: Test Policy and its contents, Strategy and its contents, Test Plan, Quality Plan and Test Plan, Quality Plan Template, System Test Plan Template, Guidelines for developing a Test Plan, Test Estimation, Test Standards, Test Scenarios and Test cases, Template for Test cases, Test Scripts, Building Test Data, Generation of Test Data, Roles and Responsibilities in STLC.

Total Periods: 45

TEXT BOOKS:

1. M.G.Limaye, **"Software Testing: Principles and Techniques and Tools,"** Tata Mc Graw - Hill Education, First Edition, 2009.
2. Boris Beizer, **"Software Testing Techniques,"** Dream Tech Press, Second Edition, 2004.

REFERENCE BOOKS:

1. Ilene Burnstein,**"Practical Software Testing,"** Springers-Verilog International Edition, 2003.
2. Dr.K.V.K.K.Prasad, **"Software Testing Tools,"** Dreamtech, First Edition, 2004.

IV B.Tech. I Semester

14BT70431: **IMAGE PROCESSING AND PATTERN RECOGNITION**

(Professional Elective-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Fundamentals of digital image processing; Image transforms; Image enhancement techniques in spatial and frequency domains; Restoration techniques; image segmentation techniques and Pattern recognition.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Image Fundamentals
   - Image Enhancement and Restoration Techniques
   - Image Segmentation Techniques
   - Representation and description
   - Pattern recognition
2. Analyze the characteristics of images using image processing techniques.
3. Develop image processing algorithms to process the images for Real Time Applications.
4. Solve problems related to images for feasible and optimal solutions in the core area of Image Processing.

Detailed Syllabus:

UNIT - I: DIGITAL IMAGE FUNDAMENTALS (10 periods)

Fundamental steps in digital Image Processing, Image sampling and quantization, some basic relationships between pixels, Arithmetic operations, Logical operations, Spatial operations.

Image Transforms: 2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar-Transform, Slant Transform, Hotelling Transform.

UNIT - II: IMAGE ENHANCEMENT (08 periods)

Basic Intensity transformation functions, Histogram processing, Fundamentals of Spatial Filtering, Smoothing spatial filters, Sharpening spatial filters, Basics of filtering in frequency domain, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters, Homomorphic filtering.

UNIT-III: IMAGE RESTORATION AND SEGMENTATION (10 periods)

Image Degradation/Restoration model, Estimating the degradation function, Inverse filtering, Weiner filtering, Constrained least squares filtering. Detection of discontinuities- Point, line and edge Detection. Thresholding- global thresholding, adaptive thresholding. Region based Segmentation.

UNIT - IV: REPRESENTATION AND DESCRIPTION (09 periods)

Chain codes, polygonal approximation, signatures, boundary segments, skeletons, boundary descriptors, regional descriptors, principal components for description, relational descriptors.

UNIT - V: PATTERN RECOGNITION (08 periods)

Pattern and pattern classes, recognition based on decision Theoretic methods- matching, optimum stastical classifiers, neural networks. Structural methods- matching shape numbers, string matching, syntactic recognition of strings, syntactic recognition of trees.

Total Periods: 45

TEXT BOOKS:

1.Rafael C. Gonzalez & Richard. E. Woods, **"Digital Image Processing,"** Third Edition, Pearson Education,2008.

2.Anil. K. Jain, **"Fundamentals of Digital Image Processing,"** Prentice Hall, 2007.

REFERENCE BOOKS:

1.William K. Pratt, **"Digital Image Processing,"** Third Edition, John Wiley and Sons, INC.2001.

IV B.Tech. I Semester

14BT71502: **NETWORK PROGRAMMING**

(Professional Elective-I)

(Common to CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Computer Networks".

COURSE DESCRIPTION: Introduction to network programming; sockets; TCP Client Server; I/O multiplexing and socket option; elementary UDP sockets; DNS; IPC; Remote Login.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in concepts of sockets, inter process communication and remote login.
2. Analyze networking protocols such as TCP and UDP.
3. Apply programming skills to solve problems relevant to client server architectures.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO NETWORK PROGRAMMING AND SOCKETS (10 periods)

OSI model, Unix standards, TCP and UDP, TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

Address structures, value result arguments, Byte ordering and manipulation function, and related functions Elementary TCP sockets -Socket, connect, bind, listen, accept, fork and exec function, concurrent servers, Close function and related function.

UNIT - II: TCP CLIENT SERVER AND SOCKET OPTIONS (10 periods)

TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

I/O Models, select function, Batch input, shutdown function, poll function, getsockopt and setsockopt functions, Socket states, Generic socket option IPV6 socket options.

UNIT - III: ELEMENTARY UDP SOCKETS AND DOMAIN NAME SERVERS (06 periods)

Introduction to UDP echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

UNIT - IV: INTERPROCESS COMMUNICATION (11 periods)

Introduction, Pipes, popen and pclose functions, FIFO's, streams and messages, System V IPC: IPC_Perm Structure, IPC Permissions, Creating and Opening IPC Channels, Message queues (msgget, msgsnd, msgrcv, msgctl Functions), Shared Memory (shmget, shmat, shmdt, shmctl Functions).

UNIT - V: REMOTE LOGIN (08 periods)

Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin overview, RPC, Transparency issues.

Total Periods: 45

TEXT BOOKS:

1. W.Richard Stevens, **"UNIX Network Programming,"** Vol. I, Sockets API, Third Edition, PHI, 2010
2. W.Richard Stevens, **"UNIX Network Programming IPC,"** Vol. II, Second Edition, PHI,2009

REFERENCE BOOKS:

1. T CHAN, **"UNIX SYSTEMS PROGRAMMING USING C++,"** Third Edition, PHI.
2. GRAHAM GLASS, KING ABLES, **"UNIX for programmers and Users,"** Third Edition, Pearson Education.

IV B.Tech. I Semester

14BT71506: **SOFT COMPUTING**

(Professional Elective-I)

(Common to CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Discrete Mathematical Structures".

COURSE DESCRIPTION: Concepts of Neural Networks (NN); Architecture of Back Propagation Networks; Adaptive Resonance Theory(ART); Fuzzy Vs Crisp Logic; Genetic Algorithms(GA);Genetic Modeling; Hybrid Systems.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Acquire knowledge on principles and techniques of soft computing such as Neural Networks, Associative Memory, Fuzzy-Logic, Genetic Algorithms and Hybrid Systems.
2. Analyze applications of back propagation networks and associative memory.
3. Solve Problems using fuzzy systems and genetic modeling.

Detailed Syllabus:

UNIT - I: NEURAL NETWORKS (09 periods)

Basic concepts of neural networks, Model of an artificial neurons, Neural Network architectures, Characteristics of neural network architecture, Early neural network architecture.

Backpropagation Networks: Architecture of Back Propagation Networks (BPN), Back propagation learning, Illustration, Applications. Effect of tuning parameters of backpropagation neural networks, Selection of various parameters in BPN, Variations of standard back propagation algorithm.

UNIT - II: ASSOCIATIVE MEMORY (09 periods)

Auto correlators, Hetero correlators, Multiple training encoding strategy, Exponential BAM, Associative memory for real coded pattern pairs, Applications.

Adaptive Resonance Theory (ART): Introduction, ART1, ART2, Applications.

UNIT - III: FUZZY SYSTEMS (09 periods)

Fuzzy versus Crisp, Crisp Sets, Fuzzy Sets, Crisp Relations, Fuzzy Relations. Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy rule based system, Defuzzification methods, Applications.

UNIT - IV: GENETIC ALGORITHMS (GA) (09 periods)

Basic concepts, Creation of Off-springs, Working principle, Encoding, Fitness Function, Reproduction.

Genetic Modelling: Inheritance operators, Cross Over, Inversion and Deletion, Mutation, Bitwise operators, Bitwise Operators Used in GA. Generational cycle, Convergence of Genetic Algorithm, Applications.

UNIT - V: (09 periods)

INTEGRATION OF NEURAL NETWORKS, FUZZY LOGIC, AND GENETALGORITHMS

Hybrid Systems: Sequential hybrid systems, Auxiliary hybrid systems, Embedded hybrid systems, Neural networks, Fuzzy logic and Genetic Algorithms hybrids: Neuro-Fuzzy hybrids, Neuro-Genetic hybrids, Fuzzy-Genetic hybrids, Preview of the Hybrid systems: GA based Backpropagation Network, Fuzzy-Backpropagation network, Fuzzy Associative Memories, Fuzzy logic controlled GA.

Total Periods: 45

TEXT BOOK:

1. Rajasekaran S, G. A Vijayalakshmi Pai, **"Neural Networks, Fuzzy Logic, and Genetic Algorithms: Synthesis and Applications,"** PHI, 2009.

REFERENCE BOOKS:

1. Timothy J.Ross **"Fuzzy Logic with Engineering Applications,"** Wiley India Pvt. Ltd.-New Delhi, 2011.
2. Jang **"Neuro Fuzzy and Soft computing,"** Pearson First Edition,2007.
3. David E. Goldberg, **"Genetic Algorithms in search, Optimization and Machine Learning,"** Pearson, First Edition, 2002.

IV B.Tech. I Semester

14BT71205: **MACHINE LEARNING**

(Professional Elective-II)

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Probability and Statistics", "Engineering Mathematics" and "Design and Analysis of Algorithms".

COURSE DESCRIPTION: Basic concepts of machine learning and decision trees; neural networks and genetic algorithms; Bayesian techniques; instant based learning and analytical learning and reinforced learning.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on supervised, unsupervised, reinforcement machine learning techniques and applications of machine learning.
2. Analyze skills on machine learning algorithms and its application.

Detailed Syllabus:

UNIT - I: INTRODUCTION, CONCEPT LEARNING AND DECISION TREES (09 periods)

Learning Problems, Designing Learning systems, Perspectives and Issues, Concept Learning, Version Spaces and Candidate Elimination Algorithm, Inductive bias, Decision Tree learning, Representation, Algorithm, Heuristic Space Search.

UNIT - II: NEURAL NETWORKS AND GENETIC ALGORITHMS (09 periods)

Neural Network Representation, Problems, Perceptrons, Multilayer Networks and Back Propagation Algorithms, Advanced Topics, Genetic Algorithms, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning.

UNIT - III: BAYESIAN AND COMPUTATIONAL LEARNING (09 periods)

Bayes Theorem, Concept Learning, Maximum Likelihood, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naive Bayes Classifier, Bayesian Belief Network, EM(Expectation-Maximization) Algorithm, Probably Learning, Sample Complexity for Finite and Infinite Hypothesis Spaces, Mistake Bound Model.

UNIT - IV: INSTANT BASED LEARNING AND LEARNING SET OF RULES (09 periods)

k- Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Sequential Covering Algorithms, Learning Rule Sets, Learning First Order Rules, Learning Sets of First Order Rules, Induction as Inverted Deduction, Inverting Resolution.

UNIT - V: ANALYTICAL LEARNING AND REINFORCED LEARNING (09 periods)

Perfect Domain Theories, Explanation Based Learning, Inductive-Analytical Approaches, FOCL (First Order Combined Learner) Algorithm, Reinforcement Learning, Task, Q-Learning, Temporal Difference Learning.

Total Periods: 45

TEXT BOOK:

1. Tom M. Mitchell, **"Machine Learning,"** McGraw-Hill, First Edition, 2013.

REFERENCE BOOKS:

1. Ethem Alpaydin, **"Introduction to Machine Learning,"** MIT Press, Second Edition, 2009.
2. Kevin P. Murphy, **"Machine Learning: A Probabilistic Perspective,"** MIT Press, 2012.

IV B.Tech. I Semester

14BT71206: **SERVICE ORIENTED ARCHITECTURE**

(Professional Elective-II)

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Software Engineering".

COURSE DESCRIPTION: Web Services; Principles of SOA; Service Layers; Simple Object Access Protocol (SOAP); Web Services Description Language (WSDL).

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Fundamentals of web services
   - Principles, services and policies of service orientation.
   - XML, WSDL related to SOA
2. Analyze complex business process critically in identifying appropriate service model logic.

Detailed Syllabus:

UNIT - I: SOA AND WEB SERVICES FUNDAMENTALS (10 periods)

Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common pitfalls of adopting SOA.

The Evolution of SOA: An SOA Timeline, The continuing evolution of SOA, The roots of SOA.

Web Services and Primitive SOA: The Web Services framework, Services, Service descriptions, messaging.

UNIT - II: SOA AND WS-* EXTENSIONS (08 periods)

WS-* and Contemporary SOA (Part I): Message Exchange Patterns, Service Activity, Coordination, Atomic transactions, Business Activities.

WS-* and Contemporary SOA (Part-II): Addressing, Reliable messaging, Correlation, Policies, Metadata exchange.

UNIT - III: PRINCIPLES, SERVICE LAYERS AND PLANNING (10 periods)

Principles of Service-Orientation: Anatomy of SOA, Common principles of Service Orientation, Inter relationship of Service Orientation Principles, Service Orientation and Object Orientation.

Service Layers: Service-Orientation and Contemporary SOA, Service Layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

SOA Delivery Strategies: SOA delivery lifecycle phases, The Top-down strategy, the bottom-up strategy, the agile strategy.

UNIT - IV: BUILDING SOA AND SERVICE MODELING (08 periods)

Service Oriented Analysis: Benefits of a Business Centric SOA and Deriving Business Services.

Service Modeling: Service Modeling, Service Modeling guidelines, Classifying Service model logic, Contrasting Service modeling approaches.

UNIT - V: BUILDING SOA AND SERVICE DESIGN (09 periods)

Service-Oriented Design: WSDL related XML Schema language basics, WSDL language basics, SOAP language basics, Service interface design tools.

Service Design: Service Design overview, Entity-centric business Service Design, Application Service Design, Task-centric business Service Design, Service Design guidelines.

Total Periods: 45

TEXT BOOK:

1. Thomas Erl, **"Service-Oriented Architecture - Concepts, Technology, and Design,"** Pearson, First Edition, 2011.

REFERENCE BOOKS:

1. Shankar Kambhampaty, **"Service Oriented Architecture for Enterprise and Cloud Applications,"** Wiley-India, Second Edition, 2010.
2. Eric Newcomer, **"Understanding SOA with Web Services,"** Pearson Education, Second Edition, 2005.

IV B.Tech. I Semester

14BT80504: **DISTRIBUTED SYSTEMS**

(Professional Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Operating Systems".

COURSE DESCRIPTION: Characterization of distributed systems; system models; inter-process communication; distributed objects and remote invocation; name services; peer-to-peer systems; transactions and concurrency control and distributed shared memory and CORBA case study.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Gain knowledge on concepts of distributed systems, system models, Inter-process communication, and RMI.
2. Apply the concepts of distributed systems to solve the real time problems.
3. Design and implement distributed application.

Detailed Syllabus:

UNIT - I: CHARACTERIZATION OF DISTRIBUTED SYSTEMS AND SYTEM MODELS (09 periods)

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges.

System models-Introduction, Architectural and Fundamental models.

UNIT - II: INTERPROCESS COMMUNICATION & DISTRIBUTED OBJECTS (09 periods)

Inter Process Communication - Introduction, The API for the Internet Protocols, External data representation and marshalling, Client-server communication, Group communication.

Distributed Objects and Remote Invocation-Introduction, communication between distributed objects, Remote procedure call, events and notifications.

UNIT - III: DISTRIBUTED FILE SYSTEMS & PEER-TO-PEER SYSTEMS (10 periods)

Distributed File Systems - Introduction, File Server Architecture.

Name Services - Introduction, Name Services and the Domain Name System, Directory Services, Case Study of Global Name Service, Case Study of the X.500 Directory Service.

Peer-to-Peer Systems-Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays.

UNIT - IV: TRANSACTIONS AND CONCURRENCY CONTROL & DISTRIBUTED TRANSACTIONS (09 periods)

Transactions and Concurrency control-Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Controls. Distributed Transactions -Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency control in Distributed Transactions, Distributed Deadlocks, and Transaction Recovery.

UNIT - V: DISTRIBUTED SHARED MEMORY & CORBA CASE STUDY (08 periods)

Distributed Shared Memory - Design and Implementation Issues, Sequential Consistency and Ivy Case Study, Release Consistency and Munin Case Study, Other Consistency Models.

CORBA Case Study- CORBA RMI, CORBA Services **Total Periods: 45**

TEXT BOOK:

1. G. Coulouris, J. Dollimore, and T. Kindberg **"Distributed Systems: Concepts and Design,"** Pearson Education, Fourth Edition, 2013.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum and Maarten Van Steen, **"Distributed Systems: Principles and Paradigms,"** Second Edition, Pearson, 2007.
2. M.L.Liu **"Distributed Computing, Principles and Applications",** Pearson Education, Third Edition, 2013.

IV B.Tech. I Semester

14BT80505: **NETWORK MANAGEMENT**

(Professional Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Computer Networks" and "Network Security"

COURSE DESCRIPTION: Principles of Network Management; SNMPv1; SNMPv2; SNMPv3; Network management and Communication; Remote Monitoring and Telecommunication management Network; Broadband and Advanced Management.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate Knowledge on SNMP, Telecommunications Networks and Remote monitoring.
2. Analyze Traffic Management Problems in Network through Remote Monitoring.
3. Apply Advanced Management tools in web based Enterprise Management.

Detailed Syllabus:

UNIT - I: DATA COMMUNICATIONS AND NETWORK MANAGEMENT OVERVIEW (09 periods)

Data Communications Foundations: Analogy of Telephone Network Management, Communication Protocols and standards, Networks, Systems, and Services, case histories of Network, System, and Service Management, Challenges of IT Managers. Network Management Overview: Network Management Goals, Organization and functions, Network Management Architecture and Organization, Current Status and Future of Network Management.

UNIT - II: BASIC FOUNDATIONS & SNMPV1 ORGANIZATION AND INFORMATION MODELS (09 periods)

Basic Foundations: Network Management Standards, Network Management Models, Organizational Model, Information Model, Communication Model, Functional Model, ASN.1, Encoding Structure

SNMPV1: History of SNMP Management, internet organization and standard, SNMPV1 Architecture, Organization and Information models.

UNIT - III: SNMPV1 COMMUNICATION AND FUNCTIONAL MODELS AND SNMPV2 NETWORK MANAGEMENT (09 periods)

SNMPV1: SNMP Architecture, Administrative Model, SNMP Protocol Specifications, SNMP Operations, SNMP MIB Group, Functional Model

SNMPV2: Major changes in SNMPV2, System Architecture, SNMPV2 structure of Management Information, SNMPV2 Management Information Base, SNMPV2 protocol, Compatibility with SNMPV1.

UNIT - IV: SNMPV3 NETWORK MANAGEMENT AND RMON (09 periods)

SNMPV3: Key features, SNMPV3 architecture, applications, Management Information Base, User based security model, Access control

Remote Monitoring: Introduction to Remote monitoring, RMON Structure of Management Information and Management Information Base, RMON1, RMON2, ATM Remote monitoring and Case study.

UNIT - V: TELECOMMUNICATIONS MANAGEMENT NETWORK AND ADVANCED MANAGEMENT (09 periods)

Tele Communications Management Network: Introduction to TMN, Operations Systems, TMN conceptual model, TMN Architecture, TMN integrated view.

Advanced Management: Next Generation NM Requirements, Limitations of SNMP Management, Evolutionary Approaches, Web Interface and Web Management, Web-based Enterprise Management, Web-based interface Management Architecture, XML based NM Technology. **Total periods: 45**

TEXT BOOK:

1. Mani Subramanian, **"Network Management: Principles and practice,"** Second Edition, New Delhi: Pearson Education, 2012.

REFERENCE BOOKS:

1. William Stallings, **"SNMP, SNMPV2,SNMPV3 and RMON 1 and 2,"** Third Edition, New Delhi: Pearson Education, 2009.
2. Stephen B Morris, **"Network Management, MIBS and MPLS: Principles, Design and Implementation,"** New Delhi: Pearson Education 2008.

IV B.Tech. I Semester

14BT81503: **HUMAN COMPUTER INTERACTION**

(Professional Elective-II)

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Importance of user interface; Graphical user interface; Design process; Screen Designing; Windows; Components; Software Tools and Interaction Devices.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Acquire knowledge on principles and components of HCI.
2. Analyze product usability evaluations and testing methods.

Detailed Syllabus:

UNIT - I: INTRODUCTION (09 periods)

Importance of User Interface - definition, Importance of good design, Benefits of good design, A brief history of Screen design, The graphical user interface - popularity of graphics, The concept of direct manipulation, Graphical system, Characteristics, Web user - Interface popularity, characteristics- Principles of user interface.

UNIT - II: DESIGN PROCESS (08 periods)

Design process - Human interaction with computers, Importance of human characteristics, human consideration in design, Human interaction speeds, and understanding business functions.

UNIT - III: SCREEN DESIGN (10 periods)

Design goals - Screen planning and purpose, Organizing screen elements, Ordering of screen data and content - screen navigation and flow - Visually pleasing composition - amount of information - focus and emphasis - presentation information simply and meaningfully - information retrieval on web - statistical graphics - Technological consideration in interface design.

UNIT - IV: WINDOWS AND MULTIMEDIA (08 periods)

Windows - New and Navigation schemes selection of window, selection of devices based and screen based controls; Components - text and messages, Icons and increases - Multimedia, colors, uses problems, choosing colors.

UNIT - V: SOFTWARE TOOLS AND DEVICES (10 periods)

Software tools - Specification methods, interface - Building Tools - Interaction Devices - Keyboard and function keys pointing devices - speech recognition digitization and generation - image and video displays - drivers.

Total periods: 45

TEXT BOOKS:

1. Wilbert O Galitz, **"The Essential Guide to User Interface Design,"** Second Edition, Wiley India Education.
2. Ben Schneiderman, **"Designing the User Interface,"** Fourth Edition, Pearson Education, Asia.

REFERENCE BOOKS:

1. A Dix, Janet Finlay, G D Abowd and R Beale, **"Human-Computer Interaction,"** Third Edition, Pearson Publishers, 2008.
2. Jonathan Wolpaw and Elizabeth Winter Wolpaw, **"Brain-Computer Interfaces,"** Principles and Practice, First Edition, Oxford Publishers, 2012.

IV B.Tech. I Semester

14BT71221: MOBILE APPLICATIONS DEVELOPMENT LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES:A Course on "Mobile Application Development"

COURSE DESCRIPTION: Hands-on experience on development of Android Mobile applications with Submenus; Context menus; Layouts; Buttons; Date Picker; Scroll view and database access with Android SQLite.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Design and develop android applications to solve real world problems.
2. Demonstrate problem solving skills for developing android mobile applications.
3. Use modern tools Eclipse IDE with android ADT, and Android Studio to develop android mobile applications.

List of Experiments:

1. Test the android development environment by performing the following operations.

a. Add the sample application to a project in eclipse workspace.

b. Create an Android Virtual Device (AVD) for sample project.

c. Create a launch configuration for sample project.

d. Run sample application in Android Emulator.

2. Develop a program to build an Android Application to display a message on the screen.
3. Develop a program which will implement Sub menu in android application.
4. Develop a program to implement Context menu (Floating List of Menu Items) in android application.
5. Develop a program to demonstrate the use of Relative Layout Views with different attributes.
6. Develop a program to demonstrate the use of Linear Layout Views with different attributes.
7. Develop a program to implement a Custom Button and handle the displayed message on button press.
8. Develop a program to implement the Table layout in View Group that displays child View elements in rows and columns.
9. Develop a program to implement the List View in android application.
10. Develop a program to show how to use Date picker control of ADK in android applications.
11. Develop a program that can show the creation of a scrollview when text is not visible on one page.
12. Develop a program to insert, delete, display, and update the employee details using Android SQLite.

REFERENCE BOOKS:

1. Wei-Meng Lee, John, **"Beginning Android™ 4 Application Development,"** Wiley & Sons Inc., First Edition, 2012.
2. Jeff McWherter, Scott Gowell, **"Professional Mobile Application Development,"** Wiley & Sons Inc., First Edition, 2012.
3. Paul Deital and Harvey Deital, **"Android How to Program,"** Detial associates publishers, First Edition, 2013.
4. Zigurd Mednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura, **"Programming Android: Java Programming for the New Generation of Mobile Devices,"** O'Reilly Media, First Edition, 2011.

IV B.Tech. I Semester

14BT71222: **MULTIMEDIA AND APPLICATIONS DEVELOPMENT LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on "Object Oriented Programming' and 'Computer Graphics"

COURSE DESCRIPTION: Hands on experience in Animating Flash Movies and Developing ActionScript Applications using a Flash Tool.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Design and develop various user authoring applications, multimedia games and animation movies using flash tool.
2. Apply various ActionScript programming principles to animate interactive flash movies for presenting multimedia content more efficiently.

List of Experiments:

The following Experiments to be Developed using adobe Flash Tool:

1. Draw an object and apply the following animation techniques:
   a. Motion Tween b. Rotation c. Shrink and Grow d. Shape Tween e. Add Guide Layer
2. a. Animate a Flash movie that shows the truck moving behind the trees.
   b. Animate a Flash movie that shows the Flag hoisting.
3. a. Animate a Flash movie that shows the Spotlight Masking. Use text as a masked object and circle as a mask object.
   b. Create a Flash movie that shows the complete word will appear on the stage from letters that fly in from various points. Use graphical text while animating the movie.
4. a. Animate a Flash movie that shows rolling wheel as a movie clip symbol.
   b. Create a movie clip symbol of a rolling wheel and then add two instance of that symbol to the vehicle. Apply motion tween to make the vehicle drive across the road.
5. Create a Flash movie that enables the user to click left and right arrow buttons to view the images of the Movie Clip in left and right directions respectively. Initially add a set of images to the Movie Clip and then view the images of the Movie Clip through the buttons by writing necessary action script code. Note: Left and Right arrow buttons should be created by the user.
6. Create a Flash movie that accepts User Id and Password from the user. Validate User Id and Password fields whenever the user presses the submit button. If a user id and password are correct display a welcome message otherwise display a message as invalid user. Store different user's user id's and passwords using an array object.
7. Create a Flash movie that allows the user to control the movement of the movie clip through the keyboard. Once the user presses the Left, Up, Right and Down arrow keys of the keyboard, the movie clip should move in Left, Upward, Right and Downward directions respectively. Make sure that, the movie clip will move in a specified boundary of the stage.
8. Write an Action Script application to sort N integer array elements.
9. Write an Action Script application to display Movie Clip's randomly.
10. Write an Action Script application to determine points along a circle.
11. Write an Action Script application to perform the following operations.
    a. Drawing a Line b. Drawing a Curve
    c. Drawing a Rectangle d. Filling a shape with specified color
    e. Filling a shape with gradient color
12. Write an Action Script application to apply the mask to an image.
13. Write an Action Script application to convert Indian currency to foreign currency.
14. Write an Action Script application to link MovieClip symbol with subclass of MovieClip class by using linkage property.
15. Write an Action Script application to design the User Registration form.

TEXT BOOK:

1. Colin Moock, **"Essentials ActionScript 2.0,"** SPD O'Reilly, First Edition,2005.

IV B.Tech. I Semester

14BT71223: **SEMINAR**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	50	50	-	-	-	2

PREREQUISITES: Nil.

COURSE DESCRIPTION: Identification of seminar topic; Literature survey; Preparation of technical report and Presentation.

COURSE OUTCOMES:

After the successful completion of the Seminar, the student will be able to:

1. Acquire in-depth knowledge in core and allied areas of interest.
2. Analyze and synthesize information related to the areas.
3. Conceptualize and construct research problems.
4. Extract information pertinent to a specific area through literature survey to conduct research.
5. Identify the applicability of modern software and tools.
6. Contribute positively to multidisciplinary groups in emerging areas with objectivity and rational analysis.
7. Plan, organize, prepare and present effective written and oral technical reports.
8. Develop independent and reflective learning.
9. Acquire awareness on professional code of conduct in the chosen area.
10. Develop independent and reflective learning.

IV B.Tech. II Semester

14BT81201: **CLOUD COMPUTING**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Computer Networks" and "Operating Systems"

COURSE DESCRIPTION: Cloud computing fundamentals; cloud computing architecture; cloud computing mechanisms; cloud security; working with clouds, virtualization and case studies.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on services, architecture, types of infrastructural models, Disaster Recovery and Virtualization.
2. Analyze the issues in cloud computing.

Detailed Syllabus:

UNIT - I: FUNDAMENTAL CLOUD COMPUTING (09 periods)

Understanding Cloud Computing: Origins and Influences, Basic Concepts and Terminology, Goals and Benefits, Risks and Challenges.

Fundamental Concepts and Models: Roles and Boundaries, Cloud Characteristics, Cloud Delivery Models, Cloud Deployment Models.

UNIT - II: CLOUD COMPUTING MECHANISMS AND ARCHITECTURE (09 periods)

Cloud-Enabling Technology: Broadband Networks and Internet Architecture, Data Center Technology, Virtualization Technology, Web Technology, Multitenant Technology, Service Technology.

Fundamental Cloud Architectures: Architecture - Workload Distribution, Resource Pooling, Dynamic Scalability, Elastic Resource Capacity, Service Load Balancing, Cloud Bursting, Elastic Disk Provisioning, Redundant Storage.

UNIT - III: CLOUD COMPUTING ADVANCED ARCHITECTURES (10 periods)

Advanced Cloud Architectures: Architecture-Hypervisor Clustering, Load Balanced Virtual Server Instances, Non-Disruptive Service Relocation, Zero Downtime, Cloud Balancing, Resource Reservation, Dynamic Failure Detection and Recovery, Bare-Metal Provisioning, Rapid rovisioning, storage Workload Management.

Specialized Cloud Architectures: Architecture - Direct I/O Access,Direct LUN Access,Dynamic Data Normalization,Elastic Network Capacity,Cross-Storage Device Vertical Tiering,Intra-Storage Device Vertical Data Tiering,Load Balanced Virtual Switches,Multipath Resource Access,Persistent Virtual Network Configuration,Redundant Physical Connection for Virtual Servers,Storage Maintenance Window.

UNIT - IV: WORKING WITH CLOUDS (09 periods)

Cloud Delivery Model Considerations: Cloud Delivery Models - The Cloud Provider, Cloud Delivery Models - The Cloud Consumer, Case Study Example.

Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations.

UNIT - V: INTRODUCTION TO VIRTUALIZATION (08 periods)

History of Virtualization, Objectives of virtualization, Benefits of Virtualized Technology, VMware, Microsoft Hyper-V and Ubuntu.

Total Periods: 45

TEXT BOOKS:

1. Thomas Erl and RicardoPuttini **"Cloud Computing- Concepts, Technology and Architecture,"** Pearson, First Edition 2013.
2. Ivanka Menken, **"Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book,"** First Edition, 2009.

REFERENCE BOOKS:

1. Barrie Sosinsky, **"Cloud Computing Bible,"** Wiley India Pvt Ltd, First Edition, 2011.
2. Rajkumar Buyya, James Broberg and Andrzej Goscinski, **"Cloud computing principles and paradigms,"** John Wiley and Sons, 2011.
3. John W. Rittinghouse, James F. Ransome, **"Cloud Computing implementation, Management and Security,"** CRC Press, Taylor & Francis group, First Edition 2010.

IV B.Tech. II Semester

14BT81202: **CRYPTOGRAPHY AND NETWORK SECURITY**

(Common to CSE, ECE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Computer Networks".

COURSE DESCRIPTION: Principles and practice of cryptography and network security: classical systems, symmetric block ciphers-DES; public-key cryptography-RSA, Diffie-Hellman; hash functions, authentication, key management, key exchange, signature schemes, E-mail, web security, and firewalls.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on Cryptographic algorithms, their mathematical models, Message Authentication, Digital Signatures and firewall.
2. Analyze vulnerabilities and threats on information systems based on various security parameters.

Detailed Syllabus:

UNIT - I: CLASSICAL ENCRYPTION TECHNIQUES (08 periods)

Introduction: Services, Mechanisms, and Attacks Concepts, The OSI Security Architecture, Model for Network Security.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques.

UNIT - II: BLOCK CIPHERS AND PUBLIC-KEY CRYPTOGRAPHY (09 periods)

Block Ciphers and the Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Block Cipher Design Principles, Block Cipher Modes of Operation.

Public-Key Cryptography: Principles of Public-Key Cryptosystems, the RSA Algorithm, Diffie-Hellman Key Exchange.

UNIT - III:

MESSAGE AUTHENTICATION CODES, HASH FUNCTIONS, AND DIGITAL SIGNATURES (09 periods)

Message authentication codes: Message Authentication Requirements, Message Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, Hash algorithms-SHA, HMAC.

Digital Signatures: Digital Signatures, Digital Signature Standard (DSS), Authentication applications-Kerberos, X.509 Authentication Service**.**

UNIT - IV: ELECTRONIC MAIL SECURITY, IP SECURITY AND WEB SECURITY (10 periods)

Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME-Multipurpose Internet Mail Extensions (MIME), S/MIME Functionality, Messages, Certificate Processing.

IP Security: IP Security Overview, Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations.

Web Security: Web security Considerations, Secure Sockets Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction.

UNIT - V: INTRUDERS, MALICIOUS SOFTWARE, AND FIREWALLS (09 periods)

Intruders: Intrusion Detection, Password Management-Password Protection, Password selection.

Malicious Software: Viruses and Related Threats, Virus Countermeasures.

Firewalls: Firewall Design Principles, Trusted Systems.

Total Periods: 45

TEXT BOOK:

1. William Stallings, **"Cryptography and Network Security Principles and Practice,"** Pearson Education, Third Edition, 2003.

REFERENCE BOOKS:

1. William Stallings, **"Network Security Essentials Applications and Standards,"** Pearson Education, Third Edition.
2. Behrouz A Forouzan and Debdeed Mukhopadhyay, **"Cryptography and Network Security,"** McGraw Hill Education, Second Edition, 2010.

IV B.Tech. II Semester

14BT81203: **.NET TECHNOLOGIES**

(Professional Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Object Oriented Programming".

COURSE DESCRIPTION: Knowledge on .NET Framework and C# Programming; Object-oriented concepts with C#; Exception handling mechanism; Interfaces; Generics; Delegates and Events in C#; Database access with ADO.NET; Web application development using Web forms and Web controls.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Basics of .NET platform.
   - Building C# applications, designing ASP.NET websites, performing Data access, building ASP.NET applications.
2. Design and develop Graphical User Interface and Web applications using .NET technologies.
3. Demonstrate problem solving skills for creating C# applications, ASP.NET applications and websites.

Detailed Syllabus:

UNIT - I: INTRODUCING C# AND .NET PLATFORM (09 periods)

Benefits of the .NET platform, Building blocks of the .NET platform, Overview of .NET assemblies, Common type system, Common language specification, Common language runtime, Platform-independent nature of .NET.

The role of the .NET framework 4.5 SDK, Building .NET application using visual studio, Anatomy of a simple C# program, System. Console class, System data types and corresponding C# keywords. Working with string data, C# iteration constructs, Decision constructs and the Relational/equality operators.

UNIT - II: CORE C# PROGRAMMING & OOP WITH C# AND EXCEPTION HANDLING (08 periods)

Understanding C# arrays, Introducing the C# class type, Constructors, The role of the this keyword, The static keyword, Pillars of OOP, C# access modifiers, C# encapsulation services, Understanding automatic properties, The basic mechanics of inheritance , The Details of Inheritance, C#'s polymorphic support.

The role of .NET Exception Handling, The simplest possible example, System-level exceptions, Application level exceptions, Processing multiple exceptions.

UNIT - III: INTERFACES, GENERICS, DELEGATES AND EVENTS (10 periods)

Understanding interface types, Defining custom interfaces, Implementing an Interface, Implementing an interfaces using visual studio, Role of generic type parameters , Creating custom generic methods, Creating custom generic structures and classes, Understanding the .NET delegate type, Delegate example, Generic Delegate, and C# Events , Understanding operator overloading.

UNIT - IV: ADO.NET (09 periods)

High level definition of ADO.NET, ADO.NET data provider, ADO.NET namespaces, Connected layer of ADO.NET, Data Readers , Database transactions, Disconnected layer of ADO.NET, Role of the dataset, Working with DataColumns, Data Rows, DataTable, DataAdapters, Binding DataTable objects to windows forms GUIs.

UNIT - V: ASP.NET WEB FORMS AND WEB CONTROLS, STATE MANAGEMENT TECHNIQUES (09 periods)

The role of http, Web applications and web servers, Role of client side scripting, Posting back to the web server, Overview of ASP.NET API, Building a single file ASP.NET web page, building an ASP.NET webpage using Code Files, ASP.NET web sites vs. ASP.NET Web applications, ASP.NET web site directory structure, The life cycle of an ASP.NET web page, Role of the web.config file, Understanding the nature of web controls, Major categories of ASP.NET web control , The Role of validation controls, Application Cache, The Control and WebControl Base Classes, Maintaining session data, Cookies.

Total Periods: 45

TEXT BOOK:

1. Andrew Troelsen **"Pro C# 5.0 and the .NET 4.5 Framework,"** Apress, Sixth Edition, 2012.

REFERENCE BOOKS:

1. Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson, Morgan Skinner, **"Professional C# 4 and .NET 4,"** WROX Publications, First Edition, 2010.
2. Mathew Mac Donald, **"The Complete Reference ASP.NET,"** TATA McGraw Hill, First Edition, 2010.

IV B.Tech. II Semester

14BT70503: **ADVANCED COMPUTER ARCHITECTURE**

(Professional Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Computer Organization".

COURSE DESCRIPTION: Quantitative design and analysis, memory hierarchy design; parallel computer models and network properties; pipelining, superscalar techniques, multiprocessors and multi computers; Multi-Vector, SIMD and Multi-Core computers.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Computational models and Computer Architectures.
   - Concepts of parallel computer models.
   - Scalable Architectures.
   - Pipelining, Superscalar processors, multiprocessors, SIMD and Multi core Computers.
2. Analyze the architectures of parallel computers and their interconnection structures.
3. Design modern computer architectures and hardware systems.

Detailed Syllabus:

UNIT - I: FUNDAMENTALS OF QUANTITATIVE DESIGN AND ANALYSIS, MEMORY HIERARCHY DESIGN (09 periods)

Fundamentals of Quantitative Design and Analysis: Introduction, Classes of computers, Defining Computer Architecture, Trends in technology, Trends in power and energy in ICs, Trends in cost, Dependability, Quantitative Principles of Computer Design.

Memory Hierarchy Design: Introduction, Advanced optimizations of cache performance, Memory technology and optimizations, Cross cutting issues-The design of memory hierarchies.

UNIT-II: PARALLEL COMPUTER MODELS AND NETWORKS PROPERTIES (09 periods)

Parallel Computer Models: The state of computing, Multiprocessors and multi-computers, Multi vector and SIMD computers,

Program and Networks Properties: Conditions of Parallelism, Program partitioning and scheduling, Program flow mechanisms, System interconnect architectures.

Examples: Detection of Parallelism in a program using Bernstein's conditions.

UNIT - III: PRINCIPLES OF SCALABLE PERFORMANCE AND MEMORY (09 periods)

Principles of Scalable Performance: Performance metrics and measures, Parallel Processing applications, Speedup performance laws.

Bus, Cache and Shared memory: Bus systems, Cache memory organizations, Shared memory organizations.

UNIT - IV: PIPELINING AND SUPERSCALAR TECHNIQUES, MULTIPROCESSORS AND MULTICOMPUTERS (09 periods)

Pipelining and Superscalar Techniques: Linear pipeline processors, nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design.

Multiprocessors and Multi-computers: Multiprocessor system interconnects Cache Coherence and synchronization mechanisms.

UNIT - V: MULTIVECTOR AND SIMD COMPUTERS, MULTICORE COMPUTERS (09 periods)

Multi-Vector and SIMD computers: Vector processing principles, Multi-vector multiprocessors, SIMD computer organizations- Implementation Models, CM2 Architecture; The Connection Machine CM5: As synchronized MIMD Machine, The CM5 Network architecture, Control Processor and processing nodes, Inter processor communications.

Case Studies: CRAY line of Computer Systems, Power PC architecture. **Total Periods: 45**

TEXT BOOKS:

1. Kai Hwang and Naresh Jotwani, **"Advanced Computer Architecture,"** Second Edition, New Delhi, McGraw Hill, 2011.
2. John L. Hennessy and David A. Patterson, **"Computer Architecture-A Quantitative Approach,"** Fifth Edition, Elsevier, 2012.

REFERENCE BOOKS:

1. Kai Hwang **"Advanced Computer Architecture,"** First Edition, New Delhi, Tata McGraw Hill, 2001.
2. Anantha Grama, Anshul Gupta, George Karypis and Vipin Kumar, **"Introduction to Parallel Computing,"** Second Edition, New Delhi, Pearson Education, 2003.

IV B.Tech. II Semester

14BT80532: **AD-HOC AND WIRELESS SENSOR NETWORKS**

(Professional Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Computer Networks".

COURSE DESCRIPTION: Ad Hoc Wireless Networks, Wireless Sensor Networks, issues of MAC protocols, Routing Protocols, Transport Layer Protocols, Quality of Service and Energy Management.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in:
   - Ad hoc and sensor networks
   - MAC Protocols and Routing Protocols
   - TCP over ad hoc wireless networks
   - QoS in ad hoc wireless networks.
2. Analyze the issues in MAC, Routing and Transport Layer in ad hoc wireless networks.
3. Apply routing and energy management techniques in the field of ad hoc wireless networks.

Detailed Syllabus:

UNIT - I: AD-HOC WIRELESS NETWORKS AND MAC PROTOCOLS (09 periods)

Ad-hoc Wireless Networks: Introduction to Ad-hoc Wireless Networks, Issues in AdHoc wireless Networks, Ad-hoc Wireless Internet.

MAC Protocols for Ad-hoc Wireless Networks: Introduction, Design Issues, Design Goals, Classification of MAC Protocols, Contention-Based Protocols-MACAW (A Media Access Protocol for Wireless LANs), Busy Tone Multiple Access Protocols, Distributed Packet Reservation Multiple Access Protocol, Distributed Priority Scheduling and Medium Access in Ad-hoc Networks.

UNIT - II: ROUTING PROTOCOLS FOR AD-HOC WIRELESS NETWORKS (11 periods)

Routing in Ad-hoc Wireless Networks: Introduction, Design Issues, Classification of Routing Protocols, Table Driven Routing Protocols-DSDV, On-Demand Routing Protocols-DSR, AODV, Hybrid Routing Protocols-ZRP, Hierarchical Routing Protocols-Hierarchical State Routing Protocol, Power-Aware Routing Protocols.

Multicast Routing In Ad-hoc Wireless Networks: Introduction, Design Issues, Operation, Classification of Multicast Routing Protocols, Tree-Based Multicast Routing Protocols-Bandwidth-Efficient Multicast Routing Protocol, Multicast Routing Protocol Based on Zone Routing, Mesh-Based Multicast Routing Protocols-On Demand Multicast Routing Protocol.

UNIT - III: TRANSPORT LAYER PROTOCOLS FOR AD-HOC WIRELESS NETWORKS (07 periods)

Introduction, Design Issues, Design Goals of a Transport Layer Protocol for Ad-hoc Wireless Networks, TCP Over Ad-hoc Wireless Networks- Traditional TCP, Feedback-Based TCP, TCP with Explicit Link Failure Notification.

UNIT - IV: QUALITY OF SERVICE AND ENERGY MANAGEMENT IN AD-HOC WIRELESS NETWORKS (09 periods)

Quality of Service in Ad Hoc Wireless Networks: Introduction, Issues and Challenges in Providing QoS in Ad-hoc Wireless Networks, Classification of QoS Solutions.

Energy Management in Ad-hoc Wireless Networks: Introduction, Need for Energy Management in Ad-hoc Wireless Networks, Classification of Energy Management Schemes, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Schemes.

UNIT - V:WIRELESS SENSOR NETWORKS (09 periods)

Wireless Sensor Networks: Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks- Self-Organizing MAC for Sensor Networks and Eavesdrop and Register, Quality of a Sensor Network. **Total Periods: 45**

TEXT BOOK:

1. C.Siva Ram Murthy, B.S.Manoj, **"Adhoc Wireless Networks - Architectures and Protocols,"** Pearson Education, 2011.

REFERENCE BOOKS:

1. C.K.Toh, **"Ad-hoc Mobile Wireless Networks: Protocols and Systems,"** First Edition, New Delhi, Pearson Education, 2007.
2. Charles E.Perkins, **"Ad hoc Networking,"** First Edition, New Delhi, Pearson Education, 2008.

IV B.Tech. II Semester

14BT71501: **EMBEDDED SYSTEM PROGRAMMING**

(Professional Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Computer Organization" and "Operating Systems".

COURSE DESCRIPTION: Embedded Systems, Design process; 8051 - Microcontroller; Program Modeling; Real Time Operating systems principles; Embedded system development tools.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in the following:
   - Embedded system components.
   - 8051 Microcontroller.
   - Principles of Real Time Operating Systems.
   - Embedded System design and development Process.
2. Demonstrate programming skills to develop software for embedded systems development.

Detailed Syllabus:

UNIT - I: INTRODUCTION (09 periods)

Embedded Systems, Processor Embedded into a system, Hardware units and devices in a system, software, Examples, SoC and VLSI technology, Complex System design and processors, System Design process, Design Formalization, Examples, Classification, Designer skills.

UNIT - II: MICROCONTROLLER (10 periods)

8051 Micro controller Hardware, Input/output Ports and Circuits, Assembly language programming-PC, ROM space, data types, flags and register banks. Jump, loop and call instructions, Addressing modes, I/O ports, Arithmetic and logic instructions and programs, programming in C.

UNIT - III: PROCESSES AND REAL-TIME OPERATING SYSTEMS (09 periods)

Threads and Tasks: Tasks, Task States, Task and Data, Concept of Semaphores, Shared Data, Inter-process Communication, Signal Function, Semaphore Functions, Message Queue Functions, Mailbox Functions, Pipe Functions.

Real-Time Operating Systems: OS Services, Process Management, Timer Functions, Event Functions, Memory Management, Device, File and I/O subsystems management, Interrupt routines.

UNIT - IV: EMBEDDED PROGRAMMING (09 periods)

Program Modeling Concepts and Embedded Programming: Program Models, DFG Models, State Machine Programming Models for Event-controlled Program Flow, Modeling of Multiprocessor Systems, UML Modeling. Software Programming in Assembly Language (ALP) and in High-Level Language 'C', 'C' & Program Elements, Object-Oriented Programming, Embedded Programming in C++ & Java.

UNIT - V: EMBEDDED SYSTEM DEVELOPMENT (08 periods)

Embedded Software Development Process and Testing: Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware-Software Design and Co-design, Testing on Host Machine, Simulators and Laboratory Tools.

Total Periods: 45

TEXT BOOKS:

1. Rajkamal, **"Embedded Systems Architecture, Programming and Design,"** Tata McGraw Hill, Second Edition, 2008.
2. Mazidi and Mazidi, **"The 8051 Microcontroller and Embedded Systems,"** Pearson, Second Edition, 2014.

REFERENCE BOOKS:

1. Kenneth J.Ayala, **"The 8051 Microcontroller,"** Cengage India, Third Edition, 2009.
2. David E. Simon, **"An Embedded Software Primer,"** Pearson Education, First Indian Reprint 2000.

IV B.Tech. II Semester

14BT81501: **HIGH PERFORMANCE COMPUTING**

(Professional Elective-III)

(Common to CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITE: A Course on "Computer Organization".

COURSE DESCRIPTION: Cache-based microprocessor architecture; Memory hierarchies; Multithreaded processors; Common sense Optimizations; The role of compilers; Data access optimization; Shared-memory computers; Parallel scalability; Introduction to OpenMP; Parallel Jacobi algorithm; Introduction to MPI; MPI performance tools; MPI parallelization of Jacobi solver.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Gain Knowledge on Modern Processors and code Optimization.
2. Design Parallel Computing algorithms.
3. Acquire Skills in Parallel Programming using OpenMP and MPI tools.

Detailed Syllabus:

UNIT - I: MODERN PROCESSORS (08 periods)

Stored-program computer architecture, General-purpose cache-based microprocessor architecture, Memory Hierarchies, Multicore processors, Multi-threaded processors, Vector Processors.

UNIT -II: BASIC OPTIMIZATION TECHNIQUES FOR SERIAL CODE (10 periods)

Scalar profiling, Common sense optimizations , Simple measures, large impact, The role of compilers, C++ Optimizations, Data access optimization-Balance analysis and lightspeed estimates, Storage order.

Case study: The Jacobi algorithm and Dense matrix transpose.

UNIT - III: PARALLEL COMPUTERS (09 periods)

Taxonomy of parallel computing paradigms, Shared-memory computers, Distributed-memory computers, Hierarchical systems, Networks. Basics of parallelization, Data Parallelism, Function Parallelism, Parallel Scalability.

UNIT - IV: SHARED-MEMORY PARALLEL PROGRAMMING WITH OpenMP (09 periods)

Introduction to OpenMP - Parallel execution, Data scoping, OpenMP work sharing for loops, Synchronization, Reductions, Loop scheduling and Tasking.

Case study: OpenMP-parallel Jacobi algorithm

Efficient OpenMP programming-Profiling OpenMP programs, Performance pitfalls.

Case study: Parallel sparse matrix-vector multiply.

UNIT - V: DISTRIBUTED-MEMORY PARALLEL PROGRAMMING WITH MPI (09 periods)

Message passing, Introduction to MPI, Examples: MPI parallelization of Jacobi solver.

Efficient MPI Programming: MPI performance tools, communication parameters, Synchronization, serialization, Contention, Reducing communication overheads, Understanding intranode point-to-point communication.

Total Periods:45

TEXT BOOK:

1. Georg Hager and Gerhard Wellein, **"Introduction to High Performance Computing for Scientists and Engineers,"** Chapman & Hall / CRC computational Science series, First Edition, 2011.

REFERENCE BOOKS:

1. Charles Severance, Kevin Dowd, **"High Performance Computing,"** O'Reilly Media, Second Edition , 1998.
2. Kai Hwang, Faye Alaye Briggs, **"Computer Architecture and Parallel Processing,"** McGraw Hill, 1984.

IV B.Tech. II Semester

14BT81204: **INFORMATION RETRIEVAL SYSTEMS**

(Professional Elective-IV)

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Data Structures and Database Management Systems"

COURSE DESCRIPTION: Architecture of Information Retrieval Systems; Functional Capabilities; Data Structures; Mathematical Algorithms; Indexing; Similarity and Clustering; Human Perception and Presentation; Text Search Techniques and Evaluation Measures.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on Information Retrieval Systems including architecture, functional capabilities, indexing and data presentation methods.
2. Analyze clustering algorithms to group similar data items and text search techniques for efficient search.
3. Design and develop data structures used to store/retrieve data items, mathematical algorithms and measures to evaluate retrieval systems.

Detailed Syllabus:

UNIT - I: INTRODUCTION (11 periods)

Primary Information Retrieval Problems, Objectives of Information Retrieval System, Functional Overview, Understanding the Search Functions, Relationship to DBMS, Digital libraries and Data Warehouses, Data structures and Mathematical Algorithms.

UNIT - II: INGEST AND INDEXING (09 periods)

Introduction, Item Receipt, Duplicate Detection, Item Normalization, Zoning and Creation of Processing Tokens, Stemming, Entity Processing, Categorization, Citational Metadata, Manual Indexing Process, Automatic Indexing of Text and Multimedia.

UNIT - III: SEARCH AND CLUSTERING (09 periods)

Similarity measures and Ranking, Hidden Markov Models Techniques, Ranking Algorithms, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches for Boolean Systems, Multimedia Searching, Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters.

UNIT - IV: INFORMATION PRESENTATION (08 periods)

Introduction, Presentation of the Hits, Display of the Item, Collaborative Filtering, Multimedia Presentation, Human Perception and Presentation.

UNIT - V: SEARCH ARCHITECTURE AND EVALUATION (08 periods)

Index Search Optimization, Text Search Optimization, GOOGLE Scalable multiprocessor architecture, Information System Evaluation, Measures used in system evaluation

Total Periods: 45

TEXT BOOK:

1. Gerald Kowalski, **"Information Retrieval Architecture and Algorithms,"** Springer, First Edition, 2013.

REFERENCE BOOKS:

1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, **"An Introduction to Information Retrieval,"** Cambridge University Press, First Edition, 2012.
2. Ricardo Baeza-Yates and Berthier Ribiero-Neto, **"Modern Information Retrieval the concepts and technology behind search,"** Addison Wesley, Second Edition, 2010.

IV B.Tech. II Semester

14BT81205: **MOBILE COMMUNICATIONS**

(Professional Elective-IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Course on "Computer Networks" and "Data communications".

COURSE DESCRIPTION: Introduction to Mobile Computing; Medium Access Control; Wireless LAN; Mobile Network and Transport Layers; Data Dissemination; Mobile Ad-Hoc Networks (MANETS); Wireless Application Protocol (WAP).

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in:
   - GSM, GPRS, Wireless LAN, MANET.
   - Protocols in Network, Transport and Application layer.
2. Analyze the issues related to database design in mobile applications.
3. Apply routing algorithms for finding shortest path in MANETS.

Detailed Syllabus:

UNIT - I: OVERVIEW OF MOBILE COMMUNICATIONS AND GSM (09 periods)

Introduction: History, applications, simplified reference model.

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT - II: MEDIUM ACCESS CONTROL AND WIRELESS LAN (09 periods)

Motivation for a specialized MAC - Hidden and exposed terminals, Near and far terminals, SDMA, FDMA, TDMA, CDMA.

IEEE 802.11: System architecture, Protocol architecture, Physical layer, Medium access control layer, MAC management,

Bluetooth: User scenarios, Architecture, Radio layer, Baseband layer, Link manager protocol, L2CAP, Security.

UNIT - III: MOBILE NETWORK AND TRANSPORT LAYERS (09 periods)

Mobile IP: Goals, assumptions, entities and terminology, IP packet delivery, agent discovery, registration, tunneling and encapsulation, optimizations; Dynamic Host Configuration Protocol (DHCP).

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission/ time-out freezing, Selective retransmission, Transaction oriented TCP; TCP over 2.5/3G wireless networks.

UNIT - IV: DATABASE ISSUES AND DATA DISSEMINATION (09 periods)

Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context aware computing, transactional models, query processing, recovery, and quality of service issues.

Data Dissemination: Push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT - V: MOBILE AD HOC NETWORKS (MANETS) AND WAP (09 periods)

Mobile Ad-hoc Networks: Routing, Destination sequence distance vector, Dynamic source routing, Alternative metrics, Overview ad-hoc routing protocols.

Wireless Application Protocol: Architecture, Wireless datagram protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment.

Total Periods: 45

TEXT BOOKS:

1. Jochen Schiller, **"Mobile Communications",** Pearson Education, Second Edition, 2003.
2. Rajkamal, **"Mobile Computing,"** OXFORD University Press, Second Edition, 2008.

REFERENCE BOOKS:

1. Stojmenovic and Cacute, **"Handbook of Wireless Networks and Mobile Computing,"** John Wiley, 2002.
2. Hansmann, Merk, Nicklous, Stober, **"Principles of Mobile Computing,"** Springer, Second Edition, 2003.

IV B.Tech. II Semester

14BT81206: **SEMANTIC WEB**

(Professional Elective-IV)

(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Web Programming"

COURSE DESCRIPTION: Semantic web fundamentals; Semantic web technology; Ontology web language; Swoogle; Semantic web services.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on:
   - Semantic web search
   - RDF , SWOOGLE
   - Semantic web services
   - RDFS, OWL
2. Acquire analysis skills on semantic web search engines and ontology engineering.

Detailed Syllabus:

UNIT - I: INTRODUCTION **(09 periods)**

The world of the semantic web: WWW, Internet usage, Meta data-Search engine, Search engine for traditional web-Semantic web.

UNIT - II: SEMANTIC WEB TECHNOLOGY **(09 periods)**

RDF(Resource Description Framework), Rules of RDF, Aggregation-Distributed information, core elements of RDF, Ontology and Taxonomy, Inferencing based on RDF schema, RDF tools

UNIT - III: ONTOLOGY WEB LANGUAGE -OWL **(08 periods)**

OWL (Ontology Web Language), Using OWL to define classes, Set operators and Enumerations, Define properties ontology matching, Three faces of OWL, Validate OWL, Protege editor.

UNIT - IV: SWOOGLE **(10 periods)**

Swoogle Architecture, FOAF, Semantic markup, Issues, prototype system, Design of Semantic web search engine, Discovery and indexation strategy, Need for Semantic Web Services.

UNIT - V: SEMANTIC WEB SERVICES **(09 periods)**

Semantic web services and applications, OWL-S: Upper ontology, WSDL-S, OWL-S to UDDI mapping Design of the search engine, implementations.

Total Periods: 45

TEXT BOOK:

1. Liyang Yu, **"Introduction to the Semantic Web and Semantic Web Services,"** Chapman & Hall/CRC, Taylor & Francis group, 2007.

REFERENCE BOOKS:

1. Johan Hjelm, **"Creating the Semantic Web with RDF, "** Wiley, 2001.
2. Grigoris Antoniou and Frank van Harmelen, **"A Semantic Web Primer",** MIT Press, 2004.

IV B.Tech. II Semester

14BT80502: **BIG DATA**

(Professional Elective-IV)

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITEs: Courses on "Data Base Management Systems" and "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Introduction to Big Data, Types of Data Sources, Hadoop Frameworks and HDFS, Map Reduce, Hadoop Ecosystem Components.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge in:
   - Analytic Paradigms
   - Big data Characteristics
   - Hadoop Framework.
2. Analyze the need for database systems for storing the large data.
3. Design and model an effective and sustainable database for better performance using Big data tools.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO BIG DATA (09 periods)

Big Data Characteristics: Volume-Variety-Velocity-Veracity, Analytics, Basic Nomenclature, Analytics Process Model, Analytical Model Requirements, Types of Data Sources, Sampling, Types of Data Elements, Missing Values, Standardizing Data, Outlier Detection and Treatment, Categorization.

UNIT - II: HADOOP FRAMEWORKS AND HDFS (08 periods)

Frameworks: A Brief History of Hadoop, The Hadoop Ecosystem, Hadoop Releases, The Building Blocks of Hadoop: Name Node-Data Node-Secondary Name Node-Job Tracker-Task Tracker.

The Hadoop Distributed File system: The Design of HDFS, HDFS Concepts, Hadoop File Systems .

UNIT - III: MAP REDUCE (09 periods)

Map Reduce: Anatomy of a Map Reduce: Map Reduce1, Map Reduce2

Failures: Failures in Classic MapReduce, Failures in YARN.

Job Scheduling: The Fair Scheduler, the Capacity Scheduler. Shuffle and Sort, Input Formats, Output Formats.

UNIT - IV: HIVE AND PIG (10 periods)

Hive: The Hive Shell, Hive Services, Comparison with Traditional Databases, HiveQL, Tables, Querying Data, User-Defined Functions.

Pig: Installing and Running Pig, Comparison with Databases, Pig Latin, User-Defined Functions, Data Processing Operators.

UNIT - V: CASE STUDY (09 periods)

Case Study: Hadoop Usage at Last.fm, Hadoop and Hive at Facebook, Nutch Search Engine, Log Processing at Rackspace, Mahout,Sqoop.

Total Periods: 45

TEXT BOOKS:

1. Bart Baesens, **"Analytics in a Big Data World: The Essential Guide to Data Science and its Applications,"** Wiley Publications ,2014.
2. Tom White, **"Hadoop:The Definitive Guide,"** Third Edition, O'REILLY Publications, 2012.

REFERENCE BOOKS:

1. Paul Zikopoulos, IBM, Chris Eaton, Paul Zikopoulos **"Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data,"** The McGraw-Hill Companies, 2012.
2. Chuck Lam **"Hadoop in action,"** Manning Publications, 2011.

IV B.Tech. II Semester

14BT71507: **SOFTWARE PROJECT MANAGEMENT**

(Professional Elective-IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Software Engineering".

COURSE DESCRIPTION: Conventional Software Management ;Evolution of Software Economics; Improving Software Economics; Lifecycle Phases; Artifacts of the Process; Workflow of the Process; Checkpoints of the Process; Software Economics; Iterative Process Planning; Project Organization and Responsibilities; Process Automation ; Project Control and Project Instrumentation; Case study(CCPDS-R).

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Gain knowledge on software effort estimation techniques, life cycle phases, project control and instrumentation.
2. Analyze the major and minor milestones, artifacts and metrics from management and technical perspective.
3. Design and develop software product using conventional and modern principles of software project management.
4. Adopt team effectiveness through Work Breakdown Structures by optimal cost and schedule estimates.

Detailed Syllabus:

UNIT - I: SOFTWARE MANAGEMENT RENAISSANCE (08 periods)

Conventional software management:

The waterfall model, conventional software Management performance.

Evolution of software economics: Software Economics, pragmatic software cost estimation.

Improving Software Economics:

Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT - II: LIFE CYCLE PHASES (09 periods)

Conventional and Modern Software Management:

Principles of Modern software engineering, principles of modern software management, transitioning to an iterative process.

Life Cycle Phases:

Engineering and Production Stages, Inception, Elaboration, construction, transition phases.

UNIT - III: ARTIFACTS OF THE PROCESS, WORKFLOWS OF THE PROCESS (09 periods)

Artifacts of the Process:

The Artifact Sets, Management Artifacts, Engineering Artifacts, Pragmatic Artifacts.

Model Based Software Architectures:

Architecture- Management Perspective, Technical Perspective.

Workflows of the Process:

Software Process Workflows, Iteration Workflows.

UNIT-IV: CHECKPOINTS OF THE PROCESS, PROJECT ORGANIZATIONS AND RESPONSIBILITIES, PROCESS AUTOMATION (09 periods)

Checkpoints of a process: Major Milestones, Minor Milestones, Periodic Status Assessments.

Iterative Process Planning: Work Breakdown Structures, Planning Guidelines, the Cost and Schedule Estimating Process, Pragmatic Planning

Project Organizations and Responsibilities: Line of Business Organizations, Project organizations, Evolution of Organizations

Process Automation: Tools- Automation Building blocks, The Project Environment.

UNIT - V: PROJECT CONTROL AND PROCESS INSTRUMENTATION, TAILORING THE PROCESS, CCPDS-R(CASE STUDY) (10 periods)

Project control and process Instrumentation: The Seven Core Metrics, Management Indicators, Quality Indicators, Lifecycle Expectations, Pragmatic Software Metrics Automation

Tailoring the Process: Process Discriminants, Next generation cost models, Modern Software Economics

CCPDS-R Case Study: Context for Case Study, Common Subsystem Overview, Process Overview, Demonstration-Based Assessment, Core Metrics **Total Periods: 45**

TEXT BOOK:

1. Walker Royce, **"Software Project Management,"** Pearson Education, 1998.

REFERENCE BOOKS:

1. Bob Hughes and Mike Cotterell, **"Software Project Management,"** Tata McGraw- Hill Edition, 2006.
2. Joel Henry, **"Software Project Management,"** Pearson Education, 2003.

IV B.Tech. II Semester

14BT81221: **COMPREHENSIVE VIVA-VOCE**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	100	100	-	-	-	2

PREREQUISITES: Nil.

COURSE DESCRIPTION: Assessment of student learning outcomes.

COURSE OUTCOMES:

After the successful completion of the Comprehensive Viva-voce, the student will be able to:

1. Demonstrate knowledge in the program domain.
2. Exhibit professional etiquette suitable for career progression.
3. Present views cogently and precisely.

IV B.Tech. II Semester

14BT81222: **PROJECT WORK**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
60	140	200	-	-	20	10

PREREQUISITES: Nil.

COURSE DESCRIPTION: Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES:

After the successful completion of the Project Work, the student will be able to:

1. Demonstrate in-depth knowledge on the project topic.
2. Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.
3. Design solutions to the chosen project problem.
4. Undertake investigation of project problem to provide valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for project work.
6. Understand professional and ethical responsibilities while executing the project work.
7. Function effectively as individual and a member in the project team.
8. Develop communication skills, both oral and written for preparing and presenting project report.
9. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.
10. Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND SYSTEMS ENGINEERING

I Year B.Tech. (Yearly Pattern)

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT1HS01	Technical English	2	-	-	4	30	70	100
14BT1BS01	Engineering Physics	2	1	-	4	30	70	100
14BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
14BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
14BT1BS04	Mathematical Methods	3	1	-	6	30	70	100
14BT1ES02	Problem Solving and Computer Programming	3	1	-	6	30	70	100
14BT1ES03	Computer-Aided Engineering Drawing	-	1	3	3	25	50	75
14BT1BS05	Engineering Physics and Engineering Chemistry Lab.	-	-	3	3	25	50	75
14BT1ES05	Problem Solving and Computer Programming Lab.	-	-	3	3	25	50	75
14BT1ES06	Engineering and IT Workshop	-	-	3	3	25	50	75
14BT1HS02	English Language Communication Skills Lab.	-	-	3	3	25	50	75
	TOTAL	**15**	**6**	**15**	**45**	**305**	**670**	**975**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND SYSTEMS ENGINEERING

II Year B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS03	Probability and Statistics	3	1	-	3	30	70	100
14BT30236	Foundations of Electrical Engineering	3	1	-	3	30	70	100
14BT30431	Electronic Devices and Circuits	3	1	-	3	30	70	100
14BT30501	Data Structures	3	1	-	3	30	70	100
14BT30502	Digital Logic Design	3	1	-	3	30	70	100
14BT31201	Discrete Mathematical Structures	3	1	-	3	30	70	100
14BT30422	Analog and Digital Electronics Lab	-	-	3	2	25	50	75
14BT30521	Data Structures Lab	-	-	3	2	25	50	75
	Total:	**18**	**6**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND SYSTEMS ENGINEERING

II Year B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3HS01	Environmental Sciences	3	1	-	3	30	70	100
14BT4HS01	Business Communication and Presentation Skills	3	1	-	3	30	70	100
14BT41501	Computer Graphics	3	1	-	3	30	70	100
14BT40501	Computer Organization	3	1	-	3	30	70	100
14BT40502	Database Management Systems	3	1	-	3	30	70	100
14BT50501	Theory of Computation	3	1	-	3	30	70	100
14BT41201	Object Oriented Programming	3	1	-	3	30	70	100
14BT40521	Database Management Systems Lab	-	-	3	2	25	50	75
14BT41221	Object Oriented Programming Lab	-	-	3	2	25	50	75
	Total:	**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND SYSTEMS ENGINEERING

III Year B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT4HS02	Professional Ethics	3	1	-	3	30	70	100
14BT5HS02	Management science	3	1	-	3	30	70	100
14BT51501	Operating Systems	3	1	-	3	30	70	100
14BT51502	Systems Software	3	1	-	3	30	70	100
14BT50431	Micro Processors and Interfacing	3	1	-	3	30	70	100
14BT40503	Design and Analysis of Algorithms	3	1	-	3	30	70	100
14BT51202	Software Engineering	3	1	-	3	30	70	100
14BT51521	Operating Systems and Systems Software Lab	-	-	3	2	25	50	75
14BT50424	Micro Processor and Interfacing Lab	-	-	3	2	25	50	75
	Total:	**27**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND SYSTEMS ENGINEERING

III Year B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS01	Managerial Economics and Principles of Accountancy	3	1	-	3	30	70	100
14BT60501	Object Oriented Analysis and Design	3	1	-	3	30	70	100
14BT70501	Compiler Design	3	1	-	3	30	70	100
14BT51201	Computer Networks	3	1	-	3	30	70	100
14BT61202	Web Programming	3	1	-	3	30	70	100
--	Open Elective	3	1	-	3	30	70	100
14BT61521	Computer Networks and Compiler Design Lab	-	-	3	2	25	50	75
14BT61522	OOAD and Web Programming Lab	-	-	3	2	25	50	75
	Total:	**18**	**6**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND SYSTEMS ENGINEERING

IV Year B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT71501	Embedded System Programming	3	1	-	3	30	70	100
14BT71502	Network Programming	3	1	-	3	30	70	100
14BT70331	Optimization Techniques	3	1	-	3	30	70	100
14BT61201	Data Warehousing and Data Mining	3	1	-	3	30	70	100
	Professional Elective - I	3	1	-	3	30	70	100
14BT71503	Kernel Programming							
14BT71504	Simulation and Modeling							
14BT70503	Advanced Computer Architecture							
14BT81202	Cryptography and Network security							
14BT71204	Software Testing Techniques							
	Professional Elective - II	3	1	-	3	30	70	100
14BT71505	Real-Time Systems							
14BT71506	Soft Computing							
14BT71507	Software Project Management							
14BT70502	Mobile Computing							
14BT81203	.Net Technologies							
14BT71521	Data Warehousing and Data Mining Lab	-	-	3	2	25	50	75
14BT71522	Network Programming Lab	-	-	3	2	25	50	75
14BT71523	Seminar	-	-	-	2	-	50	50
	Total:	**18**	**6**	**6**	**24**	**230**	**570**	**800**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2015-2016)
COMPUTER SCIENCE AND SYSTEMS ENGINEERING
IV Year B.Tech. II Semester (Yearly Pattern)

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT81501	High Performance Computing	3	1	-	3	30	70	100
14BT81201	Cloud Computing	3	1	-	3	30	70	100
	Professional Elective- III	3	1	-	3	30	70	100
14BT81502	Embedded Processors							
14BT81503	Human Computer Interaction							
14BT81504	Performance Evaluation of Computer Systems							
14BT71201	Mobile Application Development							
14BT71205	Machine Learning							
	Professional Elective- IV	3	1	-	3	30	70	100
14BT81505	Software Architecture							
14BT80502	Big Data							
14BT80533	Ad hoc Wireless Networks							
14BT71206	Service Oriented Architecture							
14BT81204	Information Retrieval Systems							
14BT81521	Comprehensive Viva-Voce	-	-	-	2	-	100	100
14BT81522	Project Work	-	-	20	10	60	140	200
	Total:	**12**	**4**	**20**	**24**	**180**	**520**	**700**
	Grand Total:				**187**	**1695**	**3980**	**5675**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

COMPUTER SCIENCE AND SYSTEMS ENGINEERING

IV B.Tech. I Semester
Open Electives

Offering Dept	Course Code	Course Title
BS&H	14BT6HS01	Banking and Insurance
BS&H	14BT6HS02	Cost Accounting and Financial Management
BS&H	14BT6HS03	Entrepreneurship for Micro, Small and Medium Enterprises
CE	14BT70105	Disaster Mitigation and Management
CE	14BT70106	Environmental Pollution and Control
CE	14BT70107	Contract Laws and Regulations
CE	14BT70108	Planning for Sustainable Development
CE	14BT70109	Rural Technology
ME	14BT60305	Artificial Intelligence and Robotics
ME	14BT60306	Global Strategy and Technology
ME	14BT60307	Intellectual Property Rights and Management
ME	14BT60308	Managing Innovation and Entrepreneurship
ME	14BT60309	Material Science
CSE	14BT60502	Engineering Systems Analysis and Design
EIE	14BT71005	Microelectromechanical Systems
IT	14BT61203	Bio-Informatics
IT	14BT61204	Cyber Security and Laws

B.Tech I Year

14BT1HS01: **TECHNICAL ENGLISH**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

DETAILED SYLLABUS:

UNIT – I: (10 periods)

My Early Days by **A. P. J. Abdul Kalam** from **All About English** by Cambridge University Press India Pvt Ltd. 2014.

Communication: Importance of Communication – Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-Verbal Communication.

UNIT – II: (10 periods)

A Speech by N. R. Narayana Murthy from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: (10 periods)

The Town by the Sea by Amitav Ghosh from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: (10 periods)

Sir. C. V. Raman: The Celebrated Genius from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Reading: Reading and Interpretation – Intensive and Extensive Reading–Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: (10 periods)

The Model Millionaire by **Oscar Wilde** from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Writing: Characteristics – Language – Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism - Referencing and Styling.

Total Periods: 50

TEXT BOOKS:

1. *All About English,* Cambridge University Press India Pvt. Ltd., First Edition, 2014.
2. Meenakshi Raman and Sangeetha Sharma, *Technical Communication,* Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, *Effective Technical Communication,* Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.
2. Martin Hewings, *Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,* Cambridge University press, First South Asian Edition, New Delhi, 1999.

B.Tech. I Year

14BT1BS01**: ENGINEERING PHYSICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

COURSE OUTCOMES :

After completion of the course a successful student will be able to

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context.

DETAILED SYLLABUS:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, Ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: (16 periods)

SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III : (17 periods)

PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative treatment), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: **(17 periods)**

DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V : **(17 periods)**

MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS

Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total Periods: 85

TEXTBOOKS:

1. S. Mani Naidu*, Engineering Physics*, Pearson Education, 2013.

2. P. K. Palaniswamy, *Engineering Physics,*Scitech Publications

REFERENCE BOOKS:

1. R. K. Gaur and S. L. Gupta*, Engineering Physics,* DhanpatRai Publications (P) Ltd., 8th Edition, 2001.

2. M. R. Srinivasan, *Engineering Physics,* New Age International (P) Limited, Publishers, 1st Edition,2010.

B.Tech. I Year

14BT1BS02 **: ENGINEERING CHEMISTRY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.

COURSE OUTCOMES:

After successful completion of the course the student is able to:

1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.
2. Develop analytical skills in:
   a. Determination of hardness of water.
   b. Determination of viscosity, flame and fire points, cloud and pour points.
   c. Determination of calorific value of fuels.
3. Develop skills in design of:
   a. Methods for control of corrosion
   b. Chemical methods for the synthesis of Nanomaterials.
4. Develop skills for providing solutions through:
   a. Mitigation of hardness of water.
   b. Control of corrosion
   c. Newer Nanomaterials for specific applications
5. Acquire awareness to societal issues on:
   a. Chemical materials utility and their impact.
   b. Quality of water.
   c. Phenomenon of corrosion.
6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:
   a. Green computing
   b. Green construction
   c. Green manufacturing systems

DETAILED SYLLABUS:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.

Conducting Polymers – Definition, types of conducting polymers and their engineering applications. **Composites** – Introduction, advantages of composites, constituents of composites, types of composites, applications of composites. **Sensors** - Introduction, types of sensors, electrochemical sensors, applications. **Insulators** – Definition, characteristic properties of insulators and classification of insulators.

UNIT–II: WATER TECHNOLOGY (15 periods)

Introduction, types of water, impurities in water and their consequences. Hardness of water, units of hardness, measurement of hardness by EDTA method, disadvantages of hardness. Softening methods – Ion exchange process, Zeolite process-Municipal water treatment. Boiler Troubles. Desalination of brackish water by Electro dialysis and Reverse osmosis. Numerical problems on measurement of hardness of water.

UNIT–III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst's equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, H_2 – O_2 fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT–IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY (17 periods)

Nano Chemistry: Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

Green Chemistry: Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems.

Total periods: 85

TEXT BOOKS:

1. P.C.Jain & Monika Jain*, Engineering Chemistry,* Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah *Engineering Chemistry,* Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2013.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, *Hand book of Nanostructured materials and Nanotechnology,* New Age international publishers, 2nd edition, 2010.
2. Paul T. Anastas, John C Warner, *Green Chemistry: Theory and practice,* Oxford University Press, 2000.

B.Tech. I Year

14BT1BS03 **: ENGINEERING MATHEMATICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas , surfaces and volumes of revolutions.
3. Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton's Law of cooling and heat transfer.
4. Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

DETAILED SYLLABUS:

UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS (20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton's Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for Q(x) = e^{ax}, *sin ax*, *cos ax*, x^n, e^{ax} *V(x)*, *x V(x)*. Method of variation of parameters . Applications to L-R-C circuits.

UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES (22 periods)

Functions of two or more variables – Homogeneous functions – total derivatives – derivatives of implicit function – Jacobian – maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers. Radius ,centre and circle of curvature, tracing of curves in cartesian, parametric and polar forms.

UNIT-III: APPLICATIONS OF INTEGRATION (18 periods)

Applications of integration to – length of curves, area of surfaces of revolution and volume of solids of revolution – Double integrals – change of variables and change of order of integration. Evaluation of Triple integrals -volume as double integral.

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS (20 periods)

Laplace transforms of standard functions – Properties of Laplace transforms–First and second shifting Theorems. Laplace transforms of derivatives and integrals–Laplace transforms of periodic functions – Unit step function – Dirac delta function – Inverse transforms–Convolution theorem. Applications of Laplace transforms to linear differential equations with constant coefficients.

UNIT-V : VECTOR CALCULUS (20 periods)

Vector differentiation – gradient, divergence, curl and vector identities. Laplacian Operator. **Vector integration**: Line integrals independent of path – work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals. Verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

Total periods: 100

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, *Engineering Mathematics,* Vol. 1, S. Chand & Company, 12thedition, 2013.

REFERENCE BOOKS:

1. Grewal, B.S., *Higher Engineering Mathematics*, Khanna Publishers, 42nd edition, 2012.
2. Kreyszig, E., *Advanced Engineering Mathematics*, John Wiley and Sons, 8th edition, 2006.

B.Tech. I Year

14BT1BS04 **: MATHEMATICAL METHODS**

(Common to CSE, CSSE, IT, ECE, EIE and EEE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: This course deals with obtaining the numerical solutions for algebraic and transcendental equations. Fundamentals of matrix theory including introduction to Eigen values, Cayley-Hamilton's theorem, numerical solutions to differential equations, transformation techniques for solving engineering problems and applications of partial differential equations are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire basic knowledge in
   (a) solving linear equations through matrix methods.
   (b) solving algebraic and transcendental equations by various mathematical methods.
   (c) fitting of various types of curves to the given data
   (d) finding the numerical values to derivatives and integrals through different mathematical methods.
   (e) solving differential equations numerically through various methods.
   (f) solving difference equations using z –transforms.
2. Develop analytical skills in
   (a) evaluating the properties of functions through Fourier series and Fourier transforms.
   (b) solving boundary value problems in engineering using Fourier transform
3. Design novel mathematical methods for
   (a) fitting geometrical curves to the given data.
   (b) for solving the differential equations.
   (c) the problems involving heat transformations.
   (d) constructing the interpolating polynomials to the given data and drawing inferences.

DETAILED SYLLABUS:

UNIT–I: MATRIX THEORY AND APPLICATIONS (20 periods)

Rank of a matrix, echelon form, normal form, inverse of a matrix by normal form. Homogenous and non-homogenous linear systems, consistency and solutions of linear system of equations. Solutions of equations by Gauss elimination method. Eigen values, Eigen vectors and properties. Cayley– Hamilton Theorem (without proof), inverse and powers of a matrix using Cayley– Hamilton Theorem, diagonalization of a matrix, quadratic forms, nature of quadratic form and reduction of quadratic form to its normal form.

UNIT-II: NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION (19 periods)

Solutions of Algebraic and Transcendental equations by bisection method, Regula – Falsi method, Newton – Raphson method. Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves. Interpolation, forward difference operator, backward difference operator, central difference operator. Relationship between different operators. Interpolation using Newton's forward formula, Newton's backward formula, Lagrange's interpolation formula.

UNIT-III:

NUMERICAL DIFFERENTIATION AND INTEGRATION, SOLUTIONS OF O D E (20 periods)

Numerical differentiation using Newton's forward formula, Newton's backward formula. Numerical integration using trapezoidal rule, Simpsons 1/3 rule, Simpsons 3/8 rule. Numerical solutions of first order ordinary differential equations using Taylor series, Euler's method modified Euler's method, Runge – Kutta method (4^{th} order only).

UNIT-IV : TRANSFORMATION TECHNIQUES (25 periods)

Fourier series , Dirichlets conditions, determination of Fourier coefficients (Euler's formulae), even and odd functions. Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, inverse transforms. Z – transforms, inverse Z– transform, properties, damping rule, shifting rule, initial and final value theorems. Convolution theorem, solution of difference equations by Z– transforms.

UNIT – V: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS (16 periods)

Formation of partial differential equations . Method of separation of variables for second order partial differential equations – solutions of one dimensional wave equation – heat equation -Laplace equation.

Total periods: 100

TEXTBOOK:

1. T.K.V. Iyenger, B. Krishna Gandhi, S. Ranganadham and M.V.S.S.N. Prasad, *Mathematical Methods,* S.Chand and Company, 8^{th} edition, 2013.

REFERENCE BOOKS:

1. B.S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 42^{nd} edition, 2012.
2. S.S.Sastry, *Introductory Methods of Numerical Analysis*, Prentice Hall of India, 4^{th} edition, 2005.

B.Tech. I Year

14BT1ES02**: PROBLEM SOLVING AND COMPUTER PROGRAMMING**

(Common to CSE, CSSE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100 **L T P C**

3 1 — 6

PREREQUISITE: A course on "Aptitude and Logical Thinking"

COURSE DESCRIPTION: This course deals with the concepts of problem solving, algorithms and program design, elements of 'C' programming language, data types, selection, multi-way selection, repetition, arrays, strings, functions, derived data types, structures, pointers, files and basic data structures of stacks, and queues.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1. Gain knowledge in
- Problem solving Methods and Fundamental Algorithms.
- Elements of C Language
- Selection and Repetition statements.
- Arrays, Strings and Functional statements.
- Derived data types, Files and Pointers.
- Basic data Structures-Stacks and Queues.

CO2. Analyze the problems and develop appropriate algorithms.
CO3. Implement various searching and sorting techniques
CO4. Apply basic data structures such as arrays, stacks and queues in application programs.
CO5. Engage in lifelong learning to develop programming competence.

DETAILED SYLLABUS

UNIT – I: **(20 periods)**

Introduction to Problem Solving: Algorithm and flowchart, the problem solving aspect, top- down design, implementation of algorithms, program verification and efficiency of algorithms.

Introduction to the C Language: C programs, identifiers, types, variables, types of operators, constants, coding constants, type casting and conversion, formatted input and output. Structure of a C program - expressions, precedence and associativity, evaluation of expressions, mixed type expressions.

UNIT – II: **(22 periods)**

Selection - Making Decisions - Two way selection: if, if-else and nested if-else.

Multi-way selection: else-if ladder and switch statements.

Repetition: concept of loop, pre-test and post-test loops, initialization and updating, event and counter controlled loops, loops in C, break, continue and goto statements.

Fundamental Algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, generation of the Fibonacci sequence, reversing the digits of an integer, number base conversion, character to number conversion, the smallest divisor of an integer, greatest common divisor of two integers and generating prime numbers.

UNIT -III: **(20 periods)**

Arrays: Arrays in C, one, two and multidimensional arrays, linear search, binary search, bubble sort, selection sort and insertion sort.

Strings: Concepts, strings in C, string input/output functions, array of strings and string manipulation functions.

Functions: Designing structured programs, functions in C, user- defined functions, types of functions, Recursion and factorial using recursion, standard library functions, scope, storage classes and pre-processor directives

UNIT – IV: **(20 periods)**

Derived Types: Type definition (typedef), enumerated types, structure, accessing structures.

Complex Structures: Nested structures, structures containing arrays, array of structures.

Structures and Functions: Sending individual members, sending the whole structure, unions and bit fields.

Pointers: Concepts, pointer variables, accessing variables through pointers, pointer declaration and definition, initialization, pointer arithmetic, array of pointers, pointers to arrays, pointers and functions, call-by-value and call-by-reference, pointers to pointers, pointers to structures and memory allocation functions.

UNIT – V: **(18 periods)**

Files: Introduction and classification of files, opening and closing of files, read and write operations, conversion of files and command line arguments.

Basic Data Structures: Overview of data structures, implementation of stack operations (push, pop), implementation of linear and Circular queue operations (insertion, deletion) using arrays.

(Total periods: 100)

TEXT BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "A Structured Programming Approach using C," Third Edition, Cengage Learning, NewDelhi, 2007.
2. R.G. Dromey, "How to Solve it by Computer," First Edition, Pearson Education, NewDelhi, 1982.

REFERENCE BOOKS:

1. Pradip Dey and Manas Ghosh, "Programming in C," Second Edition, Oxford University Press, NewDelhi, 2007.
2. Jeri R Hanly and Elliot B. Koffman, "Problem Solving and Program design in C," Seventh Edition, Pearson Education, NewDelhi, 2014.

B.Tech. I Year

14BT1ES03**: COMPUTER AIDED ENGINEERING DRAWING**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	1	3	3

PREREQUISITE: Nil

COURSE DESCRIPTION: This course deals with the concepts of computer-aided sketching, and orthographic and isometric projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES: After completion of the course, a successful student is able to :

1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general audience.

DETAILED SYLLABUS:

UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING (20 periods)

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, Different types of lines, Material conventions and free hand practicing, Definitions of Principle planes and other planes. Computer screen, layout of the software, Creation of 2D/3D environment, Selection of drawing size and scale, Standard tool bar/menus, Coordinate system, and description of most commonly used toolbars, Navigational tools, Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS (20 periods)

Introduction, Definitions- Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), Projection of lines inclined to one plane, inclined to both the planes, finding true lengths and true inclinations (No application problems).

UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES (20 periods)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS (20 periods)

Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS (20 periods)

Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.

Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts.

Total periods: 100

TEXT BOOKS:

1. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, *Engineering Graphics with Auto CAD*, PHI Learning Private Limited, Revised Edition, August 2010.
2. N D Bhat & V M Panchal, *Engineering Drawing,* Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, *AutoCAD 2013 For Engineers And Designers,* Dreamtech Press, 2013
2. T Jeyapoovan, *Engineering Drawing and Graphics Using Autocad,* Vikas Publishing House, 3rd Edition, 2010.
3. Jolhe, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2007.
4. Basant Aggarwal, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

B.Tech. I Year

14BT1BS05: **ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wave length of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:

After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.

Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of P^H of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments :

Engineering Physics:

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
4. Characteristics of LED source.
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee's method
9. Melde's experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
12. Characteristics of laser source.
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum

Engineering Chemistry:

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Conductometric titration of strong acid Vs strong base
6. Determination of P^H of a given solution by P^H metry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
10. Synthesis of Nano metal-oxide using sol– gel process.
11. Determination of the capacity of the given cation-exchange Resin.
12. Measurement of viscosity by Redwood viscometer.

Duration: 3 Periods for each experiment

TEXT BOOKS:

1. *Physics Laboratory Manual*
2. K. Mukkanti, *Practical Engineering Chemistry*, BS Publications, 2013.
3. K.N. Jayaveera, K.B. Chandra Sekhar, *Chemistry laboratory manual,* S.M. Enterprises Limited, 2013.

B.Tech. I Year

14BT1ES05**: PROBLEM SOLVING & COMPUTER PROGRAMMING LAB**

(Common to CSE,CSSE and IT)

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	**-**	**3**	**3**

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with hands on experience in developing simple programs and implementing basic data structures – stack and queue, searching and sorting in C language.

COURSE OUTCOMES:

On successful completion of this course, a successful student will be able to:

CO1. Select the appropriate data structure and algorithm design method for a specified problem.

CO2. Design, code, test, debug, and execute programs in C.

CO3. Implement and use common features found in C programs arrays, pointers, strings, stacks and Queues.

Week 1:

a. Let a and b are two integer variables whose values are 10 and 13 respectively. Write a program to evaluate the following arithmetic expressions.

i) a + b ii) a – b iii) a * b iv) a / b v) a % b

b. Write a program evaluate the following algebraic expressions after reading necessary values from keyword.

i) (ax + b)/(ax – b) ii) 2.5 log x + Cos 32^0+ | $x^2 + y^2$| + v2xy

iii) $x^5 + 10\ x^4 + 8, x^3 + 4\ x + 2$ iv) ae^{kt}

Week 2:

a. Mr. Gupta deposited Rs.1000 in a bank. The bank gives simple interest at the rate of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I = P T R / 100)

b. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 00. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

c. In a town, the percentage of men is 52. The percentage of total literacy is 48.If total percentage of literate men is 35 of the total population; write a program to find the total number of illiterate men and women if the population of the town is 8000.

Week 3:

a. Write a program that prints the given 3 integers in ascending order using if - else.

b. Write a program to calculate commission for the input value of sales amount.

Commission is calculated as per the following rules:

i) Commission is **NIL** for sales amount Rs. 5000.

ii) Commission is 2% for sales when sales amount is >Rs. 5000 and <= Rs. 10000.

iii) Commission is 5% for sales amount >Rs. 10000.

c. A character is entered through keyboard. Write a program to determine whether the Character entered is a capital letter, a small case letter, a digit or a special symbol.

The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127

Week 4:

a. If cost price and selling price of an item is input through the keyboard, write program to determine whether the seller has made profit or incurred loss. Also determine how much profit or loss he incurred in percentage.

b. An insurance company calculates premium as follows:

i) If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lacks.

ii) If a person satisfies all the above conditions and is female then the premium is Rs.3 per thousand and the policy amount cannot exceed Rs.1 lack.

iii) If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then premium is Rs.6 per thousand and the policy cannot exceed Rs. 10000.

iv) In all other cases the person is not insured.

Write a program to determine whether the person should be insured or not, his/her premium rate and maximum amount for which he/she can be insured.

Week 5:

a. Write a program, which takes two integer operands and one operator as input from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %. Use switch statement)

b. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following rules:

i) If the student gets first class and the number of subjects failed is >3, then no grace marks are awarded. If the number of subjects failed is less than or equal to '3' then the grace is 5 marks per subject.

ii) If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in less than or equal to '3' then the grace is 4 marks per subject.

iii) If the student gets third class and the number of subjects failed in is >1, then no grace marks are awarded. If the number of subjects failed in is equal to '1' then the grace is 5 marks per subject.

Week 6:

a. Write a program to find the sum of individual digits of a positive integer.

b. A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

c. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to calculate the following: Sum=$1-x^2/2!+ x^4/4!-x\ 6!+x^8/8!-x^{10}/10!$

i) A perfect number is a number that is the sum of all its divisors except itself. Six is the perfect number. The only numbers that divide 6 evenly are 1,2,3 and 6
(i.e., 1+2+3=6).

ii) An abundant number is one that is less than the sum of its divisors
(Eg: 12 <1+2+3+4+6).

iii) A deficient number is one that is greater than the sum of its divisors (Ex: 9 > 1+3).

Write a program to classify N integers (Read N from keyboard) each as perfect, abundant or deficient.

Week 8:

a. Write a program to find the largest and smallest number in a given list of integers.

b. Write a program to perform the following:

i) Addition of two matrices. ii) Multiplication of two matrices.

Week 9:'

Write a program to perform the following:

i) Linear search ii) Binary search

Week 10:

Write a program to perform the following:

i) Bubble sort ii) Selection sort

iii) Insertion sort

Week 11:

a. Write a program to convert a given octal number into binary form.
b. Write a program to convert a given decimal number into binary form.
c. Write a program to convert a given decimal number into octal form.

Week 12:

a. Write a program that uses functions to perform the following operations:
   i) To insert a sub-string in main string at a specified position.
   ii) To delete N characters from a given string from a specified position.

b. Write a program to determine whether the given string is palindrome or not.

Week 13:

Any number **x** is called colored number if it does not contain any substring **y** with the property that the product **z** of all the digits of **y** is not equal to any of the substrings of **x** (for example, take x=263, then its substrings are 2,6,3,26,63,263 only. Now, take any substring y= 26 then z=2*6=12 or y=63 then z=6*3=18. Neither **z** is the substring of 263). Write a C program to check whether the given any three digit number is colored number or not.

Week 14:

a. Write a program to display the position or index in the main string S where the sub string T begins. Display –1 if S does not contain T.

b. Write a program to count the number of lines, words and characters in a given text.

Week 15:

a. Write a program to read list of student names and perform the following operations using functions.
   i) to print list of names
   ii) to sort them in ascending order
   iii) to print the list after sorting.

b. Write a menu driven program to read list of student names and perform the following operations using array of character pointers.
   i) to insert a student name
   ii) to delete a name
   iii) to print the name

Week 16:

a. Two's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of 1. Eg: 2's complement of 11100 is 00100. Write a program to find the 2's complement of a given binary number using functions.

b. Write a program to convert a roman number (Eg: I,II,III…) in to its decimal equivalent using functions

Week 17:

Write programs to perform the following using recursion
   i) To find the factorial of a given integer.
   ii)To solve Towers of Hanoi problem.

Week 18:

Write a program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers

(**Note**: Represent complex number using a structure.)

Week 19:

a. Write a program to implement the following
   i) Call by value
   ii) Call by reference.
b. Write a program to swap the given two numbers without using additional variable. (using pointers)

Week 20:

a. Write a program which copies one 'text file' to another 'text file'.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

Week 21:

Write a program to implement stack operations using arrays.

Week 22:

Write a program to implement linear queue operations using arrays.

Mini Project 1: Students are allowed to select a lab exercise, which includes arrays, functions, pointer concepts and submit the report in Two weeks.

Mini Project 2: Students are allowed to select a lab exercise, which includes Structures, Files ,Stacks and Queues concepts and submit the report in Two weeks.

i) If the student gets first class and the number of subjects failed is >3, then no grace marks are awarded. If the number of subjects failed is less than or equal to '3' then the grace is 5 marks per subject.

ii) If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in less than or equal to '3' then the grace is 4 marks per subject.

iii) If the student gets third class and the number of subjects failed in is >1, then no grace marks are awarded. If the number of subjects failed in is equal to '1' then the grace is 5 marks per subject.

Week 6:

a. Write a program to find the sum of individual digits of a positive integer.

b. A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.

c. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to calculate the following: Sum=$1-x^2/2!+ x^4/4!-x\ 6!+x^8/8!-x^{10}/10!$

i) A perfect number is a number that is the sum of all its divisors except itself. Six is the perfect number. The only numbers that divide 6 evenly are 1,2,3 and 6
(i.e., 1+2+3=6).

ii) An abundant number is one that is less than the sum of its divisors
(Eg: 12 <1+2+3+4+6).

iii) A deficient number is one that is greater than the sum of its divisors (Ex: 9 > 1+3).
Write a program to classify N integers (Read N from keyboard) each as perfect, abundant or deficient.

Week 8:

a. Write a program to find the largest and smallest number in a given list of integers.

b. Write a program to perform the following:

i) Addition of two matrices.

ii) Multiplication of two matrices.

Week 9:'

Write a program to perform the following:

i) Linear search ii) Binary search

Week 10:

Write a program to perform the following:

i) Bubble sort ii) Selection sort

iii) Insertion sort

Week 11:

a. Write a program to convert a given octal number into binary form.

b. Write a program to convert a given decimal number into binary form.

c. Write a program to convert a given decimal number into octal form.

Week 12:

a. Write a program that uses functions to perform the following operations:

i) To insert a sub-string in main string at a specified position.

ii) To delete N characters from a given string from a specified position.

b. Write a program to determine whether the given string is palindrome or not.

Week 13:

Any number **x** is called colored number if it does not contain any substring **y** with the property that the product **z** of all the digits of **y** is not equal to any of the substrings of **x** (for example, take x=263, then its substrings are 2,6,3,26,63,263 only. Now, take any substring y= 26 then z=2*6=12 or y=63 then z=6*3=18. Neither **z** is the substring of 263). Write a C program to check whether the given any three digit number is colored number or not.

Week 14:

a. Write a program to display the position or index in the main string S where the sub string T begins. Display –1 if S does not contain T.

b. Write a program to count the number of lines, words and characters in a given text.

Week 15:

a. Write a program to read list of student names and perform the following operations using functions.

i) to print list of names

ii) to sort them in ascending order

iii) to print the list after sorting.

b. Write a menu driven program to read list of student names and perform the following operations using array of character pointers.

i) to insert a student name

ii) to delete a name

iii) to print the name

Week 16:

a. Two's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of 1. Eg: 2's complement of 11100 is 00100. Write a program to find the 2's complement of a given binary number using functions.

b. Write a program to convert a roman number (Eg: I,II,III…) in to its decimal equivalent using functions

Week 17:

Write programs to perform the following using recursion

i) To find the factorial of a given integer.

ii)To solve Towers of Hanoi problem.

Week 18:

Write a program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(**Note**: Represent complex number using a structure.)

Week 19:

a. Write a program to implement the following

i) Call by value

ii) Call by reference.

b. Write a program to swap the given two numbers without using additional variable. (using pointers)

Week 20:

a. Write a program which copies one 'text file' to another 'text file'.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

Week 21:

Write a program to implement stack operations using arrays.

Week 22:

Write a program to implement linear queue operations using arrays.

Mini Project 1: Students are allowed to select a lab exercise, which includes arrays, functions, pointer concepts and submit the report in Two weeks.

Mini Project 2: Students are allowed to select a lab exercise, which includes Structures, Files ,Stacks and Queues concepts and submit the report in Two weeks.

REFERENCE BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "A Structured Programming Approach using C," Third Edition, Cengage Learning, New Delhi, 2007.
2. PradipDey and Manas Ghosh, "Programming in C," Second Edition, Oxford University Press, New Delhi, 2007.

B.Tech. I Year

14BT1ES06**: ENGINEERING & IT WORKSHOP**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

After completion of the course, a successful student is able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a) Carpentry Shop : Cross lap joint, mortise and tenon, T-joint, dove tail joint.

b) Fitting Shop : Square fit and V-fit, semi circular fit, dove tail fit.

c) Sheet Metal Shop : Trapezoidal tray, square tin, funnel, cylinder.

d) House wiring : Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.

(e) Foundry : Preparation of casting using single piece pattern,
Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) Welding
b) Metal Cutting
c) Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

TWORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

I

b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources.

Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.

Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.

Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.

Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, *Engineering Work shop practice,* VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, *Work shop Manua***l**, SciTech Publishers, 2009.
3. K. Venkata Reddy, *Workshop Practice Manual, B*S Publications, 2008

IT WORKSHOP:

1. Vikas Gupta, *Comdex Information Technology Course Tool Kit,* 2nd edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, *Introduction to Information Technology*, 2nd edition, Pearson Education, New Delhi, 2005.
3. *IT Workshop Laboratory Manual,* Department of IT, SVEC, 2014.

B.Tech. I Year

14BT1HS02: **ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which are classified into software based learning, grammar and activities. English Speech Sounds and Phonemic Transcription, Word Stress and Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features, Vocabulary Building, are aided by software. Grammar sessions include Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays, Telephonic Etiquette, Listening Skills, Describing People, Places and Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to

1. Gain practical knowledge in
   - English Speech Sounds
   - Stress Patterns in word and sentence
   - Intonation Patterns
   - Paralinguistic Features
   - Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts.
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.
6. Demonstrate various language functions by participating in
   - Just A Minute
   - Impromptu Speech
   - Elocution
   - Role Plays
   - Presentations
7. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes c. Idioms and Phrases–Homophones–Homonyms–Homographs.
6. Functional Grammar
   a. Parts of Speech b. Tenses
   c. Change of Speech d. Change of Voice
   e. Word Order and Error Correction f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India.

II B.Tech I Semester
14BT3BS03: PROBABILITY AND STATISTICS

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITE: Course on "Engineering Mathematics".

COURSE OUTCOMES :

On successful completion of this course the students will be able to:

CO1. Acquire basic knowledge in
(a) Probability distributions, correlation and regressions,
(b) Statistical quality control and testing of hypotheses.
(c) Finding regression coefficients ,elucidating relationships in bivariate data
(d) Tests of significance for small and large samples

CO2. (i) Develop analytical skills for the problems involving
(a) Means, probability distributions and standard deviations
(b) Sampling techniques for decision making in uncertain environments
(ii) Develop skills for analyzing the data with
(a) Suitable tests of significance for practical situations.
(b) Through probability distributions for practical situations

CO3. Develop skills in applying
(a) Statistical techniques employed for quality control and maintenance of uniform quality in the manufacturing processes.

DETAILED SYLLABUS :

UNIT - I: PROBABILITY & MATHEMATICAL EXPECTATIONS (9 periods)

Probability- Conditional probability. Bayes theorem. **Random Variables:** Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density function, Mathematical expectation, Properties of Mathematical expectations, Mean and Variance.

UNIT - II: PROBABILITY DISTRIBUTIONS (9 periods)

Discrete Distributions: Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and Standard Deviations of Poisson Distribution.

Continuous Distributions: Normal Distribution, Mean, Variance and area properties.

UNIT-III: STATISTICAL QUALITY CONTROL AND CORRELATION- REGRESSION (9 periods)

Introduction, Advantages and limitations of statistical quality control, Control charts, specification limits, $\bar{X}$, R, p, np and c charts. Definition of correlation, correlation coefficient, Rank correlation. Simple linear regression, regression lines and properties.

UNIT-IV: SAMPLING DISTRIBUTIONS AND TESTS OF SIGNIFICANCE FOR LARGE SAMPLES (9 periods)

Population and Sample, Parameter and Statistic, Sampling Distribution of Statistic, Standard Error of Statistic, Null and Alternative Hypothesis, Type I and II errors, Level of Significance, Critical region, Degrees of freedom. Test of Significance for Single Proportion, Difference of Proportions, Single Mean, Difference of Means.

UNIT-V: TESTS OF SIGNIFICANCE FOR SMALL SAMPLES (9 periods)

Student's t-test: single mean, difference of means, F-test for equality of population variance, Chi-Square Test for Goodness of fit, contingency table, Chi-Square Test for Independence of Attributes.

Total No. of Periods : 45

TEXT BOOKS:

1. T.K.V. Iyengar, B. Krishna Gandhi ..etal., **Probability and Statistics**, S. Chand & Company, 3/e.(2011).
2. S.P.Gupta, **Statistical Methods**, Sultan and Chand, New Delhi, 34th edition (2005).

REFERENCE BOOKS:

1. Shahnaz Bathul, **A text book of Probability and Statistics**, Ridge Publications, 2 ed,
2. S.C.Gupta and V.K.Kapoor , **Fundamentals of Applied Statistics**, Sultan and Chand, New Delhi.(1998).

II B. Tech. I Semester
14BT30236: Foundations of Electrical Engineering

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: Engineering Physics

COURSE DESCRIPTION:
Basics of electrical circuits; operation, characteristics and applications of DC machines, AC machines; basics of control systems.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on
- Basics of electrical circuits,
- Constructionand working principle of various electrical machines,
- Concepts of control systems and transfer function.

CO2. Analyze the behavior of electrical circuits.

CO3. Evaluate
- Various circuit parameters,
- Performance characteristics of various machines,
- Transfer function of different physical systems.

DETAILED SYLLABUS:

UNIT- I: BASICS OF ELECTRICAL ENGINEERING (07 periods)

Sources of electricity,basic definitions of commonly used terms and circuit components, electric field, electric current, potential and potential difference,EMF, electric power, Ohm's law, resistive networks, inductive networks, capacitive networks, Kirchhoff's laws, series-parallel circuits, mesh analysis, nodal analysis, star-delta and delta-star transformations –problems.

UNIT-II: AC CIRCUITS (08 periods)

Principle of AC voltages, wave forms and basic definitions, RMS and average values of alternating currents and voltage, form factor and Peak factor, phasor representation of alternating quantities,*j*-operator and phasor algebra, analysis of AC circuits with single basic network element, single phase series and parallel circuits, fundamentals of three phase supply.

UNIT-III: DC MACHINES (09 periods)

Constructional details of a DC machine, DC generator - principle of operation, types, EMF equation, applications. DC motors - Principle of operation, types, torque equation, losses and efficiency, applications – simple problems.

UNIT-IV: AC MACHINES (11 periods)

Transformers - principle of operation, constructional details, losses and efficiency, regulation.working of three phase induction motors, slip ring and squirrel cage motors.working of alternator, AC servo motor, synchros, stepper motor.

UNIT- V: CONTROL SYSTEMS (10 periods)

Introduction, classification of control systems, open loop and closed loop systems, linear and non-linear systems, time variant and time invariant systems, effect of feedback, transfer functions, modeling of physical systems, derivation of transfer functions for mechanical and electrical systems, block diagram reduction technique, signal flow graphs, Mason's gain formula.

Total No. of Periods: 45

TEXT BOOKS:

1. V.K.Mehta, Rohit Mehta, Principles of Electrical Engineering, S. Chand and Company Ltd., New Delhi, 2006.
2. A. NagoorKani, Control Systems, 2nd edition, RBA Publications,Chennai, 2007.

REFERENCE BOOKS:

1. M.S. Naidu, S. Kamakshaiah, Basic Electrical Engineering, Tata McGraw Hill Publishing CompanyLtd, New Delhi, 2009.
2. T.K. Nagasarkar and M.S. Sukhija, Basic Electrical Engineering, Oxford University Press, New Delhi, 2005.

II B.Tech. I Semester

14BT30431**: ELECTRONIC DEVICES AND CIRCUITS**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITES: A course on Engineering Physics.

COURSE DESCRIPTION:

Characteristics of general and special purpose electronic devices; Rectifiers and regulators; Biasing and small signal analysis of BJT and FET, Feedback Amplifiers, Oscillator.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge in

- P-N junction diode, Zener diode and their characteristics
- Rectifiers, Filters and Regulators
- Characteristics of BJT, FET, MOSFET and special purpose electronic devices
- Amplifiers and Oscillators

CO2. Analyze numerical and analytical problems in

- Regulated Power Supply
- Transistor biasing circuits
- Transistor amplifiers
- Feedback amplifiers and
- Oscillators

CO3. Design the electronic circuits like

- Transistor biasing circuits
- Transistor amplifiers
- Feedback amplifiers and
- Oscillators

CO4. Solve engineering problems and arrive at solutions pertain ing to Electronic circuits.

DETAILED SYLLABUS:

UNIT-I: DIODE, RECTIFIERS AND REGULATORS PN JUNCTION DIODE (11 Periods)

PN Junction Diode Equation, Volt-Ampere (V-I) Characteristics, Temperature Dependence of V-I Characteristics, Ideal Versus Practical, Static and Dynamic Resistances, Diode Equivalent circuits, Junction capacitances, Break down mechanisms in semiconductor Diodes, Zener Diode Characteristics.

RECTIFIERS AND REGULATORS

Halfwave rectifier and Fullwave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter, π - section filter, comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT-II: BIPOLAR JUNCTION TRANSISTOR (13 Periods)

CHARACTERISTICS:

Transistor construction, BJT Operation, Transistor as an amplifier, Transistor currents and their relations, Input and Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications.

BIASING:

Transistor biasing, Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Emitter Feedback Bias, Voltage Divider Bias.

AMPLIFIER:

BJT Hybrid Modeling, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Analysis of CE, CB and CC configurations using simplified Hybrid Model. Comparison of CB, CE and CC configurations.

UNIT-III: FIELD EFFECT TRANSISTOR (9 Periods)

Construction, Principle of Operation and Characteristics of JFET and MOSFET (Enhancement & Depletion), Biasing of FET, Small Signal Model of JFET & MOSFET. Common Source and Common Drain Amplifiers using FET, Generalized FET Amplifier, FET as Voltage Variable Resistor, Comparison between BJT and FET.

UNIT-IV: FEEDBACK AMPLIFIERS AND OSCILLATORS (6 Periods)

Concepts, Types of Feedback Circuits (block diagram representation), General characteristics of negative feedback amplifier, Effect of Feedback on Amplifier characteristics. Barkhausen criterion, Hartley & Colpitts oscillators, Phase Shift Oscillators and Crystal Oscillator.

UNIT-V: SPECIAL PURPOSE ELECTRONIC DEVICES (6 Periods)

Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR). Principle of operation of Schottky Barrier Diode.

Total No. of Periods: 45

TEXT BOOK:

1. J. Millman, Christos C. Halkias and Satyabrata Jit, Electronic Devices and Circuits, TMH, 3rd Edition, 2010.

REFERENCE BOOKS:

1. R.L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits, PHI, 10th Edition, 2009.
2. S. Salivahana, N. Suresh Kumar, Electronic Devices and Circuits, Mc-Graw Hill, 3rd Edition, 2008.
3. David A. Bell, Electronic Devices and Circuits, Oxford University press, 5th Edition, 2008.

II B.Tech. I Semester

14BT30501**: DATA STRUCTURES**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Concepts of Data Structures- Linked Lists, Stacks, Queues, Trees Graphs, Sorting, and Hashing.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain Knowledge in

- Principles of Data Structures
- Abstract Data Type
- Linear and Non-linear Data Structures

CO2. Analyze and Identify suitable data structure design techniques for problem solving.

CO3. Develop programs to implement linear and non liner data structures.

DETAILED SYLLABUS:

UNIT-I: LINKED LISTS (9 Periods)

LINKED LISTS: Introduction To Data Structures, Pointers, Basic Operations, Implementation, Application, Circular Linked Lists, Doubly Linked List.

UNIT-II: STACKS AND QUEUES (8 Periods)

STACKS: Basic Stack Operations, Stack Linked List, Implementation, and Stack Applications.

QUEUES: Queue Operations, Queue Linked List Design, Queue Applications

UNIT-III: TREES, SEARCH TREES, AND HEAPS (10 Periods)

TREES: Basic Tree Concepts, Binary Trees.

BINARY SEARCH TREES (BST): Basic Concepts, BST Operations, BST Applications.

AVL SEARCH TREES: Basic Concepts, AVL Tree Implementations.

HEAPS: Basic Concepts, Heap Implementation, Heap Application.

UNIT-IV: MULTIWAY TREES AND GRAPHS (9 Periods)

MULTIWAY TREES: B-Trees, Simplified B-Trees, B-Tree Variations.

GRAPHS: Basic Concepts, Operations, Graph Storage Structures, Graph Algorithms: Create Graph, Insert Vertex, Delete Vertex, Retrieve Vertex, Depth-first Traversal, Breadth-first Traversal**.**

UNIT-V: SORTING AND HASHING (9 Periods)

SORTING: Sorting by Exchange-Shell Sort, Quick sort. Sorting By Distribution-Counting Sort, Bucket Sort, Radix Sort. Sorting By Merging-Merge Sort

HASHING: Introduction, Hash Table Structure, Hash Functions, Linear Open Addressing, Chaining, Applications.

Total No.of Periods: 45

TEXT BOOKS:

1. Richard Gileberg, Behrouz A. Forouzan, "Data Structures: A Pseudo code Approach with C", Second Edition, 2007.
2. Debasis Samanta, "Classic Data Structures", PHI Learning, Second Edition, 2009.

REFERENCE BOOKS:

1. G.A.V. Pai, "Data Structures and Algorithms", Tata McGraw Hill, Second Edition, 2009.
2. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J.Augenstein, "Data Structures Using C", Pearson Education, 2005.

II B.Tech. I Semester

14BT30502: DIGITAL LOGIC DESIGN

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITE: NIL

COURSE DESCRIPTION:
Introduction to number systems; logic gates; simplification of Boolean functions; Design of combinational circuits; Design of sequential circuits, Memory and Programmable Logic;

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

CO1. Gain knowledge on Boolean algebra, Minimization of Boolean functions using Map method.
CO2. Design combinational and sequential logic circuits for digital systems.
CO3. Apply Simplification techniques for simplifying Boolean functions.

DETAILED SYLLABUS:

UNIT I: BINARY SYSTEMS AND BOOLEAN ALGEBRA (9 Periods)
Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, Signed binary numbers, complements.
Boolean Algebra, Boolean functions, Canonical and standard forms, Digital logic gates.

UNIT II: GATE LEVEL MINIMIZATION (9 Periods)
The k-map method - Four-variable map, Five-Variable map, product of sums simplification, Don't-care conditions, NAND and NOR implementation, other Two-level implementations, Exclusive – OR function

UNIT III: COMBINATIONAL LOGIC (9 Periods)
Combinational Circuits, Analysis procedure, Design procedure, Binary Adder-Subtractor, BCD Adder, Binary multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-Multiplexers

UNIT IV: SEQUENTIAL LOGIC (9 Periods)
Latches, Flip-Flops, Analysis of clocked sequential circuits, Design of synchronous sequential circuits, registers, shift registers, Ripple counters, Synchronous counters, Ring Counter and Johnson Counter.

UNIT-V: MEMORY AND PROGRAMMABLE LOGIC (8 Periods)
Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-only memory, Programmable logic Array, programmable Array logic, Sequential Programmable Devices.

Total No. of Periods: 44

TEXT BOOK:
1. M. Morris Mano, "*Digital Design*", Third Edition, Pearson Education/PHI, 1999.

REFERENCE BOOKS:
1. David J Comer, "Digital Logic and State Machine Design", Third Edition, Oxford University Press, 2012

2. Charles H.Roth Jr, "Fundamentals of Logic Design", Fifth edition, Cengage Learning, 2008.

II B.Tech. I Semester

14BT31201: DISCRETE MATHEMATICAL STRUCTURES

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITES: A course on "Engineering Mathematics".

COURSE DESCRIPTION: Mathematical Logic; Predicates; Relations; Algebra Structures; Mathematical Reasoning; Recurrence Relations; Graphs; Graph Theory and its applications.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on mathematical logic, algebraic structures, relations, recurrence relations and mathematical reasoning.

CO2. Analyze and prove given statement by contradiction and automatic theorem.

CO3. Design network applications using Prim's and Kruskal's algorithms.

CO4. Apply the concepts of graph theory, permutation, combinations, counting principle and graph theory in solving real-time problems.

DETAILED SYLLABUS:

UNIT–I: MATHEMATICAL LOGIC AND PREDICATES (11 Periods)

MATHEMATICAL LOGIC: Statements and notations, Connectives, Well formed formulae, Truth Tables, Tautology, Equivalence of formulae, Normal forms.

PREDICATES: Predicate Calculus, Free and Bound variables, Rules of inference, Consistency, Proof of contradiction and Automatic Theorem Proving.

UNIT-II: FUNCTIONS AND RELATIONS (9 Periods)

RELATIONS: Properties of binary relations, Equivalence relations, Compatibility relations, Partial ordering relations, Hasse diagram and related applications.

FUNCTIONS: Inverse Functions, Composition of functions, Recursive functions, Lattice and its Properties.

UNIT-III: ALGEBRAIC STRUCTURES (6 Periods)

Algebraic System: Examples and General Properties SemiGroups and Monoids, Groups, Subgroups, Homomorphism and Isomorphism.

UNIT-IV: MATHEMATICAL REASONING AND RECURRENCE RELATIONS (10 Periods)

MATHEMATICAL REASONING: Methods of Proof, Mathematical Induction, Basics of counting, The Inclusion- Exclusion Principle, The Pigeon hole principle, Permutations and Combinations, Generalized Permutations and Combinations.

RECURRENCE RELATIONS: Generating Functions of Sequences, Calculating coefficients of Generating function, Recurrence relation, solving recurrence relations by substitution and Generating functions, Methods of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relation.

UNIT-V: GRAPH THEORY AND ITS APPLICATION (9 Periods)

Graphs: Introduction to Graphs, Types of Graphs, Graph basic terminology and Special types of simple graphs, Representation of Graphs and graph Isomorphism, Euler Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs, Euler's Formula and Graph Coloring.

Trees: Introduction to Trees, Properties of Trees, Applications of Trees, Spanning Trees, Counting trees, Depth-First Search, Breadth-First Search, Minimum Spanning Trees, Kruskal's Algorithm and Prim's Algorithm.

Total No. of Periods: 45

TEXT BOOKS:

1. J.P. Trembly and R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, 2001.
2. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw Hill, 6th edition, 2007.

REFERENCE BOOKS:

1. Joe L.Mott and Abraham Kandel, "Discrete Mathematics for Computer Scientists and Mathematicians", Prentice Hall of India Private Limited, 2nd edition, 2004.
2. Ralph P. Grimaldi and B.V.Ramana, "Discrete and Combinatorial Mathematics- an Applied Introduction", Pearson Education, 5th edition, 2006

II B.Tech. I Semester

14BT30422: ANALOG AND DIGITAL ELECTRONICS LAB

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on Electronic Devices & Circuits and Digital Logic Design.

COURSE DESCRIPTION: Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; BJT and FET characteristics; UJT and SCR characteristics; BJT amplifiers; Realization of FFs, Combinational Circuits, sequential Circuits; Demonstration on VHDL Programme.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Analyze the characteristics of different electronic devices and circuits like

- Diodes-PN Junction Diodes, Zener Diodes, SCR
- Transistors-BJT,FET,UJT
- Flip Flops-JK FF,D FF
- Combinational Circuits-HA,FA
- Sequential Circuits –Counters

CO2. Design and analyze the electronic circuits like BJT Amplifiers, Oscillators, Combinational Circuits and Sequential Circuits.

CO3. Solve engineering problems by proposing potential solutions leading to Design of better electronic circuits.

LIST OF EXPERIMENTS:

PART A

ELECTRONIC WORKSHOP PRACTICE (Only for Viva-Voce)

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, Low-power JFETs, MOSFETs, LEDs, LCDs, SCR, UJT, Linear and Digital ICs.

PART B

ANALOG DEVICES AND CIRCUITS (Minimum seven experiments to be conducted)

1. PN Junction and Zener diodes characteristics
2. Ripple Factor and Load Regulations of Rectifier with and without filters (Full wave or Half wave)
3. Input and Output characteristics of Transistor in CE configuration
4. Drain and Transfer Characteristics of JFET
5. Gain and Frequency response of CE Amplifier
6. Gain and Frequency response of Feedback Amplifier (Voltage series or current series)
7. Frequency of oscillations of Hartley and Colpitts Oscillator
8. UJT relaxation oscillator
9. SCR characteristics

PART C

DIGITAL CIRCUITS

Realization of

1. Flip Flops using Logic Gates
2. Two Problems on Combinational Circuits
3. Asynchronous Counter
4. Synchronous Counter

Demonstration of

5. VHDL Programme

II B.Tech. I Semester

14BT30521**: DATA STRUCTURES LAB**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A Course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hands on programming on concepts of data structures – Linked lists, Stacks, Queues, Trees, Search trees, Sorting, and Hashing.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain practical knowledge on C Programming and Linear and Non-Linear Data Structures.

CO2. Analyze and Identify suitable data structure techniques to solve problems.

CO3. Develop programs to implement linear and non liner data structures.

LIST OF EXPERIMENTS:

1. Write program to implement the following data structures:
   (a) Single linked list.
   (b) Double linked list.
   (c) Circular linked list.
2. Write a program to implement stack and queue using linked list.
3. Write a program to evaluate a given postfix expression using stack.
4. Write a program to convert a given infix expression to postfix form using stacks.
5. Write a program to implement
   (a) stack using two queues.
   (b) queue using two stacks.
6. Write a program to implement In-order, pre-order, post-order tree traversal of binary trees.
7. Write a program to perform operations on a binary search tree(BST) .
8. Write programs for implementation of graph traversals by applying:
   (a) Breadth First Search. (b) Depth First Search.
9. Implement the following sorting algorithms:
   (a) Merge sort.
   (b) Heap sort.
   (c) Quick Sort.
   (d)Radix Sort.
10. Write a program to implement hashing with
    (a) Separate Chaining
    (b) Open addressing methods.

REFERENCE BOOKS:

1. Richard Gileberg, Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", Second Edition, 2007.

2. Debasis Samanta, "Classic Data Structures", Phi Learning, Second Edition, 2009.

II B.Tech. II Semester

14BT3HS01: ENVIRONMENTAL SCIENCES

(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Physics and Engineering Chemistry

COURSE DESCRIPTION:

Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1. Acquire knowledge in
   a) diverse components of environment and natural resources
   b) ecosystem and biodiversity & its conservation methods
   c) population growth and human health
   d) green technology

CO2. Identify and resolve the issues related to sources of different types of pollutions.

CO3. Provide solutions to individuals, industries and government for sustainable development of natural resources.

CO4. Create awareness on environmental degradation and to bring best management practices to protect environment.

CO5. Develop skills in analyzing reports on environment for sustainable development.

CO6. Apply environmental ethics in protection of diversified ecosystems.

DETAILED SYLLABUS:

UNIT-I:

MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES (11 periods)

Multidisciplinary nature of environment: Definition, scope and importance of multidisciplinary nature of environment, segments of environment-lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness.

Natural Resources: Renewable and Non-renewable resources and associated problems- (a) forest resources: use and over exploitation, deforestation-causes, effects and remedies, case studies, (b) water resources-use and over utilization of surface & ground water, conflicts over water-benefits and problems of large dams, case studies, (c) mineral resources- mining, adverse effects, case studies, (d) food resources-world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging and salinity, case studies,
(e) energy resources-growing needs, renewable energy resources–solar, wind, hydropower, hydrogen fuel and non-renewable energy resources-coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT-II: ECOSYSTEMS AND BIODIVERSITY (10 periods)

Ecosystems: Definition and concept of an ecosystem, structure and function of an ecosystem-producers, consumers and decomposers, food chains, food webs and ecological pyramids-introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem-ponds, lakes & oceans, energy flow in the ecosystem, ecological succession.

Biodiversity: Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity–habitat loss, poaching of wildlife, man-wild life conflicts, endemic, endangered and extinct species of India, conservation of biodiversity–in-situ and ex-situ.

UNIT-III: ENVIRONMETAL POLLUTION AND CONTROL (8 periods)

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management–causes, effects and control measures of urban and industrial wastes, hazards and disaster management–floods, earthquakes, tsunamis, case studies.

UNIT-IV: SOCIAL ISSUES AND THE ENVIRONMENT (8 periods)

From unsustainable to sustainable development, urban problems related to energy, environmental ethics-issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

UNIT-V: HUMAN POPULATION AND THE ENVIRONMENT (8 periods)

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies. **Field work:** visit to a local area to document environmental assets-pond/ forest/ grassland/ hill/ mountain/ Environment Impact Assessment procedures for local environmental issues or assignment/seminar.

Total No. of periods: 45

TEXT BOOKS:

1. A.Kaushik and C.P. Kaushik, "Environmental Studies", New Age International (P) Ltd Publications, 4th Edition, 2014.
2. Erach Barucha, "Environmental Studies", Orient Blackswan, 2nd Edition, 2013.

REFERENCE BOOKS:

1. R. Rajagopalan, "Environmental Studies", Oxford University Press, 2nd Edition, 2011.
2. Benny Joseph, "Environmental Studies", Tata McGraw-Hill, 2nd Edition, 2009.
3. Dr. B S Chauhan, "Environmental Studies", University Science Press, 1st Edition, 2008.
4. M. Anji Reddy, "Textbook of Environmental Sciences and Technology", BS Publications, 2007.
5. Larry W Canter, "Environmental Impact Assessment", McGraw-Hill Education, 2nd edition, 1996.

II B. Tech. II Semester

14BT4HS01: BUSINESS COMMUNICATION AND PRESENTATION SKILLS

(Common CSE, CSSE, IT, CE and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITES : Basic grammar and fundamentals of Listening, Speaking, Reading and Writing skills.

COURSE DESCRIPTION:

Nature and Scope of Communication; Non-Verbal Communication; Writing Business Documents; Business Presentations and Public Speaking; Careers and Résumé.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Acquire knowledge in
- a) Managerial Communication
- b) Corporate Communication
- c) Business Writing
- d) Presentation Skills
- e) Career Building

CO2. Analyze and judge the situation through non-verbal communication for effective organizational communication.

CO3. Achieve personal excellence and ability to work in groups.

CO4. Develop effective communication to meet professional needs.

DETAILED SYLLABUS:

UNIT – I : NATURE AND SCOPE OF COMMUNICATION (9 periods)

Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks – Informal Communication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication.

UNIT – II : NON-VERBAL COMMUNICATION (9 periods)

Introduction - Significance of Non-verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non-verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross-cultural Communication Strategies - Corporate Communication: Introduction - Crisis Management/Communication - Case Study.

UNIT – III : WRITING BUSINESS DOCUMENTS (10 periods)

Business Writing: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters - Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT – IV : BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 periods)

Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non-functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT – V : CAREERS AND RESUME (7 periods)

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - Résumé Writing: Résumé Formats; Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non-verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

Total No. of Periods: 45

TEXT BOOK:

1. Meenakshi Raman and Prakash Singh, Business Communication, Oxford University Press, New Delhi, Second Edition, 2012.

REFERENCE BOOKS:

1. M K Sehgal and Vandana Khetarpal, Business Communication, Excel Books, New Delhi, 2011.
2. M Ashraf Rizvi, Effective Technical Communication, Tata McGraw–Hill, 2009.

II B.Tech. II Semester

14BT41501**: COMPUTER GRAPHICS**

(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Engineering Mathematics", "Problem solving and computer programming".

COURSE DESCRIPTION: Introduction to Computer Graphics; Output Primitives; 2-D Geometric Transformations and Viewing; 3-D Geometric Transformations and Viewing; 3-D object representation; Visible Surface Detection Methods.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge on graphical interactive devices, viewing transformations, 3-D object representations and surface detection methods.

CO2. Design algorithms to generate points, lines, polygons for 2-D, 3-D objects.

CO3. Apply Transformations and Clipping algorithms for 2-D and 3-D objects.

DETAILED SYLLABUS:

UNIT –I: INTRODUCTION AND OUTPUT PRIMITIVES (10 Periods)

Application areas of Computer Graphics, Overview of graphics systems, Video-display devices, Raster-scan systems, Random scan systems, Graphics monitors and work stations and input devices.

Output Primitives: Points and lines, Line drawing algorithms, Mid-point circle and ellipse algorithms.

Filled area primitives: Scan line polygon fill algorithm, Boundary-fill and flood-fill algorithms.

UNIT –II: 2-D GEOMETRICAL TRANSFORMATIONS AND 2-D VIEWING (10 Periods)

Translation, scaling, rotation, reflection and shear transformations, homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, Viewing coordinate reference frame, Window to view-port coordinate transformation, Viewing functions, Cohen-Sutherland line clipping algorithms, Sutherland -Hodgeman polygon clipping algorithm.

UNIT –III: 3-D OBJECT REPRESENTATION (8 Periods)

Polygon surfaces, Quadric surfaces, Spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces.

UNIT –IV: 3-D GEOMETRIC TRANSFORMATIONS (8 Periods)

Translation, Rotation, Scaling, Reflection and shear transformations, Composite transformations.

3-D Viewing: Viewing pipeline, Viewing coordinates, Projections and clipping.

UNIT –V: VISIBLE SURFACE DETECTION METHODS (9 Periods)

Classification, Back-face detection, Depth-buffer, Scan-line, Depth sorting, BSP-tree methods, Area sub-division and octree methods, Shading: Gouraud Shading, Phong shading.

Total No. of periods: 45

TEXT BOOK:

1. Donald Hearn and M.Pauline Baker, "Computer Graphics C version", Pearson Education, 2006.

REFERENCE BOOKS:

1. Steven Harrington, "*Computer Graphics*", TMH, 1982.
2. Neuman and Sproul, "*Principles of Interactive Computer Graphics*", TMH, 2005.

II B.Tech. II Semester

14BT40501**: COMPUTER ORGANIZATION**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITE: *A course on* "Digital Logic Design"

COURSE DESCRIPTION: Basic structure of a digital computer, Organization of the arithmetic, and logical unit, control unit, memory and I/O unit.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1: Gain knowledge on:

- Computer Arithmetic and Register Transfer Language.
- Micro-programmed Control Unit
- Input Output Organization and Memory system
- Pipelining, Multiprocessors and interconnection structures.

CO2: Analyze the functioning of Central Processing Unit

CO3: Design the Micro-programmed Control Unit, memory and I/O

DETAILED SYLLABUS:

UNIT-I: COMPUTER ARITHMETIC, REGISTER TRANSFER LANGUAGE & MICROOPERATIONS (9 Periods)

Computer Arithmetic : Data Representation, Fixed Point Representation, Floating Point Representation, Addition and subtraction, Binary multiplication Algorithms, Binary Division Algorithms, Floating point Arithmetic operations.

Register Transfer Language And Micro-Operations: Register Transfer, Bus and memory transfers, Arithmetic Micro-operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

UNIT-II: BASIC COMPUTER ORGANIZATION and DESIGN, MICRO PROGRAMMED CONTROL (8 Periods)

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

Micro Programmed Control: Control memory, Address sequencing, Design of control unit, Hard wired control, Micro-programmed control.

UNIT-III: INPUT-OUTPUT ORGANIZATION (9 Periods)

Input-Output Organization : Peripheral Devices, Input-Output Interface, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Serial communication, Introduction to Peripheral Component Interconnect (PCI) bus.

UNIT-IV: THE MEMORY SYSTEM (9 Periods)

The Memory System: Semiconductor RAM memories, Read-only memories, Cache memory, Performance considerations, Virtual memory, Secondary storage.

UNIT-V: PIPELINE & VECTOR PROCESSING AND MULTI PROCESSORS (9 Periods)

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-Processor Communication and Synchronization.

Total No. of periods: 44

TEXT BOOKS:

1. Morris Mano, "Computer System Architecture", Third Edition, Pearson Education, New Delhi.
2. Carl V Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organization", Fifth Edition, McGraw-Hill, New Delhi.

REFERENCE BOOKS:

1. W. Stallings, "Computer Organization and Architecture Designing For Performance", Eighth Edition, PHI, 2012.
2. John P.Hayes, "Computer architecture and Organisation", Third Edition, Tata McGraw-Hill, New Delhi

II B. Tech. II Semester

14BT40502: DATABASE MANAGEMENT SYSTEMS

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: A course on "Data Structures"

COURSE DESCRIPTION:

Introduction to Database Systems; Database Design; Relational Model; SQL Queries, Constraints and Triggers; Schema Refinement and Normal Forms; Transaction Management; Concurrency Control; Overview of Storage and Indexing.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge on
- Fundamentals of DBMS
- Database design
- Normal forms
- Storage and Indexing

CO2. Apply Structured Query Language (SQL) in retrieval and management of data in real time applications.

CO3. Develop skills in designing, managing databases and its security.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTIONTO DATABASE SYSTEMS&DATABASE DESIGN (9 Periods)

Introduction to Database Systems: Database System Applications, Purpose of Database Systems, View of Data-Data Abstraction, Instances and Schemas, Data Models, Database Languages-DDL,DML, Database Architecture, Database Users and Administrators.

Introduction to Database design: ER diagrams, Beyond ER design, Entities, Attributes and Entity Sets, Relationships and Relationship sets, Additional features of ER model, Conceptual Design with ER model

UNIT II : THE RELATIONAL MODEL&RELATIONAL ALGEBRA AND CALCULUS (8 Periods)

Relational Model: Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical database Design, Introduction to Views-Destroying/altering Tables and Views.

Relational Algebra and Calculus: Preliminaries, Relational Algebra Operators, Relational Calculus- Tuple and Domain Relational Calculus, Expressive Power of Algebra and calculus

UNIT III : SQL& SCHEMA REFINEMENT (10 Periods)

SQL: Form of Basic SQL Query- Examples of Basic SQL Queries, Introduction to Nested Queries, correlated Nested Queries, Set-Comparison Operators, Aggregate Operators, NULL values-Comparison using Null values- Logical connectives- AND, OR and NOT- Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL ,Triggers and Active Databases.

Schema Refinement: Problems Caused by redundancy Decompositions – Problem related to decomposition, Functional Dependencies- Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms- BCNF, Multi valued Dependencies- FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT IV: TRANSACTIONS AND CONCURRENCY CONTROL (9 Periods)

Transactions: Transaction Concept- Transaction State- Implementation of Atomicity and Durability-Concurrent Executions- Serializability-Recoverability – Implementation of Isolation – Testing for serializability.

Concurrency Control: Lock Based Protocols – Timestamp Based Protocols- Validation Based Protocols – Multiple Granularity, Deadlock Handling.

UNIT V: STORAGE AND INDEXING (9 Periods)

Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete

Total No. of Periods: 45

TEXT BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke,"Database Management Systems", Tata McGraw Hill, 3rd Edition, 2007.
2. A.Silberschatz, H.F.Korth, S.Sudarshan,"Database System Concepts", Tata McGraw hill , 5th edition, 2005.

REFERENCE BOOKS:

1. RamezElmasri, ShamkantB.Navathe," Database Systems", 6th edition, Pearson Education, 2013
2. Peter Rob and Carlos Coronel,"Database Systems Design, Implementation and Management", Cengage Learing, 7ed, 2009.

II B.Tech. II Semester
14BT50501: THEORY OF COMPUTATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Discrete Mathematical Structures".

COURSE DESCRIPTION: Fundamentals of computation – Finite State Automaton, Push Down automaton, Turing Machine, and decidability of problems.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain Knowledge on

* Finite State Automaton
* Regular Expression
* Push Down Automaton and Turing Machine.

CO2. Develop formal proofs for models of Computation.

CO3. Apply the concepts of automata in modeling abstract devices**.**

DETAILED SYLLABUS:

UNIT-I: FINITE AUTOMATA (9 Periods)

Finite Automata: Introduction to Finite Automata, Structural Representations, Automata and Complexity, The Central Concepts of Automata Theory, An Informal Picture of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata with epsilon-Transitions.

UNIT-II: REGULAR EXPRESSIONS (9 Periods)

Regular Expressions: Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expression, Proving Languages not to be Regular, Closure Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT-III: CONTEXT-FREE GRAMMARS AND PUSH DOWN AUTOMATA (10 Periods)

Context-Free Grammars: Context-Free Grammars, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages, Normal Forms for Context-Free Grammars, The Pumping Lemma for Context-Free Languages.

Push Down Automata: Definition of the Pushdown Automaton, The Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.

UNIT-IV: TURING MACHINES AND LINEAR BOUNDED AUTOMATA (8 Periods)

Turing Machines: Types of Computational Problems, The Turing Machine, Programming Techniques for Turing Machine, Extensions to the Basic Turing Machine, Restricted Turing Machines, Turing Machines and Computers, The Model of Linear Bounded Automaton.

UNIT-V: UNDECIDABILITY (9 Periods)

Undecidability: Language that is not Recursively Enumerable, An Undecidable Problem, Undecidable Problems About Turing Machines, Post's Correspondence Problem.

Total No. of Periods: 45

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D Ullman, "Introduction to Automata Theory, Languages and Computation", Third Edition, Pearson, 2011.

REFERENCES:

1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science:Automata Languages and Computation", Third Edition, Phi Learning, 2009.
2. John C Martin, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2009.

II B.Tech. II Semester
14BT41201: OBJECT ORIENTED PROGRAMMING
(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Problem Solving and Computer Programming".
COURSE DESCRIPTION: Object Oriented Concepts; Basics of Java; Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling, Applets, AWT, Database Connectivity and Servlets.
COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Demonstrate Knowledge on:
- Object Oriented Programming concepts - classes, objects, inheritance, polymorphism, encapsulation and abstraction.
- Packages, interfaces, multithreading, exception handling, event handling.

CO2. Apply AWT and Applets to design and develop interactive Graphical User Interfaces.
CO3. Gain problem solving skills to provide effective solutions for real world problems**.**
DETAILED SYLLABUS:
UNIT-I: OBJECT ORIENTED THINKING: Need for OOP paradigm, OOP concepts (9 Periods)
History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting.
classes and objects: concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.
UNIT-II: INHERITANCE, PACKAGES AND INTERFACES (9 Periods)
Understanding Inheritance: Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, using super, Creating multi-level hierarchy, method overriding, abstract classes, using final with inheritance.
Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.
Interfaces: Defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.
UNIT-III: EXCEPTION HANDLING AND MULTITHREADING (9 Periods)
Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
Java thread model, thread life cycle, creating threads, thread priority, synchronizing threads, inter thread communication.
UNIT-IV: APPLETS, EVENT HANDLING AND AWT (9 Periods)
Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class.
Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes.
The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scrollpane, dialogs, menubar, graphics, layout manager - boarder, grid, flow, card and grid bag.
UNIT-V: JDBC and SERVLETS (9 Periods)
Database Connectivity: Loading the driver, Establishing connection, Create statement, Execute query, Iterate result set, Scrollable Results, and Transactions.
Servlets: The Life Cycle of a Servlet, Using Tomcat for Servlet Development, Create and Compile the Servlet Source Code, Start Tomcat, Start a Web Browser and Request the Servlet, The Servlet API, The Javax.Servlet Package, The javax.Servlet.http Package.

Total No. of Classes: 45

TEXT BOOKS:

1. Herbert Schildt, "Java the complete reference," TMH, 7th edition, 2007.
2. Timothy Budd, "Understanding Object-oriented Programming with Java", Addison-Wesley, updated edition, 2002.

REFERENCE BOOK:

1. Sachin Malhotra, Saurab Choudhary, "Programming in java," Oxford university press, 2nd edition, 2014.

II B. Tech. II Semester

14BT40521**: DATABASE MANAGEMENT SYSTEMS LAB**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A Course on "Database Management Systems"

COURSE DESCRIPTION: Hands on experience on developing ER Design, DDL,DML commands, DCL and TCL Commands, Query processing using Aggregate operators, Sub-queries, Joins, Date Manipulation functions, PL/SQL concepts: Triggers, Functions, Cursors, Stored Procedures and basic Programs.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Design and implement a database schema for the sales database.

CO2. Apply normalization on sales database.

CO3. Analyze and evaluate the databases using SQL DML/DDL commands.

CO4. Develop solutions to database problems using programming PL/SQL including stored procedures, stored functions, cursors and triggers.

LIST OF EXPERIMENTS:

DESCRIPTION OF SALES DATABASE:

ABC is a company operating in the country with a chain of shopping centers in various cities. Everyday large numbers of items are sold in different shopping centers. The Sales database comprises of various tables like CUST, PROD, SALES_DETAIL, STATE_NAME with the following schemas.

CUST TABLE

Name	Type	Remark
CID	VARCHAR2(6)	PRIMARY KEY
CNAME	VARCHAR2(10)	
CCITY	VARCHAR2(8)	

PROD TABLE

Name	Type	Remark
PID	VARCHAR2(6)	PRIMARY KEY
PNAME	VARCHAR2(6)	
PCOST	NUMBER(4,2)	
PROFIT	NUMBER(3)	

SALES DETAIL

Name	Type	Remark
CID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
PID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
SALE	NUMBER(3)	
SALEDT	DATE	COMPOSITE PRIMARY KEY

STATE NAME

Name	Type	Remark
CCITY	VARCHAR2(8)	PRIMARY KEY
STATE	VARCHAR2(15)	

1. Data Retrieval

a) Write a query to display all columns of CUST table.
b) Write a query to display pname of all records. Sort all records by pname. (use order by clause)
c) Write a query to display cname and ccity of all records. Sort by ccity in descending order.
d) Write a query to display cname, ccity who lives in mysore.
e) Write a query to display cname, pname, sale, saledt for all customers.
f) Write a query to display cname who have purchased Pen.
g) Write a query to display saledt and total sale on the date labeled as sale of all items sold after 01-sep-2010.
h) Write a query to display saledt and total sale on the date labeled as sale of all items other than DVD.
i) Write a query to display cname and ccity of all customers who live in Kolkata or Chennai.

2. Use of Distinct, between, in clause, like operator, Dual

a) Write a query to display the pname and pcost of all the customers where pcost lies between 5 and 25.
b) Find the product ids in sale_detail table (eliminating duplicates).
c) Write a query to display distinct customer id where product id is p3 or sale date is '18-mar-2011'.
d) Write a query to display cname, pid and saledt of those customers whose cid is in c1 or c2 or c4 or c5.
e) Write a query to display cname, pid, saledt of those customers whose pid is p3 or sale date is '20-dec-2009'.
f) Write a query to display system date.
g) Write a query to display all records of prod table in which first and third character of pname is any character and second character is 'E'.
h) Write a query to display all cname which includes two 'A' in the name.

3. Constraints

a) Implement table level and Column level constraints like NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK.

4. Single Row Functions: DATE Function

a) Write a query to display the system date by rounding it to next month.
b) Write a query to display the system date by rounding it to next year.
c) Write a query to display the last date of the system date.
d) Write a query to display the next date of system date which is Friday.
e) Write a query to display sale date and date after 02 months from sale date.
f) Write a query to display system date, sale date and months between two dates.
g) Write a query to display the greatest date between sale date and system date, name it as BIG, also display sale date and SYSDATE.
h) Write a query to display the least date between sale date and system date name it as SMALL, also display sale date and SYSDATE.

5. Single Row Functions: Numeric and Character Function

a) Write a query to display the product name along with the rounded value of product cost for product name is "Pencil".
b) Write a query to display product cost along with MOD value if divided by 5.
c) Write a query to display cname in uppercase, lowercase, titlecase from cust table where customer name is "rohan".
d) Write a query to display all concatenated value of cname, ccity by converting cname into titlecase and ccity into uppercase.
e) Write a query to display the first 3 characters of cname.
f) Write a query to display the position of 'M' in the cname of the customer whose name is "SAMHITA".
g) Write a query to display the length of all customer names.
h) PAD # character in left of product cost to a total width of 5 character position.

6. Group Functions and SET Functions

a) Write a query to display the total count of customer.
b) Write a query to display the minimum cost of product.
c) Write a query to display average value of product cost rounded to 2nd decimal places.
d) Write a query to display product name with total sale detail in descending order.
e) Write a query to display product name, sale date and total amount collected for the product.
f) Write a query to display sale date and total sale date wise which was sold after "14-jul-08".
g) Write a query to display the customer name who belongs to those places whose name is having I or P.
h) Write a query to display customer name who belongs to a city whose name contains characters 'C' and whose name contains character 'A'.
   i) Write a query to display the customer name who does not belong to PUNE.

7. PL/SQL basic programs

a) Write a PL/SQL program to find largest number among three. (Hint: Use Conditional Statement)
b) Write a PL/SQL program to display the sum of numbers from 1 to N using for loop, loop…end and while…loop.

8. SQL Cursor based programs

a) Write a PL/SQL program to display the costliest and cheapest product in PROD table.
b) Write a PL/SQL program which will accept PID and display PID and its total sale value i.e. sum.

9. Functions

a) Write a function that accepts two numbers A and B and performs the following operations.
   i. Addition
   ii. Subtraction
   iii. Multiplication
   iv. Division
b) Write a function that accepts to find the maximum PCOST in PROD table.

10. Procedures

a) Write a procedure that accepts two numbers A and B, add them and print.
b) Write procedures to demonstrate IN, IN OUT and OUT parameter.

11. Triggers

a) Develop a PL/SQL program using BEFORE and AFTER triggers.
b) Create a **row level** trigger for the PROD table that would fire for INSERT or UPDATE or DELETE operations performed on the PROD table. This trigger will display the profit difference between the old values and new values.

12.Implicit and Explicit Cursors

Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

REFERENCE BOOKS:

1. Satish Ansari, "Oracle Database 11g: Hands-on SQL and PL/SQL" PHI Publishers, 2010.
2. Pranab Kumar Das Gupta, "Database Management System Oracle SQL and PL/SQL", PHI Learning Private Limited, 2009.

II B.Tech. II Semester

14BT41221**: OBJECT ORIENTED ROGRAMMING LAB**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Hands-on Programming using concepts of classes, objects, inheritance, Polymorphism, String API, Exception Handling mechanisms, Threads, Applets, AWT, Swings and Database Connectivity using JDBC and Servlets.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Design and develop real time applications using applets.

CO2. Demonstrate problem solving skills using classes, objects, inheritance, runtime polymorphism, AWT and Servlets to develop web/interactive applications**.**

LIST OF EXPERIMENTS:

1:

a) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant b^2 -4ac is negative, display a message stating that there are no real solutions.

b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.

2:

a) Write a Java program to find the average and sum of 1^{st} N numbers using command line arguments

b) Write a Java program to multiply two given matrices.

c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use String Tokenizer class of java.util)

3:

a) Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides ( ). Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes containsonly the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.

b) Write a java program to design a class using the inheritance and static that show all function of bank (withdrawl, deposit) and generate account number dynamically.

c) Write a java program to design(Implement runtime polymorphism) using abstract methods and classes

4:

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java program to make frequency count of words in a given text.

5:

a) Write a java program that import the Userdefine package and access the member variable of classes that contained by the package

b) Write a java program to handle ArithmeticException, ArrayIndexOutOf Bounds Exception using try and multiple catch statements

c) Write a java program to throw a user defined exception called Negative, if the entered input is a negative number and to handle the exception.

6:

a) Develop an applet that displays a simple message.
b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named - Compute is clicked.

7:

a) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.
b) Write a Java program for handling mouse events.

8:

a) Write a Java program that creates three threads. First thread displays - Good Morning for every one second, the second thread displays - Hello for every two seconds and the third thread displays - Welcome for every three seconds.
b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

9:

a) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.
b) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on ata time No light is on when the program starts.
c) Write a Java program that allows the user to draw lines, rectangles and ovals.

10:

a) Write an applet that computes the payment of a loan, by taking the amount of the loan, the interest rate and the number of month's values in the text fields. it takes one parameter from the browser: monthly rate as a checkbox ,if it is true, the interest is calculated per month otherwise the interest is calculated per annual.
b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

11: Create a table which should contain at least the following fields: name, password, email-id, phone number. Write a java program to connect to the database (Ex: MS-Access) and extract data from the tables and display them

12: Assume four users user1, user2, user3 and user4 having passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following.

1) Create a Cookie and add these four user ids and passwords to this Cookie, read user id and password entered in the login form.
2) If he is valid user (i.e., user-name and password match) welcome him with his name, else display "You are not an authorized user".

REFERENCE BOOK:

1. Sachin Malhotra, Saurab Choudhary, "Programming in java," Oxford university press, 2nd edition, 2013.

III B. Tech. I Semester

14BT4HS02**: PROFESSIONAL ETHICS**

(Common to CSE, CSSE, IT, CE and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

COURSE DESCRPTION: Engineering Ethics, Moral autonomy and Moral dilemmas – Professional and Ideal Virtues, Professional Responsibility and Moral Leadership – Engineering as Social Experimentation, Conscientiousness and Law of Engineering - Responsibilities and Rights, Whistle Blowing – Global Issues, Managerial Ethics.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Apply the principles of ethics to solve engineering problems.
CO2. Analyze the problems in the implementation of moral autonomy and resolve through consensus.
CO3. Responsible to follow the codes of ethics.
CO4. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas.
CO5. Function as a member, consultant, Manager, Advisor and Leader in multi–disciplinary teams.
CO6. Write reports without bias and give instructions to follow ethics.

DETAILED SYLLABUS:

UNIT I: ENGINEERING ETHICS (8 Periods)

Scope and Aim of Engineering Ethics–Senses of Engineering Ethics–Variety of Moral Issues–Types of Inquiry– Moral Dilemmas– Moral Autonomy– Kohlberg's Theory, Gilligan's theory, Consensus and Controversy.

UNIT II: PROFESSIONAL IDEALS AND VIRTUES (10 Periods)

Theories about Virtues, Professions, Professionalism – characteristics, expectations, Professional Responsibility, Integrity, Self–respect, Sense of "Responsibility". Self–interest, Customs and Religion– Self–interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories– resolving moral dilemmas and moral leadership.

UNIT III: ENGINEERING AS SOCIAL EXPERIMENTATION (9 Periods)

Engineering as experimentation– Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters–Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT IV: RESPONSIBILITIES AND RIGHTS (9 Periods)

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers– Professional rights, whistle–blowing, the bart case, employee rights and discrimination.

UNIT V: GLOBAL ISSUES (9 Periods)

Multinational corporations–Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers – Managerial ethics applied to Engineering Profession, moral leadership.

Total No. of Periods: 45

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, *Ethics in Engineering*, 3rd Edition, Tata McGraw–Hill, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, *Engineering Ethics*, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, *Fundamental of Ethics for Scientists and Engineers*, 1st Edition, Oxford University Press, 2001.
3. Charles F. Fledderman, *Engineering Ethics*, Pearson Education, 2004.
4. R. Subramanaian, *Professional Ethics*, Oxford Higher Education, 2013.

III B.Tech – I Semester
14BT5HS02: MANAGEMENT SCIENCE
(Common to CSE, CSSE, IT and CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: -

COURSE DESCRIPTION:

Concepts of Management, Evolution of thought of Management, Functions of Management, Environmental Scanning, SWOT analysis, Social Responsibility of Management, Operations Management, Forecasting Methods, Work study, Method Study, Work measurement, Statistical Quality Control, Inventory Management, Marketing, Marketing functions, Human Resource Management, Job evaluation, merit rating, Theories of motivation, Project Management, CPM, PERT, Project cost analysis, Project crashing, Entrepreneurship, Entrepreneur vs Manager, Contemporary Management practices, Just-in-time, Enterprise Resource Planning, Business Process Outsourcing, Intellectual property rights and Supply chain management.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Employ fundamental knowledge on 'Management Thought' and 'Management of a business organization'.

CO2. Apply various Managerial concepts & contexts to attain 'Optimum Utilization of available organizational resources'.

CO3. Contribute to the group, as an individual, in accomplishing the stated objective of the business organization.

CO4. Apply gained knowledge on Management to establish and run his/her own organization, if he/she deserve to be an 'Entrepreneur'.

CO5. Imbibe contemporary practices in applying Management and exercise discernment in implementing managerial decisions for ethical, safe, and sustainable operations of the business.

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION TO MANAGEMENT AND ORGANIZATION (9 Periods)

Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills - Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management. Basic concepts related to organization- Objectives, Procedure and Principles; Types of organizations – Merits, demerits and adoptability to modern firms.

UNIT – II: OPERATIONS MANAGEMENT (12 Periods)

Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling. Materials management objectives; Inventory - Types of inventory – Classical EOQ model - ABC analysis - Purchase procedure - Stores management.

Marketing: Functions of marketing - Marketing mix - Channels of distribution.

UNIT – III: HUMAN RESOURCES MANAGEMENT (HRM) (6 Periods)

Nature and scope of HRM - Functions of HRM - Role of HR Manager in an organization, Job evaluation and merit rating - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT – IV: PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (9 Periods)

Network analysis - Program evaluation and review technique (PERT) - Critical path method (CPM) - Probability of completing the project within given time - Project cost analysis - Project crashing. Introduction to entrepreneurship - Entrepreneurial traits - Entrepreneur vs. manager - Role of entrepreneurship in economic development - Women as an entrepreneur.

UNIT – V: CONTEMPORARY MANAGEMENT PRACTICES (9 Periods)

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) – Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making. **Total No. of Periods:45**

TEXT BOOKS:

1. O.P. Khanna, Industrial Engineering and Management, Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, Management, 6th Edition, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, Marketing Mangement, 12th Edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, Essentials of Management, 6th Edition, TMH, New Delhi, 2007.
3. N.D. Vohra, Quantitative Techniques in Management, 2nd Edition, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz, Management- A Global perspective,10th Edition, McGraw-Hill International.

III B.Tech - I Semester

14BT51501**: OPERATING SYSTEMS**

(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITES: A course on "Computer Organization"

COURSE DESCRIPTION:

Operating systems operations, scheduling; Critical section problem, deadlocks; Paging, segmentation; File Concept, Disk scheduling; I/O interface, concepts of protection.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge on Operating system operations, services, I/O management and protection.

CO2. Analyze

- CPU scheduling algorithms
- Synchronization issues
- Disk scheduling algorithms
- Memory allocation algorithms
- Page replacement algorithms
- File and Directory Maintenance

DETAILED SYLLABUS:

UNIT I: OPERATING SYSTEMS OVERVIEW AND PROCESS MANAGEMENT (9 Periods)

Operating systems operations, Distributed systems, Special purpose systems, Operating systems services, Systems calls, Operating system structure.

Process Management: Process scheduling, Operations on process, Inter process communication, Multi threading models, Threading issues, Scheduling criteria, Scheduling algorithms - First come first served, Shortest-job-first, Priority, Round-robin, Multilevel queue, Multilevel feedback queue.

UNIT II: SYNCHRONIZATION AND DEADLOCKS (10 Periods)

Synchronization: The critical-section problem, Peterson's Solution, Synchronization hardware, Semaphores, Classic problems of synchronization, Monitors.

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock detection, Deadlock avoidance, Deadlock recovery.

UNIT III: MEMORY MANAGEMENT (9 Periods)

Memory-Management Strategies: Swapping, Contiguous memory allocation, Paging, Structure of the page table, Segmentation.

Virtual Memory Management: Demand paging, Copy-on-Write, Page replacement, Allocation of frames, Thrashing.

UNIT IV: STORAGE MANAGEMENT (8 Periods)

File System: File Concept, Access methods, Directory structure, File system structure, File system implementation, Directory implementation, Allocation methods.

Secondary Storage Structure: Disk structure, Disk attachment, Disk scheduling, Swap-space management, Stable-storage implementation, Tertiary storage structure.

UNIT V: I/O SYSTEMS AND PROTECTION (9 Periods)

I/O Systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem.

Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights.

Total No. of periods: 45

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles," Seventh Edition, Wiley India Edition, 2011.

REFERENCE BOOKS:

1. William Stallings, "Operating Systems, Internals and Design Principles," Seventh Edition, Pearson Education, 2013.
2. Andrew S. Tanenbaum, "Modern Operating Systems," Third Edition, PHI, 2009.

III B.Tech - I Semester
14BT51502**: SYSTEMS SOFTWARE**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Microprocessors and Interfacing"

COURSE DESCRIPTION: System Software and Machine Architecture, Simplified Instructional Computer; Instruction Formats and Addressing Modes, One Pass Assemblers and Multi Pass Assemblers; Design of an Absolute Loader, MS-DOS Linker; Macro Instruction Arguments; Text Editors, User Interface;

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge in Assemblers, Loaders, Linkers, Macro Processors and Text Editors.

CO2. Design and Develop System Software using Assembly Language.

DETAILED SYLLABUS:

UNIT - I: MACHINE ARCHITECTURE (9 Periods)

System Software and Machine Architecture, The Simplified Instructional Computer(SIC)- SIC Machine architecture, Data and Instruction Formats, Addressing Modes Instruction Sets, I/O and Programming.

UNIT II: ASSEMBLERS (9 Periods)

Basic Assembler Functions- A Simple SIC Assembler, Assembler Algorithm and Data Structures,Machine-Dependent Assembler Features-Instruction Formats and Addressing Modes, Program Relocation, Machine-Independent Assembler Features - Literals, Symbol – Defining Statements, Expressions, One-PassAssemblers, Multi-PassAssemblers, Implementation Example - MASM Assembler.

UNIT III LOADERS AND LINKERS (10 Periods)

Basic Loader Functions – Design of an Absolute Loader, ASimple Bootstrap Loader, Machine-Dependent Loader Features – Relocation, Program Linking, Algorithm and Data Structures for Linking Loader, Machine-Independent Loader Features – Automatic Library Search, Loader Options, Loader Design Options –Linkage Editors, Dynamic Linking, Bootstrap Loaders, Implementation Example – MS-DOS Linker.

UNIT IV MACRO PROCESSORS (9 Periods)

Macro Instructions, Features of a Macro Facility- Macro Instruction Arguments, Conditional Macro Expansion, Macro Calls within Macros, Macro Instructions Defining Macros, Implementation-Implementation of a Restricted Facility: A Two-Pass Algorithm, A Single-Pass Algorithm.

UNIT V SYSTEM SOFTWARE TOOLS (8 Periods)

Text Editors - Overview of the Editing Process , User Interface, Editor Structure, Interactive Debugging Systems - Debugging Functions and Capabilities, Relationship with Other Parts of the System.

Total No. of Periods: 45

TEXT BOOKS:

1. Leland L. Beck, "System Software – An Introduction to Systems Programming," Third Edition, Addison-Wesley, 1999.
2. John J. Donovan, "Systems Programming," Tata McGraw-Hill Edition, 2006

REFERENCE BOOKS:

1. D. M. Dhamdhere, "Systems Programming and Operating Systems," Second Revised Edition, Tata McGraw-Hill, 2010

III B. Tech. I Semester
14BT50431: MICROPROCESSORS AND INTERFACING
(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: Courses on Digital Logic Design, Computer Organization.

COURSE DESCRIPTION:
INTEL 8086 & 8031/51- Architectures; Instruction set; Programmable Interfacing Concepts; Serial Communication; Advanced peripheral Interfacing; Applications.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

CO1. Gain potential knowledge in
- Internal hardware details of Intel 8086,8051
- Interfacing various peripherals to build stand alone systems

CO2. Critically analyze various peripherals and interfacing techniques
CO3. Design and develop Microcomputer based system to suit a particular application.
CO4. Choose suitable Hardware and software components of a system that work together to solve engineering problems.

DETAILED SYLLABUS:

UNIT-I: INTEL 8086 ARCHITECTURE AND PROGRAMMING (11 periods)
Evolution of Microprocessors, Architecture of 8086 microprocessor, register organization - special functions of general purpose registers, Memory segmentation, Pin description, Minimum and Maximum mode operation of 8086, timing diagram, Addressing modes, Assembler directives, Instruction set of 8086, , Simple programs , Procedures and Macros.

UNIT- II: MEMORY INTERFACING, PRIORITY INTERRUPT CONTROLLER AND DMA (7 periods)
Memory (static RAM and EPROM) and I/O interfacing, 8257 (DMA controller), Interrupt structure, Interrupt vector table, 8259 Programmable Interrupt Controller (PIC), importance of cascading of PICs.

UNIT-III: 8255A AND ITS APPLICATIONS (7 periods)
Types of data communication - serial and parallel, Methods of parallel data transfer, 8255A (programmable peripheral interface) - Internal block diagram, Control words and initialization, interface of I/O devices: key board, stepper motor.

UNIT-IV: SERIAL DATA COMMUNICATION AND STANDRADS (8 periods)
Types of serial data transmission - synchronous and asynchronous, 8251 (USART) - architecture, Simple programs for sending and receiving characters with an 8251 (polling & interrupt basis), serial communication standards- RS232C. RS232C to TTL and TTL to RS232C conversion.

UNIT-V: 8031/51 Microcontroller Architecture and Programming (12 periods)
Microcontrollers Vs. general purpose processors, Criterion for choosing microcontroller, 8051 Architecture-Internal and external memories, Timers/Counters, Serial communication, Interrupts. Addressing modes, Instruction set of 8051, simple programs using 8051, Timer Programming, Serial port programming, Interrupts programming.

Total No. of Periods: 45

TEXT BOOKS:

1. Douglas V.Hall, Microprocessors and Interfacing: Programming and Hardware, revised 2nd Edition, TMH, 2006.
2. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, PHI, 2000.

REFERENCE BOOKS:

1. A.K. Ray & K.M.Bhurchandi, Advanced Microprocessors and Peripherals- Architecture, Programming and Interfacing, TMH, 2002.
2. Yu-cheng Liu, Glenn A. Gibson, Microcomputer systems: The 8086/8088 Family architecture, Programming and Design, PHI, 2006.
3. Kenneth J. Ayala, The 8051 Microcontroller-Architecture, Programming & Applications, Cengage learning, 3rd Edition, 2004

III B.Tech. I Semester
14BT40503: DESIGN AND ANALYSIS OF ALGORITHMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITES: course on "Problem Solving & Computer Programming".

COURSE DESCRIPTION: Introduction to algorithms and notations;Disjoint sets and graphs; Divide and conquer; Greedy method; Dynamic programming; Backtracking; Branch and bound; and NP-hard and NP-complete problems.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge on:

- Algorithm Complexities and Asymptotic notations.
- Algorithm Design techniques-Divide and Conquer, Greedy Method, dynamic programming, Back tracking, Branch and Bound.
- NP-Hard and NP-Complete problems.

CO2. Analyze the performance of algorithms with time and Space complexities.

CO3. Design the algorithms for solving real world problems.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO ALGORITHMS & DISJOINT SETS (9 Periods)

INTRODUCTION**-**Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big (o) notation, Omega notation, Theta notation and Little (o) notation, Recurrences.

DISJOINT SETS **-** Disjoint set operations, union and find algorithms.

UNIT II: GRAPHS & DIVIDEAND CONQUER (10 Periods)

GRAPHS-Breadth First search and Traversal, Depth First Search and Traversal, spanning trees, connected components and biconnected components

DIVIDE AND CONQUER General method, Applications-Analysis of Binary search, Quick sort, Merge sort, Strassen's matrix multiplication, Finding the Maxima and Minima

UNIT III : GREEDY METHOD & DYNAMIC PROGRAMMING (9 Periods)

GREEDY METHOD **-** General method, Applications-Job sequencing with dead lines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

DYNAMIC PROGRAMMING- General method, Applications-Matrix chain multiplication, Optimal binary search trees,0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem.

UNIT IV: BACKTRACKING & BRANCH AND BOUND (8 Periods)

General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. General method, applications - Travelling sales person problem, 0/ 1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT V: NP-HARD AND NP-COMPLETE PROBLEMS (8 Periods)

NP-HARD AND NP-COMPLETE PROBLEMS**-** Basic concepts, non-deterministic algorithms, NP-Hard and NP-Complete classes, Cook's theorem, NP-hard scheduling Problems

Total No. of Periods: 45

TEXT BOOKS:

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, "Fundamentals of Computer Algorithms," Galgotia publications Pvt. Ltd, New Delhi, Second Edition ,2007.

REFERENCE BOOKS:

1. M.T.Goodrich and R. Tomassia, "Algorithm Design: Foundations, Analysis and Internet examples," John Wiley and sons, 2002.
2. S.Sridhar, "Design and Analysis of Algorithms," Oxford Press, First Edition, 2015

III B.Tech. I Semester

14BT51202**: SOFTWARE ENGINEERING**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Concepts of Software Engineering, software process models: Conventional and agile process models, software requirements engineering process, system analysis, architectural design, User interface design and re-engineering, software testing, risk and quality management.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge in
- Fundamental concepts of software engineering.
- Process models.
- Software development life cycle.

CO2. Analyze software requirements and process models required to develop a software system.

CO3. Design and develop a quality software product using design engineering principles.

CO4. Demonstrate skills in applying risk and quality management principles for effective management of software projects

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO SOFTWARE ENGINEERING (9 Periods)

A Generic view of process: Evolving role of software, Software myths, Software engineering- A layered technology, A process framework, CMMI, Process patterns, Process assessment, Personal and team process models.

Process models: Waterfall model, Incremental process models, Evolutionary process models, the unified process, agile process models-Scrum, agile modeling.

UNIT II: REQUIREMENTS ENGINEERING (9 Periods)

Functional and non-functional requirements, the software requirements document, Requirements specifications, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management.

System modeling: Context models, Interaction models, Structural models, Behavioral models, Model driven engineering

UNIT III: DESIGN ENGINEERING (9 Periods)

Creating an architectural design: Design process and design quality, Design concepts, Software architecture, Data design, Architectural styles and patterns, Architectural design

Performing user interface design: The golden rules, User interface analysis and design, Interface analysis, Interface design steps, Re-engineering.

UNIT IV: SOFTWARE TESTING (10 Periods)

Testing strategies: A strategic approach to software testing, Strategic issues, Test strategies for conventional software, Test strategies for object oriented software, Validation testing, System testing, The art of debugging.

Testing tactics: Software testing fundamentals, white box testing, Basis path testing, Control structure testing, Black box testing, Object oriented testing methods.

UNIT V: RISK AND QUALITY MANAGEMENT (8 Periods)

Risk management: Reactive and proactive risk strategies, Software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM plan.

Quality management: Quality concepts, Software quality assurance, Software reviews, Formal technical reviews, Formal approaches to SQA, Statistical software quality assurance, Software reliability.

Total No. of Periods: 45

TEXT BOOKS:

1. Roger S. Pressman, "Software Engineering, A practitioner's Approach", McGraw-Hill International Edition, 6th edition, 2010.
2. Ian Sommerville, "Software Engineering", Pearson Education, 9th edition, 2011.

REFERENCE BOOKS:

1. K. K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, 3rd edition, 2007.
2. Shely Cashman Rosenblatt, "Systems Analysis and Design", Thomson Publications, 6th edition, 2006.

III B.Tech. I Semester

14BT51521: OPERATING SYSTEMS AND SYSTEMS SOFTWARE LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	—	—	3	2

PREREQUISITES: Courses on "Operating Systems and Systems Software"

COURSE DESCRIPTION:

Hands on practical experience on implementation of CPU scheduling algorithms, Bankers algorithm for Deadlock avoidance and detection, multi programming, page replacement algorithms and file allocation strategies; Creation of symbol tables, implementation of pass one, pass two of two pass assemblers and Loaders.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Implement algorithms for

a. CPU Scheduling
b. Deadlock handling Mechanisms
c. Memory Management
d. File allocation
e. Text Processing
f. Symbol table creation
g. Assemblers and loaders

LIST OF EXPERIMENTS:

1. Implement the following CPU scheduling algorithms:
   a) FCFS
   b) Round Robin (Time Quantum=3) c) SJF d) Priority Use the following set of processes, compare the performance of above scheduling policies.

Process Name	Arrival Time	Processing Time	Priority (lower number has highest priority)
A	0	3	2
B	1	5	1
C	3	2	3
D	9	5	4
E	12	5	5

2. Implement Bankers algorithm for Deadlock avoidance and detection. Consider number of resources are 03 and Jobs are 05. The resource types A, B and C are 10, 5 and 7 instances are available respectively.

Process	Allocation			Max		
	A	B	C	A	B	C
P0	0	1	0	7	5	3
P1	2	0	0	3	2	2
P2	3	0	2	9	0	2
P3	2	1	1	2	2	2
P4	0	0	2	4	3	3

Find the safe sequence. If Max. request of any one process is changed, detect whether deadlock is occurred or not.

3. Implement multi programming with fixed number of tasks and multi programming with variable number of tasks. Processes are P1, P2, P3 with sizes 150K, 100K and 70K respectively.
4. Write a Program to simulate the following page replacement algorithms
   a) FIFO b) LRU Consider no. of Frames are three.
   Reference string is 2 3 2 1 5 2 4 5 3 2 4 2 4 5 3
5. Implement the following file allocation strategies
   a) Sequential b) Indexed c) Linked
   Consider the disk consists 20 blocks and file consists 5 records
6. Creation of a Symbol Table
7. Implementation of Pass One of Two Pass Assembler
8. Implementation of Pass Two of Two Pass Assembler
9. Implementation of an Absolute loader
10. Implementation of Relocating loader

REFERENCE BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", Seventh Edition, Willy India Edition, 2006.
2. Leland L. Beck, "System Software – An Introduction to Systems Programming," Third Edition, Addison-Wesley, 1999.
3. John J. Donovan, "Systems Programming", Tata McGraw-Hill Edition, Thirty Ninth reprint, 2006.

III B.Tech. I Semester

14BT50424**: MICROPROCESSORS AND INTERFACING LAB**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	—	—	3	2

PREREQUISITES: Courses on "Digital logic design" and "Micro processors and Micro controllers".

COURSE DESCRIPTION:

Assembly language Programming for Intel 8086 & 8051; Interfacing standard peripherals & Programming-DAC, Stepper Motor, ADC, Logic Controller, Keyboard, Seven Segment Display.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Analyze various programming alternatives & interfacing methods to build a typical microcomputer based system.

CO2. Design and develop microcomputer based system to solve various problems.

LIST OF PROGRAMMING EXCERSICES

I Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

II Interfacing with 8086

1. Stepper motor
2. Logic controllers
3. A/D and D/A converter
4. Seven segment display
5. Keyboard interfacing

III Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory
3. Programs using special instructions like SWAP, bit/byte, set/ reset etc.

III B. Tech. II Semester

14BT5HS01**: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY**

(Common to CSE, CSSE, IT, CE and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Nil

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Acquire Knowledge in

a) Tools and concepts of Micro Economics.
b) Basic Principles and concepts of Accountancy.
c) Provides life skills for effective utilization of scarce resources.
d) Financial Accounting.
e) Using advanced tools like tally and SAP.
f) Significance of Economics and Accountancy

CO2. Develop skills in analyzing problems for

a) Managerial decisions of an organization.
b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.

CO3. Develop effective communication Business and Accounting transactions.

DETAILED SYLLABUS:

UNIT – I :INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS: (9 Periods)

Definition, Nature and Scope of Managerial Economics. **Demand:** Determinants of demand – Demand function - Law of demand, assumptions and exceptions - Elasticity of demand –Types of elasticity of demand -Demand forecasting and methods of demand forecasting,

Supply- Determinants of Supply and Supply function.

UNIT – II : THEORY OF PRODUCTION AND COST ANALYSIS: (9 Periods)

Production Function: Isoquants and Isocosts – Input-output relationship - Law of returns. **Cost Concepts:** Total, Average and Marginal Cost **-** Fixed vs. Variable costs –Opportunity Costs Vs Outlay Costs– Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs- Avoidable Costs Vs Unavoidable Costs - **Break Even Analysis (BEA)**–Assumptions, Merits and demerits - Determination of Break Even Point (Simple problems).

UNIT – III : INTRODUCTION TO MARKETS AND PRICING: (9 Periods)

Market Structure: Types of Markets - Features of perfect competition - Monopoly and monopolistic competition - Price and Output determination in perfect competition and monopoly.

Pricing : Objectives and policies of pricing – Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - Market penetration – Market skimming - Block pricing – Peak load pricing - Cross subsidization. **Capital:** Significance - Types of capital – Sources of Capital.

UNIT – IV : INTRODUCTION AND PRINCIPLES OF ACCOUNTING: (9 Periods)

Accountancy: Introduction – Concepts – Conventions – Accounting Principles - Double Entry Book Keeping – Journal – Ledger - Trial Balance (Simple problems).

UNIT – V : FINAL ACCOUNTS: (9 Periods)

Introduction to Final Accounts - Trading account - Profit and Loss account and Balance Sheet with simple adjustments (Simple problems).**Computerization of Accounting System :** Manual Accounting *Vs* Computerized Accounting – Advantages and Disadvantages of Computerized Accounting.

Total No. of Periods: 45

TEXT BOOKS:

1. A.R. Aryasri, Managerial Economics and Financial Analysis, Tata Mc- Graw Hill, New Delhi, 3rd Edition, 2007.ISBN 13: 9780070078031.
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, Managerial Economics, S. Chand and Company, New Delhi, 2nd Edition, 2010.ISBN13:

REFERENCE BOOKS:

1. Vershaney and Maheswari, Managerial Economics, Sultan Chand and Sons,New Delhi, 19th Edition, 2005.
2. H. Craig Petersen and W. Cris Levis, Managerial Economics, Pearson Education, 4th Edition, 2009 ISBN-13: 978-0139762833.
3. Lipsy and Chrystel, Economics, Oxford University Press, New Delhi, 12th Edition, 2011.ISBN 978-0-19-956338-8.
4. S.P. Jain and K.L. Narang, Financial Accounting, Kalyani Publishers, Ludhiana, 6th Edition, 2002. ISBN 8127204242, 9788127204242.

III B. Tech. II Semester

14BT60501**: OBJECT ORIENTED ANALYSIS AND DESIGN**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Software Engineering" and "Object Oriented Programming".

COURSE DESCRIPTION: Introduction to UML, basic structural modeling, advanced structural modeling, class and object diagrams, basic behavioral modeling, advanced behavioral modeling, architectural modeling.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1: Gain knowledge on principles of Object Oriented analysis, design through UML Diagrams.

CO2: Analyze the concepts of high level & low level software design.

CO3: Draw UML models for real time software applications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO UML, BASIC STRUCTURAL MODELING (11 Periods)

Introduction to UML: Importance of modeling, Principles of modeling, Object Oriented Modeling, An overview of UML, conceptual model of the UML, Architecture, Software Development Life Cycle.

Basic Structural Modeling

Classes-Terms and concepts, Common modeling techniques, Relationships-modeling simple dependencies, single inheritance and structural relationships, common Mechanisms, and Diagrams.

UNIT-II: ADVANCEDSTRUCTURAL MODELING, CLASS AND OBJECT DIAGRAMS (7 Periods)

Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Instances.

CLASS AND OBJECT DIAGRAMS

Terms and concepts, modeling techniques for Class Diagram-modeling Simple collaboration, Logical database Schema, Forward and reverse engineering, Introduction to Object Diagrams.

UNIT-III: BASIC BEHAVIORAL MODELING (9 Periods)

BASIC BEHAVIORAL MODELING-I

Interactions-Terms and concepts, modeling a flow of control, Interaction diagrams-terms and concepts, modeling flows of control by time ordering and control by organization, Forward and reverse engineering.

BASIC BEHAVIORAL MODELING-II

Use cases-terms and concepts, modeling the behavior of the element, Use case Diagrams-terms and concepts, modeling the context of a system, requirement of a system, Forward and reverse engineering, Activity Diagrams-terms and concepts, modeling a workflow, modeling an operation, Forward and reverse engineering.

UNIT –IV: ADVANCED BEHAVIORAL MODELING (9 Periods)

Events and signals-modeling a family of signals and exceptions, state machines-modeling the lifetime of an object, Introduction to Processes and Threads, time and space-modeling timing constraints, distribution of objects and objects that migrate, state chart diagrams-modeling reactive objects, Forward and reverse engineering.

UNIT-V: ARCHITECTURAL MODELING (9 Periods)

Component-Terms and concepts, modeling executables and libraries, modeling tables, file and documents, modeling an API, Deployment-modeling processors and devices, modeling the distribution of components, Component diagrams-modeling source code, executable release, physical database, adaptable Systems, Forward and reverse engineering, Deployment diagrams-modeling an embedded systems, Client/server System, fully distributed systems, Forward and reverse engineering.

Total No. of Periods: 45

TEXT BOOK:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, *The Unified Modeling Language User Guide,* 2ed, Pearson Education, 2009.

REFERENCE BOOKS:

1. Magnus Penker, Brian Lyons, David Fado, Hans-Erik Eriksson, *UML 2 Toolkit,* WILEY-Dreamtech India Pvt. Ltd., 2006.
2. Pascal Roques, *Modeling Software Systems Using UML2*, WILEY-Dreamtech India Pvt. Ltd, 2004.

III B. Tech. II Semester
14BT70501**: COMPILER DESIGN**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: A Course on "Theory of Computation"

COURSE DESCRIPTION:
Concepts of Lexical analysis, Parsers, Run Time Environments, Syntax Directed Translation, Type checking, Code Optimization, Code Generation and Compiler tools

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge on phases involved in design of compilers.
CO2. Acquire skills in code optimization.
CO3. Apply knowledge on LEX and YACC tools to develop scanner and parser.

DETAILED SYLLABUS:

UNIT I– INTRODUCTION TO COMPILER AND LEXICAL ANALYSIS (9 Periods)
Introduction to Compiler: Structure of a compiler.
Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Specification of Tokens, The Lexical-Analyzer Generator Lex.
UNIT II – SYNTAX ANALYSIS (9 Periods)
Introduction: The Role of the Parser, Eliminating Ambiguity, Eliminating of Left Recursion and Left Factoring.
Top-Down Parsing: Recursive descent parsing, Non Recursive Predictive parsing, LL (1) Grammars.
Bottom-Up Parsing: Shift reduce parsing, LR parsers – Simple LR parser, Canonical LR parser, LALR parser, Using Ambiguous Grammars, The Parser Generator Yacc .
UNIT III – SYNTAX DIRECTED TRANSLATION AND TYPE CHECKING (9 Periods)
Syntax-Directed Translation: Syntax directed definition, S-attributed and L-attributed definitions, Construction of syntax trees.
Type Checking: Type Expressions, Type Equivalence, Rules for Type Checking, Type Conversions, Overloading of Functions and Operators.
UNIT IV – INTERMEDIATE CODE GENERATOR AND RUN TIME ENVIRONMENTS (9 Periods)
Intermediate Code Generation: Variants of Syntax Trees, Three Address Code, Boolean expressions, Flow-of-Control Statements, Control- Flow Translation of Boolean Expressions.
Run time Environments: Storage organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack.
UNIT V – CODE OPTIMIZATION AND CODE GENERATION (9 Periods)
Code Optimization: Basic Blocks and Flow Graphs, Optimization of Basic Blocks, The principal sources of optimization, Introduction to data flow analysis.
Code Generation: Issues in the Design of a Code Generator, The Target Language, A Simple Code Generator, Peephole optimization, Register allocation and assignment.

Total No. of Periods: 45

TEXT BOOKS:
1. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D. Ullman, "Compilers–Principles, Techniques and Tools," 2nd edition, Pearson Education, 2012.

REFERENCE BOOKS:
1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, "Compilers–Principles, Techniques and Tools, Low price edition," Pearson Education, 2004.
2. K.L.P Mishra and N. Chandrashekaran, "Theory of computer science- Automata Languages and computation," 2nd edition, PHI, 2003.

III B.Tech. II Semester

14BT51201**: COMPUTER NETWORKS**

(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Introduction to Computer Networks; The Physical Layer; The Data Link Layer; The Medium Access Sub layer; The Network Layer; The Transport Layer; The Application Layer; Network Security.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on :
- concepts of computer networks
- functionality of reference models layers
- 3G Mobile Phone Networks, 802.11

CO2. Analyze the issues in data link layer by using error detection and correction techniques, medium access sub layer by channel allocation schemes and transport layer by connection management schemes.

CO3. Acquire problem solving skills to assess the routing of the packet by selecting the appropriate routing algorithms.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND PHYSICAL LAYER (9 Periods)

Uses of Computer Networks, Network Hardware, Network Software, Reference Models: OSI, TCP/IP, Example Networks: Internet, 3G Mobile Phone Networks, 802.11. Guided Transmission Media, Wireless Transmission.

UNIT-II: DATA LINK LAYER AND MEDIUM ACCESS SUBLAYER (10 Periods)

Data Link Layer Design Issues, Error detection and correction-CRC, Hamming codes, Elementary Data Link Protocols, Sliding Window Protocols.

Channel Allocation problem, Multiple Access protocols: ALOHA, CSMA, CSMA/CD protocols, Collision free protocol, Limited contention protocol, Ethernet, DLL Switching.

UNIT-III: NETWORK LAYER (10 Periods)

Network Layer Design Issues, Routing Algorithms: Shortest path, Flooding, Distance vector, Hierarchical, Broadcast, Multicast and Any cast, Congestion Control Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet

UNIT-IV: TRANSPORT LAYER (8 Periods)

Transport Service, Elements of transport protocol, Internet Transport layer protocols: UDP, TCP;

UDP – Introduction, Remote Procedure Call, Real-Time Transport Protocol

TCP - Introduction, Service Model, Protocol, Segment Header, Connection Establishment, Connection Release, Connection Management Modeling, Sliding Window, Timer Management, Congestion Control, The Future of TCP.

UNIT-V: APPLICATION LAYER AND NETWORK SECURITY (8 Periods)

Domain name system (DNS), Electronic Mail, World Wide Web: Architectural Overview, Dynamic Web Document, HTTP.

Introduction to Network Security: Cryptography - Substitution Techniques, Transposition Techniques, One-Time Pads.

Total No. of Periods: 45

TEXT BOOK:

1. Andrew S. Tanenbaum and David J. Wetherall, "Computer Networks", Pearson Education, 5th edition, 2012.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw-Hill, 4th edition, 2006.
2. James F. Kurose and Keith W. Ross, "Computer Networking A Top-Down Approach Featuring the Internet", Pearson Education, 2nd edition, 2003.

III B.Tech. II Semester

14BT61202**: WEB PROGRAMMING**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hyper Text Markup Language (HTML); Features of HTML5; Cascading Style Sheets (CSS); JavaScript; JQuery; Hypertext Preprocessor (PHP); MySQL; Extensible Markup Language (XML); Asynchronous Java Script and XML (AJAX).

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

- **CO1.** Demonstrate knowledge on web technologies : HTML, HTML5, CSS, JavaScript, JQuery, XML, AJAX, PHP and MySQL database.
- **CO2.** Design and develop web applications using HTML, CSS, JavaScript, JQuery, XML, AJAX and PHP.
- **CO3.** Apply PHP and MySQL database concepts for developing interactive, dynamic and scalable web applications.
- **CO4.** Gain problem solving skills to develop enterprise web applications.

DETAILED SYLLABUS:

UNIT-I: HTML **(11 Periods)**

Introduction: Fundamentals of HTML, Working with Text, Organizing Text in HTML, Working with Links and URLs, Creating Tables, Working with Images, Canvas, Forms, Frames and Multimedia.

HTML5: Introduction, HTML5 Document Structure, Creating Editable Content, Checking Spelling Mistakes, Exploring Custom Data Attributes, Client-Side Storage, Drag and Drop Feature, Offline Web Applications, Web Communications, Cross-Document Messaging and Desktop Notifications.

UNIT-II: CSS AND JAVASCRIPT: **(10 Periods)**

CSS: Introduction, CSS Selectors, Inserting CSS in an HTML document, Backgrounds, Fonts, and Text Styles, Creating Boxes, Displaying, Positioning and Floating Elements, Features of CSS3.

JAVASCRIPT: Overview of JavaScript, JavaScript Functions, Events, Image Maps and Animations, JavaScript Objects, Working with Browser and Document Objects, JQuery **-** Introduction, JQuery Selectors, Events, Methods to access HTML elements and attributes.

UNIT-III: INTRODUCTION TO PHP **(7 Periods)**

Introduction, Data Types, Variables, Constants, Expressions, String Interpolation, Control Structures, Functions, Arrays, Embedding PHP Code in Web Pages, Object Oriented PHP.

UNIT-IV: PHP AND MYSQL **(7 Periods)**

PHP and Web Forms, Sending Form Data to a Server, Working with Cookies and Session Handlers, PHP with MySQL **-** Interacting with the Database, Prepared Statement, Database Transactions.

UNIT-V: XML AND AJAX **(10 Periods)**

XML: Introduction, Structure of XML Document, Document Type Definition, XML Namespaces, XML Schema, Working with DOM and SAX Parser, Working with XSLT.

AJAX: Overview, Exploring AJAX, XMLHttpRequest object.

Total No. of Periods: 45

TEXT BOOKS:

1. Kogent Learning Solutions Inc, "HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery," Dreamtech Press 1st edition, 2011.
2. W. Jason Gilmore, "Beginning PHP and MySQL," APress, 4th Edition, 2011.

REFERENCE BOOKS:

1. Thomas A. Powell, "The Complete Reference: HTML and CSS," Tata McGraw Hill, 5th edition, 2010.
2. Andrea Tarr, "PHP and MySQL," Willy India, 1st Edition, 2012.

III B.Tech. II Semester

14BT6HS01**: BANKING AND INSURANCE**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITE: Managerial Economics and Principles of Accountancy

COURSE DESCRIPTION: Origin and growth of Banking, functions and importance, RBI; Debtor and Creditor relationship, Types of Accounts, Loans and Advances; e-payment, e-cash ,NEFT, RTGS, Credit and Debit cards; Insurance elements and risk; LIC, GIC, IRDA.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Acquire Knowledge in

a) Tools and concepts of Banking and Insurance.

b) Basic Principles and concepts of Insurance and Banking.

c) Provides life skills for effective utilization of Banking and Insurance facilities.

d) e-fund transfers, e-payments and e-business models.

CO2. Develop analytical skills in understanding problems pertaining to

a) Online banking and e – payments..

b) Risk Management through insurance benefits the society at large.

c) money management by leveraging on technology, banking and insurance services.

DETAILED SYLLABUS:

UNIT – I : INTRODUCTION TO BANKING: **(9 Periods)**

Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT – II : BANK-CUSTOMER RELATIONSHIP: (9 Periods)

Debtor-creditor relationship, anti money laundering, products or services, payment and collection of cheques and other negotiable instruments. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances- principles of lending, types of loans,

UNIT – III : BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM: (9 Periods)

Features, types of e-payment system, e-cash ,NEFT,RTGS, Electronic purses, Credit and Debit cards. Business models- B2B, B2C, C2C, and B2G.

UNIT – IV : INTRODUCTION TO INSURANCE: (9 Periods)

Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT – V : INSURANCE OVERVIEW: **(9 Periods)**

Principles of insurance, insurance types, LIC & GIC insurance contract- nature, elements, functions, IRDA, Insurance Players in India.

Total No. of Periods: 45

TEXT BOOKS:

1. A.V. Ranganadha Chary, R.R. Paul- Banking and Financial system, Kalyani Publisher, New Delhi, 2nd Edition.
2. P.K.Gupta- Insurance and Risk Management, Himalaya Publishing House, New Delhi, **ISBN:** 9789350516676

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma: 'Electronic Commerce- A Manager's Guide to E-Business', Vanity Books International, Delhi,2002. **ISBN-13:** 978- 8174462039
2. Kalakota Ravi and Whinston Andrew B: 'Frontiers of Electronic Commerce', Pearson Education India, 1996 New Delhi. **ISBN:** 978-81-7758-392-2
3. Schneider, Grey P: 'Electronic Commerce, Course Technology', Cengage Learning, 2008, 8th Edition, New Delhi **ISBN-13**:978-1-4239-0305-5.

III B.Tech. II Semester

14BT6HS02**: COST ACCOUNTING AND FINANCIAL MANAGEMENT**

(OPEN ELETIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Returns on Investment..

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Acquire Knowledge in
- a) Elements of Costing.
- b) Basic concepts of Financial Management.
- c) Risk and Return
- d) Financial Accounting.
- e) Using advanced tools like tally and SAP.
- f) Significance of Economics and Accountancy

CO2. Do cost, risk and return of investment analysis.

CO3. Develop skills in providing solutions for
- a) Material, Labor, Overheads control.
- b) Excellence and ability to minimize the cost of the organization
- c) Effective investment decisions

CO4. Prepare cost sheets pertaining to manufacturing of products.

DETAILED SYLLABUS:

Unit I : INTRODUCTION TO COST ACCOUNTING (9 Periods)

Cost and Cost Accounting, Scope, Objectives, Advantages and disadvantages –Cost Accounting Vs Management Accounting – Elements of Costing –Installation of costing system – Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

Unit II: COST ANALYSIS (9 Periods)

Analysis of Cost – Preparation of cost sheet, estimate, tender and quotation (Simple problems) – Importance of Costing while pricing the products.

Unit III: STANDARD COSTING (9 Periods)

Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labor variances (Simple Problems).

Unit IV : FINANCIAL MANAGEMENT *(*9 Periods)

Financial Management-Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

Unit V: RISK AND RETURNS ON INVESTMENT (9 Periods)

Investment-Meaning and Definition- concept of risk and returns- Investment Alternatives- Introduction to Behavioral Finance – Anomalies –Key Concepts –Anchoring – Mental Anchoring-Confirmation and Hindsight Bias-Gambler's Fallacy-Herd Behavior-Over Confidence-Overreaction and Availability Bias-Prospect Theory.

Total No. of Periods: 45

TEXT BOOKS:

1. S.P. Jain and K.L. Narang: Cost Accounting, Kalyani Publishers, Ludhiana, 6th Edition, 2002
2. James C Van Horne, Financial Management and Policy, Prentice-Hall of India/Pearson, 12th Edition, 2001 ISBN-10: 0130326577

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, Cost and Management Study Material, New Delhi.
2. I.M. Pandey, Financial Management, Vikas Publishing House Pvt. Ltd., 10th Edition, 2010, ISBN- 13 9788125937142

III B.Tech. II Semester

14BT6HS03**: ENTREPRENEURSHIP FOR MICRO SMALL AND MEDIUM ENTERPRISES**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITES: NIL

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Acquire Knowledge in

a) Schemes and institutions encouraging entrepreneurship.
b) Basic Principles and concepts of Accountancy.
c) Significance of entrepreneurship.

CO2. (i) Develop analytical skills in understanding problems pertaining to

a) Personal excellence through financial and professional freedom.
b) Women entrepreneurship acts as contrivance in the societal development

(ii) Develop Critical thinking and evaluation ability.

CO3. Generate ideas for formulating business plans.

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT (9 Periods)

Concept of Entrepreneurship – Growth of Entrepreneurship in India **-** Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur – Functions of Entrepreneur – Need for an Entrepreneur – Entrepreneurial Decision Process – Types of Entrepreneurs – Distinction between an Entrepreneur and a manager – Intrapreneur - Entrepreneur Vs Intrapreneur.

UNIT – II: IDEA GENERATION AND FORMULATION OF BUSINESS PLANS : (9 Periods)

Sources of Ideas – Methods of idea generation - – Product Identification – Opportunity Selection – Steps in Setting up of a Small Business Enterprise - Contents Of Business Plans – Significance – Formulation of Business Plan – Business Opportunities in Various Sectors – Common Errors in Business Plan Formulation – Project Report Preparation.

UNIT – III: MICRO AND SMALL ENTERPRISES (9 Periods)

Meaning and Definition – Micro and Macro units – Essentials – Features – Characteristics – relationship between Micro and Macro Enterprises – Rationale behind Micro and Small Enterprises – Scope of Micro and Small Enterprises – Objectives of Micro Enterprises - Problems of Micro and Small Enterprises

UNIT – IV: INSTITUTIONAL FINANCE AND SUPPORT TO ENTREPRENEUR (9 Periods)

Need for Institutional Finance **-** Commercial Banks – Industrial Development Bank of India (IDBI) – Industrial Finance Corporation of India Ltd. (IFCI) – Industrial Credit Investment Corporation of India Ltd. (ICICI)– State Financial Corporations (SFCs) - State Industrial Development Corporations (SIDCs) – Small Industries Development of Bank of India (SIDBI) –– Need For Institutional Support – National Small Industries Corporation Ltd (NSIC) – Small Industries Development Organisation (SIDO) – Small Industries Service Institutes (SISIs) – District Industries Centres (DICs) – National Institute of Entrepreneurship and Small Business Development (NIESBUD) – Technical Consultancy Organizations (TCOS)(Origin, Mission, and credit facility/support).

UNIT –V: WOMEN ENTREPRENEURSHIP (9 Periods)

Concept of Women entrepreneur - Functions of Women entrepreneurs - Growth of women entrepreneurship in India - Challenges of Women entrepreneurs- Programmes supporting women entrepreneurship – Rural Entrepreneurship – Meaning, Need for Rural entrepreneurship, Problems of rural entrepreneurship, Role of NGOs.

Total No. of Periods: 45

TEXT BOOKS:

1. Dr.S.S.Khanka, Entrepreneurial Development, S. Chand and Company Ltd, Revised Edition, 2012. **ISBN**: 9788121918015
2. Madhurima Lall & Shikha Sahai, Entrepreneurship, Excel Books India, 2nd Edition 2008. **ISBN** : 9789350620953

REFERENCE BOOKS:

1. Nandan, H., Fundamentals of Entrepreneurship, PHI Learning Pvt. Ltd., 2013, New Delhi, 3rd edition 2013. **ISBN**: 9788120347502
2. Vasanth Desai, "The Dynamics of Entrepreneurial Development and Management", Himalaya Publishing House, 4th edition 2009. **ISBN**: 9788183184113
3. Bholanath Dutta, Entrepreneurship Management – Text and Cases, Excel Books, 1st edition 2009. **ISBN**: 9789350621257

III B.Tech. II Semester

14BT70105**: DISASTER MITIGATION AND MANAGEMENT**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Natural disasters and hazards – Earthquakes – Floods and cyclones, droughts – Landslides – Disaster management.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Explain various types of disasters and mitigation strategies

CO2. Analyze and interpret the Guidelines for hazard assessment and vulnerability analysis

CO3. Use historical data of disaster losses and inform the people over preparedness

CO4. Address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society

CO5. Function in multidisciplinary teams for the effective displacement of people during disasters

DETAILED SYLLABUS:

UNIT-I: (8 Periods)

INTRODUCTION: Types of disasters – Natural disasters – Impact of disasters on environment – Infrastructure and development – Concepts of hazards and vulnerability analysis– Hazard Assessment **–** Guidelines for hazard assessment and vulnerability analysis – Basic principles and elements of disaster mitigation

UNIT-II: (11 Periods)

EARTHQUAKES : Introduction to earthquakes – Intensity scale (MSK–64) – Seismic activity in India – Seismic zones of India – Earthquakes in A.P. – Action plan for earthquake disaster preparedness – Elements at risk, recovery and rehabilitation after earthquake – Earthquake resistant design and construction of buildings. Tsunami – Onset, types and causes – Warning – Element at risk – Typical effects – Specific preparedness and mitigation strategies

UNIT-III: (11 Periods)

FLOODS AND CYCLONES: Onset, types, warnings – Elements at risk – Typical effects – Indian floods and cyclones – Hazard zones – Potential for reducing hazards – Mitigation strategies and community based mitigation.

DROUGHTS: Onset, types and warning – Kinds of droughts – Causes of droughts – Impact of droughts – Early warning and response mechanisms – Mitigation strategies – Droughts in India

UNIT-IV: (7 Periods)

LANDSLIDES: Onset, types and warning – Causes of landslides –Elements at risk – Indian land slides – Hazards zones – Typical effects – Mitigation strategies and community based mitigation

UNIT-V: (8 Periods)

DISASTER MANAGEMENT: Disaster management organization and methodology – Disaster management cycle – Disaster management in India – Typical cases – Cost–benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Total No. of Periods: 45

TEXT BOOKS

1. V.K. Sharma, Disaster Management, National Centre for Disaster Management, IIPE, 1999.
2. A.S. Arya, Anup Karanth, and Ankush Agarwal, Hazards, Disasters and Your Community: A Primer for Parliamentarians, GOI–UNDP Disaster Risk Management Programme, 2005.

REFERENCE BOOKS

1. Disaster Management *in India*, A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. R. B. Singh *Natural Hazards And* Disaster Management, Rawat Publications, 2009.
3. Pardeep sahni, Alka Dhameja, Uma Medury Disaster Mitigation, 4th Edition, PHI Learning Pvt. Ltd., 2011.
4. Sanjay K. Sharma Environment Engineering and Disaster Management, 1st Edition, USP Publishers, 2011.

III B.Tech. II Semester

14BT70106**: ENVIRONMENTAL POLLUTION AND CONTROL**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Introduction, Sources and Effects of Air Pollution – Dispersion of Pollutants and their control – Surface and Ground Water Pollution and control–Soil Pollution and remediation– Management of Municipal Solid Wastes.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Explain various pollutants, characteristics and their dispersion.

CO2. Analyze the major pollutants that causes environmental pollution.

CO3. Conduct research and select suitable techniques to control pollution.

CO4. Understand the effects of environmental pollutions on human beings and vegetation

CO5. Communicate the methods of management and control of environmental pollution

DETAILED SYLLABUS:

UNIT-I: (8 Periods)

INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS: Scope – Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, Point and Non– Point, Line and Area Sources of Air Pollution – Stationary and Mobile Sources – Dispersion of Pollutants – Dispersion Models – Applications.

UNIT-II: (9 Periods)

EFFECTS AND CONTROL OF PARTICULATES: Effects of Air Pollutants on Man, Material and Vegetation – Global Effects of Air Pollution – Green House Effect, Heat Island, Acid Rains, Ozone Holes – Control of Particulates – Control at Sources – Process Changes – Equipment Modifications – Design and Operation of Control Equipment – Settling Chambers – Centrifugal Separators – Bag Filters, Dry and Wet Scrubbers – Electrostatic Precipitators.

UNIT-III: (10 Periods)

WATER POLLUTION: Introduction–Water Quality in Surface Waters – Nutrients – Controlling Factors in Eutrophication–Effects of Eutrophication – Ground Water Pollution – Thermal Pollution – Marine Pollution – Sewage Disposal in Ocean – Types of Marine Oil Pollution – Cleanup of Marine Oil Pollution – Control of Water Pollution – Case Study on Tanneries –Drinking Water Quality Standards.

UNIT-IV: (9 Periods)

SOIL POLLUTION: Soil Pollutants – Sources of Soil Pollution – Causes of Soil Pollution and their Control – Effects of Soil Pollution–Diseases Caused by Soil Pollution – Methods to Minimize Soil Pollution – Effective Measures to Control Soil Pollution – Case Study on Fertilizer.

UNIT-V: (9 Periods)

MUNICIPAL SOLID WASTE MANAGEMENT: Introduction – Types of Solid Wastes – Principles of Excreta Disposal – Domestic Solid Waste Production – Collection of Solid Wastes – Transport of Solid Wastes – Management of Solid Wastes – Methods of Land Disposal – Sanitary Landfill – Composting – Incineration.

Total No. of Periods: 45

TEXT BOOKS

1. C.S.Rao, Environmental Pollution Control Engineering, 2nd Edition, New Age International Pvt Ltd., 2007.
2. Y. Anjaneyulu, Introduction to Environmental Science, 1st Edition, BS Publications., 2009.

REFERENCE BOOKS

1. M.N. Rao and H.V.N. Rao, Air Pollution, 19th Edition, Tata McGraw–Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, Fundamentals of Air Pollution, 5th Edition, Academic Press (Elsevier), 2014.
3. S.M.Khopkar , Environmental Pollution Monitoring and Control, 2nd Edition, New Age International Pvt Ltd., 2007.
4. S.Deswal and K.Deswal, Environmental Science, 2nd Edition, Dhanpat Rai & Co, 2011.

III B.Tech. II Semester

14BT70107**: CONTRACT LAWS AND REGULATIONS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: —-

COURSE DESCRIPTION: Construction Contracts – Tenders – Arbitration – Legal Requirements – Labour Regulations.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Explain contract documents and tendering processes.

CO2. Analyze the legal issues in arbitration and in contracts documents.

CO3. Address the legal issues in collecting taxes.

CO4. Follow ethics while bidding, sale and purchase of property.

CO5. Develop and Prepare tender documents as per the standards.

DETAILED SYLLABUS:

UNIT-I: (9 Periods)

CONSTRUCTION CONTRACTS: Indian Contracts Act – Elements of Contracts – Types of Contracts – Features – Suitability – Design of Contract Documents – International Contract Document and laws – Standard Contract Document – Law of Torts.

UNIT-II: (9 Periods)

TENDERS: Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Financial Points of View – Two Cover System – Preparation of the Documentation – Contract Formation and Interpretation – Potential Contractual Problems – Price Variation Clause – Comparison of Actions and Laws – Subject Matter – Violations.

UNIT-III: (9 Periods)

ARBITRATION: Arbitration – Comparison of Actions and Laws –Agreements – Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Arbitration Disputes – Dispute Review Board.

UNIT-IV: (9 Periods)

LEGAL REQUIREMENTS: Legal Requirements for Planning – Property Law – Agency Law – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties – Local Government Approval – Statutory Regulations – Insurance and Bonding – Laws Governing Purchase and Sale – Use of Urban and Rural Land – Land Revenue Codes – EMD – Security Deposits – Liquidated Damages.

UNIT-V: (9 Periods)

LABOUR REGULATIONS: Social Security – Welfare Legislation – Laws Relating to Wages, Bonus and Industrial Disputes – Labour Administration – Insurance and Safety Regulations – Workmen's Compensation Act – Maternity Benefit Act – Child Labour Act – Other Labour Laws.

Total No. of Periods: 45

TEXT BOOKS

1. G.C.V. Subba Rao Law of Contracts I & II, 11th Edition, S. Gogia & Co., 2011.
2. Jimmie Hinze, Construction Contracts, 2nd Edition, Mc Graw Hill, 2001.

REFERENCE BOOKS

1. Gajaria G.T, Kishore Gajaria, Laws Relating to Building and Engineering Contracts in India, 4th Edition, Lexis Nexis Butterworths India, 2000.
2. B. S. Patil, Civil Engineering Contracts and Estimates, 3rd Edition, University Press (India) Private Ltd., 2013.
3. Joseph T. Bockrath, Contracts and the Legal Environment for Engineers and Architects, 7th Edition, McGraw Hill Education, 2010.
4. Akhileshwar Pathak, Contract Law, 1st Edition, Oxford University Press, 2011.

III B.Tech. II Semester

14BT70108**: PLANNING FOR SUSTAINABLE DEVELOPMENT**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: —-

COURSE DESCRIPTION: Introduction to Sustainable Development – Environment, Sciences and Sustainability – Sustainable Development Politics and Governance – Tools, Systems and Innovations for Sustainability – Communication and Learning for Sustainability.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate the knowledge of planning, environment, tools and systems for sustainable development.

CO2. Analyze the current challenges to sustainability

CO3. Use theoretical frameworks and provide solutions to the real world sustainability issues.

CO4. Conduct awareness of contemporary issues on globalization interms of sustainability.

CO5. Give recommendations for the sustainability issues and solutions using a holistic approach.

CO6. Explain a sense of civic responsibility, including reflection on the student's own role in developing and nurturing sustainable communities.

CO7. Participate in decision making as individual and responsible for collective decision.

DETAILED SYLLABUS:

UNIT-I: (8 Periods)

INTRODUCTION TO SUSTAINABLE DEVELOPMENT: Definition and Concepts of Sustainable Development – Capitalization of Sustainability – National and Global Context – The Millennium Development Goals –Emergence and Evolution of Sustainability and Sustainable Development – Theories of Sustainability – Case Studies

UNIT-II: (8 Periods)

ENVIRONMENT, SCIENCES AND SUSTAINABILITY: 127128Climate Change – Science, Knowledge and Sustainability – Unforeseen Environmental Impacts on Development – Challenges of Sustainable Development – Centrality of Resources in Sustainable Development – Case Studies.

UNIT-III: (10 Periods)

SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE: Governance and Democracy and Eco–Welfare – Global Civil Society and World Civil Politics – Civic Environmentalism – Policy Responses to Sustainable Development – Economics of Sustainability – Social Responsibility in Sustainability – National Action

UNIT-IV: (11 Periods)

TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY: Need for System Innovation – Transition and Co–Evolution – Theories and Methods for Sustainable Development – Strategies for Eco–Innovation – Ecological Foot Print Analysis – Socio Ecological Indicators – Eco Labels– Policy Programmes for System Innovation – Case Studies

UNIT-V: (8 Periods)

COMMUNICATION AND LEARNING FOR SUSTAINABILITY: Role of Emerging Media – Remarkable Design and Communication Art, Activism and the Public Interest – Education for Sustainability – Participation in Decision Making – Critical Thinking and Reflection – Case Studies

Total No. of Periods: 45

TEXT BOOKS

1. John Blewitt, Understanding Sustainable Development, Earth Scan Publications Ltd., 2nd Edition, 2008.
2. Jennifer A. Elliot, An introduction to sustainable development, Earth Scan Publications Ltd., 4th Edition, 2006.

REFERENCE BOOKS

1. Peter Rogers, Kazi F Jalal , John A Boyd, An introduction to sustainable development, Earth Scan Publications Ltd., 1st Edition, 2006.
2. Simon Dresner, The Principles of Sustainability, Earth Scan Publications Ltd., 2nd Edition, 2008.
3. Peter Bartelmus, Environment growth and development: The concepts and strategies of sustainability, Routledge, 3rd Edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, Mirilia Bonnes, Jose Antonio Corraliza, Maria Vittoria Giuliani, People places and sustainability, Hogrefe & Huber Publishers, 2nd Edition, 2003.

III B.Tech. II Semester

14BT70109**: RURAL TECHNOLOGY**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: NIL

COURSE DESCRIPTION: Research & Development – Non Conventional Energy – Community Development – IT Management

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Acquire the knowledge of various nonconventional energy systems and technologies for rural development.

CO2. Apply the principles of IT for the rural development.

CO3. Responsible for the development of technologies in rural areas.

CO4. Understand the impact of technologies in societal and environmental aspects.

DETAILED SYLLABUS:

UNIT-I: 9 Periods)

RESEARCH & DEVELOPMENT: India – Ancient Indian Technologies – Rural India Life – Indian Farmer – Role of Science and Technology in Rural Development – Rural Technology and Poverty Eradication – Rural Business Hubs – Technology in improving rural infrastructure – Various organizations related to innovation – Issues of technology transfer: CAPART, NABARD, CSIR, NIF.

UNIT-II: (9 Periods)

NON CONVENTIONAL ENERGY: Definition of Energy, Types of alternative sources of energy, Sources of non conventional energy –Solar energy – Solar Cooker – Solar Heater – Biogas – Recycling and Management and Wastes Conservation – Assessment & Production of biomass products & their utilization.

UNIT-III: (9 Periods)

TECHNOLOGIES FOR RURAL DEVELOPMENT: Food & Agro based technologies – Tissue culture – Building and Construction technologies – Cultivation and processing of economic plants – Cottage and social Industries.

UNIT-IV: (9 Periods)

COMMUNITY DEVELOPMENT: Water conservation – Rain water Harvesting – Drinking water – Environment and Sanitation – Bio fertilizers – Medical and Aromatic plants – Employment generating technologies – Apiculture – Piciculture – Aquaculture.

UNIT-V: (9 Periods)

IT IN RURAL DEVELOPMENT: The Role of Information Technology in Rural Areas – Impact of Information Technology in Rural development – Need and Necessity of Technology – Corporate Social Responsibilities – Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and Saansad Adarsh Gram Yojana (SAGY) – village adoptions schemes.

Total No. of Periods: 45

TEXT BOOKS

1. M.S Virdi, Sustainable Rural Technologies, Daya Publishing House, New Delhi, 1st Edition, 2009.
2. S.V. Prabhath & P. Ch. Sita Devi, Technology and Rural India, Serials Publications, New Delhi, 1st Edition, 2012.

REFERENCE BOOKS

1. P. R. S. Murthy, R.C. Chackravarthy, Information Technology & Rural Development, Pacific Books International, 1st Edition, 2011.
2. Shivakanth Singh, Rural Development Policies and Programmes, Northern book centre, New Delhi, 1st Edition, 2002.
3. L.M.Prasad, Principles and Practice of Management, Sultan Chand & Sons, New Delhi, 8th Edition, 2014.
4. Venkata Reddy. K, Agriculture and Rural Development Gandhian Perspective, Himalaya Publishing House, 1st Edition, 2001.

III B.Tech. II Semester

14BT60305**: ARTIFICIAL INTELLIGENCE AND ROBOTICS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

COURSE DESCRIPTION*:*

Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning*;*

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1: Impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.

CO2: Employ effective methods to analyze a robot motion control while executing a specific task**.**

CO3: Design and Implement appropriate solutions for search Problems such as playing two person games and for planning problems which involve defining a sequence of actions of a robot.

CO4: Apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance.

DETAILED SYLLABUS:

UNIT-I: ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING (10 periods)

The Underlying assumption of AI; AI Technique: simple Tic-Tac-Toe program; Problem solving: State space search; Production systems: control strategies, search space control: depth-first, breadth-first search; Heuristic search: Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT-II: KNOWLEDGE REPRESENTATION & LEARNING (9 periods)

Knowledge Representation; Predicate Logic: Simple facts in logic, resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; slots; conceptual dependency; scripts; Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.

UNIT-III: ROBOTICS –VISION & SENSING (8 periods)

Robotics: Robot Classification, Robot Specification, notation; Sensing: Range sensing: Triangulation; proximity sensing: Inductive, Capacitive and Ultrasonic sensing; touch sensing: tactile sensing, artificial skins; Force and torque sensing: Wrist force sensors; Vision: low-level vision, high-level vision.

UNIT-IV: ROBOT PROGRAMMING & CONTROL (10 periods)

Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: characteristics, specifications; Task level languages; Language structure: VAL II.

UNIT-V: ROBOT INTELLIGENCE & TASK PLANNING (8 periods)

Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; graph search technique; Problem solving and problem reduction; robot learning; Task planning: Modelling, task specification, obstacle avoidance, grasp planning; Expert system.

Total No. of Periods: 45

TEXT BOOKS:

1. E. Rich and K. Knight,"Artificial intelligence", Tata Mc Graw Hill, 2nd ed., 1992.
2. K.S. Fu, R.C. Gonzalez, C.S.G. Lee, Robotics: Control, Sensing, Vision, and Intelligence, Mc Graw Hill, International Edition, 1987.

REFERENCE BOOKS:

1. Mikell P. Groover, "Industrial Robotics, Technology, Programming, and Applications", Tata Mc Graw Hill, 9th reprint 2011.
2. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992.
3. N.J. Nilsson, "Principles of AI", Narosa Publ. House, 2000.
4. George Luger, .Al-Structures and Strategies for and Strategies for Complex Problem solving, Pearson Educations, 4th edition, 2002.

III B.Tech. II Semester

14BT60306**: GLOBAL STRATEGY AND TECHNOLOGY**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: -Nil-

COURSE DESCRIPTION:

Introduction to strategic management, strategic management process, principles of good strategy, globalisation, globalisation strategies, research & development strategies, technology management and transfer, significance, elements of transfer process, corporate governance: the Indian scenario.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Decide upon a macroscopic management strategy to optimize the impact of decisions with limited resources.

CO2. Identify the impact of globalization in a given engineering scenario. Participate in elementary discussions on corporate governance.

CO3. Analyse an industrial Engineering problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO STRATEGIC MANAGEMENT (9 periods)

Definitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT-II: GLOBALISATION (9 periods)

Meaning and dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouring Globalisation; Globalisation strategies.

UNIT-III: RESEARCH & DEVELOPMENT STRATEGIES (9 periods)

Introduction, Concept, Evolution of R & D Management, R & D as a business, R & D and competitive advantage, Integration of R & D, Elements of R & D strategies, Selection of R & D strategies, Implementation strategies, R & D trends, Responses to changes.

UNIT IV: TECHNOLOGY MANAGEMENT AND TRANSFER (9 periods)

TECHNOLOGY MANAGEMENT: Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.

TECHNOLOGY TRANSFER: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT –V: CORPORATE GOVERNANCE: THE INDIAN SCENARIO (9 periods)

Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance – Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family – owned business in India, Corporate Governance and the Indian ethos.

Total No. of Periods: 45

TEXT BOOKS:

1. Francis Cherunilam, Stategic Management, Himalaya Publishing House, 3rd Edition, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan, Management of Technology, Stategic Management, Himalaya Publishing House, 2nd Edition, 2012.

REFERENCE BOOKS:

1. White and Bruton, The management of Technology and innovation; a strategic approach, Cengage Learning, 1st Edition, 2007.
2. S.K.Mandak, Ethics in business and Corporate Governance, TMH, 2nd Edition, 2012.

III B.Tech. II Semester

14BT60307**: INTELLECTUAL PROPERTY RIGHTS and MANAGEMENT**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES:-Nil

COURSE DESCRIPTION:

Protection of ideas, innovation and artistic endeavors ; Acts and procedure related to patents, trademarks, passing off, copy right, design registration, trade secrets and cyber laws, case studies in each.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1 : prepare documents and fill applications needed for filing a patent, design, copy right and trade mark.

CO2 : ensure smooth transition from concept to final product.

CO3 : exercise discretion in following ethical aspects in dealing with intellectual property rights.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF INTELLECTUALPROPERTY RIGHTS (9 periods)

Introduction and importance of intellectual property rights (IPRs), types of intellectual property, International scenario in IPR: WIPO, WTO, TRIPS, international and national patent acts: United States of America patent act, United Kingdom patent act, India patent act, recent amendments in India patent act 1972.

UNIT-II: PATENTS (9 periods)

Introduction, Basic concepts, object and value of patent law, advantages of patent to inventor, patentable inventions, Not patentable inventions, overview of patent procedure, Bio technology patents, patents on computer program, patent rights on micro organism, plant breeding and breeders right, protection of bio diversity, protection of traditional knowledge, infringement of patents and remedy for infringement.

UNIT-III: TRADEMARKS (9 periods)

Trade Marks: Basic concepts, definition, functions, kinds of trademarks: service trademarks, collective trademarks, certification trademarks, textile trade marks, registrable and non registrable trademarks, registration of trademarks, examination process, establishing trade mark right, good will, infringement and action for trademarks, passing off, trade mark and eco label, comparison with patents industrial design and copy right.

UNIT-IV: INDUSTRIAL DESIGN, TRADE SECRETS, CYBER LAWS (9 periods)

Industrial Design: Basic concepts, scope and nature of rights, process of registration rights, rights after registration, transfer of interest or rights, reliefs and remedies and action for infringement of rights, appeals..

Trade Secrets: Definition, significance, tools to protect trade secrets in India

Cyber laws: Co relation to intellectual property

UNIT-V: COPY RIGHTS (9 periods)

Copy Rights: Introduction, nature and scope, subject matter, related or allied rights, works in which copy rights subsists, registration of copy rights, conferred by copy right, copy right protection in India, transfer of copy rights, right of broad casing organizations and of performer, computer software.

Total No. of Periods: 45

TEXT BOOKS:

1. P.Narayan, "Intellectual Property Law", Eastern Law House, New Delhi and Kolkata, 2005,
2. Deborah E. Bouchoux, "Intellectual Property Rights", Cengage Learning, India edition, 2011.

REFERENCE BOOKS:

1. Bainbridge David, "Intellectual Property Rights: Key to New Wealth, National Research Development Corporation, Pearson Education, New Delhi.
2. W.R.Cornesh, "Intellectual Property Rights: Patent, Copy Right, Trade Mark, Allied Rights", Universal law publishing private limited, Delhi, 2001.
3. S.R. Myneni, "Law of Intellectual Property", Asia law house, Hyderabad 2001.
4. Prabuddha Ganguly, "Intellectual Property Rights: Unleasing Knowledge Economy", TMH New Delhi, 1 st edition, 2001.

III B.Tech. II Semester

14BT60308**: MANAGING INNOVATION AND ENTREPRENEURSHIP**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts Shifting Composition of the Economy Purposeful Innovation & 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1: Define, explain and illustrate theories of business innovation and entrepreneurship, the evolution of industries and economies, and the roles of Entrepreneurs.

CO2: Develop a comprehensive and well structured business plan for a new venture.

CO3: Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan; and,

CO4: Work effectively in multidisciplinary, cross-cultural teams, towards the development of a Team Project.

DETAILED SYLLABUS:

UNIT-I: ENTREPRENEURSHIP (7 Periods)

Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, entrepreneurial growth and development.

UNIT-II: CREATIVITY AND INNOVATION (11 Periods)

Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies: Strategies that aim at introducing an innovation, innovation & entrepreneurship, planning - incompatible with Innovation & entrepreneurship.

UNIT-III: THE INDIVIDUAL ENTREPRENEUR (7 Periods)

Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation Entrepreneurial motivation (nAch story); Achievement Motivation in Real life- Case Study. Entrepreneurs versus inventors.

UNIT-IV: INTERNATIONAL ENTREPRENEURSHIP OPPORTUNITIES (11 Periods)

International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Entrepreneurial entry in to international business, strategic Issues in International Entrepreneurship.

UNIT-V: CREATIVE PROBLEM SOLVING (9 Periods)

Problem Identification and Problem Solving: Problem Identification. Problem solving Innovation and Diversification.

Total No. of Periods: 45

TEXT BOOKS:

1. Martin, M.J. "Managing Innovation and Entrepreneurship in Technology based Firm", John Wiley Interscience, 1994.
2. Ettlie, J.E. "Managing Technology Innovation", John Wiley & Sons, 2000.
3. Robert D Hisrich., Michael P Peters., Dean A Shepherd,"Entrepreneurship"The McGraw-Hill Companies, 6th Edition, 2011

REFERENCE BOOKS:

1. Christensen, C. M. and Raynor, M. E. The Innovators Solution: Creating and Sustaining Successful Growth, Boston, MA: Harvard Business School Press, (2003).
2. Drucker, P. F., Innovation and Entrepreneurship, New York: Harper, 1985.
3. Harvard Business Review on Innovation (Collection of articles), Harvard Business School Press (2001).
4. Harvard Business Review on Entrepreneurship (Collection of articles), Harvard Business School Press (1999)
5. Rogers, E.M., "Diffusion of Innovations", New York: Simon and Schuster, 5th Edition, 2003.
6. Drucker, P. F. "The Discipline of Innovation," Harvard Business Review, May2000. (Originally published 1985, May-June)

III B.Tech. II Semester

14BT60309**: MATERIAL SCIENCE**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Engineering Chemistry" and "Engineering Physics".

COURSE DESCRIPTION

Structure and Bonding in metals; Steels ,Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semi conductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics engineering, Material Selection and manufacturing of Optical fibers

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Understand how materials are formed and their classification based on atomic arrangement.

CO2. Illustrate how the design of the various types of steels, cast Irons and Non ferrous alloys influence various engineering applications.

CO3. Understand the basic difference in properties of various conductors, Insulators and Semiconductors and application of various advanced materials for different branches of Engineering .

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO MATERIALS SCIENCE (7 periods)

Structure of metals: Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size.

Constitution of alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT-II: CAST IRONS , STEELS & NON-FERROUS METALS (12 periods)

Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels. Structure and properties of Copper and its alloys, Aluminum and its alloys,

UNIT-III: ELECTRIC CONDUCTORS & INSULATORS (12 periods)

Type of materials selected for conductors, Insulators and semiconductors. Introduction to ceramics-Bonding and microstructure-DC properties of ceramic materials–AC properties– mechanical properties - Ceramics as Conductors, Insulators and capacitors, introduction to Plastics-DC properties-AC properties-mechanical properties.

UNIT-IV: SEMICONDUCTORS AND MAGNETIC MATERIALS (9 periods)

Fabrication of Semiconductors-Producing a silicon wafer-Lithography and Deposition-Packaging of semiconductors materials-Types of magnetic materials- Measuring magnetic properties-Application of soft magnetic materials in Electromagnets and relays, AC transformers, Generators and motors.

UNIT-V: ADVANCED MATERIALS AND APPLICATIONS (5 periods)

Composites – Fiber reinforced, Metal Matrix, Ceramic Matrix – properties and applications; Ceramics – Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Glasses– properties and applications, manufacturing of Optical fibers.

Total No. of Periods: 45

TEXT BOOKS:

1. Kodigre V D, Material Science and Metallurgy, Everest Publishing House, Pune, 31st edition, 2011.
2. Ian.P.Jones, *Material Science for Electrical and Electronic Engineers*, Oxford University Press, New Delhi,2000

REFERENCE BOOKS:

1. V. Raghavan, *Physical Metallurgy: Principles and Practices,* PHI, New Delhi, 2nd edition, 2006.
2. William. D. Callister, *Materials Science & Engineering-An Introduction,* John Wiley and sons, New Delhi, 6th edition, 2002.
3. A.J. Dekkar, *Electrical Engineering Materials*, PHI, New Delhi, 1970.

III B. Tech. II Semester

14BT60502**: ENGINEERING SYSTEMS ANALYSIS AND DESIGN**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: NIL

COURSE DESCRIPTION:

Overview of theSystems Process, Technologies for systems, System Development Life Cycle, system Analysis and Modeling,levels of anagement, Project Management,Systems Implementation and importance of UMLPrototyping, Maintaining and Managing the Systems output Process.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge on:

- Systems Process and System Design
- Systems Analysis and Modeling
- System Development Life Cycle
- Design Management and Maintenance Tools.

CO2. Apply the CASE Tools for System Processand estimation the given models.

CO3. Design, Develop and implement new Techniques for modeling the systems.

CO4. Work effectively as team member on projects

CO5. Manage and Maintain the System Process.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (9 periods)

Introduction- Systems, Types of systems,integrating technologies for systems, Need for system analysis and design, Role of the systems analyst, the system development life cycle, CASE tools for analysis and design.

UNIT-II: ANALYSIS AND MODELING ORGANIZATIONAL SYSTEMS (9 periods)

Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, levels of management, organizational culture.

UNIT-III: PROJECT MANAGEMENT (9 periods)

Project initiation, Problem in organization, Determining feasibilities,ascertaining hardware and software needs,identifying, forecasting, comparing costs and benefits, activity planning and control, managing the project.

UNIT-IV: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (9 periods)

Object oriented analysis and design- Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT-V: DESIGNING EFFECTIVE OUTPUT (9 periods)

Output design objectives, relating output content to output method, realizing how output bias affects users, designing output for display, Case studies- Designing a web site management, online exam management.

Total No. of Periods: 45

TEXT BOOKS:

1. Kenneth E.Kendall and Julie E.Kendall, "System analysis and Design",8th Edition, Pearson Education , India,2011.

REFERENCE BOOKS:

1. Dennis, Wixom, and Roth "Systems Analysis and Design"5th Edition, John Wiley. 2012.
2. Shelly and Rosenblatt, "Systems Analysis and Design" 9th Edition, Cengage Learning, 2012.

III B. Tech. II Semester

14BT71005**: MICROELECTROMECHANICAL SYSTEMS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: Basic knowledge in Physics.

COURSE DESCRIPTION:

Overview of Micro Electro Mechanical Systems (MEMS), scaling laws, working principles of microsensors and microactuators, materials, microfabrication processes, packaging of Microsystems.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1: Demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators.

CO2: Identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF MEMS AND SCALING LAWS (9 Periods)

Introduction, MEMS and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.

Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid- body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT-II: **WORKING PRINCIPLES OF MICROSYSTEMS (9 Periods)**

Microsensors, acoustic wave sensors, biomedical and biosensors, chemical sensors, pressure sensors, thermal sensors. Microactuation: actuation using thermal forces, shape-memory alloys, piezoelectric crystals, electrostatic forces. MEMS with microactuators, microgrippers, micromotors, microvalves, micropumps. Microaccelerometers, microfludics.

UNIT-III: MATERIALS FOR MEMS AND MICROSYSTEMS (9 Periods)

Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

UNIT-IV: MEMS FABRICATION PROCESS AND MICROMANUFACTURING (9 Periods)

Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.

UNIT-V: MEMS PACKAGING (9 Periods)

Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging.

Total No. of Periods: 45

TEXT BOOK:

1. Tai-Ran Hsu, *MEMS & Microsystems, Design and Manufacture*, McGraw Hill Education (India) Pvt. Ltd., 2002.

REFERENCE BOOKS:

1. G.K.Ananthasuresh, K.J.Vinoy, *Micro and Smart Systems*, Wiley India, Ist edition, 2010

2. Nitaigour Premchand Mahalik, *MEMS*, McGraw Hill Education (India) Pvt. Ltd., eighth reprint, 2013.

III B.Tech. II Semester
14BT61205: BIO INFORMATICS
(OPEN ELECTIVE)
(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.

CO2. Analyze biological database management system.

CO3. Create, select and apply appropriate techniques and tools to manage the biological data.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO BIOINFORMATICS (8 Periods)

Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

UNIT-II: BIOLOGY AND INFORMATION (7 Periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT-III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 Periods)

Heuristic alignment algorithms, global sequence alignments- Needleman-Wunsch algorithm, local sequence alignments- smith-waterman algorithm, amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.

UNIT-IV: PRIMARY DATABASES AND THEIR USE (11 Periods)

Introduction to biological databases- organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT-V: SECONDARY DATABASES (9 Periods)

Introduction to secondary databases- organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-organization and Management of databases, KEGG, ExPASy, BRENDA.

Total No. of Periods: 45

TEXT BOOKS:

1. David W. Mount **"Bioinformatics: Sequence and Genome Analysis",** CSHL Press, 2nd edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, **"Bioinformatics Basics, Applications in Biological Science and Medicine",** CRC Press, Taylor & Francis Group, 2nd edition,2005.
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, **"Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery",** PHI Learning Pvt. Ltd., 3rd edition, 2011.

III B.Tech. II Semester

14BT61206**: CYBER SECURITY AND LAWS**

(OPEN ELECTIVE)

(Common to CSE, CSSE, IT and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge in Cyber security, Cyber crimes and its related laws in Indian and Global Act.

CO2. Analyze the legal perspectives and laws related to cyber crimes in Indian context.

CO3. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO CYBER CRIMES (9 Periods)

Introduction, Definition, Origin, Cyber Crime and Information Security, Cyber Criminals, Classifications of Cyber Crimes, The Legal Perspectives and Indian Perspective, Cyber Crime and Indian ITA 2000, Global Perspective on Cyber Crimes.

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Café and Crimes, Botnets.

UNIT-II: TOOLS AND METHODS USED IN CYBER CRIME (9 Periods)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT-III: CYBER CRIMES AND CYBER SECURITY-LEGAL PERSPECTIVES (8 Periods)

Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT-IV: CYBER SECURITY-ORGANIZATIONAL IMPLICATIONS (10 Periods)

: Introduction, Cost of Cyber Crimes and IPR issues, Web Threats for Organizations – Evils and Perils, Security and Privacy Implications from Cloud Computing, Social Media Marketing-Security Risks and Perils for Organizations, Social Computing and Associated Challenges for Organizations, Protecting People's Privacy in Organization, Organizational Guidelines for Internet Usage, Safe Computing and Usage Policy, Incident Handling and Best Practices, Media and Asset Protection.

UNIT-V: CYBER TERRORISM AND INFORMATION WARFARE (9 Periods)

Introduction, Intellectual Property in the Cyber Space, the Ethical Dimension of Cyber Crimes, the Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.

Cyber Crime Illustrations: Indian Banks lose Millions of Rupees, Justice vs. Justice, Parliament Attack, The Indian case of online Gambling, Bank and Credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam.

Total No. of Periods: 45

TEXT BOOK:

1. Nina Gobole, Sunit Belapure, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives," Wiley India, 1st edition, 2011.

REFERENCE BOOKS:

1. Ferrara et al., "Cyber Law: Text and Cases," Cengage Learning, 3rd edition, 2012.
2. Vivek Sood, "Cyber Law Simplified", Tata McGraw-Hill, 1st edition, 2012.
3. Prashant Mali, "Cyber Law and Cyber Crimes," Snow White Publications Pvt. Ltd., 1st edition, 2013.

III B.Tech. II Semester

14BT61521**: COMPUTER NETWORKS AND COMPILER DESIGN LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	**50**	**75**	**-**	**-**	**3**	**2**

PREREQUISITES: Courses on "Computer Networks and Compiler Design"

COURSE DESCRIPTION: Hands on practical experience on implementing data link layer framing methods, routing algorithms and Encryption standards; Top down and bottom up parsing techniques , Design of lexical analyzer using LEX and YACC tools.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain basic programming skills to implement

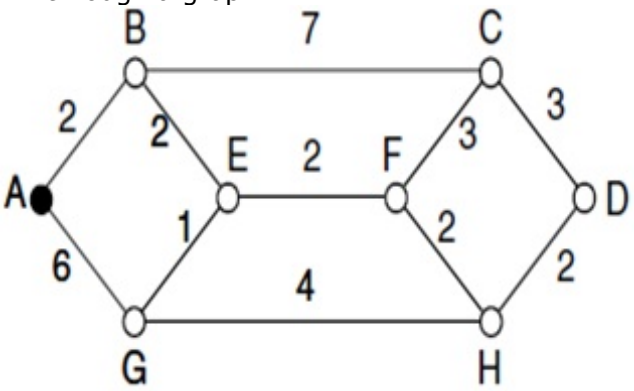
a. Framing mechanisms for data link layer,
b. Shortest path using Dijkstra's
c. Distance vector
d. Intermediate code generation
e. Code optimization.

CO2. Design Lexical Analyzer, Intermediate code generator and code optimizer for a Compiler.

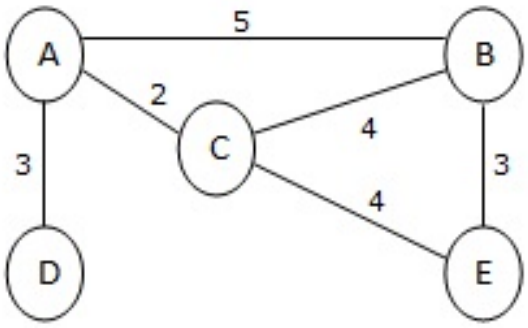
CO3. Implement lexical analysis and parsing using LEX and YACC tools.

LIST OF EXPERIMENTS:

1. Implement the following data link layer framing methods
   a. Character Count
   b. Character Stuffing
   b. Bit Stuffing
2. Design a program to compute checksum for the given frame 1101011011 using CRC-12, CRC-16, CRC-CCIP. Display the actual bit string transmitted. Suppose any bit from is inverted during transmission. Show that this error is detected at the receivers end.
3. Implement Dijkstra 's algorithm to compute the Shortest path through a graph.



4. Design a program to obtain routing table for each node using distance vector routing algorithm by considering the given subnet with weights indicating delay between nodes.



5. Simulate the Random Early Detection congestion control algorithm.

6. Encrypt the message "COMPUTER NETWORKS LAB" using Caesar cipher with a key of 20. Ignore the space between words. Decrypt the message to get the original plain text.
7. Design a Lexical analyzer for the given language. The Lexical analyzer Should ignore redundant spaces, tabs and new lines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitary long, you may restrict length to some reasonable value.
8. Implement the lexical analyzer using FLEX or LEX or other lexical analyzer generating tools.
9. Generate predictive parsing table for the given grammar

   E®TE'

   E'®+TE' | Î

   T®FT'

   T'®*FT' | Î

   F®(E) | id
10. Implement a program to generate intermediate code for the expression ((a+b)*c).
11. Generate an optimized code for the following instructions

    A=C+D

    B=C+D

    C=F+G

    E=A+B

    END.
12. Design a simple calculator using: YACC

REFERENCE BOOKS:

1. Andrew S. Tanenbaum and David J. Wetherall "Computer Networks," Pearson Education, Fifth Edition,2012.
2. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffery D. Ullman, "Compilers Principles, Techniques and Tools", Second Edition, Pearson Education, 2012.

III B. Tech. II Semester

14BT61522**: OOAD and WEB PROGRAMMING LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITE: Courses on "Object Oriented Analysis & Design", "Web programming".

COURSE DESCRIPTION: Hands on practical experience on Modeling case studies – Automated Teller Machine,Library Information System, Online Ticket Reservation system, Two Floor Elevator Simulator; HTML, HTML5, CSS, JavaScript, JQuery, XML, AJAX, PHP and MySQL.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1: Design and Develop interactive and dynamic web applications using HTML, CSS, JavaScript, JQuery, XML, AJAX, PHP and MySQL for real world applications.

CO2: Use Unified Modeling Language for designing software systems.

LIST OF EXPERIMENTS:

CASE STUDY 1: AUTOMATED TELLER MACHINE (ATM)

Problem Statement:

Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

CASE STUDY 2: LIBRARY INFORMATION SYSTEM

Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned back to the library, that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

CASE STUDY 3: ONLINE TICKET RESERVATION FOR RAILWAYS

Problem Statement:

Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, date of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes i.e. Sleeper class, First class and the AC compartment. Design the application for the above problem description.

CASE STUDY 4: RECRUITMENT PROCEDURE FOR SOFTWARE INDUSTRY

Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company. The technical skill and the experience of the candidates are reviewed and the short listed candidates are called for the interview. There may be different rounds for interview like the written test, technical interview, and HR interview. After the successful completion of all rounds of interview, the selected candidates names are displayed. Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirementbenefit to the candidate.

CASE STUDY 5: TWO FLOOR ELEVATOR SIMULATOR

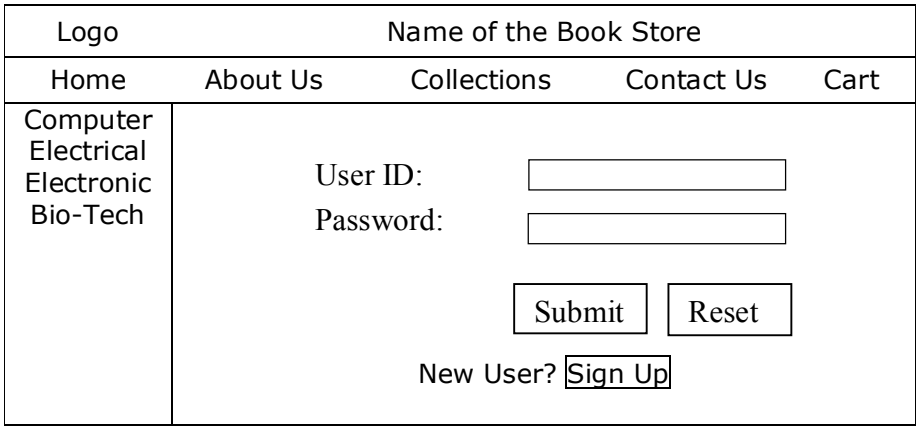
The elevator has the basic function that all elevator systems have, such as moving up and down, open and close doors, and of course, pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to MaxFloor, where the first floor is the lobby. There are car call buttons in the car corresponding to each floor. For every floor except for the top floor and the lobby, there are two hall call buttons for the passengers to call for going up and down. There is only one down hall call button at the top floor and one up hall call button in the lobby. When the car stops at a floor, the doors are opened and the car lantern indicating the current direction the car is going is illuminated so that the passengers can get to know the current moving direction of the car. The car moves fast between floors, but it should be able to slow down early enough to stop at a desired floor. When an elevator has no requests, it remains at its current floor with its doors closed.

In order to certificate system safety, emergency brake will be triggered and the car will be forced to stop under any unsafe conditions.

CASE STUDY 6: HOME APPLIANCE CONTROL SYSTEM

A home appliance control system (HACS) is a system which provides various services to remotely operate on home appliances, such as microwave oven, TV, and garage door etc through remote devices such as mobile phone, desktop and palm-top. A home appliance control system (HACS) is a system which is controlled by a remote system such as a mobile phone or a palm-top, and at the same time controls, monitors and coordinates home appliances such as air conditioner, microwave oven, garage doors, TV set, VCR, audio controller, indoor/outdoor lights, water sprinkler, home security system, bath tub controller, etc. In order to activate home appliances and to allow for different ways of cooking, the HACS needs mechanisms for communication between the different devices in the system, and for coordination among the various processes running on such devices. The system administrator of the HACS system has the ability to add a new appliance or delete an existing one. The system administrator has the ability to add a new remote device and configure it with HACS or delete an existing one when it is not used. Also the system administrator can create an account for a new user or delete existing account if it is no longer used.

7. Design the following static web pages required for an online book store web site.



The Home page must have the following three frames:

Top frame: Logo and the book store name and links to Home page, Latest arrivals, Best sellers, Contact us and Search.

Left frame: At least four links for navigation, which will display the books catalogue relevant to engineering disciplines. For e.g. when the link "Computers" is clicked, the catalogue relevant to computer science books will be displayed in the right frame.

Right frame: The pages of navigated links in the left and top frame must be loaded in the right frame. Initially it will load the Home page that can include the description of the book store, sign-in and create account information.

B) Catalogue Page:

The catalogue page should display the following details of books available in the web site. The details are as follows:

a) Snap shot of cover page b) Title of the text book c) Author name
d) Publisher e) Price f) More details link.

Logo	Name of the Book Store			
Home	About Us	Collections	Contact Us	Cart

Computer
Electrical
Electronic
Bio-Tech

Computer Books

Cover Page	Book Details	Price	Remarks
	Book : XML Bible Author : Winston Publication : Wiley	INR 399.00	Add to Cart
	Book : Multimedia Author : Ze Nian Li Publication : Prearson	INR 455.00	Add to Cart
	Book : HTML Author : Watson Publication : SPD	INR 355.00	Add to Cart

C) Registration Page:

Design the Registration page with the following fields and link it to create an account link.

a) First Name b) Last Name c) Gender d) Date of Birth e) Username f) Password g) Confirm Password h) Address i) Postal Code j) Mobile No. k) Email-Id

8. a) Design a web page to store username and password information using the local storage concept.
   b) Design a web page to store employee information including Name, Emp.Id, Department, Salary and Address on a client's machine using a real SQL database.
9. Apply the following styles to all web pages of online book store web site.
   a) Fonts and Styles: font-family, font-style, font-weight and font-size
   b) Backgrounds and colors: color, background-color, background-image and background-repeat
   c) Text: text-decoration, text-transformation, text-align and text- indentation, text-align
   d) Borders: border, border-width, border-color and border-style
   e) Styles for links: A: link, A: visited, A:active, A:hover
   f) Selectors, Classes, Layers and Positioning elements.
10. Write a JavaScript/JQuery code to validate the following fields of the Registration web page.
    a) First Name/Last Name - should contain only alphabets and the length should not be less than 8 characters.
    b) Username - It should contain combination of alphabets, numbers and _. It will not allow spaces and special symbols.
    c) Password - It should not less than 8 characters in length.
    d) Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.
    e) Postal Code: It must allow only 6 digit valid number.
    f) Mobile No. - It should allow only numbers and total number of digits should be equal to 10.
    g) E-mail id - It should allow the mail id with the following format:

Ex. mailid@domainname.com

11. Design a web page with the following features using HTML5, JavaScript and JQuery
    a) Displaying of images with Custom animated effects
    b) Playing of selected video from the list of loaded videos
    c) Showing the animated text in increasing and decreasing font size
    d) Changing the size of the area in a web page using DIV tag
    e) Hides and Shows elements on web page.
12. Write an XML file to store book details including:
    a) Title of the book b) Author of the book c)ISBN number
    d) Publisher Name e) Edition f) Price
    i. Write a Document Type Definition (DTD) or XML Schema to validate the above XML file.
    ii. Display the contents of the XML file with the following format using XSLT.

    The contents should be displayed in a table format. The header of the table should be in color grey and the author names should be displayed in red color, bold and capitalized. Use appropriate colors for remaining fields.
13. Design a web page to reload some portion of the web page content using XMLHttpRequest object.
14. a) Deploy and navigate web pages of online book store using WAMP/XAMPP web server.

    b) Write a PHP program to red user name and favorite color from the HTML form. Display the name of the user in green color and sets user favorite color as a background for the web page.
15. Write a PHP code to read the username and password entered in the Login form of the online book store and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.
16. Write a PHP code to read user details entered through the registration web page and store the same into MySQL database.
17. Write a PHP code for storing books details like Name of the book, author, publisher, edition, price, etc into MySQL database. Embed a PHP code in catalogue page of the online book store to extract books details from the database.

REFERENCE BOOKS:

1. Grady Booch, James Rum Baugh, Ivar Jacobson, "The Unified Modeling Language UserGuide," Second Edition, Pearson Education, 2009.

2. Kogent Learning Solutions Inc, "HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery," First Edition, Dreamtech Press, 2011.

IV B.Tech. I Semester
14BT71501: EMBEDDED SYSTEM PROGRAMMING
(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Courses on "Computer Organization" and "Operating Systems".

COURSE DESCRIPTION: Embedded Systems, Design process; 8051 – Microcontroller; Program Modeling; Real Time Operating systems principles; Embedded system development tools.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge in the following:

a. Embedded system components.
b. 8051 Microcontroller.
c. Principles of Real Time Operating Systems.
d. Embedded System design and development Process.

CO2. Acquire programming skills to develop software for Embedded systems development.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (9 PERIODS)

Embedded Systems, Processor Embedded into a system, Hardware units and devices in a system, software, Examples, SoC and VLSI technology, Complex System design and processors, System Design process, Design Formalization, Examples, Classification, Designer skills.

UNIT-II: MICROCONTROLLER (10 PERIODS)

8051 Micro controller Hardware, Input/output Ports and Circuits, Assembly language programming-PC, ROM space, data types, flags and register banks. Jump, loop and call instructions, Addressing modes,

I/O ports, Arithmetic and logic instructions and programs, programming in C.

UNIT-III: PROCESSES AND REAL-TIME OPERATING SYSTEMS (9 PERIODS)

Threads and Tasks: Tasks, Task States, Task and Data, Concept of Semaphores, Shared Data, Inter-process Communication, Signal Function, Semaphore Functions, Message Queue Functions, Mailbox Functions, Pipe Functions.

Real-Time Operating Systems: OS Services, Process Management, Timer Functions, Event Functions, Memory Management, Device, File and I/O subsystems management, Interrupt routines.

UNIT-IV: EMBEDDED PROGRAMMING (9 PERIODS)

Program Modeling Concepts and Embedded Programming: Program Models, DFG Models, State Machine Programming Models for Event- controlled Program Flow, Modeling of Multiprocessor Systems, UML Modeling. Software Programming in Assembly Language (ALP) and in High-Level Language 'C', 'C' & Program Elements, Object-Oriented Programming, Embedded Programming in C++ & Java.

UNIT-V: EMBEDDED SYSTEM DEVELOPMENT (8 PERIODS)

Embedded Software Development Process and Testing: Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware–Software Design and Co-design, Testing on Host Machine, Simulators and Laboratory Tools.

Total No. of Periods: 45

TEXT BOOKS

1. Rajkamal, "Embedded Systems Architecture, Programming and Design," Tata McGraw Hill, Second Edition, 2008.
2. Mazidi and Mazidi, " The 8051 Microcontroller and Embedded Systems," Pearson, Second Edition, 2014.

REFERENCE BOOKS:

1. Kenneth J.Ayala, "The 8051 Microcontroller," Cengage India, Third Edition, 2009.
2. David E. Simon, "An Embedded Software Primer", Pearson Education, First Indian Reprint 2000.

IV B. Tech. I Semester

14BT71502**: NETWORK PROGRAMMING**

(Common to CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE: *A Course on* "Computer Networks"

COURSE DESCRIPTION:

Introduction to network programming; sockets; tcp client server; I/O multiplexing and socket option; elementary udp sockets; DNS; IPC; Remote Login

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1: Gain knowledge in concepts of sockets, inter process communication and remote login.

CO2: Analyze networking protocols such as TCP and UDP.

CO3: Apply programming skills to solve problems relevant to client server architectures.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO NETWORK PROGRAMMING AND SOCKETS (10 Periods)

OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application. Address structures, value result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets -Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

UNIT-II: TCP CLIENT SERVER AND SOCKET OPTIONS (10 Periods)

TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host. I/O Models, select function, Batch input, shutdown function, poll function, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket options.

UNIT-III: ELEMENTARY UDP SOCKETS AND DOMAIN NAME SERVERS (06 Periods)

Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

UNIT-IV: INTERPROCESS COMMUNICATION (11 Periods)

Introduction, Pipes, popen and pclose functions, FIFO's, streams and messages, System V IPC: IPC_Perm Structure, IPC Permissions, Creating and Opening IPC Channels, Message queues (msgget, msgsnd, msgrcv, msgctl Functions), Shared Memory (shmget, shmat, shmdt,shmctlFunctions).

UNIT-V: **REMOTE LOGIN (08 Periods)**

Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview,RPC, Transparency Issues.

Total No. of Periods: 45

TEXT BOOKS:

1. W.Richard Stevens, "UNIX Network Programming," Vol. I, Sockets API, Third Edition, PHI, 2010
2. W.Richard Stevens, "UNIX Network Programming IPC," Vol. II, Second Edition, PHI,2009

REFERENCE BOOKS:

1. T CHAN, "UNIX SYSTEMS PROGRAMMING USING C++," Third Edition, PHI.
2. GRAHAM GLASS, KING ABLES, "UNIX for programmers and Users," Third Edition, Pearson Education.

IV B.Tech. I Semester
14BT70331**: OPTIMIZATION TECHNIQUES**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES*:* Engineering Mathematics, Matrices and Numerical Methods

COURSE DESCRIPTION*:* Introduction to optimization; classical optimization techniques; classification of optimization problems; linear programming; transportation and assignment models; non-linear programming; un-constrained non-linear programming; constrained non-linear programming; dynamic programming.

COURSE OUTCOMES*:*

On successful completion of this course the students will be able to:

CO1. Identify mathematical model to employ in a given application requiring optimization.
CO2. Analyze a practical situation and formulate appropriate objective function and constraints.
CO3. Apply the techniques of optimization to maximize the efficiency and minimize the wastage in select situations.

DETAILED SYLLABUS:

UNIT -I: CLASSICAL OPTIMIZATION TECHNIQUES (9 periods)

Introduction, engineering applications of optimization, statement of an optimization problem: design vector, design constraints, constraint surface, objective function; classification of optimization problems; single variable optimization; multi variable optimization without constraints; multi variable optimization with equality constraints: Lagrange multipliers method; multi variable optimization with inequality constraints: Kuhn Tucker conditions.

UNIT -II: LINEAR PROGRAMMING (9 periods)

Requirements of Linear Programming Problem; Formulation of linear programming problems; Graphical solution; Simplex method; Two–phase method; Big M-method; Dual formulation; Dual simplex method.

UNIT -III: TRANSPORTATION AND ASSIGNMENT MODELS (9 periods)

Transportation: Formulation, initial basic feasible solution: North–West corner rule, least cost method, and Vogel's approximation method; Modified distribution (MODI) method of optimal solution; variants in transportation problems: unbalanced, and maximization problem.

Assignment: Formulation, solution of assignment problem and itsvariants; travelling salesmen problem.

UNIT –IV: NON-LINEAR PROGRAMMING (9 periods)

One dimensional minimization methods, classification: Fibonacci method, quadratic interpolation method; classification of unconstrained minimization methods: Powell's method, steepest descent method (Cauchy's method); classification of constrained optimization techniques: interior and exterior penalty function methods.

UNIT –V: DYNAMIC PROGRAMMING (9 periods)

Multistage decision processes; concept of sub optimization and principle of optimality; computational procedure in dynamic programming: calculus method, and tabular method; LPP by dynamic programming approach, Applications: reliability problem, shortest path problem, and capital budgeting problem.

Total No. of Periods: 45

TEXT BOOKS:

1. Singiresu S Rao, Engineering Optimization: Theory and Practice, New Age International, 3rd enlarged Edition, 2010.
2. Hamdy A. Taha, Introduction to Operations Research, PHI, 9th edition, 2013.

REFERENCE BOOKS:

1. A.Ravindran, K.M.Ragsdell, G.V.Reklaitis, Engineering Optimization: Methods and applications, Wiley India Pvt. Ltd., 2nd Edition, 2013.
2. P.K.Gupta and D.S. Hira, Operations Research, S.Chand, 1st edition(reprint), 2008.
3. C Mohan and Kusum Deep, Optimization Techniques, New Age International Publishers, 1st edition(reprint), 2010.
4. R. Panneerselvam, Operations Research, PHI, 2nd edition, 2012.

IV B.Tech. I Semester

14BT61201**: DATAWAREHOUSING AND DATA MINING**

(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Database Management Systems"

COURSE DESCRIPTION: Data Warehouse Design, Data Mining Fundamentals, Data Preprocessing, Mining Frequent Patterns, Classification and Prediction, Clustering Techniques.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on

- Concepts of data mining and data warehousing
- Data preprocessing and association rule mining
- Classification and Prediction techniques
- Clustering techniques

CO2. Analyze data mining techniques for finding necessary useful and potential knowledge

CO3. Apply machine learning techniques to discover and measure interesting patterns from large databases.

DETAILED SYLLABUS:

UNIT-I: DATA WAREHOUSING AND DATA MINING (12 Periods)

Data Warehouse: Basic Concepts, Modeling, Design and Usage, Data Generalization by Attribute-oriented Induction **Data Mining:** Why Data Mining, What is Data Mining, Kinds of data can be mined, Kinds of patterns can be mined, Kinds of applications targeted, Major Issues in Data Mining.

UNIT-II: DATA PREPROCESSING (10 Periods)

Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

UNIT-III: MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS (7 Periods)

Basic Concepts, Frequent Itemset Mining Methods, pattern mining in Multilevel and Multidimensional Space

UNIT-IV: CLASSIFICATION AND PREDICTION TECHNIQUES (9 Periods)

Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule Based Classification, Techniques to improve classification accuracy: Bagging and Boosting, Bayesian Belief Networks, Classification using frequent patterns.

UNIT-V: CLUSTER ANALYSIS (7 Periods)

Cluster Analysis, Partitioning Methods: K-Means; Hierarchical Methods: AGNES Vs DIANA; Density based Methods: DBSCAN, Outlier Analysis and Detection Methods.

Total No. of Periods: 45

TEXT BOOK:

1. Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining: Concepts and Techniques" 3rd edition, Elsevier, 2013.

REFERENCE BOOKS:

1. Margaret H Dunham, "Data Mining Introductory and Advanced Topics", 2nd edition, Pearson Education, 2006.
2. Tan P.N, Steinbach M. and Kumar V.: "Introduction to Data Mining", Addison-Wesley, 2006.

IV B. Tech. – I Semester

14BT71503**: KERNEL PROGRAMMING**

(Professional Elective – I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITE: A Course on "Operating Systems"

COURSE DESCRIPTION:

Features of UNIX; The File System; The shell interpretive cycle; Introduction to unix operatiing System; Architecture of Unix operating system; process states and transitions; process creation;

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1: gain knowledge to manage simple file processing operations, organize directory structures.

CO2: Able to design and develop shell scripts to perform more complex tasks.

CO3: Acquire programming skills through shell scripting.

DETAILED SYLLABUS:

UNIT-I: (9 Periods)

INTRODUCTION TO UNIX: Features of UNIX, Internal And External Commands, Command Structure.

GENERAL-PURPOSE UTILITIES: cal, date, echo, printf, bc, script, passwd, PATH, who, uname, tty, stty, pwd, cd, mkdir, rmdir, od.

HANDLING FILES: The File System, cat, cp, rm, mv, more, file, ls, wc, pg, cmp, comm, diff, gzip, tar, zip, df, du, mount, umount, chmod, The vi editor ,security by file Permissions

NETWORKING COMMANDS: ping, telnet, ftp, finger, arp, rlogin.

UNIT-II: (9 Periods)

THE SHELL: The shell interpretive cycle, shell offerings, pattern matching, Escaping and quoting, Redirection, pipes, tee, command substitution, shell variables.

ESSENTIAL SHELL PROGRAMMING: shell scripts, read: making scripts interactive, using command line arguments, exit and exit status of command, The logical operators, if conditional, using test and [] to Evaluate Expressions, the case conditional, expr: computation and string handling,$0:calling a script by different names, While: looping, for: looping, set and shift: Manipulating the positional parameters, the here document, trap, debugging shell scripts with set –x, sample validation and data entry scripts.

UNIT-III: (11 Periods)

Introduction to Kernel: Architecture of Unix operating system, introduction to system concepts, Kernel Data Structures, System Administration.

UNIT-IV: (7 Periods)

The structure of process: process states and transitions, layout of system memory, the context of a process, saving the context of process, manipulation of the process address, sleep

UNIT-V (9 Periods)

Process control: process creation, signals, process termination, awaiting process termination, invoking other programs, the user id of a process, changing the size of a process, the shell, system boot and init process.

Total No. of Periods: 45

TEXT BOOKS:

1. Sumitabha Das, "Unix Concepts And Applications", 4thEdition. TMH, 2006. (1, 2 units)
2. Maurice J. Bach, "The Design of the Unix Operating System", 1st Edition, PHI Learning.

REFERENCE BOOKS:

1. Graham Glass, King Ables, "Unix for programmers and users", 3rd Edition, Pearson Education, 2009.
2. N.B Venkateswarlu, "Advanced Unix programming", 2ndEdition, BS Publications, 2010.
3. Yashwanth Kanitkar, "Unix Shell programming", 1stEdition, BPB Publisher, 2010.

IV B.Tech. I Semester

14BT71504**: SIMULATION AND MODELING**

(PROFESSIONAL ELECTIVE – I)

(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITES: A course on "Probability and Statistics"

COURSE DESCRIPTION:

Discrete event simulation; useful statistical models; queueing systems; properties of random numbers, test for random numbers; data collection, types of simulations with respect to output analysis.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

- **CO1.** Gain knowledge on functional modeling of system design.
- **CO2.** Analyze the performance of queueing systems in real world applications.
- **CO3.** Design dynamic system operations using simulation results.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO DISCRETE EVENT SIMULATION (9 Periods)

Simulation of queueing systems, Simulation of inventory systems, Concepts in discrete-event simulation, List processing, Selection of simulation software.

UNIT II: STATISTICAL MODELS (9 Periods)

Review of terminology and concepts, Useful statistical models, Discrete distributions, Continuous distributions, Poisson process, Empirical distributions.

UNIT III: QUEUEING MODELS (9 Periods)

Characteristics of queueing systems, Queueing notation, Long-run measures of performance of queueing systems, Steady-state behavior of infinite-population Markovian models, Steady-state behavior of finite-population models, Networks of queues.

UNIT IV: RANDOM NUMBERS (9 Periods)

Properties of random numbers, Generation of pseudo-random numbers, Techniques for generating random numbers, Tests for random numbers, Inverse-transform technique, Acceptance-rejection technique, Special properties.

UNIT V: ANALYSIS OF SIMULATION DATA (9 Periods)

Data collection, Identifying the distribution with data, Parameter estimation, Goodness-of-fit tests, Fitting a nonstationary Poisson process, Selecting input models without data, Multivariate and time series input models.

Types of simulations with respect to output analysis, Stochastic nature of output data, Measures of performance and their estimation, Output analysis of terminating Simulations and steady state simulations.

Total No. of Periods: 45

TEXT BOOK:

1. Jerry Banks, John S. Carson II, Barry L.Nelson and David M.Nicol, "*Discrete-Event System Simulation,*" Fourth Edition PHI Learning Private Ltd., New Delhi, 2009.

REFERENCE BOOKS:

1. Geoffrey Gordon, "*System Simulation,*" Second Edition, PHI, 2006.
2. Averill M. Law, "Simulation *Modeling and Analysis*," Fourth Edition, McGraw Hill Education (India) Private Limited, 2007.

IV B.Tech. I Semester

14BT70503**: ADVANCED COMPUTER ARCHITECTURE**

(PROFESSIONAL ELECTIVE-I)

(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITE: *A course on* "Computer Organization".

COURSE DESCRIPTION

Quantitative design and analysis, memory hierarchy design; parallel computer models and network properties; pipe lining, superscalar techniques, multiprocessors and multi computers; Multi-Vector, SIMD and Multi-Core computers

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge of:
- Computational models and Computer Architectures.
- Concepts of parallel computer models.
- Scalable Architectures.
- Pipelining, Superscalar processors, multiprocessors, SIMD and Multi core Computers.

CO2. Analyze the architectures of parallel computers and their interconnection structures.

CO3. Design modern computer architectures and hardware systems

DETAILED SYLLABUS:

UNIT-I: FUNDAMENTALS OF QUANTITATIVE DESIGN AND ANALYSIS, MEMORY HIERARCHY DESIGN (9 Periods)

Fundamentals of Quantitative Design and Analysis: Introduction, Classes of computers, Defining Computer Architecture, Trends in technology, Trends in power and energy in ICs, Trends in cost, Dependability, Quantitative Principles of Computer Design.

Memory Hierarchy Design: Introduction, Advanced optimizations of cache performance, Memory technology and optimizations, Cross cutting issues–The design of memory hierarchies.

UNIT-II: PARALLEL COMPUTER MODELS AND NETWORKS PROPERTIES (9 Periods)

Parallel Computer Models: The state of computing, Multiprocessors and multi-computers, Multi vector and SIMD computers.

Program and Networks Properties: Conditions of Parallelism, Program partitioning and scheduling, Program flow mechanisms, System interconnect architectures.

Examples: Detection of Parallelism in a program using Bernstein's conditions.

UNIT-III: PRINCIPLES OF SCALABLE PERFORMANCE AND MEMORY (9 Periods)

Principles of Scalable Performance: Performance metrics and measures, Parallel Processing applications, Speedup performance laws.

Bus, Cache and Shared memory: Bus systems, Cache memory organizations, Shared memory organizations.

UNIT-IV: PIPELINING AND SUPERSCALAR TECHNIQUES, MULTIPROCESSORS AND MULTICOMPUTERS (9 Periods)

Pipelining and Superscalar Techniques: Linear pipeline processors, nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design.

Multiprocessors and Multi-computers: Multiprocessor system interconnects Cache Coherence and synchronization mechanisms.

UNIT-V: MULTIVECTOR AND SIMD COMPUTERS, MULTICORE COMPUTERS (9 Periods)

Multi-Vector and SIMD computers: Vector processing principles, Multi-vector multiprocessors, SIMD computer organizations- Implementation Models, CM2 Architecture; The Connection Machine CM5: As synchronized MIMD Machine, The CM5 Network architecture, Control Processor and processing nodes, Inter processor communications.

Case Studies: CRAY line of Computer Systems, Power PC architecture

Total No. of Periods: 45

TEXT BOOKS:

1. Kai Hwang and Naresh Jotwani, "Advanced Computer Architecture," Second Edition, New Delhi, McGraw Hill, 2011.
2. John L. Hennessy and David A. Patterson, "Computer Architecture- A Quantitative Approach," Fifth Edition, Elsevier, 2012

REFERENCE BOOKS:

1. Kai Hwang "AdvancedComputer Architecture," First Edition, New Delhi, Tata McGraw Hill, 2001.
2. Anantha Grama, Anshul Gupta, George Karypis and Vipin Kumar, "Introduction to Parallel Computing," Second Edition, New Delhi, Pearson Education, 2003.

IV B.Tech. I Semester

14BT81202**: CRYPTOGRAPHY AND NETWORK SECURITY**

(PROFESSIONAL ELECTIVE – I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Computer Networks".

COURSE DESCRIPTION: Principles and practice of cryptography and network security: classical systems, symmetric block ciphers-DES; public-key cryptography-RSA, Diffie-Hellman; hash functions, authentication, key management, key exchange, signature schemes, E-mail, web security, and firewalls.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on Cryptographic algorithms, their mathematical models, Message Authentication, Digital Signatures and firewall.

CO2. Analyze vulnerabilities and threats on information systems based on various security parameters.

DETAILED SYLLABUS:

UNIT-I: CLASSICAL ENCRYPTION TECHNIQUES (8 Periods)

Introduction: Services, Mechanisms, and Attacks Concepts, The OSI Security Architecture, Model for Network Security.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques.

UNIT-II: BLOCK CIPHERS AND PUBLIC-KEY CRYPTOGRAPHY (9 Periods)

Block Ciphers and the Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Block Cipher Design Principles, Block Cipher Modes of Operation.

Public-Key Cryptography: Principles of Public-Key Cryptosystems, the RSA Algorithm, Diffie-Hellman Key Exchange.

UNIT-III: MESSAGE AUTHENTICATION CODES, HASH FUNCTIONS, AND DIGITAL SIGNATURES (9 Periods)

Message authentication codes: Message Authentication Requirements, Message Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, Hash algorithms-SHA, HMAC.

Digital Signatures: Digital Signatures, Digital Signature Standard (DSS), Authentication applications-Kerberos, X.509 Authentication Service.

UNIT-IV: ELECTRONIC MAIL SECURITY, **IP SECURITY AND WEB SECURITY (10 Periods)**

Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME- Multipurpose Internet Mail Extensions (MIME), S/MIME Functionality, Messages, Certificate Processing.

IP Security: IP Security Overview, Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations.

Web Security: Web security Considerations**,** Secure Sockets Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction.

Unit-V: INTRUDERS, MALICIOUS SOFTWARE, AND FIREWALLS (9 Periods)

Intruders: Intrusion Detection, Password Management-Password Protection, Password selection.

Malicious Software: Viruses and Related Threats, Virus Countermeasures.

Firewalls: Firewall Design Principles, Trusted Systems.

Total No. of Periods: 45

TEXT BOOK:

1. William Stallings, "Cryptography and network Security principles and Practice", Pearson Education, 3rd edition, 2003.

REFERENCE BOOKS:

1. William Stallings, "Network Security Essentials Applications and Standards", Pearson Education, 3rd edition.
2. Behrouz A Forouzan and Debdeed Mukhopadhyay, "Cryptography and Network Security", McGraw Hill Education, 2nd edition, 2010.

IV B.Tech. I Semester

14BT71204: SOFTWARE TESTING TECHNIQUES

(PROFESSIONAL ELECTIVE – I)

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Software Engineering".

COURSE DESCRIPTION: Basic & Advance concepts of Software Testing and Techniques: STLC in SDLC, Coverage, Verification & Validation Models, Workbenches, Defects management, White box testing, Black box testing, Integration testing, System testing, Automation tools.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

- **CO1.** Demonstrate in-depth knowledge in software testing methodologies, test strategies.
- **CO2.** Analyzing testing circumstances and their resultants in software development.
- **CO3.** Design & develop the best tests strategies in accordance to the development model.
- **CO4.** Acquire problem solving skills to ensure quality software development meeting the industry standards.
- **CO5.** Conduct tests with latest testing tools to address critical and complex areas of the software testing and achieve quality with ease.

DETAILED SYLLABUS:

UNIT-I: BASIC CONCEPTS OF SOFTWARE TESTING (9 Periods)

Software Testing Fundamentals: Definition, Approaches, Testing during SDLC, Traceability Matrix, Essentials of Software Testing, Workbench, Features of Test Process, Misconceptions about Testing, Principles of Software Testing, Salient features of Good Testing, Test Policy, Test Strategy, Test Planning, Challenges in Testing, Categories of Defect, Defect, Error/Mistake in Software, Test Process, Skills required by Tester

UNIT-II: ADVANCED CONCEPTS OF SOFTWARE TESTING (9 Periods)

Software Verification & Validation: Verification, Verification Workbench, Methods of Verification, Types of Reviews, Reviews in STLC, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Management of Verification & Validation.

V-Test Model: V-model for Software, Testing during - Proposal Stage, Requirement Stage, Test-Planning Stage, Design Phase, Coding. VV Model, Critical Roles and Responsibilities.

Defect Management: Defect Classification, Management Process, Lifecycle, Template, Fixing & Root Cause of Defect, Estimating impact of Defect, Defect Management needing the Risk, Techniques for finding Defects, Reporting a Defect.

UNIT-III: TESTING TECHNIQUES -I (9 Periods)

Flow Graphs and Path Testing: Path-Testing Basics, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Implement and Application of Path Testing.

Transaction-Flow Testing and Data-Flow Testing: Transact ion Flows, Transaction-Flow Testing Techniques, Dataflow Testing Basics, Data-Flow Testing Strategies, Application, Tools, Effectiveness.

UNIT-IV: TESTING TECHNIQUES -II (10 Periods)

Logic Based Testing: Motivational Overview, Decision Tables, Path Expressions Again, KV Charts, Specifications.

State Graphs And Transition Testing: State Graphs, Good State Graphs and Bad, State Testing, Testability Tips.

UNIT-V: TESTING TOOLS AND TEST PLANNING (8 Periods)

Testing Tools: Features of Test Tool, Guidelines for selecting Test Tools, Tools and Skills of Tester, Static & Dynamic Testing Tools, Advantages & Disadvantages of using Test Tools, When to use Automated Test Tools, Testing using Automated Tools, Difficulties while introducing New Tools.

Test Planning: Test Policy & its contents, Strategy & its contents, Test Plan, Quality Plan & Test Plan, Quality Plan Template, System Test Plan Template, Guidelines for developing a Test Plan, Test Estimation, Test Standards, Test Scenarios & Test cases, Template for Test cases, Test Scripts, Building Test Data, Generation of Test Data, Roles & Responsibilities in STLC.

Total No. of Periods: 45

TEXT BOOKS:

1. M.G.Limaye, "Software Testing: Principles and Techniques and Tools", Tata Mc Graw Hill Education, 1ST Edition, 2009.
2. Boris Beizer, "Software Testing Techniques", Dream Tech Press, 2nd Edition, 2004.

REFERENCE BOOKS:

1. Ilene Burnstein,"Practical Software Testing", Springers-Verilog International Edition, 2003.
2. Dr.K.V.K.K.Prasad, "Software Testing Tools", Dreamtech, 1st Edition, 2004.

IV B.Tech. I Semester

14BT71505**: REAL-TIME SYSTEMS**

(PROFESSIONAL ELECTIVE – II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITES: A Course on **"**Operating Systems"

COURSE DESCRIPTION:

Principles of Real-Time systems with emphasis on analyzing the Scheduling algorithms. Reference model of the Real-Time systems, Timing Constraints and Applications; Resource Access Control; Multiprocessor System Environment; Real-Time Communication Model.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge on

a) Principles of Real time systems,
b) Resource Access Control
c) Multi Processor Real Time Systems
d) Real Time Communication

CO2. Analyze the Scheduling algorithms in Real Time Systems

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO REAL-TIME SYSTEMS (9 Periods)

Real-Time Applications, Digital Control, High Level Controls, Signal Processing Applications, Jobs and Processors ,Release Times, Deadlines, and Timing Constraints, Hard Real-Time Systems and Soft Real-Time Systems, Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

UNIT II: SCHEDULING (10 Periods)

Clock-Driven Approach, Weighted Round-Robin Approach, Priority-Driven Approach, Dynamic Versus Static Systems, Effective Release Times and Deadlines, Optimality of the EDF and LST Algorithms, Nanoptimality of the EDF and the LST Algorithms, Challenges in validating Timing Constraints in Priority-Driven Systems, Off-Line Versus On-Line Scheduling, Notions and Assumptions, Static, Timer-Driven Scheduler, Cyclic Executives, Average Response Time of Aperiodic Jobs, Scheduling Sporadic jobs.

UNIT III: RESOURCE ACCESS CONTROL (9 Periods)

Assumptions on Resources, Effect of Resource Contention and Resource Access Control (RAC), NonPreemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic-Priority Systems, Preemption-Ceiling Protocol, Controlling Concurrent Accesses to Data Objects.

UNIT IV: MULTIPROCESSOR SCHDULING AND SYNCHRONIZATION (9 Periods)

Multiprocessor and Distributed System Model, Task Assignment, Multiprocessor Priority-Ceiling Protocol, Elements of Scheduling Algorithms and Schedulability of Fixed-Priority End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and validation of Dynamic Multiprocessor Systems, Flexible Applications, Tasks with Temporal Distance Constraints.

UNIT V: REAL-TIME COMMUNICATION (8 Periods)

Model of Real-Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real-time Protocol Communication in Multicomputer System.

Total No. of Periods: 45

TEXT BOOK:

1. Jane W.S. Liu, "Real-Time Systems," Pearson Education Publication, 2011

REFERENCE BOOKS:

1. Phillip A. Laplante, "Real-Time Systems Design and Analysis," Third Edition, Prentice Hall of India, 2010.
2. C.M. Krishna, Kang G. Shin, "Real-Time Systems", McGraw-Hill International Edition, 1997.

IV B.Tech. I Semester
14BT71506**: SOFT COMPUTING**
(PROFESSIONAL ELECTIVE – II)
(Common to CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Discrete Mathematical structures".

COURSE DESCRIPTION: Concepts of Neural Networks (NN); Architecture of back propagation networks; Adaptive Resonance Theory (ART); Fuzzy Vs Crisp Logic; Genetic Algorithms (GA); Genetic Modeling; Hybrid Systems.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Acquire knowledge on principles and techniques of soft computing such as Neural Networks, Associative Memory, Fuzzy Systems, Genetic Algorithms and Hybrid Systems.
CO2. Analyze applications of backpropagation networks and associative memory
CO3. Solve Problems using fuzzy systems and genetic modelling

DETAILED SYLLABUS:

UNIT–I: NEURAL NETWORKS (9 Periods)

Basic concepts of neural networks, Model of an artificial neurons, Neural Network architectures, Characteristics of neural network architecture, Early neural network architecture.

Backpropagation Networks: Architecture of Back Propagation Networks (BPN), Back propagation learning, Illustration, Applications. Effect of tuning parameters of backpropagation neural networks, Selection of various parameters in BPN, Variations of standard back propagation algorithm.

UNIT-II: ASSOCIATIVE MEMORY (9 periods)

Auto correlators, Hetero correlators, Multiple training encoding strategy, Exponential BAM, Associative memory for real coded pattern pairs, Applications.

Adaptive Resonance Theory (ART): Introduction, ART1, ART2, Applications.

UNIT-III: FUZZY SYSTEMS (9 Periods)

Fuzzy versus Crisp, Crisp Sets, Fuzzy Sets, Crisp Relations, Fuzzy Relations. Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy rule based system, Defuzzification methods, Applications.

UNIT-IV: GENETIC ALGORITHMS (GA) (9 periods)

Basic concepts, Creation of Off-springs, Working principle, Encoding, Fitness Function, Reproduction.

Genetic Modelling: Inheritance operators, Cross Over, Inversion and Deletion, Mutation, Bitwise operators, Bitwise Operators Used in GA. Generational cycle, Convergence of Genetic Algorithm, Applications.

UNIT-V: INTEGRATION OF NEURAL NETWORKS, FUZZY LOGIC, AND GENETIC ALGORITHMS: (9 periods)

Hybrid Systems: Sequential hybrid systems, Auxiliary hybrid systems, Embedded hybrid systems, Neural networks, Fuzzy logic and Genetic Algorithms hybrids: Neuro-Fuzzy hybrids, Neuro-Genetic hybrids, Fuzzy-Genetic hybrids, Preview of the Hybrid systems: GA based Backpropagation Network, Fuzzy-Backpropagation network, Fuzzy Associative Memories, Fuzzy logic controlled GA.

Total No. of Periods: 45

TEXT BOOK:
1. Rajasekaran S, G. A Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic, and Genetic Algorithms: Synthesis and Applications", PHI, 2009.

REFERENCE BOOKS:
1. Timothy J.Ross "Fuzzy Logic with Engineering Applications", Wiley India Pvt. Ltd. New Delhi, 2011.
2. Jang "Neuro Fuzzy and Soft computing", Pearson First Edition,2007
3. David E. Goldberg, "Genetic Algorithms in search, Optimization and Machine Learning", Pearson, First Edition, 2002.

IV B.Tech. I Semester
14BT71507: SOFTWARE PROJECT MANAGEMENT
(PROFESSIONAL ELECTIVE – II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Software Engineering"

COURSE DESCRIPTION:
Conventional Software Management ;Evolution of Software Economics; Improving Software Economics; Lifecycle Phases; Artifacts of the Process; Workflow of the Process; Checkpoints of the Process; Software Economics; Iterative Process Planning; Project Organization and Responsibilities; Process Automation ; Project Control and Project Instrumentation; Case study(CCPDS-R)

COURSE OUTCOMES
On successful completion of this course the students will be able to:

CO1. Gain knowledge on software effort estimation techniques, life cycle phases, project control and instrumentation.
CO2. Analyze the major and minor milestones, artifacts and metrics from management and technical perspective .
CO3. Design and develop software product using conventional and modern principles of software project management.
CO4. Adopt team effectiveness through Work Breakdown Structures by optimal cost and schedule estimates.

DETAILED SYLLABUS:

UNIT – I: SOFTWARE MANAGEMENT RENAISSANCE (8 periods)

Conventional software management:
The waterfall model, conventional software Management performance. Evolution of software economics**:** Software Economics, pragmatic software cost estimation.

Improving Software Economics:
Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT – II: LIFE CYCLE PHASES (7 periods)

Conventional and Modern Software Management:
Principles of Modern software engineering, principles of modern software management, transitioning to an iterative process.

Life Cycle Phases:
Engineering and Production Stages, Inception, Elaboration, construction, transition phases.

UNIT – III: ARTIFACTS OF THE PROCESS, WORKFLOWS OF THE PROCESS (9 periods)

ARTIFACTS OF THE PROCESS:
The Artifact Sets, Management Artifacts, Engineering Artifacts, Pragmatic Artifacts.

Model Based Software Architectures:
Architecture- Management Perspective, Technical Perspective.

Workflows of the Process:
Software Process Workflows, Iteration Workflows

UNIT – IV: CHECKPOINTS OF THE PROCESS, PROJECT ORGANIZATIONS AND RESPONSIBILITIES, PROCESS AUTOMATION (10 periods)

Checkpoints of a process: Major Milestones, Minor Milestones, Periodic Status Assessments.
Iterative Process Planning: Work Breakdown Structures, Planning Guidelines, the Cost and Schedule Estimating Process, Pragmatic Planning
Project Organizations and Responsibilities: Line of Business Organizations, Project organizations, Evolution of Organizations
Process Automation: Tools- Automation Building blocks, The Project Environment.

UNIT – V: PROJECT CONTROL AND PROCESS INSTRUMENTATION, TAILORING THE PROCESS, CCPDS-R(CASE STUDY) (11 periods)

Project control and process Instrumentation: The Seven Core Metrics, Management Indicators, Quality Indicators, Lifecycle Expectations, Pragmatic Software Metrics Automation
Tailoring the Process: Process Discriminants, Next generation cost models, Modern Software Economics
CCPDS-R Case Study: Context for Case Study, Common Subsystem Overview, Process Overview, Demonstration Based Assessment, Core Metrics

Total No. of Periods: 45

TEXT BOOK :
1. Walker Royce, "Software Project Management", Pearson Education, 1998.

REFERENCE BOOKS :
1. Bob Hughes and Mike Cotterell, "Software Project Management", Tata McGraw- Hill Edition,2006.
2. Joel Henry, "Software Project Management", Pearson Education,2003.

IV B. Tech. I Semester
14BT70502**: MOBILE COMPUTING**
(Common to CSE, CSSE and IT)
(PROFESSIONAL ELECTIVE – II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: *A Course on* "Computer Networks"

COURSE DESCRIPTION:

Concepts of GSM, Wireless MAC,CDMA Systems,3G,4G,Mobile IP Network Layer, Mobile Transport Layer, Databases, Data Dissemination, Broadcasting Systems, Mobile Synchronization and Mobile Devices.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge in

- GSM and CDMA Systems.
- Mobile IP, and Mobile TCP
- Databases and Data Dissemination
- Mobile data Synchronization

CO2. Analyze data delivery mechanisms in data dissemination and broadcasting systems

CO3. Design of Mobile File Systems for Mobile Devices.

DETAILED SYLLABUS:

UNIT- I: OVERVIEW and GSM ARCHITECTURE (8 periods)

Overview: Mobile Computing**,** Mobile Computing Architecture, Mobile Devices, Mobile System Networks

GSM and Other 2G Architectures: GSM, Radio Interfaces of GSM, Protocols of GSM, Localization, Call Handling, Handover, Security, New Data Services, General Packet Radio Service.

UNIT- II: WIRELESS MEDIUM ACCESS CONTROL, CDMA, 3G, AND4G COMMUNICATION: (9 Periods)

Multiplexing, Controlling the Medium Access, , Frequency Hopping Spread Spectrum ,Coding Methods , Code Division Multiple Access, IMT -2000 3G Wireless Communication Standard, WCDMA 3G Communication Standards, I-mode, OFDM, Long-term Evolution, WiMaxRel 1.0 IEEE 802.16e, 4G Networks.

UNIT- III: MOBILE IP NETWORK LAYER & MOBILE TRANSPORT LAYER (9 periods)

Mobile IP Network Layer: IP and Mobile IP Network Layer, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, Dynamic Host Configuration Protocol.

Mobile Transport Layer: Conventional TCP/IP Transport Layer Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Methods for Mobile TCP –layer Transmission, TCP over 2.5G/3G Mobile Networks.

UNIT –IV: DATABASESAND DATA DISSEMINATION ANDBROADCASTING SYSTEMS (10 periods)

Databases: Database Hoarding Techniques, Data Caching, Client-Server Computing and Adaptation, Transaction Models, Query Processing, Data Recovery Process, Issues Relating to Quality Of Service.

Data Dissemination and Broadcasting Systems: Communication Asymmetry, Classification of Data-Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Techniques.

UNIT – V: MOBILE SYNCHRONIZATION AND MOBILE DEVICES (9 periods)

Mobile Synchronization in Mobile Computing Systems: Synchronization, Synchronization Software for Mobile Devices, Synchronization Protocols, SyncML- Synchronization Language for Mobile Computing, Sync4J (Funambol), Synchronized Multimedia Markup Language (SMIL).

Mobile Devices: Server and Management–Mobile Agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems, Security.

Total No. of periods: 45

TEXT BOOK:

1. Raj Kamal,"*Mobile Computing",* Oxford University Press, Second Edition,2007

REFERENCE BOOKS:

1. Jochen H. Schiller,"*Mobile Communications",* Pearson Education, Second Edition,2004
2. AsokeTalukder, Roopa Yavagal,"*Mobile Computing",* Tata McGraw Hill, Second Edition 2010.

IV B.Tech. I Semester

14BT81203**: .NET TECHNOLOGIES**

(PROFESSIONAL ELECTIVE – II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Object Oriented Programming through Java".

COURSE DESCRIPTION:

Knowledge on .NET Framework and C# Programming, Object-oriented concepts with C#, Exception handling mechanism, Interfaces; Generics; Delegates and Events in C#, Database access with ADO.NET, Web application development using Web forms and Web controls.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on:
- Basics of .NET platform.
- Building C# applications, designing ASP.NET websites, performing Data access, building ASP.NET applications.

CO2. Design and develop Graphical User Interface and Web applications using .NET technologies.

CO3. Demonstrate problem solving skills for creating C# applications, ASP.NET applications and websites.

DETAILED SYLLABUS:

UNIT I: INTRODUCING C# AND .NET PLATFORM (9 Periods)

Benefits of the .NET platform, Building blocks of the .NET platform, Overview of .NET assemblies, Common type system, Common language specification, Common language runtime, Platform-independent nature of .NET. The role of the .NET framework 4.5 SDK, Building .NET application using visual studio, Anatomy of a simple c# program, System. Console class, System data types and corresponding c# keywords. Working with string data, C# iteration constructs Decision constructs and the Relational/equality operators.

UNIT II: CORE C# PROGRAMMING & OOP WITH C# ANDEXCEPTION HANDLING (8 Periods)

Understanding **C#** arrays**,** Introducing the C# class type, Constructors, The role of the this keyword, The static keyword, Pillars of OOP, C#access modifiers, C# encapsulation services, Understanding automatic properties , The basic mechanics of inheritance , The Details of Inheritance, C#'s polymorphic support.

The role of .NET Exception Handling, The simplest possible example, System-level exceptions, Application level exceptions, Processing multiple exceptions.

UNIT III: INTERFACES, GENERICS, DELEGATES AND EVENTS (10 Periods)

Understanding interface types, Defining custom interfaces, Implementing an Interface, Implementing an interfaces using visual studio, Role of generic type parameters , Creating custom generic methods, Creating custom generic structures and classes, Understanding the .NET delegate type, Delegate example, Generic Delegate, and C# Events , Understanding operator overloading.

UNIT IV: ADO.NET (9 Periods)

High level definition of ADO.NET, ADO.NET data provider, ADO.NET namespaces, Connected layer of ADO.NET, Data Readers , Database transactions, Disconnected layer of ADO.NET, Role of the dataset, Working with DataColumns, Data Rows, DataTable, DataAdapters, Binding DataTable objects to windows forms GUIs.

UNIT V: ASP.NET Web Forms and Web Controls, State Management Techniques (9 Periods)

The role of http, Web applications and web servers, Role of client side scripting, Posting back to the web server, Overview of ASP.NET API, Building a single file ASP.NET web page, building an ASP.NET webpage using Code Files, ASP.NET web sites vs. ASP.NET Web applications, ASP.NET web site directory structure, The life cycle of an ASP.NET web page, Role of the web.config file, Understanding the nature of web controls, Major categories of ASP.NET web control , The Role of validation controls, Application Cache, The Control and WebControl Base Classes, Maintaining session data , Cookies.

Total No. of Periods: 45

TEXT BOOK:

1. Andrew Troelsen "Pro C# 5.0 and the .NET 4.5 Framework", Apress, 6th edition, 2012.

REFERENCE BOOKS:

1. Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson, MorganSkinner, "Professional C# 4 and .NET 4", WROX Publications, 1st edition, 2010.
2. Mathew Mac Donald, "The Complete Reference ASP.NET", TATA McGraw Hill, 1st edition, 2010.

IV B.Tech. I Semester

14BT71521**: DATA WAREHOUSING AND DATA MINING LAB**

(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITE: A Course on "Data warehousing and data mining"

COURSE DESCRIPTION: Hands on practical experience on Data transformations like aggregation, filter, joiner transformations using INFORMATICA; Data preprocessing techniques; Mining frequent patterns, classification and clustering techniques using WEKA open source machine learning tool.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Design warehouse and develop mining algorithms to solve real-time problems.

CO2. Apply warehouse and mining tools to store and extract data from large databases.

LIST OF EXPERIMENTS:

I. Experiments on Informatica

For the given data tables

Employee table

Name	datatype	Size
eno	number	10
ename	varchar	7
sal	number	7
job	varchar	10
deptno	number	4

Dept table

name	datatype	size
eno	number	10
ename	varchar	7
deptno	number	5
deptname	varchar	7
sal	number	7
job	varchar	10

1. Implement mapping of warehouse server on Employee table.
2. Display the list of employees whose salary is greater than 5000 by designing filter transformation.
3. Find the maximum and minimum salaried employee using aggregate transformation.
4. Join Employee and Dept table using joiner transformation.

II. Experiments on Weka 3.7.5:

Credit Risk Assessment: The business of banks is making loans Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. **Knowledge Engineering.** Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. **Books.** Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. **Common Sense.** Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. **Case Histories.** Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data: Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit

dataset (original) Excel spreadsheet version of the German credit data (Down load from web).In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer!)

A few notes on the German dataset:

- **DM** stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- **Owns_telephone.** German phone rates are much higher than in Canada so fewer people own telephones.
- **Foreign_worker.** There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are **20 attributes** used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks:

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
5. Is testing on the training set as you did above a good idea? Why or Why not?
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what cross-validation is briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?
7. Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)
9. sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?
12. (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

REFERENCE BOOK:

1. Ian. H. Witton and Eibe Frank "Data Mining: Practical Machine Learning Tools and techniques", Second Edition, Elsevier Publication, 2005.

IV B. Tech. I Semester
14BT71522**: NETWORK PROGRAMMING LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A Course on "Network Programming".

COURSE DESCRIPTION
Hands on practical experience on Iterative client and server; TCP client and server; UDP client and server; Concurrent server; IPC; Message Queues ; shared Memory.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

CO1. Implement inter process communication mechanisms.
CO2. Obtain Programming skills for developing TCP and UDP Connectivity for client server Application.

LIST OF EXPERIMENTS:
1. Design TCP iterative Client and server application to reverse the given input sentence
2. Design TCP client and server application to transfer file
3. Design a TCP concurrent server to echo given set of sentences using poll functions
4. Design UDP Client and server application to implement the echo concept.
5. Design TCP Concurrent server to handle multiple file descriptors using System Call Select
6. Design UDP Client and server application to reverse the given input sentence
7. Design UDP Client server to transfer a file
8. Design using poll client server application to multiplex TCP and UDP requests for converting a given text into upper case.
9. Implement the following forms of IPC.
   a)Pipes b)FIFO
10. Implement file transfer using Message Queue form of IPC.
11. Implement file transfer using Shared Memory.

REFERENCE BOOKS:

1. W.Richard Stevens, "UNIX Network Programming," Vol. I, Sockets API, Third Edition, PHI,2010

2. W.Richard Stevens, "UNIX Network Programming IPC," Vol. II, Second Edition, PHI,2009.

IV B.Tech. I Semester
14BT71523**: SEMINAR**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	50	50	-	-	-	2

PREREQUISITES: All the courses of the program up to III B. Tech. – II Semester.

COURSE DESCRIPTION:

Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES:

On completion of seminar work the student will be able to

CO1. Acquire in-depth knowledge in the areas of interest of the seminar topic.

CO2. Analyze critically chosen seminar topic for substantiated conclusions.

CO3. Undertake investigation of seminar topic providing valid conclusions.

CO4. Function effectively as individual on the chosen seminar topic.

CO5. Develop communication skills, both oral and written for preparing and presenting seminar reports.

CO6. Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

IV B.Tech. II Semester

14BT81501**: HIGH PERFORMANCE COMPUTING**

(Common to CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: A Course on "Computer Organization"

COURSE DESCRIPTION: Cache-based microprocessor architecture; Memory hierarchies; Multithreaded processors; Common sense Optimizations; The role of compilers; Data access optimization; Shared-memory computers; Parallel scalability; Introduction to OpenMP; Parallel Jacobi algorithm; Introduction to MPI; MPI performance tools; MPI parallelization of Jacobi solver.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain Knowledge on Modern Processors and code Optimization.

CO2. Design Parallel Computing algorithms.

CO3. Acquire Skills in Parallel Programming using OpenMP and MPI tools.

(PO4)

DETAILED SYLLABUS:

UNIT-I: MODERN PROCESSORS (8 Periods)

Stored-program computer architecture, General-purpose cache-based microprocessor architecture, Memory Hierarchies, Multicore processors, Multi-threaded processors, Vector Processors.

UNIT-II: BASIC OPTIMIZATION TECHNIQUES FOR SERIAL CODE (10 Periods)

Scalar profiling, Common sense optimizations , Simple measures, large impact, The role of compilers, C++ Optimizations, Data access optimization-Balance analysis and lightspeed estimates, Storage order.

Case study: The Jacobi algorithm and Dense matrix transpose.

UNIT-III: PARALLEL COMPUTERS (09 Periods)

Taxonomy of parallel computing paradigms, Shared-memory computers, Distributed-memory computers, Hierarchical systems, Networks. Basics of parallelization, Data Parallelism, Function Parallelism, Parallel Scalability.

UNIT-IV: SHARED-MEMORY PARALLEL PROGRAMMING WITH OpenMP (09 Periods)

Introduction to OpenMP – Parallel execution, Data scoping, OpenMP work sharing for loops, Synchronization, Reductions, Loop scheduling and Tasking.

Case study: OpenMP-parallel Jacobi algorithm

Efficient OpenMP programming-Profiling OpenMP programs, Performance pitfalls.

Case study: Parallel sparse matrix-vector multiply.

UNIT V–DISTRIBUTED-MEMORY PARALLEL PROGRAMMING WITH MPI (09 Periods)

Message passing, Introduction to MPI, Examples: MPI parallelization of Jacobi solver.

Efficient MPI Programming: MPI performance tools, communication parameters, Synchronization, serialization, Contention, Reducing communication overheads, Understanding intranode point-to-point communication.

Total No.of Periods: 45

TEXT BOOK:

1. Georg Hager and Gerhard Wellein, "Introduction to High Performance Computing for Scientists and Engineers," Chapman & Hall / CRC computational Science series, First Edition ,2011.

REFERENCES:

1. Charles Severance, Kevin Dowd, "High Performance Computing," O'Reilly Media, Second Edition , 1998.
2. Kai Hwang , Faye Alaye Briggs, " Computer Architecture and Parallel Processing," McGraw Hill,1984.

IV B.Tech. II Semester

14BT81201**: CLOUD COMPUTING**

(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Computer Networks" and "Operating Systems"

COURSE DESCRIPTION: Cloud computing fundamentals; cloud computing architecture; cloud computing mechanisms; cloud security; working with clouds, virtualization and case studies.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on services, architecture, types of infrastructural models, disaster recovery and Virtualization.

CO2. Analyze the issues in cloud computing.

DETAILED SYLLABUS:

UNIT I: FUNDAMENTAL CLOUD COMPUTING (9 Periods)

Understanding Cloud Computing: Origins and Influences, Basic Concepts and Terminology, Goals and Benefits, Risks and Challenges.

Fundamental Concepts and Models: Roles and Boundaries, Cloud Characteristics, Cloud Delivery Models, Cloud Deployment Models.

UNIT II: CLOUD COMPUTING MECHANISMS AND ARCHITECTURE (9 Periods)

Cloud-Enabling Technology: Broadband Networks and Internet Architecture, Data Center Technology, Virtualization Technology, Web Technology, Multitenant Technology, Service Technology.

Fundamental Cloud Architectures: Architecture - Workload Distribution, Resource Pooling, Dynamic Scalability, Elastic Resource Capacity, Service Load Balancing, Cloud Bursting, Elastic Disk Provisioning, Redundant Storage.

UNIT III: CLOUD COMPUTING ADVANCED ARCHITECTURES (9 Periods)

Advanced Cloud Architectures: Architecture-Hypervisor Clustering, Load Balanced Virtual Server Instances, Non-Disruptive Service Relocation, Zero Downtime, Cloud Balancing, Resource Reservation, Dynamic Failure Detection and Recovery,Bare-Metal Provisioning,Rapid Provisioning,Storage Workload Management.

Specialized Cloud Architectures: Architecture - Direct I/O Access,Direct LUN Access,Dynamic Data Normalization,Elastic Network Capacity, Cross-Storage Device Vertical Tiering,Intra-Storage Device Vertical Data Tiering,Load Balanced Virtual Switches,Multipath Resource Access,Persistent Virtual Network Configuration,Redundant Physical Connection for Virtual Servers,Storage Maintenance Window.

UNIT IV: WORKING WITH CLOUDS (9 Periods)

Cloud Delivery Model Considerations: Cloud Delivery Models: The Cloud Provider, Cloud Delivery Models: The Cloud Consumer, Case Study Example.

Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations.

UNIT V: INTRODUCTION TO VIRTUALIZATION (9 Periods)

History of Virtualization, Objectives of virtualization, Benefits of Virtualized Technology, VMware, Microsoft Hyper-V and Ubuntu.

Total No. of Periods: 45

TEXT BOOK:

1. Thomas Erl and RicardoPuttini "Cloud Computing- Concepts, Technology & Architecture," Pearson, 1st edition 2013.
2. Ivanka Menken, "Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book", 1st edition, 2009.

REFERENCE BOOKS:

1. Barrie Sosinsky, "Cloud Computing Bible," Wiley India Pvt Ltd, 1st edition, 2011.
2. Rajkumar Buyya, James Broberg and Andrzej Goscinski,"Cloud computing principles and paradigms," john Wiley and sons, 2011.
3. John W. Rittinghouse, James F. Ransome, "Cloud Computing implementation, Management and Security," CRC Press, ISBN: 9788120341609, Taylor & Francis group, 1st edition 2010.

IV B.Tech. II Semester
14BT81502**: EMBEDDED PROCESSORS**
(PROFESSIONAL ELECTIVE – III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

Prerequisites: Courses on "Microprocessor & Interfacing" and **"**Embedded Systems"

COURSE DESCRIPTION: Embedded Processor introduction, Architecture, RISC, Embedded Systems Hardware, Software, Register, ARM instructions, Assembly Code, Software interrupts, Exceptional handling, C Programming.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Acquire knowledge on embedded processor architecture.

CO2. Design and develop programs for ARM processor.

DETAILED SYLLABUS:

UNIT – I: INTODUCTION TO EMBEDDED PROCESSORS (8 Periods)

Processor Technology, IC Technology, Design Technology, Combinational Logic, Sequential Logic, Custom Single-Purpose Processor Design, RT-Level Custom Single-Purpose Processor Design, Optimizing Custom Single-Purpose Processors, Basic Architecture, Operation.

UNIT – II: INTRODUCTION TO ARM PROCESSOR (10 Periods)

The RISC Design Philosophy, The ARM Design Philosophy, Embedded System Hardware, Embedded System Software, Registers, Current Program Status Register, Pipeline, Exceptions, Interrupts, and the Vector Table, Core Extensions, Architecture Revisions, ARM Processor Families.

UNIT – III: THE ARM INSTRUCTION SET (9 Periods)

Data Processing Instructions, Branch Instructions, Load-Store Instructions, Software Interrupt Instruction, Program Status Register Instructions, Loading Constants, Conditional Execution.

UNIT – IV: ARM ASSEMBLY LANGUAGE PROGRAMMING (10 Periods)

Writing Assembly Code, Profiling and Cycle Counting, Instruction Scheduling, Register Allocation, Conditional Execution, Looping Constructs, Bit Manipulation, Efficient Switches, Handling Unaligned Data.

UNIT – V: EFFICIENT C PROGRAMMING (8 Periods)

Basic C Data Types , C Looping Structures , Register Allocation , Function Calls , Pointer Aliasing , Structure Arrangement, Bit-Fields , Unaligned Data and Endianness , Division , Floating Point , Inline Functions and Inline Assembly.

Total No. of Periods: 45

TEXT BOOKS:

1. Andrew N Sloss, Dominic Symes and Chris wright, "ARM System Developers guide: Designing and optimizing system software," Elsevier 2014.
2. Frank Vahid, Tony Givargis and John Wiley, "Embedded System Design: A Unified hardware/software Approach," third Edition, John Wiley publication 2012.

REFERENCE BOOKS:

1. Steve Furber," *A*RM System on chip Architecture,*"* second Edition, Pearson Education.
2. David Seal, "ARM Architecture reference manual*,"* Addison Wesley.

IV B.Tech. II Semester

14BT81503**: HUMAN COMPUTER INTERACTION**

(PROFESSIONAL ELECTIVE-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PREREQUISITES: -

COURSE DESCRIPTION: Importance of user interface; Graphical user interface; Design process; Screen Designing; Windows; Components; Software Tools and Interaction Devices.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1: Acquire knowledge on principles and components of HCI.

CO2: Analyze product usability evaluations and testing methods.

DETAILED SYLLABUS:

UNIT I – INTRODUCTION (9 Periods)

Importance of user Interface – definition, Importance of good design, Benefits of good design, A brief history of Screen design, The graphical user interface – popularity of graphics, The concept of direct manipulation, Graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT II – DESIGN PROCESS (8 Periods)

Design process – Human interaction with computers, Importance of human characteristics, human consideration in design, Human interaction speeds, and understanding business functions.

UNIT III - SCREEN DESIGN (10 Periods)

Design goals – Screen planning and purpose, Organizing screen elements, Ordering of screen data and content – screen navigation and flow –Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT IV – WINDOWS AND MULTIMEDIA (08 Periods)

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls; Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT V– SOFTWARE TOOLS AND DEVICES (10 Periods)

Software tools – Specification methods, interface – Building Tools –Interaction Devices – Keyboard and function keys pointing devices – speech recognition digitization and generation – image and video displays –drivers.

Total No. of Periods: 45

TEXT BOOKS:

1. Wilbert O Galitz, "The Essential Guide to user Interface Design", Second Edition, Wiley India Education.
2. Ben Schneiderman, "Designing the User Interface", Fourth Edition, Pearson Education, Asia.

REFERENCE BOOKS:

1. A Dix, Janet Finlay, G D Abowd and R Beale, "Human-Computer Interaction", Third Edition, Pearson Publishers,2008.

2. Jonathan Wolpaw and Elizabeth Winter Wolpaw, "Brain-Computer Interfaces", Principles and Practice, First Edition, Oxford Publishers, 2012.

IV B.Tech. II semester

14BT81504**: PERFORMANCE EVALUATION OF COMPUTER SYSTEMS**

(PROFESSIONAL ELECTIVE – III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A Course on "Simulation and Modeling**"**

COURSE DESCRIPTION: Performance Evaluation System; Queuing theory; Workloads; Monitors; Experimental Design; Summarization of data; linear regression models.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge in:

i) Queueing model, workload selection and techniques.

ii) Design of Hardware, Software and Firmware monitors.

CO2. Analyze and interpret the data using summarization.

CO3. Design and develop 2^k Experimental models for evaluating the performance of a computer system.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO PERFORMANCE EVALUATION (9 periods)

The art of performance evaluation, Performance projects, Common mistakes, Systematic approach, Selecting an evaluation technique, Performance metrics: selection, Usage, Classification, Setting performance requirements.

UNIT II: **QUEUING MODELS (10 Periods)**

Introduction to queueing theory; Analysis of single queue; Queuing networks; Operational laws.

UNIT-III: WORKLOADS (9 Periods)

Types of work load; The art of workload selection; Work load characterization techniques.

UNIT-IV: MONITORS (8 Periods)

Monitor terminology, classification, software, hardware monitors, Software versus Hardware monitors, Firmware and hybrid monitors, distributed system monitors, program execution monitors, techniques for improving program performance, accounting logs, analysis and inter presentation of accounting log data.

UNIT V: EXPERIMENTAL DESIGN AND SUMMARIZING DATA (9 Periods)

Introduction to Experimental Design, 2^K Factorial Designs; Summarizing measured data; simple Linear Regression Models;

Total No. of Periods: 45

TEXT BOOK:

1. Raj Jain, "The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling," Wiley-India, 2008

REFERENCE BOOK:

1. Kishore S.Trivedi, "Probability & Statistics with reliability, queuing, and computer science applications," PHI, 2006.

IV B.Tech. II Semester

14BT71201**: MOBILE APPLICATION DEVELOPMENT**

(PROFESSIONAL ELECTIVE – III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Object Oriented Programming through Java".

COURSE DESCRIPTION: Knowledge on Mobile platforms, Designing of Mobile User Interface and tools for developing user interface, Introduction to Android, Understanding Activities, Linking Activities using Intents, Creating the User Interface Programmatically, Views, Menus, Database Storage, SMS, e-mail, Displaying Maps, Building a Location Tracker Web Services Using HTTP, Sockets Programming, Communication between a Service and an Activity, Introduction to iOS and Windows Phone 7.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on
- a. Mobile platforms and Mobile User Interface
- b. Android Activities and Intents
- c. Messaging, Networking, Location based Services, Android Services
- d. Basics of iOS and Windows phone 7

CO2. Demonstrate problem solving skills to design and develop solutions for real world problems with android mobile applications.

DETAILED SYLLABUS:

UNIT–I MOBILE APP OR WEBSITE, MOBILE USER INTERFACE DESIGN, ANDROID PROGRAMMING (9 Periods)

Mobile Web Presence, Mobile Applications, Marketing, App as a Mobile Web App, Effective Use of Screen Real Estate, Understanding Mobile Application Users, Understanding Mobile Information Design, Understanding Mobile Platforms, Using the Tools of Mobile Interface Design.

What is android, obtaining the required tools, First Android Application, Anatomy of an Android Application.

UNIT – II ACTIVITIES, INTENTS AND ANDROID USER INTERFACE (9 Periods)

Understanding Activities, Linking Activities using Intents, Calling Built-In Applications using Intents, Displaying Notifications, Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Listening for UI Notifications

UNIT – III DESIGNING USER INTERFACE WITH VIEWS, DISPLAYING PICTURES AND MENUS WITH VIEWS, DATA PERSISTENCE (9 Periods)

Basic Views, Picker Views, List Views, Using Menus with Views, Some Additional Views, Saving and Loading User Preferences, Persisting Data to Files, Creating and Using Databases.

UNIT – IV MESSAGING, LOCATION-BASED SERVICES, AND NETWORKING (9 Periods)

SMS Messaging, Sending e-mail, Displaying Maps, Getting Location Data, Monitoring a Location, Consuming Web Services Using HTTP.

UNIT – V DEVELOPING ANDROID SERVICES, GETTING STARTED WITH IOS, AND WINDOWS PHONE 7 (9 Periods)

Creating Your Own Services, Establishing Communication between a Service and an Activity, Binding Activities to Services, Understanding Threading.

iOS Tools, iOS Project, Debugging iOS Apps, Objective-C Basics, Hello World App, Building the Derby App in iOS. Windows Phone 7 Metro, Application Bar, Tiles, Tombstoning, Tools, Windows Phone 7 Project, Building the Derby App in Windows Phone 7

Total No. of Periods: 45

TEXT BOOKS:

1. Wei-Meng Lee, John, **"**Beginning Android™ 4 Application Development**",** Wiley & Sons Inc., 1st edition, 2012.
2. Jeff McWherter, Scott Gowell, **"**Professional Mobile Application Development**",** Wiley & Sons Inc., 1st edition, 2012.

REFERENCE BOOKS:

1. Paul Deital and Harvey Deital, **"**Android How to Program**",** Detial associates publishers, 1st edition, 2013.
2. Zigurd Mednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura, **"**Programming Android Java Programming for the New Generation of Mobile Devices**",** O'Reilly Media, 1st edition, 2011.

IV B.Tech – II Semester

14BT71205**: MACHINE LEARNING**

(PROFESSIONAL ELECTIVE – III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Probability & Statistics", "Engineering Mathematics" and "Design and Analysis of Algorithms".

COURSE DESCRIPTION:

Basic concepts of machine learning and decision trees, neural networks and genetic algorithms, Bayesian techniques, instant based learning, and analytical learning and reinforced learning.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on supervised, unsupervised, reinforcement machine learning techniques and applications of machine learning.

CO2. Analyze skills on machine learning algorithms and its application.

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION, CONCEPT LEARNING AND DECISION TREES (9 Periods)

Learning Problems, Designing Learning systems, Perspectives and Issues, Concept Learning, Version Spaces and Candidate Elimination Algorithm, Inductive bias, Decision Tree learning, Representation, Algorithm, Heuristic Space Search.

UNIT – II: NEURAL NETWORKS AND GENETIC ALGORITHMS (9 Periods)

Neural Network Representation, Problems, Perceptrons, Multilayer Networks and Back Propagation Algorithms, Advanced Topics, Genetic Algorithms, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning.

UNIT – III: BAYESIAN AND COMPUTATIONAL LEARNING (9 Periods)

Bayes Theorem, Concept Learning, Maximum Likelihood, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier, Bayesian Belief Network, EM(Expectation–Maximization) Algorithm, Probably Learning, Sample Complexity for Finite and Infinite Hypothesis Spaces, Mistake Bound Model.

UNIT-IV: INSTANT BASED LEARNING AND LEARNING SET OF RULES (9 Periods)

k- Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Sequential Covering Algorithms, Learning Rule Sets, Learning First Order Rules, Learning Sets of First Order Rules, Induction as Inverted Deduction, Inverting Resolution.

UNIT–V: ANALYTICAL LEARNING AND REINFORCED LEARNING (9 Periods)

Perfect Domain Theories, Explanation Based Learning, Inductive-Analytical Approaches, FOCL (First Order Combined Learner) Algorithm, Reinforcement Learning, Task, Q-Learning, Temporal Difference Learning.

Total No. of Periods: 45

TEXT BOOK:

1. Tom M. Mitchell, "Machine Learning", McGraw-Hill, 1st Edition, 2013

REFERENCE BOOKS:

1. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, 2nd Edition, 2009.
2. Kevin P. Murphy, "Machine Learning", a Probabilistic Perspective, MIT Press, 2012.

IV B.Tech. II Semester

14BT81505**: SOFTWARE ARCHITECTURE**

(PROFESSIONAL ELECTIVE – IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: A course on "Software Engineering"

COURSE DESCRIPTION: Architecture Business Cycle; Layered Systems; Heterogeneous architectures; Architectural structures for shared information systems; Inter-operability; Patterns for distribution; Architectural design space; Applications of ADL; Tools for Architectural Design;

COURSE OUTCOMES

On successful completion of this course the students will be able to:

CO1: Acquire knowledge in software architecture, styles, patterns and frameworks

CO2: Design software architectures.

CO3: Gain Skills to describe software architecture using Architectural Description Languages.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO SOFTWARE ARCHITECTURE AND ARCHITECTURAL STYLES (9 periods)

Introduction to software architecture: An Engineering Discipline for software, status of software architecture. Architecture Business Cycle: Where does Architecture comes from,Software process and Architecture Business cycle, what makes a good Architecture

Architecture styles:

Pipes and filters ,data abstraction and object oriented organization , Event-based Implicit Invocation, Layered Systems, Repositories, Interpreters ,process control, Other Familiar Architectures, Heterogeneous Architectures.

UNIT – II: SHARED INFORMATION SYSTEMS AND ARCHITECTURE DESIGN GUIDANCE (9 periods)

Database Integration, Interpretation in Software Development Environments, Architectural Structures for Shared Information Systems. Guidance for User Interface Architectures, Case Study in Inter-operability: World Wide Web

UNIT-III : ARCHITECTURAL PATTERNS (8 periods)

Introduction

From Mud to Structure: Layers, pipes and Filters, Blackboard

Distributed Systems**:** Broker

UNIT – IV: FORMAL MODELS AND SPECIFICATION (10 periods)

Formalizing the Architecture of a Specific System, Formalizing an Architectural Styles, Formalizing Architectural Design Space, Case Study of an Industry Standard Computing Infrastructure: J2EE\EJB

UNIT – V: ARCHITECTURE DESCRIPTION LANGUAGES AND TOOLS FOR ARCHITECTURE DESIGN (9 periods)

Architectural Description Languages: Requirements for Architecture Description Languages, First class Connectors, Adding Implicit Invocation to Traditional programming Languages.

Tools for Architectural Design:

UniCon- A universal Connector Language, Exploiting Style in Architecture Design Environments, Beyond Definition/Use: Architectural Interconnection

Total No. of Periods: 45

TEXT BOOK:

1. Mary Shaw, David Garlan, " Software Architecture Perspective: on an Emerging Discipline", PHI,1996 .
2. Len Bass, Paul Elements, Rick Kazman, "Software Architecture in Practice", SEI Series, 2012.

REFERENCE BOOKS:

1. Buschmann," Pattern Oriented Software Architecture", Wiley, 1996.
2. Gamma, Shaw, "An Introduction to Software Architecture", World Scientific, 1995

IV B. Tech. II Semester
14BT80502**: BIG DATA**
(PROFESSIONAL ELECTIVE – IV)
(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: Courses on "Data Base Management Systems" and "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Introduction to Big Data, Types of Data Sources, Hadoop Frameworks and HDFS, Map Reduce, Hadoop Ecosystem Components.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge in
- Big data Characteristics
- Hadoop Framework.
- Hadoop Ecosystem Components
- Map Reduce.

CO2. Analyze the need for database systems for storing the large data

CO3. Design and model an effective and sustainable database for better performance using Big data tools

DETAILED SYLLABUS:

UNIT I - INTRODUCTION TO BIG DATA (9 Periods)

Big Data Characteristics: Volume-Variety-Velocity-Veracity, Analytics, Basic Nomenclature, Analytics Process Model, Analytical Model Requirements, Types of Data Sources, Sampling, Types of Data Elements, Missing Values, Standardizing Data, Outlier Detection and Treatment, Categorization.

UNIT II – HADOOP FRAMEWORKS AND HDFS (8 Periods)

Frameworks: A Brief History of Hadoop, The Hadoop Ecosystem, Hadoop Releases, The Building Blocks of Hadoop: Name Node-Data Node-Secondary Name Node-Job Tracker-Task Tracker.

The Hadoop Distributed File system: The Design of HDFS, HDFS Concepts, Hadoop File Systems .

UNIT III – MAP REDUCE (9 Periods)

Map Reduce: Anatomy of a Map Reduce: Map Reduce1-Map Reduce
2. Failures: Failures in Classic MapReduce, Failures in YARN. Job Scheduling: The Fair Scheduler, the Capacity Scheduler. Shuffle and Sort, Input Formats, Output Formats.

UNIT IV –HIVE AND PIG (10 Periods)

Hive: The Hive Shell, Hive Services, Comparison with Traditional Databases, HiveQL, Tables, Querying Data, User-Defined Functions.

Pig: Installing and Running Pig, Comparison with Databases, Pig Latin, User-Defined Functions, Data Processing Operators.

UNIT V –CASE STUDY (8 Periods)

Case Study: Hadoop Usage at Last.fm, Hadoop and Hive at Facebook, Nutch Search Engine, Log Processing at Rackspace, Mahout,Sqoop.

Total No. of Periods: 44

TEXT BOOKS:

1. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications",Wiley Publications ,2014.
2. Tom White, "Hadoop:The Definitive Guide", 3rd Edition, O'REILLY Publications, 2012.

REFERENCE BOOKS:

1. Paul Zikopoulos, IBM, Chris Eaton, Paul Zikopoulos "Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data", The McGraw-Hill Companies, 2012.
2. Chuck Lam "Hadoop in action" , Manning Publications, 2011.

IV B. Tech. II Semester

14BT80533**: AD HOC WIRELESS NETWORKS**

(PROFESSIONAL ELECTIVE - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	—	3

PRE-REQUISITES: *A Course on* "Computer Networks"

COURSE DESCRIPTION: This course deals with the concepts and issues of Ad Hoc Wireless Networks, MAC protocols, Routing Protocols, Multicast Routing protocols, Transport Layer and Security Protocols, Quality of Service and Energy Management in Ad Hoc Networks.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge in
- Issues in ad hoc wireless networks
- MAC Protocols
- Routing Protocols
- Quality of service
- Energy management

CO2. Analyze the challenges in designing MAC protocols, routing protocols and Transport protocols for Ad hoc Networks.

CO3. Solve engineering problems with wide range of solutions in ad hoc wireless networks.

CO4. Apply appropriate Routing Protocols in the field of ad hoc wireless networks.

DETAILED SYLLABUS:

UNIT I: AD HOC WIRELESS NETWORKS & MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS (9 periods)

Ad Hoc Wireless Networks: Introduction, Issues in Ad hoc Wireless Networks, Ad hoc Wireless Internet

MAC protocols for Ad hoc Wireless Networks: Issues in Designing a MAC Protocol for Ad hoc Wireless Networks , Design Goals for a MAC Protocol for Ad hoc Wireless Networks, Classifications of MAC Protocol, Contention- Based protocol-MACAW, Contention-Based protocol with Reservation Mechanism- D-PRMA , Contention-Based protocol with Scheduling Mechanism- DPS.

UNIT II: ROUTING PROTOCOLS FOR AD HOC WIRELESS NETWORKS & MULTICAST ROUTING IN AD HOC WIRELESS NETWORKS (9 periods)

Routing Protocols for Ad hoc Wireless Networks Issues in Designing a Routing Protocol for Ad hoc Wireless Networks,Classifications of Routing Protocols, Table –Driven Routing Protocols-Destination Sequenced Distance Vector Routing Protocol, On-Demand routing protocols-Dynamic Source routing protocol, Ad Hoc On-Demand Distance Vector Routing Protocol.

Multicast Routing in Ad hoc Wireless Networks: Introduction, Issues in designing a multicast protocol, operation of multicast routing protocols, classification of multicast routing protocols, Tree-Based Multicast Routing- Bandwidth Efficient Multicast Routing Protocol(BEMRP)

UNIT III: TRANSPORT LAYER AND SECURITY PROTOCOLS FOR AD HOC WIRELESS NETWORKS (9 periods)

Transport Layer for Ad hoc Wireless Networks Issues in Designing a Transport layer protocol for Ad hoc Wireless Networks, Design goals of a Transport layer protocol for Ad hoc Wireless Networks, Classification of Transport layer solutions, TCP over Ad hoc Wireless Networks.

Security protocols for Ad hoc Wireless Networks- Security in Ad hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, and Secure Routing in Ad hoc Wireless Networks.

UNIT IV: QUALITY OF SERVICE AND FRAMEWORK IN AD HOC WIRELESS NETWORKS(9 periods)

Quality of Service in Ad Hoc Wireless Networks: Introduction, Issues and challenges in providing QOS in Ad Hoc Wireless Networks, Classification of QOS solutions, MAC Layer Solutions – IEEE 802.11e , Network layer solutions- QOS Routing protocol , Ticket-Based QOS Routing Protocol .

QOS Frame Work for Ad Hoc Wireless Networks: QOS models, QOS Resource Reservation Signaling, INSIGNIA model.

UNIT-V: ENERGY MANAGEMENT IN AD HOC WIRELESS NETWORKS (9 periods)

Energy Management in Ad Hoc Wireless Networks: Introduction, Need for energy management in Ad Hoc Wireless Networks, classification of energy management schemes, Battery Management Schemes: Device Dependent schemes, Network layer solutions, Transmission power management schemes: Data link layer solutions, Higher Layer solutions, System Power Management Schemes: Processor Power Management Scheme, Device Power Management Scheme. **Total No. of periods: 45**

TEXT BOOKS:

1. C.Siva Ram Murthy, B.S.Manoj, "Adhoc Wireless Networks – Architectures and Protocols," Pearson Education, 1st edition, 2004.

REFERENCE BOOKS:

1. C.K.Toh, "Ad hoc Mobile Wireless Networks," Pearson Education, New Delhi, 2002.
2. Charles E. Perkins, "Ad hoc Networking," Pearson Education, New Delhi, 2011.

IV B.Tech. II Semester

14BT71206**: SERVICE ORIENTED ARCHITECTURE**

(PROFESSIONAL ELECTIVE - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A Course on "Software Engineering".

COURSE DESCRIPTION: Web Services, Principles of SOA; Service Layers; Simple Object Access Protocol (SOAP); Web Services Description Language (WSDL).

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on:

- Fundamentals of web services
- Principles, services and policies of service orientation.
- XML, WSDL related to SOA

CO2. Analyze complex business process critically in identifying appropriate service model logic.

DETAILED SYLLABUS:

UNIT-I: SOA AND WEB SERVICES FUNDAMENTALS (9 Periods)

Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common pitfalls of adopting SOA.

The Evolution of SOA: An SOA Timeline, The continuing evolution of SOA, The roots of SOA.

Web Services and Primitive SOA: The Web Services framework, Services, Service descriptions, messaging.

UNIT-II: SOA AND WS-* EXTENSIONS (8 Periods)

WS-* and Contemporary SOA (Part I): Message Exchange Patterns, Service Activity, Coordination, Atomic transactions, Business Activities.

WS-* and Contemporary SOA (Part-II): Addressing, Reliable messaging, Correlation, Policies, Metadata exchange.

UNIT - III: PRINCIPLES, SERVICE LAYERS AND PLANNING (10 Periods)

Principles of Service-Orientation: Anatomy of SOA, Common principles of Service Orientation, Inter relationship of Service Orientation Principles, Service Orientation and Object Orientation.

Service Layers: Service-Orientation and Contemporary SOA, Service Layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

SOA Delivery Strategies: SOA delivery lifecycle phases, The Top-down strategy, the bottom-up strategy, the agile strategy.

UNIT-IV: BUILDING SOA AND SERVICE MODELING (8 Periods)

Service Oriented Analysis: Benefits of a Business Centric SOA and Deriving Business Services.

Service Modeling: Service Modeling, Service Modeling guidelines, Classifying Service model logic, Contrasting Service modeling approaches.

UNIT-V: BUILDING SOA AND SERVICE DESIGN (9 Periods)

Service-Oriented Design: WSDL related XML Schema language basics, WSDL language basics, SOAP language basics, Service interface design tools.

Service Design: Service Design overview, Entity-centric business Service Design, Application Service Design, Task-centric business Service Design, Service Design guidelines.

Total No. of Periods: 45

TEXT BOOK:

1. Thomas Erl, **"**Service-Oriented Architecture - Concepts, Technology, and Design", Pearson, 1st Edition, 2011.

REFERENCE BOOKS:

1. Shankar Kambhampaty, "Service Oriented Architecture for Enterprise and Cloud Applications", Wiley- India, 2nd edition, 2010
2. Eric Newcomer, "Understanding SOA with Web Services", Pearson Education, 2nd edition, 2005.

IV B.Tech. II Semester

14BT81204**: INFORMATION RETRIEVAL SYSTEMS**

(PROFESSIONAL ELECTIVE - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on **"**Data Structures and Database Management Systems"

COURSE DESCRIPTION: Architecture of Information Retrieval Systems; Functional Capabilities; Data Structures; Mathematical Algorithms; Indexing; Similarity and Clustering; Human Perception and Presentation; Text Search Techniques and Evaluation Measures.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Demonstrate knowledge on Information Retrieval Systems including architecture, functional capabilities, indexing and data presentation methods.

CO2. Analyze clustering algorithms to group similar data items and text search techniques for efficient search.

CO3. Design and develop data structures used to store/retrieve data items, mathematical algorithms and measures to evaluate retrieval systems.

DETIALED SYLLABUS:

UNIT I: INTRODUCTION (11 Periods)

Primary Information Retrieval Problems, Objectives of Information Retrieval System, Functional Overview, Understanding the Search Functions, Relationship to DBMS, Digital libraries and Data Warehouses, Data structures and Mathematical Algorithms.

UNIT II: INGEST AND INDEXING (9 Periods)

Introduction, Item Receipt, Duplicate Detection, Item Normalization, Zoning and Creation of Processing Tokens, Stemming, Entity Processing, Categorization, Citational Metadata, Manual Indexing Process, Automatic Indexing of Text and Multimedia.

UNIT III: SEARCH AND CLUSTERING (9 Periods)

Similarity measures and Ranking, Hidden Markov Models Techniques, Ranking Algorithms, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches for Boolean Systems, Multimedia Searching, Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters.

UNIT IV: INFORMATION PRESENTATION (8 Periods)

Introduction, Presentation of the Hits, Display of the Item, Collaborative Filtering, Multimedia Presentation, Human Perception and Presentation.

UNIT V: SEARCH ARCHITECTURE AND EVALUATION (8 Periods)

Index Search Optimization, Text Search Optimization, GOOGLE Scalable multiprocessor architecture, Information System Evaluation, Measures used in system evaluation

Total No. of Periods: 45

TEXT BOOK:

1. Gerald Kowalski, "Information Retrieval Architecture and Algorithms", Springer, 1st edition, 2013.

REFERENCE BOOKS:

1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, "An Introduction to Information Retrieval", Cambridge University Press, 1st edition, 2012.
2. Ricardo Baeza-Yates and Berthier Ribiero-Neto, "Modern Information Retrieval the concepts and technology behind search", Addison Wesley, 2nd edition, 2010.

IV B. Tech. II Semester

14BT81521**: COMPREHENSIVE VIVA-VOCE**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	100	100	-	-	-	2

PREREQUISITES: All courses of the program.

COURSE DESCRIPTION:

Assessment of student learning outcomes.

COURSE OUTCOMES:

Comprehensive Viva-Voce enables a successful student to

CO1. Demonstrate knowledge in the program domain.

CO2. Present his views cogently and precisely.

CO3. Exibit professional etiquette suitable for career progression.

IV B. Tech. II Semester
14BT81522**: PROJECT WORK**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
60	140	200	-	-	20	10

PREREQUISITES: All the courses of the program up to IV B. Tech. – I Semester.

COURSE DESCRIPTION:

Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

- **CO1.** Acquire in-depth knowledge in the areas of interest.
- **CO2.** Analyze critically chosen problem for conducting research and developing a project.
- **CO3.** Design solutions through knowledge gained, for solving problem efficiently.
- **CO4.** Solve real world problems in the project domain.
- **CO5.** Use the appropriate techniques, resources and modern engineering tools necessary for project work.
- **CO6.** Understand professional and ethical responsibilities for sustainable development in chosen field of project.
- **CO7.** Perform harmonically in multi-cultural groups, and develop a high level of interpersonal skills.
- **CO8.** Develop communication skills, both oral and written for preparing and presenting reports.
- **CO9.** Engage in lifelong learning to improve knowledge and competence continuously.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

ELECTRONICS AND COMMUNICATION ENGINEERING

I Year B.Tech. (Yearly Pattern)

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT1HS01	Technical English	2	-	-	4	30	70	100
14BT1BS01	Engineering Physics	2	1	-	4	30	70	100
14BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
14BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
14BT1BS04	Mathematical Methods	3	1	-	6	30	70	100
14BT1ES01	Programming in C and Data Structures	3	1	-	6	30	70	100
14BT1ES03	Computer-Aided Engineering Drawing	-	1	3	3	25	50	75
14BT1BS05	Engineering Physics and Engineering Chemistry Lab.	-	-	3	3	25	50	75
14BT1ES04	Programming in C and Data Structures Lab.	-	-	3	3	25	50	75
14BT1ES06	Engineering and IT Workshop	-	-	3	3	25	50	75
14BT1HS02	English Language Communication Skills Lab.	-	-	3	3	25	50	75
	TOTAL	**15**	**6**	**15**	**45**	**305**	**670**	**975**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

ELECTRONICS AND COMMUNICATION ENGINEERING

II B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS02	Special Functions and Complex Analysis	3	1	-	3	30	70	100
14BT3HS01	Environmental Sciences	3	1	-	3	30	70	100
14BT30401	Probability and Stochastic Processes	3	1	-	3	30	70	100
14BT30402	Semiconductor Devices and Circuits	3	1	-	3	30	70	100
14BT30231	Electrical Technology	3	1	-	3	30	70	100
14BT30232	Network Analysis	3	1	-	3	30	70	100
14BT30421	Semiconductor Devices and Circuits Lab	-	-	3	2	25	50	75
14BT30222	Electrical Technology Lab	-	-	3	2	25	50	75
	Total:	**18**	**6**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

ELECTRONICS AND COMMUNICATION ENGINEERING

II B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT4HS02	Professional Ethics	3	1	-	3	30	70	100
14BT40401	Analog Communications	3	1	-	3	30	70	100
14BT40402	Electronic Circuit Analysis and Design	3	1	-	3	30	70	100
14BT40403	Electromagnetic Theory and Transmission Lines	3	1	-	3	30	70	100
14BT40404	Signals and Systems	3	1	-	3	30	70	100
14BT40405	Switching Theory and Logic Design	3	1	-	3	30	70	100
14BT50201	Control Systems	3	1	-	3	30	70	100
14BT40421	Electronic Circuit Analysis and Design Lab	-	-	3	2	25	50	75
14BT40422	Signals and Systems Lab	-	-	3	2	25	50	75
	Total:	**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

ELECTRONICS AND COMMUNICATION ENGINEERING

III B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT4HS01	Business Communication and Presentation Skills	3	1	-	3	30	70	100
14BT5HS01	Managerial Economics and Principles of Accountancy	3	1	-	3	30	70	100
14BT50401	Antennas and Propagation	3	1	-	3	30	70	100
14BT50402	Digital Communications	3	1	-	3	30	70	100
14BT50403	Digital IC Applications	3	1	-	3	30	70	100
14BT50404	Linear IC Applications	3	1	-	3	30	70	100
14BT50405	Pulse and Digital Circuits	3	1	-	3	30	70	100
14BT50421	Analog and Digital Communications Lab	-	-	3	2	25	50	75
14BT50422	PDC and IC Lab	-	-	3	2	25	50	75
	Total:	**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

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COURSE STRUCTURE (2014-2015)

ELECTRONICS AND COMMUNICATION ENGINEERING

III B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT60401	Digital Signal Processing	3	1	-	3	30	70	100
14BT60402	Microwave Engineering	3	1	-	3	30	70	100
14BT60403	VLSI Design	3	1	-	3	30	70	100
14BT60201	Microprocessors and Microcontrollers	3	1	-	3	30	70	100
14BT40501	Computer Organization	3	1	-	3	30	70	100
Professional Elective-I		3	1	-	3	30	70	100
14BT60404	Analog IC Design							
14BT60405	Image Processing							
14BT60406	TV & Radar Engineering							
14BT41201	Object Oriented Programming							
14BT60421	Digital IC Applications Lab	-	-	3	2	25	50	75
14BT60222	Microprocessors and Microcontrollers Lab	-	-	3	2	25	50	75
	Total:	**18**	**6**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

ELECTRONICS AND COMMUNICATION ENGINEERING

IV B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT70401	Electronic Measurements and Instrumentation	3	1	-	3	30	70	100
14BT70402	Embedded Systems	3	1	-	3	30	70	100
14BT70403	Light Wave Communications	3	1	-	3	30	70	100
14BT51201	Computer Networks	3	1	-	3	30	70	100
--	Open Elective	3	1	-	3	30	70	100
Professional Elective-II		3	1	-	3	30	70	100
14BT70404	Advanced Digital Signal Processing							
14BT70405	Digital CMOS IC Design							
14BT70406	Telecommunication Switching Systems							
14BT51501	Operating Systems							
14BT70421	Digital Signal Processing Lab	-	-	3	2	25	50	75
14BT70422	Microwave and Light Wave Communications Lab	-	-	3	2	25	50	75
14BT70423	Seminar	-	-	-	2	-	50	50
	Total:	**18**	**6**	**6**	**24**	**230**	**570**	**800**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

ELECTRONICS AND COMMUNICATION ENGINEERING

IV B.Tech. I Semester
Open Electives

Offering Dept	Course Code	Course Title
BS&H	14BT6HS01	Banking and Insurance
BS&H	14BT6HS02	Cost Accounting and Financial Management
BS&H	14BT6HS03	Entrepreneurship for Micro, Small and Medium Enterprises
CE	14BT70105	Disaster Mitigation and Management
CE	14BT70106	Environmental Pollution and Control
CE	14BT70107	Contract Laws and Regulations
CE	14BT70108	Planning for Sustainable Development
CE	14BT70109	Rural Technology
ME	14BT60305	Artificial Intelligence and Robotics
ME	14BT60306	Global Strategy and Technology
ME	14BT60307	Intellectual Property Rights and Management
ME	14BT60308	Managing Innovation and Entrepreneurship
ME	14BT60309	Material Science
CSE	14BT60502	Engineering Systems Analysis and Design
EIE	14BT71005	Microelectromechanical Systems
IT	14BT61203	Bio-Informatics
IT	14BT61204	Cyber Security and Laws

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

ELECTRONICS AND COMMUNICATION ENGINEERING

IV B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS02	Management Science	3	1	-	3	30	70	100
14BT80401	Cellular and Mobile Communications	3	1	-	3	30	70	100
Professional Elective-III		3	1	-	3	30	70	100
14BT80402	Mixed Signal Design							
14BT80403	Satellite Communications							
14BT80531	Wireless Sensor Networks							
14BT81202	Cryptography and Network Security							
Professional Elective-IV		3	1	-	3	30	70	100
14BT80404	Low Power VLSI Design							
14BT80405	Speech Processing							
14BT80406	Spread Spectrum Communications							
14BT40502	Data Base Management Systems							
14BT80421	Comprehensive Viva-Voce	-	-	-	2	-	100	100
14BT80422	Project Work	-	-	20	10	60	140	200
Total:		**12**	**4**	**20**	**24**	**180**	**520**	**700**
Grand Total:					**187**	**1695**	**3980**	**5675**

B.Tech I Year

14BT1HS01: **TECHNICAL ENGLISH**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

DETAILED SYLLABUS:

UNIT – I: (10 periods)

My Early Days by **A. P. J. Abdul Kalam** from **All About English** by Cambridge University Press India Pvt Ltd. 2014.

Communication: Importance of Communication – Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-Verbal Communication.

UNIT – II: (10 periods)

A Speech by N. R. Narayana Murthy from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: (10 periods)

The Town by the Sea by Amitav Ghosh from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: (10 periods)

Sir. C. V. Raman: The Celebrated Genius from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Reading: Reading and Interpretation – Intensive and Extensive Reading–Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: (10 periods)

The Model Millionaire by **Oscar Wilde** from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Writing: Characteristics – Language – Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism - Referencing and Styling.

Total Periods: 50

TEXT BOOKS:

1. *All About English,* Cambridge University Press India Pvt. Ltd., First Edition, 2014.
2. Meenakshi Raman and Sangeetha Sharma, *Technical Communication,* Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, *Effective Technical Communication,* Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.
2. Martin Hewings, *Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,* Cambridge University press, First South Asian Edition, New Delhi, 1999.

B.Tech. I Year

14BT1BS01**: ENGINEERING PHYSICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

COURSE OUTCOMES :

After completion of the course a successful student will be able to

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context.

DETAILED SYLLABUS:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, Ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: (16 periods)

SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III : (17 periods)

PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative treatment), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: **(17 periods)**

DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V : **(17 periods)**

MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS

Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total Periods: 85

TEXTBOOKS:

1. S. Mani Naidu*, Engineering Physics*, Pearson Education, 2013.

2. P. K. Palaniswamy, *Engineering Physics,*Scitech Publications

REFERENCE BOOKS:

1. R. K. Gaur and S. L. Gupta*, Engineering Physics,* DhanpatRai Publications (P) Ltd., 8th Edition, 2001.

2. M. R. Srinivasan, *Engineering Physics,* New Age International (P) Limited, Publishers, 1st Edition,2010.

B.Tech. I Year
14BT1BS02 **: ENGINEERING CHEMISTRY**
(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.

COURSE OUTCOMES:

After successful completion of the course the student is able to:

1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.
2. Develop analytical skills in:
   a. Determination of hardness of water.
   b. Determination of viscosity, flame and fire points, cloud and pour points.
   c. Determination of calorific value of fuels.
3. Develop skills in design of:
   a. Methods for control of corrosion
   b. Chemical methods for the synthesis of Nanomaterials.
4. Develop skills for providing solutions through:
   a. Mitigation of hardness of water.
   b. Control of corrosion
   c. Newer Nanomaterials for specific applications
5. Acquire awareness to societal issues on:
   a. Chemical materials utility and their impact.
   b. Quality of water.
   c. Phenomenon of corrosion.
6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:
   a. Green computing
   b. Green construction
   c. Green manufacturing systems

DETAILED SYLLABUS:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.

Conducting Polymers – Definition, types of conducting polymers and their engineering applications. **Composites** – Introduction, advantages of composites, constituents of composites, types of composites, applications of composites. **Sensors** - Introduction, types of sensors, electrochemical sensors, applications. **Insulators** – Definition, characteristic properties of insulators and classification of insulators.

UNIT–II: WATER TECHNOLOGY (15 periods)

Introduction, types of water, impurities in water and their consequences. Hardness of water, units of hardness, measurement of hardness by EDTA method, disadvantages of hardness. Softening methods – Ion exchange process, Zeolite process-Municipal water treatment. Boiler Troubles. Desalination of brackish water by Electro dialysis and Reverse osmosis. Numerical problems on measurement of hardness of water.

UNIT–III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst's equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, H_2 – O_2 fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT–IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY (17 periods)

Nano Chemistry: Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

Green Chemistry: Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems.

Total periods: 85

TEXT BOOKS:

1. P.C.Jain & Monika Jain*, Engineering Chemistry,* Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah *Engineering Chemistry,* Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2013.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, *Hand book of Nanostructured materials and Nanotechnology,* New Age international publishers, 2nd edition, 2010.
2. Paul T. Anastas, John C Warner, *Green Chemistry: Theory and practice,* Oxford University Press, 2000.

B.Tech. I Year

14BT1BS03 **: ENGINEERING MATHEMATICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas , surfaces and volumes of revolutions.
3. Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton's Law of cooling and heat transfer.
4. Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

DETAILED SYLLABUS:

UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS (20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton's Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for Q(x) = e^{ax}, *sin ax*, *cos ax*, x^n, e^{ax} *V(x)*, *x V(x)*. Method of variation of parameters . Applications to L-R-C circuits.

UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES (22 periods)

Functions of two or more variables – Homogeneous functions – total derivatives – derivatives of implicit function – Jacobian – maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers. Radius ,centre and circle of curvature, tracing of curves in cartesian, parametric and polar forms.

UNIT-III: APPLICATIONS OF INTEGRATION (18 periods)

Applications of integration to – length of curves, area of surfaces of revolution and volume of solids of revolution – Double integrals – change of variables and change of order of integration. Evaluation of Triple integrals -volume as double integral.

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS (20 periods)

Laplace transforms of standard functions – Properties of Laplace transforms–First and second shifting Theorems. Laplace transforms of derivatives and integrals–Laplace transforms of periodic functions – Unit step function – Dirac delta function – Inverse transforms–Convolution theorem. Applications of Laplace transforms to linear differential equations with constant coefficients.

UNIT-V : VECTOR CALCULUS (20 periods)

Vector differentiation – gradient, divergence, curl and vector identities. Laplacian Operator. **Vector integration**: Line integrals independent of path – work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals. Verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

Total periods: 100

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, *Engineering Mathematics,* Vol. 1, S. Chand & Company, 12thedition, 2013.

REFERENCE BOOKS:

1. Grewal, B.S., *Higher Engineering Mathematics*, Khanna Publishers, 42nd edition, 2012.
2. Kreyszig, E., *Advanced Engineering Mathematics*, John Wiley and Sons, 8th edition, 2006.

B.Tech. I Year

14BT1BS04 **: MATHEMATICAL METHODS**

(Common to CSE, CSSE, IT, ECE, EIE and EEE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: This course deals with obtaining the numerical solutions for algebraic and transcendental equations. Fundamentals of matrix theory including introduction to Eigen values, Cayley-Hamilton's theorem, numerical solutions to differential equations, transformation techniques for solving engineering problems and applications of partial differential equations are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire basic knowledge in
   (a) solving linear equations through matrix methods.
   (b) solving algebraic and transcendental equations by various mathematical methods.
   (c) fitting of various types of curves to the given data
   (d) finding the numerical values to derivatives and integrals through different mathematical methods.
   (e) solving differential equations numerically through various methods.
   (f) solving difference equations using z –transforms.
2. Develop analytical skills in
   (a) evaluating the properties of functions through Fourier series and Fourier transforms.
   (b) solving boundary value problems in engineering using Fourier transform
3. Design novel mathematical methods for
   (a) fitting geometrical curves to the given data.
   (b) for solving the differential equations.
   (c) the problems involving heat transformations.
   (d) constructing the interpolating polynomials to the given data and drawing inferences.

DETAILED SYLLABUS:

UNIT–I: MATRIX THEORY AND APPLICATIONS (20 periods)

Rank of a matrix, echelon form, normal form, inverse of a matrix by normal form. Homogenous and non-homogenous linear systems, consistency and solutions of linear system of equations. Solutions of equations by Gauss elimination method. Eigen values, Eigen vectors and properties. Cayley– Hamilton Theorem (without proof), inverse and powers of a matrix using Cayley– Hamilton Theorem, diagonalization of a matrix, quadratic forms, nature of quadratic form and reduction of quadratic form to its normal form.

UNIT-II: NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION (19 periods)

Solutions of Algebraic and Transcendental equations by bisection method, Regula – Falsi method, Newton – Raphson method. Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves. Interpolation, forward difference operator, backward difference operator, central difference operator. Relationship between different operators. Interpolation using Newton's forward formula, Newton's backward formula, Lagrange's interpolation formula.

UNIT-III:

NUMERICAL DIFFERENTIATION AND INTEGRATION, SOLUTIONS OF O D E (20 periods)

Numerical differentiation using Newton's forward formula, Newton's backward formula. Numerical integration using trapezoidal rule, Simpsons 1/3 rule, Simpsons 3/8 rule. Numerical solutions of first order ordinary differential equations using Taylor series, Euler's method modified Euler's method, Runge – Kutta method (4^{th} order only).

UNIT-IV : TRANSFORMATION TECHNIQUES (25 periods)

Fourier series , Dirichlets conditions, determination of Fourier coefficients (Euler's formulae), even and odd functions. Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, inverse transforms. Z – transforms, inverse Z– transform, properties, damping rule, shifting rule, initial and final value theorems. Convolution theorem, solution of difference equations by Z– transforms.

UNIT – V: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS (16 periods)

Formation of partial differential equations . Method of separation of variables for second order partial differential equations – solutions of one dimensional wave equation – heat equation -Laplace equation.

Total periods: 100

TEXTBOOK:

1. T.K.V. Iyenger, B. Krishna Gandhi, S. Ranganadham and M.V.S.S.N. Prasad, *Mathematical Methods,* S.Chand and Company, 8^{th} edition, 2013.

REFERENCE BOOKS:

1. B.S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 42^{nd} edition, 2012.
2. S.S.Sastry, *Introductory Methods of Numerical Analysis*, Prentice Hall of India, 4^{th} edition, 2005.

B.Tech. I Year

14BT1ES01**: PROGRAMMING IN C & DATA STRUCTURES**

(Common to ECE, EEE, EIE, ME and CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Nil

COURSE DESCRIPTION: This course deals with fundamentals of programming in C language such as syntax of C, mechanisms of input and output processing, derived data types like arrays, strings and pointers. Also file in C and data structures are discussed.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Gain knowledge on developing algorithms and programming techniques.
2. Gain analytical skills on
    a. Searching and sorting
    b. File management functions.
    c. Various Data Structures
3. Design various applications using basic data structures like linked list, stacks and queues
4. Gain competence to represent and solve real time problems using tree data structures.

DETAILED SYLLABUS:

Unit-I: (15 periods)

Programming Languages- Compiler, Interpreter, Loader, and Linker- Program execution- Classification of programming-Algorithms and flowcharts .

Basics of C: Introduction, Standardizations of C language, Developing Programs in C, Structure of C program, Variables, Data Types, Declaration, Token, Operators and expressions, L values and R values, Type Conversion in C.

Unit-II: (20 periods)

Input and Output: Basic screen and key board I/O in C , Non formatted input and output , Formatted Input and output. Control Statements: Specifying Test Condition for Selection and Iteration, Writing Test Expressions, Conditional Execution and Selection, Iterative and Repetitive Execution, GOTO Statement, Special Control statements, Nested loops.

Unit-III: (20 periods)

Arrays and Strings: One dimensional Array, Strings: One-Dimensional Character Arrays, Multidimensional Arrays, Arrays of Strings. Functions: Concept of function, Call by Value Mechanism, passing arrays to Functions, Scope and extent, Storage classes, Inline function, Recursion, Searching and sorting.

Unit-IV: (25 periods)

Pointers: Introduction, Understanding Memory Address, Address Operators, pointer, Void pointer, Null pointer, use of pointers, arrays and pointers, Pointer and strings, pointer arithmetic, pointers to pointers, pointer to arrays, Pointers to functions, Dynamic memory allocation, Pointer and const Qualifier. User-defined data types and variables: Structures, union, Enumerations types, Bitfields.

Files in C: Working with text files, Binary files, Random Access files, other file management functions, Command line arguments, C preprocessor, Type qualifier.

Unit-V: (20 periods)

Linked Lists: Singly Linked Lists, Circular Linked lists, Doubly Linked list Applications of Linked Lists. Stacks and Applications, Queues, Other Variations of Queues, Applications, Tree-Binary tree, Traversals, Kinds of binary tress, Binary Search tree, Application of tree

Total periods: 100

TEXT BOOK:

1. PradipDey and Manas Ghosh, *Programming in C*, 2nd edition, Oxford University Press, New Delhi, 2007

REFERENCE BOOKS:

1. D. Samanta, *Classic Data Structures*, 2nd edition, PHI Learning, New Delhi, 2004
2. Behrouz A. Forouzan and Richard F. Gilberg, *A Structured Programming Approach using C*, 3rd edition, Cengage Learning, New Delhi, 2007.

B.Tech. I Year

14BT1ES03**: COMPUTER AIDED ENGINEERING DRAWING**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	1	3	3

PREREQUISITE: Nil

COURSE DESCRIPTION: This course deals with the concepts of computer-aided sketching, and orthographic and isometric projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES: After completion of the course, a successful student is able to :

1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general audience.

DETAILED SYLLABUS:

UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING (20 periods)

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, Different types of lines, Material conventions and free hand practicing, Definitions of Principle planes and other planes. Computer screen, layout of the software, Creation of 2D/3D environment, Selection of drawing size and scale, Standard tool bar/menus, Coordinate system, and description of most commonly used toolbars, Navigational tools, Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS (20 periods)

Introduction, Definitions- Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), Projection of lines inclined to one plane, inclined to both the planes, finding true lengths and true inclinations (No application problems).

UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES (20 periods)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS (20 periods)

Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS (20 periods)

Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.

Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts.

Total periods: 100

TEXT BOOKS:

1. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, *Engineering Graphics with Auto CAD*, PHI Learning Private Limited, Revised Edition, August 2010.
2. N D Bhat & V M Panchal, *Engineering Drawing,* Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, *AutoCAD 2013 For Engineers And Designers,* Dreamtech Press, 2013
2. T Jeyapoovan, *Engineering Drawing and Graphics Using Autocad,* Vikas Publishing House, 3rd Edition, 2010.
3. Jolhe, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2007.
4. Basant Aggarwal, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

B.Tech. I Year

14BT1BS05: **ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wave length of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:

After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.

Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of $^{P^H}$ of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments :

Engineering Physics:

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
4. Characteristics of LED source.
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee's method
9. Melde's experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
12. Characteristics of laser source.
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum

Engineering Chemistry:

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Conductometric titration of strong acid Vs strong base
6. Determination of P^H of a given solution by P^H metry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
10. Synthesis of Nano metal-oxide using sol– gel process.
11. Determination of the capacity of the given cation-exchange Resin.
12. Measurement of viscosity by Redwood viscometer.

Duration: 3 Periods for each experiment

TEXT BOOKS:

1. *Physics Laboratory Manual*
2. K. Mukkanti, *Practical Engineering Chemistry*, BS Publications, 2013.
3. K.N. Jayaveera, K.B. Chandra Sekhar, *Chemistry laboratory manual,* S.M. Enterprises Limited, 2013.

B.Tech. I Year

14BT1ES04**: PROGRAMMING IN C & DATA STRUCTURES LAB**

(Common to ECE, EEE, EIE, ME and CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION: This course provides programming practice in C language specifically syntax of C, input-output processing, derived data types, file processing, and data structures.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Design, code, test, debug and execute programs in C.
2. Implement and use common features found in C programs – arrays, pointers, strings, stacks and queues.
3. Select the appropriate data structure and algorithm design method for a specified problem.

Week 1:

a. Write a C program to print the string "SVEC" at four corners and center of the screen using single printf statement.

b. Mr. Gupta deposits Rs.1000 in a bank. The bank gives simple interest of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I=PTR/100)

c. Write a program to exchange the values of two variables without using the third variable.

Week 2:

a. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

b. In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.

c. Assume that any month is of 30 days. Input total days through keyboard. Find out the exact number of Years, Months & Days.

Week-3

a. Write a program that reads in a number, then reads in a single digit and determines whether the first number contains the digit. If it does, the program should display how many times the digit occurs in the number.

b. Write a program to print Pythagoras triplets a = m* n , b=$(n^2 + m^2)/2$, c=$(n^2-m^2)/2$ where m = 1,3, 5 ……; n = m + 2, m + 4 ……

c. Write a program to produce the following pattern:

a.
```
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7
1 2 3 4 5 6
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

b.
```
1 2 3 4 5 6 7 8 9 10
  2 3 4 5 6 7 8 9 10
    3 4 5 6 7 8 9 10
      4 5 6 7 8 9 10
        5 6 7 8 9 10
          6 7 8 9 10
            7 8 9 10
              8 9 10
                9 10
                  10
```

Week-4

a. Write a C program to generate Pascal's triangle.

b. Write a C program to construct a pyramid of numbers.

Week-5

a. The formula used to calculate the amount of interest on a bank account that compounds interest daily is

$$i = p\,(1 + r)^d - p$$

where:
i is the total interest earned,
p is the principal (the amount originally deposited in the account),
r is the rate of interest as a decimal less than 1 (for example, 15 percent is expressed as 0.15), and
d is the number of days the money is earning interest.
Write a program that accepts values for p, r and d and calculates the interest earned.

b. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127

c. Write a C program to convert a given decimal number into its equivalent
   i. Binary Number
   ii. Octal Number
   iii. Hexadecimal Number
   iv. Quinary Number(base 5)

Week-6

a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %, use switch statement)
b. Write a program to find the sum of individual digits of a positive integer.
c. A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.
d. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to find the largest and smallest number in a list of integers.
b. Write a program to perform the following:
   i) Addition of two matrices.
   ii) Multiplication of two matrices.

Week-8

a. Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
b. Write a C program to determine if the given string is a palindrome or not
c. Write a C Program to implement all string operations.
   1. Find the length of string 2. Reverse the string.
   3. Comparing the two strings. 4. Copy the string .

Week -9:

a. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 10:

a. Write a C program to count the lines, words and characters in a given text.
b. Write a program that simulates a password entry.
c. Write a program to read a five letter word and generate all possible combinations of two-letter words using those five letters.

Week 11:

Write a program to perform the following:
i) Linear search ii) Binary search

Week 12:

Write a program to perform the following:
i) Selection sort ii) Insertion sort
iii) merge Sort iv) Quick sort

Week 13:

Write programs to perform the following using recursion

i) To find the factorial of a given integer.

ii)To solve Towers of Hanoi problem

Week-14

a. Write a C Program to return a substring from a main string using pointers.

b. Write a C program to return character frequency count in a text using pointers

Week-15

a. Write a C program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

b. Write a Program to enter records of students display in sorted order according to ID number.

c. Define a structure to store employee's data with the following specifications:
Employee-Number, Employee-Name, Basic pay, Date of Joining

i) Write a function to store 10 employee details.

ii) Write a function to implement the following rules while revising the basic pay.
If Basic pay <= Rs.5000 then increase it by 15%.
If Basic pay > Rs.5000 and <= Rs.25000 then it increase by 10%.
If Basic pay > Rs.25000 then there is no change in basic pay.

iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

Week-16

a. Write a program which copies one text file to another.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

c. Consider the following text file:

Input File:

S.No.	Customer_ID	Item No.	Qty.	Price Per Item (Rs.)
1.	C01	I1	2	10
2.	C02	I2	5	50
3.	C03	I2	5	50
4.	C04	I4	10	10

S.V. PROVISION STORES
TIRUPATI
Customer_ID: C01 Date: 12-08-2010

Item	Qty	Price
I1	2	20
Total		20

Week - 17:

Write a program to implement the following operations on Singly Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week -18:

Write a program to implement the following operations on Circular Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week -19 :

Write a program to implement the following operations on Doubly Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week- 20:

Write a program to implement stack operations using:

i) Arrays ii) Pointers

Week -21 :

Write a program to implement linear queue operations using:

i) Arrays ii) Pointers

Week -22:

a) Write a program to implement circular queue operations using arrays
b) Write a program to implement traversals of a Binary tree
   i. Preorder ii. Post order iii. Inorder

Week- 23

Write a program to implement insertion and deletion in a binary search tree.

REFERENCE BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "**A Structured Programming Approach using C**," Third Edition, Cengage Learning, New Delhi, 2007.
2. PradipDey and Manas Ghosh, "**Programming in C**", Second Edition, Oxford University Press, New Delhi, 2007
3. D. Samanta, "**Classic Data Structures**", Second Edition, PHI Learning, New Delhi, 2004.

B.Tech. I Year

14BT1ES06**: ENGINEERING & IT WORKSHOP**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

After completion of the course, a successful student is able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a) Carpentry Shop : Cross lap joint, mortise and tenon, T-joint, dove tail joint.

b) Fitting Shop : Square fit and V-fit, semi circular fit, dove tail fit.

c) Sheet Metal Shop : Trapezoidal tray, square tin, funnel, cylinder.

d) House wiring : Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.

(e) Foundry : Preparation of casting using single piece pattern,
Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) Welding
b) Metal Cutting
c) Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

TWORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

I

b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources.

Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.

Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.

Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.

Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, *Engineering Work shop practice,* VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, *Work shop Manua***l**, SciTech Publishers, 2009.
3. K. Venkata Reddy, *Workshop Practice Manual, B*S Publications, 2008

IT WORKSHOP:

1. Vikas Gupta, *Comdex Information Technology Course Tool Kit,* 2nd edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, *Introduction to Information Technology*, 2nd edition, Pearson Education, New Delhi, 2005.
3. *IT Workshop Laboratory Manual,* Department of IT, SVEC, 2014.

B.Tech. I Year

14BT1HS02: **ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which are classified into software based learning, grammar and activities. English Speech Sounds and Phonemic Transcription, Word Stress and Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features, Vocabulary Building, are aided by software. Grammar sessions include Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays, Telephonic Etiquette, Listening Skills, Describing People, Places and Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to

1. Gain practical knowledge in
   - English Speech Sounds
   - Stress Patterns in word and sentence
   - Intonation Patterns
   - Paralinguistic Features
   - Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts.
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.
6. Demonstrate various language functions by participating in
   - Just A Minute
   - Impromptu Speech
   - Elocution
   - Role Plays
   - Presentations
7. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes c. Idioms and Phrases–Homophones–Homonyms–Homographs.
6. Functional Grammar
   a. Parts of Speech b. Tenses
   c. Change of Speech d. Change of Voice
   e. Word Order and Error Correction f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India.

II B.Tech - I Semester

14BT3BS02: **SPECIAL FUNCTIONS AND COMPLEX ANALYSIS**

(Common to ECE, EEE, and EIE)

Int. Marks: 30;	**Ext. Marks: 70;**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: A course on Engineering Mathematics.

COURSE DESCRIPTION: Beta, Gamma functions and their properties; Limits continuity and analyticity of complex functions; Integration, power series, singularities, residues; conformal mapping with applications.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- (a) Beta and Gamma functions
- (b) Expressing complex functions in power series
- (c) Differentiation and integration of complex functions
- (d) Conformal mappings and bilinear transformations
- (e) Expressing complex functions in terms of graphs and power series

CO2. Develop analytical skills in providing solutions for problems involving
- (a) Fluid, Electrical and Magnetic Potential functions
- (b) Integration of complex functions
- (c) Improper real integrals

CO3. Develop skills in analyzing
- (a) the properties exhibited by complex functions in Argand plane.
- (b) the properties of complex functions by expressing them in power series and graphs.
- (c) properties of improper integrals through residue theory.

DETAILED SYLLABUS:

UNIT-I: SPECIAL FUNCTIONS (10 Periods)

Beta and gamma functions - properties - relationship between beta and gamma functions. Applications - evaluation of improper integrals using beta and gamma functions. Bessel function - generating function (without proof) - recurrence relations - orthogonality.

UNIT-II: ANALYTIC FUNCTIONS (10 Periods)

Function of a complex variable - limits and continuity of functions. Differentiability - analyticity , Cauchy - Riemann equations (both cartesian and polar) . Conjugate and harmonic conjugate functions - Milne Thompson method. Potential functions.

UNIT-III: COMPLEX INTEGRATION AND POWER SERIES (08 Periods)

Line integral - Evaluation of line integrals along curves and closed contours - Cauchy's Integral theorem (without proof) - Cauchy's integral formula - Derivatives of analytic function - Generalized integral formula- Evaluation of integrals using integral formula. Taylor's theorem (without proof) - Laurent's theorem (without proof) - Power series expansion of complex functions.

UNIT-IV: RESIDUE THEOREM - APPLICATIONS (09 Periods)

Zeros and Singularities - Types of singularities - Residues - Evaluation of Residues at poles- Pole of order m and pole at infinity- Residue theorem- Evaluation of integrals using residue theorem - Evaluation of improper and real integrals of the type:

i) $\int_0^{2\pi} f(\cos\theta, \sin\theta)\, d\theta$ ii) $\int_{-\infty}^{\infty} f(x)\, dx$ iii) $\int_{-\infty}^{\infty} e^{imx} f(x)\, dx$

UNIT-V: CONFORMAL MAPPINGS (08 Periods)

Definition, examples and mappings defined by $w = e^z$, $\log z$, z^2, $\sin z$, $\cos z$. Translation, Rotation, Inversion. Bilinear transformation - Properties - Fixed points, Cross ratio. Invariance of circles under bilinear transformation. Determination of bilinear transformation using three given points.

Total Periods: 45

TEXT BOOKS:

1 T.K.V. Iyenger, B. Krishna Gandhi,. etal, *Text book of Engineering Mathematics*, Vol - III, S. Chand & Company, 8th Edition, 2011.

REFERENCE BOOKS:

1. Grewal, B.S, *Higher Engineering Mathematics*, Khanna Publishers, Delhi, 4/2 Edition, 2012.

2. Shahnaz Bathul, *Special Functions and Complex Variables*, PHI Learning, 2nd Edition, 2010.

II B. Tech - I Semester

14BT3HS01: **ENVIRONMENTAL SCIENCES**

(Common to ECE, EEE & EIE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Courses on Engineering Physics and Engineering Chemistry.

COURSE DESCRIPTION: Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in

a) diverse components of environment and natural resources

b) ecosystem and biodiversity & its conservation methods

c) population growth and human health

d) green technology

CO2. Identify and resolve the issues related to sources of different types of pollutions.

CO3. Provide solutions to individuals, industries and government for sustainable development of natural resources.

CO4. Create awareness on environmental degradation and to bring best management practices to protect environment.

CO5. Develop skills in analyzing reports on environment for sustainable development.

CO6. Apply environmental ethics in protection of diversified ecosystems.

DETAILED SYLLABUS:

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES

MULTIDISCIPLINARY NATURE OF ENVIRONMENT: (11 Periods)

Definition, scope and importance of multidisciplinary nature of environment, segments of environment-lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness.

NATURAL RESOURCES: Renewable and Non-renewable resources and associated problems- (a) forest resources: use and over exploitation, deforestation-causes, effects and remedies, case studies, (b) water resources-use and over utilization of surface & ground water, conflicts over water-benefits and problems of large dams, case studies, (c) mineral resources- mining, adverse effects, case studies, (d) food resources-world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging and salinity, case studies, (e) energy resources-growing needs, renewable energy resources-solar, wind, hydropower, hydrogen fuel and non-renewable energy resources-coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT-II: ECOSYSTEMS AND BIODIVERSITY (10 Periods)

ECOSYSTEMS: Definition and concept of an ecosystem, structure and function of an ecosystem-producers, consumers and decomposers, food chains, food webs and ecological pyramids-introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem-ponds, lakes & oceans, energy flow in the ecosystem, ecological succession.

BIODIVERSITY: Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity-habitat loss, poaching of wildlife, man-wild life conflicts, endemic, endangered and extinct species of India, conservation of biodiversity-in-situ and ex-situ.

UNIT-III: ENVIRONMETAL POLLUTION AND CONTROL (08 Periods)

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management-causes, effects and control measures of urban and industrial wastes, hazards and disaster management-floods, earthquakes, tsunamis, case studies.

UNIT-IV: SOCIAL ISSUES AND THE ENVIRONMENT (08 Periods)

From unsustainable to sustainable development, urban problems related to energy, environmental ethics-issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

UNIT-V: HUMAN POPULATION AND THE ENVIRONMENT (08 Periods)

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies. Field work: visit to a local area to document environmental assets-pond / forest / grassland / hill / mountain / Environment Impact Assessment procedures for local environmental issues or assignment/seminar.

Total Periods: 45

TEXT BOOKS:

1. A.Kaushik and C.P. Kaushik, *Environmental Studies*, New Age International (P) Ltd Publications, 4th Edition, 2014.
2. Erach Barucha, *Environmental Studies*, Orient Blackswan, 2nd Edition, 2013.

REFERENCE BOOKS:

1. R. Rajagopalan, *Environmental Studies*, Oxford University Press, 2nd Edition, 2011.
2. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2nd Edition, 2009.
3. Dr. B S Chauhan, *Environmental Studies*, University Science Press, 1st Edition, 2008.
4. M. Anji Reddy, *Textbook of Environmental Sciences and Technology*, BS Publications, 2007.
5. Larry W Canter, *Environmental Impact Assessment*, McGraw-Hill Education, 2nd Edition, 1996.

II B. Tech - I Semester

14BT30401: PROBABILITY AND STOCHASTIC PROCESSES

Int. Marks: 30	Ext. Marks: 70	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: A Course on engineering mathematics containing elementary probability theory, ordinary and partial differential equations and linear algebra.

COURSE DESCRIPTION: Probability theory; The Random Variable; Operation on Single and Multiple Random Variables; Stochastic Processes - Temporal and spectral Characteristics; Noise analysis

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Concepts of Probability
- Single and multiple random variables
- Operation on Single and multiple random variables
- Random processes and their characteristics
- Electrical noise

CO2. Analyze operation on single and multiple random variables and processes.

CO3. Design solutions for complex engineering problems involving random processes.

DETAILED SYLLABUS :

UNIT-I: PROBABILITY (07 Periods)

Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, and Independent Events

UNIT-II: THE RANDOM VARIABLE (12 Periods)

Introduction, Random Variable Concept, Distribution Function, Density Function, Properties, The Gaussian Random Variable, Other distribution and density examples, conditional distribution, Methods of defining Conditioning Event, Conditional Density, Properties.

OPERATIONS ON SINGLE RANDOM VARIABLE: Introduction, Expectation, Moments, Functions that give moments-Characteristic Function, Moment Generating Function, Chebychev's Inequality, Transformations of a random Variable.

UNIT-III: MULTIPLE RANDOM VARIABLES (10 Periods)

MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution and density functions, Properties, Marginal Distribution Functions, Conditional Distribution and Density, Statistical Independence, Distribution and density of a sum of random variables, Central Limit Theorem.

OPERATIONS ON MULTIPLE RANDOM VARIABLES: Expected Value of a Function of Random Variables- Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT-IV: STOCHASTIC PROCESSES-TEMPORAL CHARACTERISTICS (10 Periods)

Concept of Stochastic process, Stationary and Statistical Independence, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes. Correlation Functions-Auto correlation function and its properties, Cross correlation function and its properties, Covariance Function and its properties, Linear system response of Mean and mean-squared value, Autocorrelation function, and Cross-correlation functions. Gaussian Random Processes, Poisson Random Process.

UNIT-V: NOISE ANALYSIS (06 Periods)

NOISE CLASSIFICATION: uncorrelated noise (external nose: atmospheric noise, extra terrestrial noise, manmade noise. internal noise: shot noise, transit-time nose, thermal noise). Noise power, Noise voltage, correlated noise, impulse noise, interference, signal-to-noise power ratio, Noise factor and Noise Figure, Equivalent noise temperature. **Total Periods: 45**

TEXT BOOKS:

1. Peyton Z. Peebles, *Probability, Random Variables & Random Signal Principles*, TMH, 4th Edition, 2002.
2. Wayne Tomasi, *Electronic communications systems*, Pearson Education, 5th Edition, 2004.

REFERENCE BOOKS:

1. Athanasios Papoulis and S. Unnikrishna Pillai, *Probability, Random Variables and Stochastic Processes*, PHI, 4th Edition, 2002.
2. Henry Stark and John W. Woods, *Probability and Random Processes with Application to Signal Processing*, Pearson Education, 3rd Edition, 2002.

II B.Tech - I Semester

14BT30402: **SEMICONDUCTOR DEVICES AND CIRCUITS**

(Common to ECE, EEE & EIE)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Engineering Physics.

COURSE DESCRIPTION: Characteristics of general and special purpose electronic devices; Rectifiers, filters and regulators; Biasing and small signal analysis of BJT and FET.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Demonstrate fundamental knowledge in
- p-n junction diode and its characteristics
- Zener diode and its characteristics
- Rectifiers, Filters and Regulators
- Characteristics of BJT, FET, MOSFET and special purpose electronic devices

CO2. Analyze numerical and analytical problems in
- Rectifiers using Filters
- Regulated Power Supplies
- Transistor biasing circuits and stabilization
- Transistor amplifiers
- FET biasing circuits and amplifiers

CO3. Design electronic circuits like
- BJT and FET biasing circuits
- BJT and FET amplifiers

CO4. Solve engineering problems and arrive at solutionspertaining to electronic circuits.

DETAILED SYLLABUS:

UNIT-I: PN JUNCTION DIODE, RECTIFIERS AND REGULATORS (12 Periods)

PN-JUNCTION DIODE: p-n Junction as a diode, p-n Junction diode equation, Volt-Ampere (V-I) characteristics, temperature dependence of p-n characteristics, diode resistance-static and dynamic resistances, transition and diffusion capacitances, break down mechanisms in semiconductor diodes, Zener diode characteristics.

RECTIFIERS AND REGULATORS: Half-Wave rectifier and Full-Wave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter, p - section filter, comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT-II: BIPOLAR JUNCTION TRANSISTOR, BIASING AND STABILIZATION: (09 Periods)

Transistor construction, BJT Operation, Transistor currents and their relations, Input and Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications, Transistor Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Base Feedback Bias, Voltage Divider Bias, Bias Stability, Transistor as an amplifier, Thermal Runaway, Problems on biasing circuits.

UNIT-III: SMALL SIGNAL ANALYSIS OF BJT AMPLIFIERS: (10 Periods)

BJT Modeling, Hybrid Modeling, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Millers Theorem, Analysis of CE, CB and CC configurations using simplified Hybrid Model, Comparison of CB, CE and CC configurations.

UNIT-IV: FIELD EFFECT TRANSISTOR: (09 Periods)

Construction, Principle of operation and characteristics of JFET and MOSFET (Enhancement & Depletion), Biasing of FET, Small Signal Model of JFET, Common Source and Common Drain Amplifiers using JFET, Generalized FET Amplifier, FET as Voltage Variable Resistor, Comparison of BJT and FET.

UNIT-V: SPECIAL PURPOSE ELECTRONIC DEVICES: (05 Periods)

Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR).Principle of operation of Schottky, Barrier Diode.

Total Periods: 45

TEXT BOOKS:

1. J. Millman, Christos C. Halkias and SatyabrataJit, *Electronic Devices and Circuits*, TMH, 3rd Edition, 2010.

REFERENCE BOOKS:

1. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits*, PHI, 10th Edition, 2009.
2. David A. Bell, *Electronic Devices and Circuits*, Oxford University press, 5th Edition, 2014.
3. S. Salivahanan, N. Suresh Kumar, *Electronic Devices and Circuits*, Mc-Graw Hill, 3rd Edition 2013.

II B. Tech - I Semester
14BT30231: ELECTRICAL TECHNOLOGY

Int. Marks: 30;	Ext. Marks: 70;	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: A Course on Network Analysis.

COURSE DESCRIPTION: DC Machines; Three phase systems; operation and performance of a transformer, Three phase induction motor, Alternators and special machines.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

1. Demonstrate knowledge in
   - Construction & operation of various types of electrical machines.
   - Necessity of starter.
   - Three phase circuits.
2. Analyze the characteristics of various electrical machines.
3. Evaluate the performance of electrical machines.
4. Select suitable machines for real time applications.

DETAILED SYLLABUS:

UNIT-I: DC MACHINES (10 Periods)

DC GENERATOR: construction and working principle, types, EMF equation, losses, open circuit and load characteristics, applications - problems.

DC MOTOR: working principle, torque equation, characteristics, applications, speed control of shunt motor, Swinburne's test, three point starter-problems.

UNIT-II: SINGLE PHASE TRANSFORMER (10 Periods)

Working principle of single phase transformer, constructional features, EMF equation, equivalent circuit, losses, efficiency and regulation of transformer, OC and SC test, predetermination of efficiency and regulation - problems.

UNIT-III: THREE PHASE CIRCUITS (08 Periods)

Introduction to polyphase systems, advantages of polyphase system, generation of three phase voltages, phase sequence, star and delta connections, relationship between phase and line quantities in three phase balanced circuits, power measurement in three phase systems using two wattmeter method - problems.

UNIT-IV: THREE PHASE INDUCTION MOTOR AND ALTERNATOR (08 Periods)

INDUCTION MOTOR: principle of operation, construction and types, slip, rotor frequency, torque, torque-slip characteristics- problems.

ALTERNATORS: principle of operation, constructional features, types, EMF equation.

UNIT-V: SPECIAL MACHINES (09 Periods)

Single phase induction motors - construction, principle of operation (double field revolving theory) and applications of split phase induction motor, capacitor motor, shaded-pole motor. Construction, principle of operation and applications of universal motors and stepper motors.

Total Periods: 45

TEXT BOOKS:

1. B.L. Theraja and A.K. Theraja, A *Text Book of Electrical Technology* in S.I.Units, Vol.2, S.Chand Company Ltd, New Delhi, 2012.
2. V.K. Mehta, Rohit Mehta, *Principles of Electrical Engineering and Electonics*, S.Chand Company Ltd, New Delhi, 2010

REFERENCE BOOKS:

1. H.Cotton, *Electrical Technology*, CBS Publishers & Distributors, 2004.
2. M.S. Naidu and S. Kamakshaiah, *Electrical Technology*, Tata McGraw-Hill Publishing company Ltd, New Delhi, 2007.
3. A. Sudhakar and Shyammohan, P*rinciples of Electrical Engineering*, Tata McGraw Hill Education Private Limited, New Delhi. 2012.

II B. Tech - I Semester

14BT30232: **NETWORK ANALYSIS**

(Common to ECE & EIE)

Int. Marks: 30 ;	**Ext. Marks: 70 ;**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Courses on Engineering Physics and Engineering Mathematics.

COURSE DESCRIPTION: Basic concepts of electric circuits; voltage - current relationship of basic circuit elements; mesh and nodal analysis; AC circuits; transient analysis; two port network parameters; filters; network theorems.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- voltage and current relationships for various electric elements.
- network reduction techniques.
- concepts of 1-phase and 3-phase electric circuits.
- concepts of two port networks and filters.
- various network theorems.

CO2. Analyze
- a circuit using mesh and nodal concepts
- a two port network for various network parameters
- various types of filter networks
- the transient behavior of the circuits.

CO3. Design single phase circuits and filters to meet the required specifications

CO4. Solve
- electrical circuits for voltage, current and power using conventional circuit analysis methods and network theorems
- transient responses
- two port networks and filters

DETAILED SYLLABUS:

UNIT-I: INTRODUCTON TO ELECTRICAL CIRCUITS (10 Periods)

Concepts of charge, current, voltage, power, circuit elements, Ohm's law, Kirchoff's Laws, network reduction techniques, voltage and current division rules, series-parallel circuits, star-delta and delta-star transformations, source transformation, nodal analysis, mesh analysis- problems.

UNIT-II: SINGLE PHASE AC CIRCUITS (08 Periods)

INTRODUCTION TO AC QUANTITIES, BASIC DEFINITIONS: cycle, time period, frequency, amplitude, determination of average value, rms value, form factor and peak factor for different alternating waveforms, phase and phase difference, phase relation in R, L, C circuits, series and parallel circuits, impedance and power triangle, power factor. Series and parallel resonance-quality factor and bandwidth. Current locus diagram-problems.

UNIT-III: TRANSIENT ANALYSIS (08 Periods)

Transient response of R-L, R-C and R-L-C for DC excitation - transient response of R-L, R-C and R-L-C for sinusoidal excitation, solution by using differential equation and Laplace Transforms method - problems.

UNIT-IV: TWO PORT NETWORKS AND FILTERS (10 Periods)

Impedance parameters, admittance parameters, transmission (ABCD) parameters, hybrid parameters, conversion of one parameter to another, conditions for reciprocity and symmetry, interconnection of two port networks in series, parallel and cascaded configurations - problems.

FILTERS: Classification of filters, filter networks and equations of filter networks, classification of pass band and stop band, characteristic impedance in the pass band & stop bands, constant-k Low pass filter, high pass filter, m-derived high pass and low pass filter, band pass filter and band elimination filter-problems.

UNIT-V: NETWORK THEOREMS (09 Periods)

Superposition, Thevenin's, Norton's, maximum power transfer, Tellegen's, Millman's, reciprocity, compensation theorems for D.C. and sinusoidal excitation- applications and problems.

Total Periods: 45

TEXT BOOKS:

1. A. Sudhakar, S.P.Shyam Mohan, *Circuits and Network analysis and synthesis,* 4th Edition, Tata McGraw Hill publishing company Ltd., New Delhi, 2007.
2. A.Chakrabarthi, *Circuit Theory (analysis and synthesis)*, 6th Edition, Dhanpat Rai & Co, New Delhi, 2014.

REFERENCE BOOKS:

1. M.E. Van Valkenberg, *Network Analysis*, Pearson Publications, 3rd Edition, New Delhi 2006.
2. W. H. Hayt, J. E. Kemmerly, S. M. Durbin, *Engineering Circuit Analysis*, 6th Edition, Tata McGraw Hill publishing company Ltd., New Delhi, 2008.

II B. Tech - I Semester

14BT30421: **SEMICONDUCTOR DEVICES AND CIRCUITS LAB**

(Common to ECE, EEE & EIE)

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	-	**3**	**2**

PREREQUISITES: A Course on Semiconductor Devices and Circuits.

COURSE DESCRIPTION: Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; Transistor and FET characteristics; UJT and SCR characteristics; BJT and FET amplifiers.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze the characteristics of different electronic devices, like
- Diode
- Zener Diode
- Transistor
- FET and UJT

CO2. Design and analyze the electronic circuits like transistor and FET amplifiers

CO3. Solve engineering problems and arrive at solutions pertaining to electronics.

LIST OF EXPERIMENTS:

PART A: (Only for viva voce Examination)

Electronic Workshop Practice (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs.
2. Identification, Specifications and Testing of Active Devices, Diodes: BJTs, Low-power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.
3. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO.

PART B: (Minimum of 10 experiments to be conducted)

1. Forward and Reverse bias characteristics of PN Junction diode
2. Zener diode characteristics and Zener as Voltage Regulator.
3. Input and Output characteristics of Transistor in CB Configuration.
4. Input and Output characteristics of Transistor in CE Configuration
5. Halfwave Rectifier with and without filters.
6. Fullwave Rectifier with and without filters.
7. FET characteristics
8. Measurement of h parameters of transistor in CE configurations
9. Frequency response of CE Amplifier.
10. Frequency response of CC Amplifier.
11. Frequency response of Common Source FET Amplifier.
12. SCR Characteristics.
13. UJT Characteristics.

II B. Tech - I Semester

14BT30222: **ELECTRICAL TECHNOLOGY LAB**

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	**-**	**3**	**2**

PREREQUISITES: Courses on Network Analysis and Electrical Technology.

COURSE DESCRIPTION: Determination of Two port network parameters, verification of network theorems; Response of RLC circuits; Performance characteristics of AC and DC Machines.

COURSE OUTCOMES: On successful completion of course, the students will be able to:

CO1. Analyze the performance of electrical machines.
CO2. Design various types of passive filters and resonant circuits.
CO3. Solve complex problems in electrical circuits and machines.

LIST OF EXPERIMENTS: Any SIX experiments from each part to be conducted

Part-A

1. Series and parallel resonant circuits.
2. Time response of first order RL/RC network for periodic non-sinusoidal inputs.
3. Determination of Z and Y parameters for a given Two-port network
4. Determination of ABCD and h-parameters for a given Two-port network
5. Verification of Superposition and Reciprocity theorems
6. Verification of maximum power transfer theorem for both DC and AC excitation.
7. Verification of Thevenin's and Norton's theorems
8. Design of low pass and high pass filters.

Part-B

1. Magnetization characteristic of a DC generator.
2. Swinburne's test on a DC shunt machine.
3. Brake test on a DC shunt motor.
4. Speed control of DC shunt motor by
   a. Field flux control method
   b. Armature voltage control method.
5. OC and SC tests on a single-phase transformer.
6. Load test on a single phase transformer.
7. Brake test on a three-phase induction motor.
8. External characteristics of DC shunt generator.

II B. Tech - II Semester

14BT4HS02: **PROFESSIONAL ETHICS**

(Common to ECE, EEE & EIE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: --

COURSE DESCRIPTION: Engineering Ethics, Moral autonomy and Moral dilemmas - Professional and Ideal Virtues, Professional Responsibility and Moral Leadership - Engineering as Social Experimentation, Conscientiousness and Law of Engineering - Responsibilities and Rights, Whistle Blowing - Global Issues, Managerial Ethics.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Apply the principles of ethics to solve engineering problems.
CO2. Analyze the problems in the implementation of moral autonomy and resolve through consensus.
CO3. Responsible to follow the codes of ethics
CO4. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas
CO5. Function as a member, consultant, Manager, Advisor and Leader in multi-disciplinary teams
CO6. Write reports without bias and give instructions to follow ethics

DETAILED SYLLABUS:

UNIT-I: ENGINEERING ETHICS (08 Periods)

Scope and Aim of Engineering Ethics-Senses of Engineering Ethics- Variety of Moral Issues-Types of Inquiry- Moral Dilemmas- Moral Autonomy- Kohlberg's Theory, Gilligan's theory, Consensus and Controversy,

UNIT-II: PROFESSIONAL IDEALS AND VIRTUES (10 Periods)

Theories about Virtues, Professions, Professionalism - characteristics, expectations, Professional Responsibility, Integrity, Self-respect, Sense of "Responsibility". Self-interest, Customs and Religion- Self-interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories- resolving moral dilemmas and moral leadership.

UNIT-III: ENGINEERING AS SOCIAL EXPERIMENTATION (09 Periods)

Engineering as experimentation- Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters-Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT-IV: RESPONSIBILITIES AND RIGHTS (09 Periods)

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, the bart case, employee rights and discrimination.

UNIT-V: GLOBAL ISSUES (09 Periods)

Multinational corporations-Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers - Managerial ethics applied to Engineering Profession, moral leadership.

Total Periods: 45

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, *Ethics in Engineering*, 3rd Edition, Tata McGraw-Hill, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, *Engineering Ethics*, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, *Fundamental of Ethics for Scientists and Engineers*, 1st Edition, Oxford University Press, 2001.
3. Charles F. Fledderman, *Engineering Ethics*, Pearson Education, 2004.
4. R. Subramanaian, *Professional Ethics*, Oxford Higher Education, 2013

II B.Tech - II Semester
14BT40401: **ANALOG COMMUNICATIONS**

Int. Marks: 30 **Ext. Marks: 70** **Total Marks: 100** **L T P C**
3 1 - 3

PREREQUISITES: Courses on Semiconductor Devices and circuits, Signals and Systems and Probability & Stochastic Processes.

COURSE DESCRIPTION: Continuous Wave Analog Modulations; Pulse Analog Modulations; Modulators and De-Modulators; AM and FM Transmitters and Receivers; Noise performance of AM and FM Systems; TDM and FDM systems; Applications of AM and FM Systems.

COURSE OUTCOMES: On successful completion of the course, the students will be able to

CO1. Demonstrate fundamental knowledge in
- Elements of Analog Communication systems.
- Generation and Detection of AM, PM, FM and Pulse modulated signals
- Effect of noise on AM and FM transmission
- TDM and FDM systems.

CO2. Analyze different types of analog modulation systems and calculate total power, bandwidth of AM, PM and FM.

CO3. Design an efficient Transmitter and Receiver based on SNR, bandwidth and equipment complexities.

CO4. Formulate and solve specific problems in analog communication systems.

DETAILED SYLLABUS :

UNIT-I: AMPLITUDE MODULATION - I (10 Periods)

Introduction to communication system, Need for modulation, Amplitude Modulation: Time domain and frequency domain description - single tone modulation - Power relations in AM waves, Generation of AM waves: Square law modulator - Switching modulator, Detection of AM waves: Square law detector - Envelope detector, Double Side Band Suppressed Carrier Modulation: Time domain and frequency domain description, Generation of DSB-SC Waves: Balanced Modulators - Ring Modulator, Detection of DSB-SC modulated waves-Coherent detector, COSTAS Loop

UNIT-II: AMPLITUDE MODULATION - II (08 Periods)

AM-SSB MODULATION: Frequency domain description, Frequency discrimination method for generation of AM-SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM-SSB Modulated waves, Demodulation of AM-SSB Waves, Signal to Noise ratio in coherent detection of AM-SSB wave, Vestigial Side Band Modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave plus Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT-III: ANGLE MODULATION (08 Periods)

Concept of instantaneous frequency, Generalized concept of angle modulation, Bandwidth of angle modulated waves - Narrow band frequency modulation (NBFM); and Wide band FM (WBFM), Phase modulation, Verification of Frequency modulation bandwidth relationship, Features of angle modulation, Generation of FM waves -Indirect method, Direct generation; Demodulation of FM, Bandpass limiter, Practical frequency demodulators, Small error analysis, Pre-emphasis & De-emphasis filters, FM receiver, FM Capture Effect.

UNIT-IV: ANALOG COMMUNICATION SYSTEMS (13 Periods)

TRANSMITTERS: Radio Transmitter, Classification of radio transmitters, AM Transmitter, Collector Modulator, Balanced modulator using transistors, FM Transmitter, Reactance FET modulator, Varactor diode modulator, frequency stability in FM Transmitter.

RECEIVERS: Radio Receiver, Classification of radio receivers, Tuned radio frequency receiver, Superheterodyne receiver, Choice of IF, Receiver Characteristics, AGC, FM Receiver, Amplitude limiting, Comparison between AM and FM Receivers.

NOISE: Band-Pass systems, Signal to Noise ratio in coherent detection of DSBSC, SSB, Signal to Noise ratio in envelop detection of AM, Signal to Noise ratio in Angle Modulation System- Narrowband & wideband, Threshold in Angle Modulation System, Pre-emphasis & De-emphasis.

UNIT-V: PULSE ANALOG MODULATION (06 Periods)

Pulse modulation, Pulse Amplitude modulation, Generation & demodulation of PAM, Pulse Width Modulation, Generation & demodulation of PWM, Pulse Position Modulation, Generation and demodulation of PPM. Multiplexing, Time Division Multiplexing, Frequency Division Multiplexing.

Total Periods: 45

TEXT BOOKS:

1. Simon Haykin, *Communication Systems*, John Wiley, 2nd Edition, 1978.
2. B. P. Lathi, *Modern Digital and Analog Communication Systems*, Oxford Univ. press, 3rd Edition, 2006.

REFERENCE BOOKS:

1. Sam Shanmugam, *Digital and Analog Communication Systems*, John Wiley, 2006.
2. R. P. Singh, S.P. Sapre, *Communication Systems - Analog and Digital*, TMH, 2nd Edition, 2007.
3. George Kennedy and Bernard Davis, E*lectronics & Communication System*, TMH, 2004.

II B. Tech - II Semester

14BT40402: **ELECTRONIC CIRCUIT ANALYSIS AND DESIGN**

(Common to ECE & EIE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: A course on Semiconductor Devices and Circuits

COURSE DESCRIPTION: BJT - Multi Stage amplifiers; Frequency Response; Feedback Amplifiers; Oscillators; Large Signal Amplifiers; Tuned Amplifiers; FET amplifiers.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Demonstrate knowledge in
- Multi Stage Amplifiers.
- BJT Frequency Response.
- FET Amplifiers.
- Feedback Amplifiers.
- Oscillators.
- Power Amplifiers.
- Tuned Amplifiers.

CO2. Perform analysis of electronic circuits.

CO3. Design and develop electronic sub-systems such as Feedback Amplifiers, Oscillators and Power amplifiers with given specifications.

CO4. Solve problems arising due to poor circuit design by choosing the appropriate design.

DETAILED SYLLABUS :

UNIT-I: MULTI STAGE AMPLIFIERS (08 Periods)

Introduction, Distortion in amplifiers, n-stage cascaded amplifier, Methods of inter-stage coupling, Analysis of RC Coupled Amplifier, Direct and Transformer Coupled Amplifier, Darlington Pair, CE-CC amplifier, Cascode amplifier.

UNIT-II: (11 Periods)

BJT FREQUENCY RESPONSE

Frequency response of BJT amplifier, Analysis at low and high frequencies, Effect of coupling and bypass capacitors, Hybrid-p Common Emitter transistor model, CE short circuit gain, CE current gain with resistive load, Single-stage CE transistor amplifier response, Gain-Bandwidth Product, Multistage Frequency Effects.

FET AMPLIFIERS

FET Small signal Model, Low-frequency Common-Source and Common-Drain Amplifiers, High-frequency Common-Source and Common-Drain Amplifiers.

UNIT-III: BJT FEEDBACK AMPLIFIERS AND OSCILLATORS (10 Periods)

Concept of feedback, Classification of feedback amplifiers, general characteristics of negative feedback amplifiers, Effect of feedback on amplifier characteristics, voltage series, voltage shunt, current series and current shunt feedback configurations. Conditions for oscillations, Classification of oscillators, RC phase shift oscillator, Wien bridge oscillator, Generalized analysis of LC oscillators - Hartley and Colpitts oscillators, Piezoelectric crystal oscillator, Frequency and Stability of oscillators.

UNIT-IV: POWER AMPLIFIERS (08 Periods)

Classification of power amplifiers, Class A large-signal amplifiers, Series-fed and transformer-coupled Class A audio power amplifier, Efficiency of Class A amplifier, Class B amplifier, Transformer-coupled Class B push-pull amplifier, Complementary symmetry Class B push-pull amplifier, Efficiency of Class B amplifier, Distortion in power amplifiers, Transistor power Dissipation, Thermal stability and Heat sinks.

UNIT-V: TUNED AMPLIFIERS (08 Periods)

Introduction, Q-factor, Small signal single tuned amplifiers, Double-tuned amplifiers, Effect of cascading single and double tuned amplifiers on bandwidth, Stagger-tuned amplifiers, Class-C tuned amplifiers.

Total Periods: 45

TEXT BOOKS:

1. Jacob Millman and Christos C. Halkias, *Integrated Electronics*, Tata McGraw-Hill, 2nd Edition, 2010.
2. Robert L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits Theory*, Pearson Education, 10th Edition, 2009.
3. K. Lal Kishore, *Electronic Circuit Analysis*, BS Publications, 2nd Edition, 2003.

REFERENCE BOOKS:

1. Donald A. Neamen, *Electronic Circuit Analysis and Design*, Tata McGraw-Hill, 3rd Edition, 2007.

II B. Tech - II Semester

14BT40403: ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Int. Marks: 30	Ext. Marks: 70	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: Courses on Engineering Mathematics & Engineering Physics.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Electrostatics
- Magnetostatics
- Boundary conditions
- Maxwell's equations
- Poynting theorem
- Transmission line applications
- EM wave's characteristics

CO2. Analyze different electromagnetic problems.

CO3. Design and Develop different impedance transformation techniques.

CO4. Solve engineering problems by proposing Maxwell's equations.

DETAILED SYLLABUS:

UNIT-I: ELECTROSTATICS (12 Periods)

Coulomb's Law, Electric Field Intensity - Fields due to Different Charge Distributions. Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Convection and Conduction Currents, Relaxation Time, Isotropic and Homogeneous Dielectrics, Continuity Equation, Poisson's and Laplace's Equations. Maxwell's Two Equations for Electrostatic Fields, Capacitance- Parallel Plate, Coaxial, Spherical Capacitors, illustrative Problems.

UNIT-II: MAGNETOSTATICS (07 Periods)

Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, illustrative Problems.

UNIT-III: MAXWELL'S EQUATIONS (06 Periods)

Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric-Conductor Interfaces, illustrative Problems.

UNIT-IV: EM WAVE CHARACTERISTICS (10 Periods)

Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media. Conductors & Dielectrics - Characterization, Wave Propagation in Good Conductors and Good Dielectrics. Polarization, Reflection-Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics. Refraction of Plane Waves- Brewster Angle, Total Internal Reflection. Poynting Vector and Poynting Theorem - Applications, illustrative Problems.

UNIT-V: TRANSMISSION LINES (10 Periods)

Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless/Low Loss Characterization, Condition for Distortion less, Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. l/4, l/2, l/8 Lines - Impedance Transformations. Smith Chart - Configuration and Applications, Single stub matching. Introduction to Double Stub Matching, Illustrative Problems.

Total Periods: 45

TEXT BOOKS:

1. Matthew N.O. Sadiku, *Elements of Electromagnetics*, 3rd Edition, Oxford University Press, 2001.
2. Nathan Ida, *Engineering Electromagnetics*, 2nd Edition, Springer (India) Pvt. Ltd., New Delhi, 2005.
3. John D. Ryder, *Networks, Lines and Fields*, 2nd Edition, PHI, 1999.

REFERENCE BOOKS:

1. William H. Hayt Jr. and John A. Buck, *Engineering Electromagnetics*, 7th Edition, TMH, 2006.
2. Schaum's Out-lines, *Electromagnetics*, 2nd Edition, TMH, 2006.
3. E.C. Jordan and K.G. Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd Edition, PHI, 2000.

II B. Tech - II Semester

14BT40404: **SIGNALS AND SYSTEMS**

(Common to ECE & EIE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Courses on Engineering Mathematics and Mathematical Methods.

COURSE DESCRIPTION: Analysis of signals and systems; Representation of signals using Fourier series and Fourier transform and their properties; Time - Domain and Frequency-Domain aspects of signals and systems; concept of convolution and correlation; Sampling and types of sampling; Laplace transform of signals; Z-Transform of sequences and their properties.

COURSE OUTCOMES: On successful completion of the course, students will be able to:

CO1. Demonstrate fundamental knowledge in
- Trigonometric and exponential Fourier series representation of periodic signals
- Fourier transform of signals
- Convolution and correlation of functions
- Sampling Process
- Laplace transforms, ROC for Laplace Transform
- Z-Transform of discrete sequences and ROC for Z-Transform

CO2. Perform time and frequency domain analysis of variouscontinuous and discrete time signals and systems

CO3. Develop solutions to stable and causal systems

CO4. Solve engineering problems critically in the area of signal processing

DETAILED SYLLABUS:

UNIT-I: SIGNALS AND SYSTEMS (10 Periods)

Elementary signals- Unit Impulse and Unit Step Functions, Exponential and Sinusoidal Signals. Classification of Continuous-Time and Discrete-Time Signals, Basic operations on signals, Classification of Continuous-Time and Discrete-Time Systems, Basic System Properties, Linear Time-Invariant Systems - Discrete-Time LTI Systems- The Convolution Sum, Continuous-Time LTI Systems - The Convolution Integral, Properties of Linear Time-Invariant Systems.

UNIT-II: FOURIER SERIES & FOURIER TRANSFORM OF CONTINUOUS-TIME SIGNALS (10 Periods)

The Response of LTI Systems to Complex Exponentials. Fourier Series Representation of Continuous-Time Periodic Signals, Convergence of the Fourier Series, Properties of Continuous-Time Fourier Series Representation of Aperiodic Signals, The Continuous-Time Fourier Transform, The Fourier Transform for Periodic Signals, Properties of the Continuous-Time Fourier Transform, The Convolution Property, Fourier Properties and Basic Fourier Transform Pairs, Systems characterized by Linear constant coefficient differential equations. The Magnitude-Phase Representation of the Fourier Transform, The Magnitude-Phase Representation of the Frequency Response of LTI Systems

UNIT-III: CORRELATION OF SIGNALS & SAMPLING (11 Periods)

Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

SPECTRAL CHARACTERISTICS OF SYSTEM RESPONSE: Power density spectrum of response, Cross-power spectral density of input and output of a linear system.

SAMPLING: Representation of a Continuous-Time Signal by Its Samples - Sampling Theorem, Reconstruction of a Signal from Its Samples Using Interpolation. Effect of under sampling:Aliasing, Discrete-Time Processing of Continuous-Time Signals.

UNIT-IV: LAPLACE TRANSFORMS (07 Periods)

The Laplace Transform, The Region of Convergence for Laplace Transforms, The Inverse Laplace Transform, Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot, Properties of the Laplace Transform, Some Laplace Transform Pairs, Analysis and Characterization of LTI Systems Using the Laplace Transform, System Function Algebra and Block Diagram Representations, Unilateral Laplace Transform.

UNIT-V: Z-TRANSFORMS (07 Periods)

The Z-Transform -Region of Convergence for the z-Transform, The Inverse z-Transform, Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot, Properties of the z-Transform, Some Common z-Transform Pairs, Analysis and Characterization of LTI Systems Using z-Transforms, System Function Algebra and Block Diagram Representations, Unilateral z-Transforms.

Total Periods: 45

TEXT BOOKS:

1. Alan V. Oppenheim, Alan S. Willsky, & S. Hamid, *Signals and Systems*, Pearson Higher Education, 2nd Edition , 2008.
2. B.P. Lathi, *Principles of Linear Systems and Signals*, Oxford University Press, 2nd Edition, 2013.

REFERENCE BOOKS:

1. Simon Haykin and B. Van Veen, *Signals & Systems*, John Wiley, 2nd Edition, 2010.
2. A. Anand Kumar, *Signals & Systems*, PHI, 2011.

II B.Tech - II Semester

14BT40405: **SWITCHING THEORY AND LOGIC DESIGN**

(Common to ECE, EEE & EIE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: A course on Basic algebra.

COURSE DESCRIPTION: Number system and Boolean algebra; Minimization; Analysis and synthesis of digital circuits; Asynchronous Sequential Logic & Programmable Memories.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in:
- Conversion of number systems, Binary Codes.
- Basic theorems, properties and postulates of Boolean algebra.
- Minimization of switching functions using Map method and Tabular method.
- Design of combinational and sequential circuits.
- Realization of Boolean functions using PLDs.

CO2. Perform the analysis of reduction of Boolean function and implementation using PLDs.

CO3. Design and develop various combinational and sequential circuits.

CO4. Solve engineering problems and arrive at solutions pertaining to Digital Electronics.

DETAILED SYLLABUS:

UNIT-I: NUMBER SYSTEM & BOOLEAN ALGEBRA (08 Periods)

Digital systems, Binary Numbers, Number base conversions, Complements of numbers, Signed binary numbers, Binary codes, Error detection and correction codes. Boolean Algebra-Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, logical operations & Logic gates.

UNIT-II: GATE LEVEL MINIMIZATION (08 Periods)

The map method, four variable, Five variable K-map, POS & SOP Simplification, Don't care conditions, NAND & NOR Implementation, Other two level Implementation, Ex-or Function, Tabular Method-Simplification of Boolean function using tabulation Method.

UNIT-III: ANALYSIS AND SYNTHESIS OF COMBINATIONAL CIRCUITS (09 Periods)

Combinational circuits, Analysis & Design procedure, Binary Adder-subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers.

UNIT-IV: ANALYSIS AND SYNTHESIS OF SEQUENTIAL CIRCUITS (11 Periods)

Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers & Counters - Registers, Shift Registers, Synchronous counters and Asynchronous counters.

UNIT-V: ASYNCHRONOUS SEQUENTIAL LOGIC & PROGRAMMABLE MEMORIES (09 Periods)

Introduction, Analysis procedure, Circuits with Latches, Design Procedure, Reduction of State and flow tables, Race-free State Assignment, Hazards. ROM, PLA, PAL.

Total Periods: 45

TEXT BOOKS:

1. M.Morris Mano, *Digital Design*, Pearson, 3rd Edition, 2001.

REFERENCE BOOKS:

1. ZviKohavi and NirahK.Jha, *Switching theory and Finite Automata Theory*, Tata McGraw-Hill, 2nd Edition, 1978.
2. Charles H. Roth, *Fundamentals of Logic Design*, Thomson Publications, 5th Edition,2004.
3. A Anand Kumar, *Switching Theory and Logic Design*, PHI, 2008.

II B. Tech - II Semester

14BT50201: **CONTROL SYSTEMS**

(Common to ECE & EIE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: Courses on Network Analysis and Signals & Systems.

COURSE DESCRIPTION: Concepts of control system; transfer function of various physical systems; time response analysis; frequency response analysis; compensators; stability analysis; state space analysis

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- modelling of physical systems
- time and frequency domain specifications used for stability analysis.
- various methods of determining the stability of the system
- realization of various compensators
- concept of controllability and observability.

CO2. Analyze the stability of the system in time and frequency domains.

CO3. Demonstrate problem solving skills in
- deriving the transfer function using block diagram reduction technique and signal flow graph.
- determination of steady state error and static error constants.
- evaluating the system stability in time and frequency domains.
- solving the state equations of a system.
- evaluating controllability and observability of a system.

DETAILED SYLLABUS:

UNIT-I: CONTROL SYSTEMS CONCEPTS (09 Periods)

Classification of control systems, effects of feedback. Mathematical models -mechanical and electrical systems, analogous systems. Block diagram reduction methods, signal flow graph, Mason's gain formula, transfer function of DC servo motor, AC servo motor, synchros.

UNIT-II: TIME RESPONSE ANALYSIS (08 Periods)

Test signals, time response of first and second order systems, transient response of second order systems, time domain specifications, steady state response, steady state error, error constants and generalized error coefficients, response with proportional, integral and derivative controllers.

UNIT-III: STABILITY ANALYSIS IN TIME DOMAIN (09 Periods)

The concept of stability, Routh's stability criterion, difficulties in the formation of Rough table, application of R-H criterion. Root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root loci, relative stability analysis.

UNIT-IV: FREQUENCY RESPONSE ANALYSIS (09 Periods)

Frequency domain specifications, Bode plots, determination of frequency domain specifications and transfer function from the Bode plot, stability analysis from Bode plots, Polar plots, phase margin and gain margin. Nyquist stability criterion, stability analysis. Compensation techniques- realization of Lag, Lead and Lag-Lead compensators.

UNIT-V: STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS (10 Periods)

Concepts of state, state variables and state model, derivation of state models from physical systems, diagonalization, solution of state equations- state transition matrix and it's properties. Concept of controllability and observability, Kalman's test only.

Total Periods: 45

TEXT BOOKS:

1. A. Anand kumar, *Control Systems*, PHI learning Pvt Ltd., 2nd Edition, 2014.
2. I. J. Nagrath and M. Gopal, *Control Systems Engineering*, New Age International (P) Limited, 5th Edition, 2007.

REFERENCE BOOKS:

1. K. Ogata, *Modern Control Engineering*, Prentice Hall of India, 4th Edition, 2006.
2. A. NagoorKani, *Control Systems*, RBA Publications, 2nd Edition, 2006.

II B.Tech - II Semester

14BT40421: **ELECTRONIC CIRCUIT ANALYSIS AND DESIGN LAB**

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	**-**	**3**	**2**

PREREQUISITES: Courses on Semiconductor Devices & Circuits and Electronic Circuit Analysis and Design.

COURSE DESCRIPTION: Design, Simulation and Implementation of Single stage & Multistage Amplifiers; Feedback Amplifiers and Oscillators; Power Amplifiers; Tuned BJT Amplifiers and FET Amplifier.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze amplifiers, Oscillator and Tuned circuits.

CO2. Design and develop Multistage & Power amplifiers and Oscillator circuits.

CO3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid solutions.

CO4. Use PSPICE tools for simulation of amplifier and oscillator circuits.

LIST OF EXPERIMENTS:

(Minimum of Twelve experiments to be conducted)

Part-I: Design and Simulation of the following circuits using simulation software

(Minimum of Six Experiments to be conducted):

1. Common Emitter amplifier
2. Common Source amplifier
3. A Two Stage RC Coupled Amplifier
4. Cascode Amplifier
5. Current shunt and Voltage Series Feedback Amplifier
6. Wien Bridge Oscillator using Transistors
7. RC Phase Shift Oscillator using Transistors
8. Class A Power Amplifier (Transformer less)
9. Class B Complementary Symmetry Amplifier

Part-II: Design and Implementation of the following circuits through hardware

(Minimum of Six Experiments to be conducted):

Any Three circuits from part-I

Any Three of the following

1. Darlington Pair
2. FET Amplifier
3. Hartley and Colpitt's Oscillators
4. Single Tuned Voltage Amplifier
5. Class A Power Amplifier (with transformer load)
6. Class C Tuned Amplifier

II B.Tech - II Semester
14BT40422: **SIGNALS AND SYSTEMS LAB**

Int. Marks: 25 **Ext. Marks: 50** **Total Marks: 75**

L	T	P	C
-	-	3	2

PREREQUISITES: A Course on Signals & Systems.

COURSE DESCRIPTION: Generation of various signals and sequences; convolution and correlation; verification of linearity and time invariance properties; sampling theorem verification.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate programming skills in
- Basic Operations on Matrices.
- Generation of Various signals and Sequences.
- Convolution and Correlation of signals and Sequences
- Weiner-Khinchin relation and Sampling Theorem
- Fourier Tranform and Laplace Transform

CO2. Analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

CO3. Use MATLAB Toolboxes to complex engineering activities in the domain of Signal processing.

LIST OF EXPERIMENTS:

1. Basic Operations on Matrices.
2. Generation of Various signals and Sequences Such as Unit Impulse, Unit Step, Square, Saw Tooth, Triangular, Sinusoidal, Ramp, Sinc function.
3. Operations on Signals and Sequences (Addition, Multiplication, Scaling, Shifting, Folding), Computation of Energy and Average Power.
4. Finding the Even and Odd Parts of Signal or Sequence and Real and Imaginary Parts of a Signal.
5. Verification of Linearity and Time Invariance Properties of a System.
6. Computation of Unit Sample, Unit Step and Sinusoidal Responses of the Given LTI System and Verifying its Stability.
7. Finding the Fourier Transform of a given Signal and plotting its Magnitude and Phase Spectrum.
8. Convolution of Signals and Sequences.
9. Autocorrelation and Cross correlation of Signals and Sequences.
10. Verification of Weiner-Khinchin Theorem.
11. Removal of Noise by Auto Correlation / Cross correlation in a given signal corrupted by noise.
12. Sampling Theorem Verification.
13. Laplace Transform.
14. Locating Zeros and Poles and plotting the Pole-Zero map in S-Plane and Z-Plane for the given Transfer Function
15. Impulse response of a raised cosine filter.

III B. Tech - I Semester

14BT4HS01: BUSINESS COMMUNICATION AND PRESENTATION SKILLS

(Common to ECE, EEE and EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Basic grammar and fundamentals of Listening, Speaking, Reading and Writing skills.

COURSE DESCRIPTION: Nature and Scope of Communication; Non-Verbal Communication; Writing Business Documents; Business Presentations and Public Speaking; Careers and Resume.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
   a) Managerial Communication
   b) Corporate Communication
   c) Business Writing
   d) Presentation Skills
   e) Career Building

CO2. Analyze and judge the situation through non-verbal communication for effective organizational communication.

CO3. Achieve personal excellence and ability to work in groups.

CO4. Develop effective communication to meet professional needs.

DETAILED SYLLABUS:

UNIT-I: NATURE AND SCOPE OF COMMUNICATION (09 Periods)

Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks - Informal Communication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication.

UNIT-II: NON-VERBAL COMMUNICATION (09 Periods)

Introduction - Significance of Non-verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non-verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross-cultural Communication Strategies- Corporate Communication: Introduction - Crisis Management/ Communication - Case Study.

UNIT-III: WRITING BUSINESS DOCUMENTS (10 Periods)

BUSINESS WRITING: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters- Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT-IV: BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 Periods)

Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non-functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT-V: CAREERS AND RESUME (07 Periods)

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - Resume Writing: Resume Formats; Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non-verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

Total Periods: 45

TEXT BOOKS:

1. Meenakshi Raman and Prakash Singh, *Business Communication*, Oxford University Press, New Delhi, 2nd Edition, 2012.

REFERENCE BOOKS:

1. M K Sehgal and Vandana Khetarpal, *Business Communication*, Excel Books, New Delhi, 2011.
2. M Ashraf Rizvi, *Effective Technical Communication*, Tata McGraw-Hill, 2009.

III B. Tech - I Semester

14BT5HS01: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY

(Common to ECE, EEE and EIE)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITE: --

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in
- a) Tools and concepts of Micro Economics.
- b) Basic Principles and concepts of Accountancy.
- c) Provides life skills for effective utilization of scarce resources.
- d) Financial Accounting.
- e) Using advanced tools like tally and SAP.
- f) Significance of Economics and Accountancy.

CO2. Develop skills in analyzing problems for
- a) Managerial decisions of an organization.
- b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.

CO3. Develop effective communication in Business and Accounting transactions.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS: (09 Periods)

Definition, Nature and Scope of Managerial Economics.

DEMAND: Determinants of demand - Demand function - Law of demand, assumptions and exceptions - Elasticity of demand - Types of elasticity of demand - Demand forecasting and methods of demand forecasting, **Supply**- Determinants of Supply and Supply function.

UNIT-II: THEORY OF PRODUCTION AND COST ANALYSIS: (09 Periods)

PRODUCTION FUNCTION: Isoquants and Isocosts - Input-output relationship - Law of returns.

COST CONCEPTS: Total, Average and Marginal Cost - Fixed Vs Variable costs -Opportunity Costs Vs Outlay Costs- Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs- Avoidable Costs Vs Unavoidable Costs - Break Even Analysis (BEA)-Assumptions, Merits and demerits - Determination of Break Even Point (Simple problems).

UNIT-III: INTRODUCTION TO MARKETS AND PRICING: (09 Periods)

MARKET STRUCTURE: Types of Markets - Features of perfect competition - Monopoly and Monopolistic competition - Price and Output determination in perfect competition and monopoly.

PRICING: Objectives and policies of pricing - Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - Market penetration - Market skimming - Block pricing - Peak load pricing - Cross subsidization.

CAPITAL: Significance - Types of capital - Sources of Capital.

UNIT-IV: INTRODUCTION AND PRINCIPLES OF ACCOUNTING: (09 Periods)

ACCOUNTANCY: Introduction - Concepts - Conventions - Accounting Principles - Double Entry Book Keeping - Journal - Ledger- Trial Balance (Simple problems).

UNIT-V: FINAL ACCOUNTS: (09 Periods)

Introduction to Final Accounts - Trading account - Profit and Loss account and Balance Sheet with simple adjustments (Simple problems).

COMPUTERIZATION OF ACCOUNTING SYSTEM: Manual Accounting Vs Computerized Accounting - Advantages and Disadvantages of Computerized Accounting.

Total Periods: 45

TEXT BOOKS:

1. A.R. Aryasri, *Managerial Economics and Financial Analysis*, Tata McGraw Hill, New Delhi, 3rd Edition, 2007, ISBN 13: 9780070078031.
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, *Managerial Economics*, S. Chand and Company, New Delhi, 2nd Edition, 2010.

REFERENCE BOOKS:

1. Vershaney and Maheswari, *Managerial Economics*, Sultan Chand and Sons, New Delhi, 19th Edition, 2005.
2. H. Craig Petersen and W. Cris Levis, *Managerial Economics*, Pearson Education, 4th Edition, 2009, ISBN-13: 978-0139762833.
3. Lipsy and Chrystel, *Economics*, Oxford University Press, New Delhi, 12th Edition, 2011, ISBN: 978-0-19-956338-8.
4. S.P. Jain and K.L. Narang, *Financial Accounting*, Kalyani Publishers, Ludhiana, 6th Edition, 2002, ISBN: 8127204242.

III B.Tech - I Semester
14BT50401: ANTENNAS AND PROPAGATION

Int. Marks: 30 **Ext. Marks: 70** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Electromagnetic Theory and Transmission Lines.

COURSE DESCRIPTION: Antenna Parameters; Wire antennas; Antenna arrays; VHF, UHF and Microwave antennas; Antenna measurements; Wave propagation.

COURSE OUTCOMES: On successful completion of the course, the students will be able to: Demonstrate knowledge on the fundamental principles of antenna theory.

CO1. Analyze complex engineering problems critically for conducting research in antennas design.
CO2. Solve engineering problems with wide range of solutions in antennas and wave propagation.
CO3. Apply appropriate techniques, resources and tools to engineering activities in the field of Antenna Design.

DETAILED SYLLABUS:

UNIT-I: ANTENNA BASICS AND THIN LINEAR WIRE ANTENNAS (09 Periods)

Introduction, Basic antenna parameters- patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective height. Antenna Field Zones, Polarization, Radiation from Small Electric Dipole, Quarter wave Monopole and Half wave Dipole - Current Distributions, Field Components, Radiated power, Radiation Resistance, Beam width, Directivity, Effective Area and Effective Height. Natural current distributions, far fields and patterns of Thin Linear Center-fed Antennas of different lengths.

UNIT-II: ANTENNA ARRAYS (09 Periods)

Point sources- Definition, Patterns, arrays of 2 Isotropic sources- Different cases. Principle of Pattern Multiplication, Uniform Linear Arrays - Broadside Arrays, End Fire Arrays, EFA with increased Directivity, Derivation of their characteristics and comparison, BSA with Non-uniform Amplitude Distribution - General considerations and Binomial Arrays, Illustrative problems.

UNIT-III: VHF, UHF AND MICROWAVE ANTENNAS (12 Periods)

Arrays with Parasitic Elements, Yagi-Uda Arrays, Folded Dipoles & their characteristics. Helical Antennas - Helical Geometry, Helix modes, Practical Design considerations for Monofilar Helical Antenna in Axial and Normal Modes. Horn Antenna, Microstrip Antennas - Introduction, features, advantages and limitations. Rectangular patch antennas - Geometry and parameters, characteristics of Microstrip antennas, Impact of different parameters on characteristics. Reflector antennas- Introduction, Flat sheet and corner reflectors, paraboloidal reflectors - geometry, pattern characteristics, Feed Methods, Reflector Types.

UNIT-IV: ANTENNA MEASUREMENTS (06 Periods)

Introduction, Concepts- Reciprocity, Near and Far Fields, Coordination system, sources of errors, Patterns to be Measured, Pattern Measurement, Arrangement, Directivity Measurement, Gain Measurements (by comparison, Absolute and 3-Antenna Methods).

UNIT-V: WAVE PROPAGATION (09 Periods)

Ground wave propagation, Space wave propagation- Introduction, field strength variation with distance and height, effect of earth's curvature, absorption. Super refraction, M-curves and duct propagation, scattering phenomena, tropospheric propagation, fading and path loss calculations. Sky wave propagation- Introduction, structure of Ionosphere, refraction and reflection of sky waves by Ionosphere, Ray path, Critical frequency, MUF, LUF, OF, Virtual height and Skip distance, Relation between MUF and Skip distance, Multi-Hop propagation.

Total Periods: 45

TEXT BOOKS:

1. John D. Kraus and Ronald J. Marhefka and Ahmad S.Khan, *Antennas (For All Applications)*, TMH, 3rd Edition, 2006.
2. E.C.Jordon and K.G.Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd Edition, PHI, 2000.

REFERENCE BOOKS:

1. C.A. Balanis, *Antenna Theory*, John Wiley & Sons, 2nd Edition, 1982.
2. E.V.D. Glazier and H.R.L. Lamont, *The Services Text Book of Radio: Transmission and Propagation*, Vol.5, Standard Publishers Distributors, Delhi.
3. G.S.N.Raju, *Antennas and Wave Propagation*, Pearson Education India, 1st Edition, 2006.

III B.Tech - I Semester
14BT50402 : DIGITAL COMMUNICATIONS

Int. Marks: 30	Ext. Marks: 70	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: Courses on Signals and Systems, Analog Communications, Probability and Stochastic Processes.

COURSE DESCRIPTION: Digitization techniques - PCM, DPCM, Delta modulation and Adaptive Delta Modulation; Digital signal transmission through carrier modulation techniques; Detection of baseband signals and error detection; Information Theory and Source and channel coding techniques.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Elements of Digital Communication systems.
- Digitization techniques such as PCM, DPCM, DM and ADM
- Digital carrier modulation techniques such as ASK, PSK, FSK and M-QAM
- Error Probability and detection of Baseband and Bandpass modulated signals
- Measurement of information
- Source and Error Control Coding techniques.

CO2. Analyse different types of digital modulation systems based on power and bandwidth for conducting research.

CO3. Design an efficient Transmitter and Receiver based on SNR, bandwidth and equipment complexities for transmitting digital signals.

CO4. Solve engineering problems in the core area of digital communications.

DETAILED SYLLABUS :

UNIT-I: PULSE DIGITAL MODULATION (10 Periods)

Elements of Digital Communication Systems, Advantages Of Digital Communication Systems, Quantization of signals, Quantization error, Pulse Code Modulation (PCM), Electrical representation of binary digits, PCM System, Companding, Differential PCM, Delta Modulation and its drawbacks, Adaptive Delta Modulation.

UNIT-II: NOISE IN PULSE-CODE AND DELTA-MODULATION SYSTEMS (08 Periods)

PCM transmission, Calculation of Quantization noise, Output Signal Power, Effect of thermal noise in PCM, Output Signal To Noise Ratio in PCM, Delta Modulation, Quantization Noise in DM, Output signal power, Effect of thermal noise in DM, Output Signal To Noise Ratio in DM, Comparison of PCM and DM systems.

UNIT-III: DIGITAL MODULATION SCHEMES (12 Periods)

BASE BAND DATA TRANSMISSION: Elements of Baseband Binary PAM Systems, Baseband Shaping, Correlative coding, Eye Pattern.

BAND PASS DATA TRANSMISSION: Introduction, Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Quadrature PSK and M-ary PSK, Differential Phase Shift Keying (DPSK), M-ary QAM, Probability of error, Optimum filter, Matched filter, Correlator, Calculation of error Probability of ASK, PSK, FSK and QPSK.

UNIT-IV: INFORMATION THEORY (08 Periods)

Measure of Information, Source Encoding - Huffman coding; Shanon-Fano Coding, Error Free Communication over Noisy Channel, Channel Capacity of Discrete Memoryless Channel, Channel Capacity of Continuous Channel, Practical Communication Systems in light of Shannon's Equation.

UNIT-V: ERROR DETECTION AND CORRECTION CODING SCHEMES (07 Periods)

Introduction, Linear block codes, Cyclic Codes, Burst error detecting and correcting codes, Convolutional Codes, Comparison of Coded and Uncoded Systems.

Total Periods: 45

TEXT BOOKS:

1. H. Taub and D. Schilling, *Principles of Communication Systems*, TMH, 2nd Edition, 2003.
2. B.P. Lathi, *Modern Digital and Analog Communication Systems*, Oxford reprint, 3rd Edition, 2004.
3. Simon Haykin, *Communication Systems*, John Wiley, 2nd Edition, 1978.

REFERENCE BOOKS:

1. R.P. Singh and S.D. Sapre, *Communication Systems Analog and Digital*, TMH, 2nd Edition, 2007.
2. Sam Shanmugam, *Digital and Analog Communication Systems*, John Wiley, 2005.

III B. Tech - I Semester
14BT50403: DIGITAL IC APPLICATIONS

Int. Marks: 30 **Ext. Marks: 70** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Semiconductor Devices & Circuits and Switching Theory and Logic Design.

COURSE DESCRIPTION: Logic Families-CMOS Bipolar and its Interfacing; Verilog HDL Language Elements and Modelling; IC Level Combinational and Sequential Logic Design; Memories-ROM, SRAM, DRAM.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Demonstrate knowledge in:
- Classification of integrated circuits.
- Characteristics of integrated circuits.
- MOS, TTL and ECL logic families.
- Interfacing between different logic families.
- Design combinational and sequential circuits using digital ICs such as 74XX.

CO2. Perform analysis of circuits design using MOSFETs.

CO3. Design and develop circuits from simple design to complex designs.

CO4. Solve problems arising due to poor interfacing between ICs by choosing the appropriate IC to develop complex designs.

DETAILED SYLLABUS:

UNIT-I: DIGITAL LOGIC FAMILIES AND INTERFACING (09 Periods)

Introduction to logic families, CMOS logic, CMOS steady state and dynamic electrical behavior, CMOS logic families. Bipolar logic, Transistor-Transistor logic, TTL families, CMOS/TTL interfacing, Low voltage CMOS logic and interfacing, Emitter Coupled Logic.

UNIT-II: HARDWARE DESCRIPTION LANGUAGE (09 Periods)

Introduction, Language Elements, Expressions, Modeling-gate level modeling, data flow modeling, behavioral modeling, structural modeling.

UNIT-III: COMBINATIONAL LOGIC DESIGN (10 Periods)

Adders & Subtractors, Ripple Adders, Carry-Look ahead Adders, MSI Arithmetic and Logic Units, Combinational Multipliers, Excess-3 to BCD code coverter,74x138 3-to-8 Decoder, 74x148 Priority Encoder, Three-State Devices, 74x151 8-to-1 Multiplexer, 74x155 1x2 Demultiplexer, 74x86 Exclusive-OR gates, 74x280 9-Bit Parity Generator, Standard MSI Magnitude Comparators, Barrel Shifter, Simple Floating point Encoder, Dual Priority Encoder, modeling of circuits by using Verilog HDL.

UNIT-IV: SEQUENTIAL LOGIC DESIGN (10 Periods)

Latches and Flip-Flops, Counters-74x163 4-bit binary counters, 74x169 up/down counter, Ring Counters, Johnson Counters. Shift Registers-74x194 4-bit universal shift registers, MSI shift registers. Synchronous Design Methodology, Impediments to Synchronous Design, modeling of circuits by using Verilog HDL.

UNIT-V: MEMORIES (07 Periods)

ROM: Internal structure, 2D-decoding commercial types, timing applications.

STATIC RAM: Internal structure, SRAM timing, standard SRAM, synchronous RAM.

DYNAMIC RAM: Internal structure, timing, synchronous DRAM.

Total Periods: 45

TEXT BOOKS:

1. John F.Wakerly, *Digital Design Principles & Practices*, Pearson Education Asia, 4th Edition, 2008.
2. J.Bhaskar, *A Verilog HDL Primer*, BS Publications, 2nd Edition, 2001.

REFERENCE BOOKS:

1. Charles H.Roth Jr., *Digital System Design Using VHDL*, PWS Publications, 2nd Edition, 2008.
2. Stephen Brown and ZvonkoVramesic, *Fundamentals of Digital Logic with VHDL Design*, McGraw Hill, 2nd Edition, 2005.

III B. Tech - I Semester
14BT50404: **LINEAR IC APPLICATIONS**

Int. Marks: 30 **Ext. Marks: 70** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Network Analysis & Pulse and digital Circuits.

COURSE DESCRIPTION: Operational Amplifiers (Op-Amp) basics and its characteristics; Op-Amp Linear and Non Linear Applications; Voltage Regulators and Analog filter Design; study of internal functional blocks and the applications of special ICs like IC 555 Timer; PLL circuits; DAC and ADCs; DAC and ADC Specifications.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Op-Amp IC application.
- Waveform generator.
- Voltage Regulator & Filter design.
- IC 555 Timer applications.
- PLL applications.
- ADC and DAC converter.

CO2. Analyze Op-Amp circuits and evaluate its Gain, Bandwidth, Input and Output impedances.

CO3. Design and Develop Linear ICs subsystems and systems.

CO4. Solve engineering problems by proposing potential solutions leading to design better Linear ICs.

DETAILED SYLLABUS:

UNIT-I: OPERATIONAL AMPLIFIER (09 Periods)

Differential amplifier - DC and AC analysis of Dual input balanced output configuration, Properties of other differential amplifier configuration (dual input unbalanced output, single ended input-balanced/unbalanced output), Cascade differential amplifier stages, Level Translator. Basic information of OP-AMP, OP-Amp Block diagram, ideal and practical OP-Amp Specifications, DC and AC characteristics, 741 OP-Amp, OP-Amp parameters and Measurement, input and output offset voltages and currents, slew rate, CMRR, PSRR, drift, Frequency compensation techniques.

UNIT-II: OPERATIONAL AMPLIFIER APPLICATIONS (09 Periods)

Introduction, Basic Op-Amp applications, Instrumentation Amplifiers, AC Amplifier, V to I and I to V Converters, Op-amp circuits using diodes, Sample and Hold Circuit, Log and Antilog Amplifiers, Differentiator & Integrator, Multivibrators, Triangular Wave Generator.

UNIT-III: VOLTAGE REGULATOR & ANALOG FILTERS (10 Periods)

VOLTAGE REGULATOR: Introduction, Series Op-amp Regulator, IC Voltage Regulators-Fixed Voltage Series Regulator, Characteristics, Line and Load Regulation, Dual Voltage Supply. 723 General Purpose Regulator.

ANALOG FILTERS: Introduction, RC Active Filters- first order and second order Low pass & High pass, Band pass and Band reject.

UNIT-IV: IC 555 TIMERS AND PLL (10 Periods)

IC 555 TIMER: Introduction to 555 Timer, functional diagram, Monostable Operations, Applications of Monostable - Missing Pulse Detector, Linear Ramp Generator. Astable operation & its applications.

PLL: Introduction, Basic principles, Phase Detector/Comparator, SE/NE 566 Voltage Controlled Oscillator (VCO), Low Pass Filter. Monolithic Phase-Locked Loop IC 566. Applications of PLL- Frequency multiplication & frequency translation.

UNIT V: D-A and A-D CONVERTERS (07 Periods)

D-A CONVERTERS: Introduction, Basic DAC techniques-Weighted resistor DAC, R-2R Ladder DAC, Inverted R-2R DAC and Monolithic DAC (IC1408).

A-D CONVERTERS: Introduction, Direct type ADCs- parallel comparator, Counter, Successive Approximation Converter & Dual slope ADC. DAC and ADC specifications.

Total Periods: 45

TEXT BOOKS:

1. D. Roy Chowdhury, *Linear Integrated Circuits*, New Age International (p) Ltd, 4th Edition, 2011.
2. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs*, PHI, 3rd Edition, 1998.

REFERENCE BOOKS:

1. David A. Bell, *Operational Amplifiers & Linear ICs*, Oxford University Press, 2nd Edition, 1997.
2. R.F.Coughlin & Fredrick Driscoll, *Operational Amplifiers & Linear Integrated Circuits*, PHI, 6th Edition, 2001.

III B.Tech - I Semester

14BT50405: PULSE AND DIGITAL CIRCUITS

Int. Marks: 30	Ext. Marks: 70	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: Courses on Electronic Devices and Circuits and Network Analysis.

COURSE DESCRIPTION: Analysis of Linear and Non-linear Wave shaping circuits; switching characteristics of Diode and Transistor; Multivibrators; sweep circuits; Pulse synchronization; sampling and logic gates.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Responses of High-pass and Low-pass RC circuits for different inputs
- Clipping and Clamping operations.
- Methods of generating the Time-base waveforms
- Operating Principles of Sampling gates
- Realization of logic gates using Diodes and Transistors

CO2. Perform the analysis of Linear and Non-linear wave shaping circuits

CO3. Design and Develop Multivibrator Circuits

CO4. Solve engineering problems pertaining to Pulse and Digital circuits

DETAILED SYLLABUS :

UNIT-I: LINEAR WAVE SHAPING (09 Periods)

High-pass, Low-pass RC circuits, their response for step, pulse, square and ramp inputs. High pass RC network as a Differentiator and Low pass RC network as an Integrator, Parallel RLC circuit and its response for step input, Ringing circuit, attenuators and its application as a CRO probe.

UNIT-II: NON-LINEAR WAVE SHAPING (08 Periods)

Diode Switching times, Diode clippers, Transistor clipper, Clipping at two independent levels, Comparators, Clamping operation, Clamping circuit taking source and Diode resistances into account, Clamping circuit theorem, Practical clamping circuits, effect of Diode characteristics on Clamping voltage, Synchronized Clamping.

UNIT-III: MULTIVIBRATOR CIRCUITS (09 Periods)

Transistor as a switch, Transistor switching times, Analysis and Design of Fixed-Bias Bistable, Monostable, Astable Multivibrators (Collector-Coupled), Symmetrical and Asymmetrical triggering, Schmitt trigger Circuit.

UNIT-IV: (10 Periods)

TIME-BASE GENERATORS: General features of a Time-Base signal, methods of generating Time-Base waveform, Miller and Bootstrap Time-Base generators - basic principles, Transistor Miller Time-Base generator, Transistor Bootstrap Time-Base generator. Transistor Current Time-Base generators, Methods of linearity improvements.

SYNCHRONIZATION AND FREQUENCY DIVISION: Pulse Synchronization of Relaxation Devices, Frequency Division in the sweep circuit, Stability of Relaxation Devices, Astable Relaxation circuits, Synchronization of a sweep circuit with symmetrical signals.

UNIT-V: SAMPLING GATES AND DIGITAL LOGIC CIRCUITS (09 Periods)

SAMPLING GATES: Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Four Diode Sampling gate, Six diode gate, Applications of sampling gates.

DIGITAL LOGIC CIRCUITS: Realization of Logic gates (OR, AND & NOT) using diodes & transistors, Analysis of RTL, DTL, TTL and CMOS Logic families and Comparison between the logic families.

Total Periods: 45

TEXT BOOKS:

1. Jacob Millman, Herbert Taub and Suryaprakash Rao Mothiki, *Pulse, Digital and Switching Waveforms*, TMH, 3rd Edition, 2014.

2. David A. Bell, *Pulse, Switching and Digital Circuits*, Oxford University Press, 5th Edition, 2015.

REFERENCE BOOKS:

1. A. Anand Kumar, P*ulse and Digital Circuits*, PHI, 2nd Edition, 2012.

2. R.Venkataraman, *Pulse, Digital Circuits and Computer Fundamentals*, Dhanapat Rai Publications, 3rd Edition, 2009.

III B. Tech - I Semester

14BT50421: **ANALOG & DIGITAL COMMUNICATIONS LAB**

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	**-**	**3**	**2**

PREREQUISITES: Courses on Analog and Digital Communications.

COURSE DESCRIPTION: Study of various analog and pulse modulation, demodulation and associated circuits; Spectral analysis of AM signals; Study of various digital modulation, demodulation and associated circuits.

COURSE OUTCOMES: On successful completion of the course, students will be able to:

CO1.Analyze circuits pertaining to Communication Systems.

CO2.Design and Develop efficient Communication Systems.

CO3.Solve problems pertaining to Analog & Digital Communications.

LIST OF EXPERIMENTS:

Part - A: Analog Communications

(Any 6 Experiments):

1. Amplitude Modulation and Demodulation
2. DSB-SC Modulation and Demodulation
3. Spectral analysis of AM signals using spectrum analyzer.
4. Frequency Modulation and Demodulation.
5. Pre-emphasis & De-emphasis.
6. Characteristics of Mixer.
7. PAM Generation and Reconstruction.
8. PWM Generation and Reconstruction.

Part - B: Digital Communications

(Any 6 Experiments):

1. Verification of Sampling Theorem.
2. Time Division Multiplexing.
3. Pulse Code Modulation.
4. Delta Modulation.
5. Frequency shift keying - Modulation and Demodulation.
6. Phase shift keying - Modulation and Demodulation.
7. Differential phase shift keying - Modulation and Demodulation.
8. Frequency Synthesizer.

III B. Tech - I Semester

14BT50422: **PDC & IC LAB**

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	**-**	**3**	**2**

PREREQUISITES: Courses on Pulse and Digital Circuits and Linear IC Applications.

COURSE DESCRIPTION: Linear and Non-linear Wave shaping circuits; generation of sweep signal; sampling and logic gates; design of multivibrator circuits and filters, verification of Op-Amp applications; Timers; Voltage regulator; ADC and DAC.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze Linear, Non-linear Wave shaping circuits and applications of Op-Amp.
CO2. Design different multivibrator circuits and filters.
CO3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid solutions.

LIST OF EXPERIMENTS:

Minimum Twelve Experiments to be conducted

PART A: Pulse and Digital Circuits Lab: (Minimum of six experiments to be conducted)

1. Linear wave shaping - High Pass and Low Pass RC Circuits.
2. Non-Linear wave shaping - Clippers and Clampers.
3. Bistable Multivibrator.
4. Astable Multivibrator.
5. Schmitt Trigger.
6. Bootstrap sweep circuit.
7. Sampling Gates.
8. Study of Logic Gates & Some applications.

PART B: IC Lab: (Minimum of six experiments to be conducted)

1. Op-Amp Applications-Adder, Subtractor and Comparator circuits.
2. Active Filter Applications-LPF, HPF (first and second order).
3. Function Generator using Op-Amps.
4. IC 555 Timer-Monostable and Astable Multivibrators.
5. IC 566-VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 Bit ADC and DAC.
8. Precision Rectifier using Op-Amp.

III B. Tech - II Semester
14BT60401: DIGITAL SIGNAL PROCESSING

Int. Marks: 30	Ext. Marks: 70	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: A course on Signals and Systems.

COURSE DESCRIPTION: Continuous and Discrete signals and sequences; Systems; DFT and FFT algorithms for the analysis of discrete sequences; Design and Realization of Digital IIR and FIR filters; Multirate systems and some of the Signal processing applications.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Digital signals, sequences and systems.
- DFT and FFT transforms.
- Analog & Digital Filter Design.
- Digital Filter Realization.
- DSP Processors.

CO2. Perform Frequency analysis of discrete time signals in suppressing unnecessary frequency components.

CO3. Design and Develop digital filters to optimize system performance and their realization.

CO4. Solve problems in processing of signals through digital systems and applying them in signal processing.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO DIGITAL SIGNAL PROCESSING (10 Periods)

Review of Discrete-Time signals, systems and their classification. Discrete-Time systems described by difference equations.

FREQUENCY ANALYSIS OF DISCRETE TIME SIGNALS:

Fourier series for DT periodic signal and power density spectrum, the Fourier transform of DT aperiodic signals and energy density spectrum, convergence of Fourier transforms. Review of Z-transforms, Applications, solution for difference equations of digital filters.

UNIT-II: DISCRETE AND FAST FOURIER TRANSFORMS (09 Periods)

DFS representation of periodic sequences, properties of Discrete Fourier Series.

DISCRETE FOURIER TRANSFORMS (DFT): Properties of DFT, Linear filtering methods based on DFT, Relationship of FT to Z Transform, Frequency analysis of signals using DFT.

FAST FOURIER TRANSFORMS (FFT): Radix-2 Decimation In Time (DIT) and Decimation In Frequency (DIF) FFT algorithms, Inverse FFT.

UNIT-III: IIR DIGITAL FILTERS (08 Periods)

Design of IIR digital filters from analog filters-IIR filter design by approximation of derivatives, Impulse Invariance and Bilinear transformation. Characteristics of commonly used analog filters, Frequency transformations. Structural realization of IIR systems-direct, cascade and parallel form structures, Transposed form.

UNIT-IV: FIR DIGITAL FILTERS (08 Periods)

Symmetric and anti-symmetric FIR filters, Design of Linear Phase FIR digital filters using windowing techniques, Frequency sampling technique, Comparison of IIR and FIR filters. Structural realization of FIR filters-direct, cascade-form structures and Linear Phase structures.

UNIT-V: INTRODUCTION TO DSP PROCESSORS (10 Periods)

INTRODUCTION TO PROGRAMMABLE DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in P-DSPs, Multiple access memory, multiported memory, VLIW Architecture, Pipelining, Special addressing modes, On-Chip Peripherals.

ARCHITECTURE OF TMS 320C6X: Introduction, Features of 'C6X Processors, Internal Architecture, CPU, General-Purpose Register Files, Functional Units and Operation, Data Paths, Control Register File.

Total Periods: 45

TEXT BOOKS:

1. John G.Proakis, Dimitris G.Manolakis, *Digital Signal Processing*, Principles, Algorithms and Applications, Pearson Education/PHI, 4th Edition, 2007.
2. Alan.V. Oppenheim, Ronald.W. Schafer, John R Buck, *Discrete Time Signal Processing*, Prentice Hall, 2nd Edition, 2006.
3. B.Venkataramani, M. Bhaskar, *Digital Signal Processors - Architecture, Programming and Applications*, TATA McGraw Hill, 2nd Edition, 2010.

REFERENCE BOOKS:

1. Tarun Kumar Rawat, *Digital Signal Processing*, Oxford University Press, 1st Edition, 2015.

III B.Tech - II Semester

14BT60402: MICROWAVE ENGINEERING

Int. Marks: 30 **Ext. Marks: 70** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: A course on Electromagnetic Theory and Transmission Lines.

COURSE DESCRIPTION: Rectangular waveguides and its characteristics; Strip lines and Microstrip lines; Waveguide components; Microwave tubes; Microwave solid state devices; and Microwave measurements.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Waveguides
- Microwave Components
- Microwave Tubes
- Microwave Measurements

CO2. Perform analysis mathematically the operation and working of the various tubes. Quantify the signal and noise characteristics of microwave systems such as communication networks, Radars, Radiometers and relate this to the design process.

C03. Design microwave components such as power dividers, hybrid junctions, microwave filters, ferrite devices and single stage microwave transistor amplifier.

C04. Solve problems in effects of noise on microwave systems.

DETAILED SYLLABUS:

UNIT-I: MICROWAVE TRANSMISSION LINES (12 Periods)

Introduction, Microwave spectrum and bands, applications of Microwaves. Rectangular Waveguides- solution of wave equation in Rectangular Coordinates, TE and TM mode analysis, Expressions for fields, Characteristic equation and cutoff frequencies, filter characteristics, dominant and degenerate modes, sketches of TE and TM mode fields in the cross section. Mode characteristics - Phase and Group velocities, wavelengths and impedance relations. Power Transmission and Power Losses. Introduction to Circular Waveguides, Cavity resonators- Introduction, rectangular cavities, dominant modes and resonant frequencies, Q-factor and coupling coefficients. Micro strip lines- Introduction, Z_O relations, effective dielectric constant, losses, Q-factor, Illustrative Problems.

UNIT-II: WAVEGUIDE COMPONENTS AND APPLICATIONS (10 Periods)

Waveguide multiport junctions-E plane and H plane Tees, Magic Tee, Directional coupler; Waveguide discontinuities - waveguide windows, tuning screws and posts, matched loads; Coupling mechanisms- probe, loop, aperture types. Ferrites-composition and characteristics, faraday rotation, ferrite components - Gyrator, Isolator and Circulator. Waveguide attenuators- resistive card, rotary vane Attenuators, waveguide phase shifters - dielectric, rotary vane phase shifters; Scattering Matrix- Significance, Formulation and Properties. S Matrix calculations for 2-port junction, E plane and H plane Tees, Magic Tee, Directional coupler, Circulator and Isolator, Illustrative problems.

UNIT-III: MICROWAVE TUBES- I (08 Periods)

Limitations and losses of conventional tubes at microwave frequencies. Microwave tubes-O type and M type classifications.

O TYPE TUBES: 2 cavity klystrons-structure, Reentrant cavities, Velocity Modulation process and Applegate diagram, bunching process and small signal theory- Expressions for O/P power and efficiency. Reflex Klystrons-structure, Velocity Modulation, Applegate diagram, mathematical theory of bunching, power output, efficiency, oscillating modes and O/P characteristics, Effect of Repeller Voltage on Power O/P, Illustrative problems.

UNIT-IV: MICROWAVE TUBES -II (08 Periods)

HELIX TWTS: Significance, types and characteristics of slow wave structures; structure of TWT and amplification process (qualitative treatment), suppression of oscillations, gain considerations.

M-TYPE TUBES: Introduction, cross field effects, Magnetrons-different types, cylindrical travelling wave magnetron - Hull cutoff and Hartree conditions, modes of resonance and PI-mode operation, separation of PI-mode, O/P characteristics, Illustrative Problems.

UNIT-V: MICROWAVE SOLID STATE DEVICES & MEASUREMENTS (08 Periods)

Introduction, classification, applications, Transfer Electronic Devices, Gunn diode- principles, RJWH theory, characteristics, basic modes of operation - Gunn oscillation modes. LSA Mode, Varactor Diode, Parametric Amplifier, Introduction to Avalanche Transit time devices (brief treatment only).

MEASUREMENTS: Description of Microwave bench- different blocks and their features, errors and precautions; Microwave power measurement- Bolometer method, Measurement of attenuation, frequency, low and high VSWR, Q of the cavity and impedance measurements. **Total Periods: 46**

TEXT BOOKS:

1. Samuel Y. Liao, *Microwave devices and circuits*, Pearson Education, 3rd Edition, 2003.
2. Matthew N.O.Sadiku, *Elements of Electromagnetics*, Oxford University Press, 4th Edition, 2007.

REFERENCE BOOKS:

1. Sushrut Das, *Microwave Engineering*, Oxford University Press, 2014.
2. R.E.Collin, *Foundations for Microwave Engineering*, IEEE Press, John Wiley, 2nd Edition, 2002.
3. F. E. Terman, *Electronic and Radio Engineering*, McGraw Hill, 4th Edition, 1955.
4. Peter A. Rizzi, *Microwave Engineering Passive Circuits*, PHI, 1999.

III B.Tech - II Semester
14BT60403: **VLSI DESIGN**

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: Courses on Switching Theory and Logic Design and Digital ICs and their Applications.
COURSE DESCRIPTION: Introduction to the design and implementation of VLSI circuits for complex digital systems; CMOS technology; submicron design; clocking; subsystem design; CAD tools and algorithms; simulation; verification; testing and design methodology.
COURSE OUTCOMES: On successful completion of the course, the students will be able to:
CO1. Demonstrate knowledge in
- Understanding the Fabrication of MOS Transistors.
- Electrical properties of CMOS and Bi-CMOS Circuits.
- Designing Static Combinational and Sequential logic at transistor level, including Mask layout.
- Estimating and optimizing combinational RC Circuit delay using RC delay models and logical effort.
- Design methodology and tools.
- Testing the chip at various abstraction levels.

CO2. Perform analysis of Circuit Characterization and Performance Estimation of CMOS device and Create models of moderately sized CMOS circuits that realize specified digital functions.
CO3. Formulate and solve technology specific problems in developing an IC circuit using EDA tools.
CO4. Use modern design tools to IC devices to create System On-Chip (SOC) designs in FPGAs.

DETAILED SYLLABUS:

UNIT-I: FABRICATION & ELECTRICAL PROPERTIES OF MOS (09 Periods)
Introduction to MOS, CMOS and Bi-CMOS technology, Fabrication of NMOS and CMOS, Basic Electrical Properties of MOS & Bi-CMOS Circuits: I_{ds}-V_{ds} relationships, Threshold Voltage VT, g_m, g_{ds} and ω_0, Pass Transistor, NMOS inverter, pull up to pull down ratio for an NMOS inverter, CMOS & Bi-CMOS Inverters.

UNIT-II: CMOS CIRCUIT DESIGN PROCESS (10 Periods)
VLSI design flow, MOS layers, stick diagrams, n-MOS design style, CMOS design style, lambda based design rules, layouts for inverters, sheet resistance, capacitances of layers, Gate delays, Delay estimation, Driving large capacitive loads, Fan-in and Fan-out, choice of layers, Scaling and limitations of scaling.

UNIT-III: SUBSYSTEM DESIGN - I (09 Periods)
Adders- Transmission based Adder, Carry look-ahead adder, Manchester carry chain adder, Carry Bypass Adder, Carry Skip Adder, Carry Select Adder, Shifters- Barrel Shifter, Logarithmic Shifter, Multipliers- Array Multiplier, Carry Save Multiplier, Booth Multiplier, ALUs, Parity generators, Comparators, Zero/One Detectors.

UNIT-IV: SUBSYSTEM DESIGN - II (09 Periods)
Counters- Synchronous & Asynchronous Counter, High Density Memory Elements. Design Approach, PLA, PAL - 22V10 PAL architecture, Programming of PALs, FPGAs, CPLDs, Cell based Design Methodology.

UNIT-V: SYNTHESIS AND CMOS TESTING (08 Periods)
Types of Simulation, VHDL Synthesis, Layout Synthesis, Design Capture tools, Design Verification tools.
CMOS TESTING: CMOS Testing, Need for testing, Test Principles, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

Total Periods: 45

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, *Essentials of VLSI Circuits and Systems*, PHI, 2005 Edition.
2. Weste and EShraghian, *Principles of CMOS VLSI Design*, Pearson Ed, 1999.

REFERENCE BOOKS:

1. John M. Rabaey, *Digital Integrated Circuits: A Design Perspective*, 2nd Edition, PHI, 1997.
2. John P. Uyemura, *Introduction to VLSI Circuits and Systems,* John Wiley, 2003.
3. Eugene D. Fabricius, *Introduction to Very Large Scale Integration Design Paperback*, Aug 1990, McGraw Hill Education (ISE Editions).
4. Stephen Brown, Zvonko Vranesic, *Fundamentals of Digital Logic with VHDL Design*, TMH 2007.

III B. Tech - II Semester

14BT60201: **MICROPROCESSORS AND MICROCONTROLLERS**

(Common to ECE, EEE & EIE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: Courses on Switching Theory & Logic Design and Computer Organization.

COURSE DESCRIPTION: Architecture, Instruction set and programming of 8086; Programmable interfacing devices: 8255, 8251, 8259, 8257 - their architecture and programming; Interfacing Memory and I/O devices with 8086; Architecture, Programming, Interrupts and Applications of 8051 Microcontroller.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate potential knowledge in
- Internal hardware details of Intel 8086, 8051 and programmable devices like 8255, 8251, 8259, 8257.
- Interfacing various peripherals to build stand alone systems.

CO2. Critically analyze the requirements to meet the specifications.

CO3. Design suitable interfaces for real time applications.

CO4. Exhibit programming skills, choose suitable hardware and program the devices to solve engineering problems.

DETAILED SYLLABUS:

UNIT-I: 8086 ARCHITECTURE AND PROGRAMMING (10 Periods)

Microprocessor Evolution and types, 8086 internal Architecture - register organization, memory segmentation, memory organization. Introduction to programming the 8086 - Assembler directives, addressing modes, instruction set, simple programs, procedures and macros.

UNIT-II: 8086 INTERFACING AND INTERRUPTS (08 Periods)

Pin description, minimum & maximum mode operation of 8086, timing diagram. Interfacing memory (RAM and EPROM) to 8086. 8086 Interrupts- types and interrupt responses, Interrupt Vector Table, priority of interrupts. 8259 priority interrupt controller - architecture, system connections and cascading, initialization of 8259.

UNIT-III: PROGRAMMABLE DATA COMMUNICATION DEVICES (11 Periods)

Introduction to serial and parallel communication, methods of parallel data transfer. 8255 PPI- internal architecture and system connections, operational modes and initialization, interfacing stepper motor, ADC, DAC. Methods of serial data transfer, 8251 USART- architecture and its initialization, sending and receiving characters. Serial Communication Standard RS232C, USB. Architecture and Operation of 8257 DMA controller.

UNIT-IV: 8051 MICROCONTROLLER AND PROGRAMMING (08 Periods)

Microcontroller Vs general purpose microprocessor. 8051/8052 Microcontroller- architecture, features, register organization, pin diagram, internal and external memories & their interfacing, instruction set, addressing modes, simple programs.

UNIT-V: 8051 INTERFACING (08 Periods)

Timer/Counters- Registers, modes and programming. Serial communication- registers, programming 8051 for serial communication. Interrupts- registers, programming. 8051 Applications- Interfacing key board, LEDs and LCD.

Total Periods: 45

TEXT BOOKS:

1. Douglas V. Hall, *Microprocessors and Interfacing: Programming and Hardware*, Tata McGraw Hill, revised 2nd edition, 2006.
2. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, Prentice Hall of India, 2000.

REFERENCE BOOKS:

1. A.K. Ray and K.M. Bhurchandi, A*dvanced Microprocessors and Peripherals- Architecture*, Programming and Interfacing, Tata McGraw Hill, 2002 reprint.
2. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer systems: The 8086/8088 Family architecture, Programming and Design*, Prentice Hall of India, 2006.

III B.Tech - II Semester
14BT40501: **COMPUTER ORGANIZATION**

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITE: A course on Switching Theory and Logic Design.
COURSE DESCRIPTION: Basic structure of a digital computer, Organization of the arithmetic and logical unit, control unit, memory and I/O unit.
COURSE OUTCOMES: On successful completion of the course, the students will be able to:
CO1. Demonstrate knowledge in:
- Computer Arithmetic and Register Transfer Language.
- Micro-programmed Control Unit.
- Input Output Organization and Memory system.
- Pipelining, Multiprocessors and interconnection structures.

CO2. Analyze the functioning of Central Processing Unit.
CO3. Design the Micro-programmed Control Unit, memory & I/O.

DETAILED SYLLABUS:

UNIT-I: COMPUTER ARITHMETIC, REGISTER TRANSFER LANGUAGE & MICRO-OPERATIONS (09 Periods)

COMPUTER ARITHMETIC: Data Representation, Fixed Point Representation, Floating Point Representation, Addition and Subtraction, Binary Multiplication Algorithms, Binary Division Algorithms, Floating Point Arithmetic operations.

REGISTER TRANSFER LANGUAGE AND MICRO-OPERATIONS: Register Transfer, Bus and memory transfers, Arithmetic micro operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

UNIT-II: BASIC COMPUTER ORGANIZATION AND DESIGN, MICRO PROGRAMMED CONTROL (08 Periods)

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input-Output Interrupts.

MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, Design of control unit, Hard wired control, Micro-programmed control.

UNIT-III: INPUT-OUTPUT ORGANIZATION (08 Periods)

Input-Output Organization: Peripheral Devices, Input-Output Interface, Modes of Transfer, Priority Interrupt, Direct memory Access, Input-Output Processor (IOP), Serial communication, Introduction to Peripheral Component Interconnect (PCI) bus.

UNIT-IV: THE MEMORY SYSTEM (08 Periods)

THE MEMORY SYSTEM: Semiconductor RAM memories, Read-only memories, Cache memory, Performance considerations, Virtual memory, Secondary storage.

UNIT-V: PIPELINE & VECTOR PROCESSING AND MULTI PROCESSORS (09 Periods)

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

MULTIPROCESSORS: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-Processor Communication and Synchronization.

Total Periods: 44

TEXT BOOKS:

1. Morris Mano, *Computer System Architecture*, 3rd Edition, Pearson Education, New Delhi.
2. Carl V Hamacher, Zvonko G. Varanesic and Safat G. Zaky, *Computer Organization*, 5th Edition, McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. W. Stallings, *Computer Organization and Architecture Designing For Performance*, 8th Edition, PHI, 2012.
2. John P.Hayes, *Computer architecture and Organisation*, 3rd Edition, Tata McGraw Hill, New Delhi.

III B. Tech - II Semester

14BT60404: **ANALOG IC DESIGN**

(PE-I)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: Courses on Semiconductor Devices and Circuits and Electronic Circuits Analysis and Design.

COURSE DESCRIPTION: MOS & CMOS Devices and Modeling, Current mirrors, Band gap References, Differential Amplifiers, Design of Two-Stage Op-Amps. Open Loop Comparators, Ring Oscillators. Voltage Controlled Oscillators, Non-Ideal Effects in PLLs and Delay Locked Loops.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- MOS devices and modeling
- Current Mirrors
- Output Amplifiers
- Two stage operational Amplifiers
- Open loop comparators
- Oscillators and Phase locked loop

CO2. Analyze complex engineering problems in any analog circuits in real time applications.

CO3. Design and Develop Analog ICs subsystems and systems.

CO4. Solve engineering problems for feasible and optimal solutions in the core area of analog ICs.

DETAILED SYLLABUS:

UNIT-I: MOS & CMOS DEVICES AND MODELING (08 Periods)

The MOS Transistor, Passive Components- Capacitor & Resistor, Integrated circuit Layout, CMOS Device Modeling- Simple MOS Large-Signal Model, Other Model Parameters, Small-Signal Model for the MOS Transistor, Sub-threshold MOS Model.

UNIT-II: ANALOG CMOS SUB-CIRCUITS (09 Periods)

MOS Switch, MOS Diode/Active Resistor, Current Sinks and Sources, Current Mirrors-basic current mirrors, Source degenerated current mirrors, Cascode current Mirror and Wilson Current Mirror, Current and Voltage References, Band gap Reference.

UNIT-III: CMOS AMPLIFIERS (09 Periods)

Inverters, Differential Amplifiers, Cascode Amplifiers, Current Amplifiers, Output Amplifiers.

UNIT-IV: CMOS OPERATIONAL AMPLIFIERS (09 Periods)

Design of CMOS Op-Amps, Compensation of Op-Amps, Design of Two-Stage Op-Amps, Power Supply Rejection Ratio of Two-Stage Op-Amps, Cascode Op-Amps.

UNIT-V: COMPARATORS AND OSCILLATORS (10 Periods)

COMPARATORS: Characterization of Comparator, Two-Stage Comparator, Open-Loop Comparator, Discrete-Time Comparators.

OSCILLATORS: General Considerations, Ring Oscillators, Voltage Controlled Oscillators.

Total Periods: 45

TEXT BOOKS:

1. Philip E. Allen and Douglas R. Holberg, *CMOS Analog Circuit Design*, Oxford University Press, International 2nd Edition/Indian Edition, 2010.
2. Behzad Razavi, *Design of Analog CMOS Integrated Circuits*, Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1. Paul R. Gray, Paul J. Hurst, S. Lewis and R. G. Meyer, *Analysis and Design of Analog Integrated Circuits*, Wiley India, 5th Edition, 2013.
2. David A.Johns, Ken Martin, *Analog Integrated Circuit Design*, Wiley Student Edn, 1997.

III B.Tech - II Semester

14BT60405: **IMAGE PROCESSING**

(PE-I)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Courses on Digital signal processing, Digital communications.

COURSE DESCRIPTION: Fundamentals of image processing; Image transforms; Image enhancement techniques in spatial and frequency domains; Restoration techniques; Image segmentation techniques; Image compression techniques.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstarte knowledge in
- Image Fundamentals
- Image Enhancement & Restoration Techniques
- Image Segmentation & Compression Techniques
- Color image processing

CO2. Analyze different images using various processing techniques

CO3. Develop various image processing algorithms to process the images in various Real Time Applications.

CO4. Solve problems related to images for feasible and optimal solutions in the core area of Image Processing.

DETAILED SYLLABUS:

UNIT-I: IMAGE FUNDAMENTALS **(10 Periods)**

Fundamental steps in Image Processing, Image sampling & quantization, some basic relationships between pixels, Arithmetic operations, Logical operations, Spatial operations.

IMAGE TRANSFORMS: 2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar-Transform, Slant Transform, Hotelling Transform.

UNIT-II: IMAGE ENHANCEMENT **(11 Periods)**

Basic Intensity transformation functions, Histogram processing, Fundamentals of spatial filtering, Smoothing spatial filters, Sharpening spatial filters, Combining spatial Enhancement methods.

Basics of filtering in frequency domain, Correspondence between filtering in the spatial and frequency domains, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters, Homomorphic filtering.

UNIT-III: IMAGE RESTORATION **(07 Periods)**

Image degradation/Restoration model, Noise models, Restoration in the presence of Noise only spatial filtering- mean, order-statistic and adaptive filters. Estimating the degradation function, Inverse filtering, Weiner filtering, Constrained least squares filtering.

UNIT-IV: IMAGE COMPRESSION **(08 Periods)**

Classification of redundancy in Images, Image Compression models, Run length coding, Arithmetic coding, Dictionary based compression, bit-plane coding, Transform based coding, Image compression standards.

UNIT-V: IMAGE SEGMENTATION AND COLOR IMAGE PROCESSING **(09 Periods)**

Detection of discontinuities- Point, line and edge Detection. Thresholding- global thresholding, adaptive thresholding. Region based Segmentation. Color image fundamentals- RGB, HSI models, Conversions, Pseudo Color Image Processing, Color transformations.

Total Periods: 45

TEXT BOOKS:

1. Rafael C. Gonzalez & Richard E. Woods, *Digital Image Processing*, Pearson Education, 3rd Edition, 2008.
2. Anil K. Jain, *Fundamentals of Digital Image processing*, Prentice Hall, 2007.

REFERENCE BOOKS:

1. William K. Pratt, *Digital Image Processing*, John Wiley and Sons, 3rd ed., 2002.

III B. Tech - II Semester

14BT60406: **TV AND RADAR ENGINEERING**

(PE-I)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: Courses on Pulse and Digital Circuits, Analog and Digital Communications.

COURSE DESCRIPTION: Introduction to Television systems, Transmission and Reception of video signals, Composite Video Signal, Color TV, Digital TV, Advanced Television Systems.

Radar equation, classification of radars, MTI and pulsed radar, radar receivers, Echo signal detection in the presence of noise.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate fundamental knowledge in
- Sound and Picture transmission
- Composite Video signals & TV picture tubes
- Digital TV technology & Advanced television systems
- CW and MTI Radars
- Radar Receivers

CO2. Analyze NTSC, SECAM, PAL coder and decoders and Radar signals in the presence of noise.

CO3. Design Matched filter for radar receiver.

CO4. Solve engineering problems with feasible and economical solutions in television and Radar systems.

DETAILED SYLLABUS:

UNIT-I: BASIC TELEVISION SYSTEM AND SCANNING PRINCIPLES (11 Periods)

Elements of Television system, Sound and Picture transmission, scanning process, video signal, transmission & reception of video signals, brightness perception & photometric quantities, aspect ratio & rectangular scanning, persistence of vision & flicker, Kell factor, vertical and horizontal resolution, interlaced scanning, Composite Video Signal: Lines and scanning, video signal components, horizontal sync and blanking standards, vertical sync and blanking standards, video modulation and vestigial side band signal, sound modulation and inter-carrier system. Standard channel characteristics, reception of the vestigial side band signal, television broadcast channels, television camera pick-ups: Vidicon, Plumbicon.

UNIT-II: COLOR TELEVISION SIGNALS AND SYSTEMS (07 Periods)

Colour fundamentals, mixing of colours and colour perception, chromaticity diagram, colour television camera, Principle and working of colour television, colour TV signals and transmission, Principles of NTSC, SECAM and PAL coder and decoder.

UNIT-III: DIGITAL TELEVISION TECHNOLOGY (09 Periods)

Merits of digital technology, fully digital television system, digital television signals, digitized video parameters, digital video hardware, transmission of digital TV signals, bit rate reduction, digital TV receivers. Advanced Television systems: Multiplexed Analog Component Encoding Television System (MAC TV), High Definition Television System (HDTV), LCD and LED Displays.

UNIT-IV: RADAR (12 Periods)

Radar Range Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, SNR, False Alarm Time and Probability, Integration of Radar Pulses, Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment). Doppler Effect, CW Radar- Block Diagram, Applications of CW radar, FM-CW Radar, Multiple Frequency CW Radar. MTI Radar with- Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers.

UNIT-V: RADAR RECEIVERS (06 Periods)

Noise Figure and Noise Temperature, Display types. Duplexers- Branch type and Balanced type, Circulators as Duplexers. Detection of Radar Signals in Noise- Introduction, Matched Filter Receiver-Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

Total Periods: 45

TEXT BOOKS:

1. A.M. Dhake, *Television and Video Engineering*, TMH, 2nd Edition, 2008.
2. Merrill I. Skolnik, *Introduction to Radar Systems*, TMH Special Indian Edition, 2nd Edition, 2007.

REFERENCE BOOKS:

1. R.R. Gulati, *Monochrome and color TV*, New Age International publication, 2nd Edition, 2005.
2. Merrill I. Skolnik, *Introduction to Radar Systems*, TMH, 3rd Edition, 2008.
3. Jiun-Haw Lee, david N.Liu, Shin-Tson Wu, *Introduction to Flat Panel Displays*, John Wiley & Sons, 2008.

III B.Tech - II Semester

14BT41201: **OBJECT ORIENTED PROGRAMMING**

(PE-I)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: A course on Programming in C and Data Structures.

COURSE DESCRIPTION: Object Oriented Concepts; Basics of Java; Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling, Applets, AWT, Database Connectivity and Servlets.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in:
- Object Oriented Programming concepts- classes, objects, inheritance, polymorphism, encapsulation and abstraction.
- Packages, interfaces, multithreading, exception handling, event handling.

CO2. Apply AWT and Applets to design and develop interactive Graphical User Interfaces.

CO3. Gain problem solving skills to provide effective solutions for real world problems.

DETAILED SYLLABUS:

UNIT-I: (09 Periods)

OBJECT ORIENTED THINKING: NEED FOR OOP PARADIGM, OOP CONCEPTS

History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting.

CLASSES AND OBJECTS: concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-II: INHERITANCE, PACKAGES AND INTERFACES (09 Periods)

UNDERSTANDING INHERITANCE: Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, using super, Creating multi-level hierarchy, method overriding, abstract classes, using final with inheritance.

PACKAGES: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

INTERFACES: Defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-III: EXCEPTION HANDLING AND MULTITHREADING (09 Periods)

Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Java thread model, thread life cycle, creating threads, thread priority, synchronizing threads, inter thread communication.

UNIT-IV: APPLETS, EVENT HANDLING AND AWT (09 Periods)

APPLETS: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class. Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scrollpane, dialogs, menubar, graphics, layout manager - boarder, grid, flow, card and grid bag.

UNIT-V: JDBC and SERVLETS (09 Periods)

DATABASE CONNECTIVITY: Loading the driver, Establishing connection, Create statement, Execute query, Iterate result set, Scrollable Results, and Transactions.

SERVLETS: The Life Cycle of a Servlet, Using Tomcat for Servlet Development, Create and Compile the Servlet Source Code, Start Tomcat, Start a Web Browser and Request the Servlet, The Servlet API, The Javax.Servlet Package, The javax.Servlet.http Package. **Total Periods: 45**

TEXT BOOKS:

1. Herbert Schildt, *Java the complete reference*, TMH, 7th edition, 2007.
2. Timothy Budd, *Understanding Object-oriented Programming with Java*, Addison-Wesley, updated edition, 2002.

REFERENCE BOOK:

1. Sachin Malhotra, Saurab Choudhary, *Programming in java*, Oxford university press, 2nd edition, 2014.

III B. Tech - II Semester

14BT60421: **DIGITAL IC APPLICATIONS LAB**

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	**-**	**3**	**2**

PREREQUISITES: A Course on Digital IC Applications.

COURSE DESCRIPTION: Design, verification, simulation and synthesis of combinational and sequential circuits.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Perform analysis digital system design.

CO2. Acquire skills by solving problems in the domain of digital systems.

CO3. Use modern CAD tools to analyze RTL, Technology schematic and system implementation in digital domain.

LIST OF EXPERIMENTS:

Minimum Twelve Experiments to be conducted

Simulate the internal structure of the following Digital IC's using HDL and verify the operations of the Digital IC's (Hardware) in the Laboratory.

1. Realization of Logic Gates- 74XX.
2. Half Adder, Full Adder & Ripple Carry Adder.
3. Half Subtractor, Full Subtractor.
4. 8-3 Encoder-74x148.
5. 3-8 Decoder-74x138.
6. 8x1 Multiplexer-74x151 and 2x4 Demultiplexer-74x155.
7. 4 Bit Comparator-74x85.
8. D Flip-Flop 74x74 and JK Flip-Flop 74x109.
9. Decade counter-74x90.
10. 4 Bit Counter-74x93.
11. Shift Register-74x95.
12. Universal shift register-74x194/195.
13. RAM (16x4)-74189(read and write operations).
14. ALU.

III B.Tech - II Semester

14BT60222: **MICROPROCESSORS AND MICROCONTROLLERS LAB**

(Common to ECE, EEE & EIE)

Int. Marks: 25 **Ext. Marks: 50** **Total Marks: 75**

L	T	P	C
-	-	3	2

PREREQUISITES: A course on Microprocessors and Microcontrollers.

COURSE DESCRIPTION: Assembly language Programming for Intel 8086 & 8051; Interfacing standard peripherals & Programming-DAC, Stepper Motor, ADC, Logic Controller, Keyboard, Seven Segment Display.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze various programming alternatives & interfacing methods to build a typical microcomputer based system.

CO2. Design and develop microcomputer based system to solve various problems.

LIST OF EXPERIMENTS:

Any **TWELVE** experiments to be conducted.

I Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

II Interfacing with 8086

1. Stepper motor
2. Logic controller
3. A/D converter
4. Seven segment display
5. Keyboard interfacing

III Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory
3. Programs using special instructions like SWAP, bit/byte, set/ reset etc.

IV Interfacing with 8051

1. Stepper Motor
2. Digital to Analog Converter
3. Square wave generation using Timers in Mode 0 and Mode 1

IV B. Tech – I Semester

14BT70401: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Semiconductor Devices and Circuits, Linear IC Applications.

COURSE DESCRIPTION: Performance Characteristics of Instruments; Indicators; Signal Generators; Analyzers; Oscilloscopes; AC and DC Bridges; Sensors and Transducers; Data Acquisition System.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Demonstrate Knowledge in
- Working of Instruments
- Various measurement techniques available
- Errors in measurements and their rectification

CO2. Analyze parameters, measuring methods and evaluate errors involved in measurement.

CO3. Solve engineering problems by proposing potential solutions leading to better instruments designs.

DETAILED SYLLABUS:

UNIT-I : (10 Periods)

PERFORMANCE CHARACTERISTICS OF INSTRUMENTS

Static Characteristics, Accuracy, Precision, Resolution, Sensitivity, Errors in Measurement, Dynamic Characteristics-Speed of Response, Fidelity, Lag and Dynamic Error, Statistical Analysis.

DISPLAY DEVICES: Basic Meter Movement, DC Voltmeters-Multirange, Range Extension, Loading, Transistor Voltmeter, Solid State Voltmeter, AC Voltmeters–Using Rectifiers, Multirange, Range Extension, Ammeters- Multirange, Universal Shunt, Extending Ranges, Ohmmeters, Series Type and Shunt Type, Calibration of DC Instrument & Ohmmeter, Multimeter for Voltage, Current and Resistance Measurements.

UNIT-II: (08 Periods)

SIGNAL GENERATORS

Fixed and Variable AF Oscillators, Standard Signal Generator, AF Sine & Square Wave Generator, Function Generators-Square & Pulse, Random Noise, Sweep and Arbitrary Waveform Generators-Specifications and Principles of Working (Block Diagram Approach).

ANALYZERS: Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzers, Digital Fourier Analyzers and Logic Analyzers.

UNIT-III: OSCILLOSCOPES (10 Periods)

Block Diagram of CRO, CRT Features, Vertical and Horizontal Amplifiers, Horizontal and Vertical Deflection Systems, Triggered Sweep CRO and Delayed Sweep, Sync Selector Circuits, Probes for CRO – Active, Passive and Attenuator Type, Dual Beam & Trace CRO, Measurement of Amplitude, Frequency and Phase (Lissajous method). Standard Specifications of CRO.

Sampling Oscilloscope, Storage Oscilloscope, Digital Readout Oscilloscope, Digital Storage Oscilloscope, Digital Frequency Counter, Time and Phase Measurement.

UNIT-IV: BRIDGES AND RECORDERS (08 Periods)

DC BRIDGES: Wheatstone Bridge, Kelvin Bridge, Practical Kelvin's Double Bridge.

AC BRIDGES: Maxwell's Bridge, Hay's Bridge, Schering Bridge, Wien Bridge, Anderson Bridge, Errors and Precautions in Using Bridges, Q-meter.

RECORDERS: Strip Chart Recorder and X-Y Recorder.

UNIT-V: (09 Periods)

SENSORS AND TRANSDUCERS

ACTIVE AND PASSIVE TRANSDUCERS: Measurement of Displacement (Resistance, Capacitance, Inductance; LVDT), Force (Strain Gauges), Pressure (Piezoelectric Transducers), Temperature (Resistance Thermometers, Thermocouples and Thermistors), Velocity, Acceleration, Vibration.

DATA ACQUISITION SYSTEM: Generalized Data Acquisition System, Signal Conditioning, Single & Multi Channel DAS.

Total Periods: 45

TEXT BOOKS:

1. H.S.Kalsi, *Electronic Instrumentation*, TMH, 3rd Edition, 2015.
2. A.D. Helfrick and W.D. Cooper, *Modern Electronic Instrumentation and Measurement Techniques*, PHI, 5th Edition, 2006.

REFERENCE BOOKS:

1. Sawhney.A.K., *A Course in Electrical & Electronic Measurement and Instrumentation*, Dhanpat Rai & Company Private Limited, New Delhi, 18th Edition, 2007.
2. David A. Bell, *Electronic Instrumentation & Measurements*, PHI, 2nd Edition, 2003.

IV B.Tech - I Semester

14BT70402: **EMBEDDED SYSTEMS**

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: A course on Microprocessors and Microcontrollers.

COURSE DESCRIPTION: Introduction to Embedded System; State Machines and Concurrent Process Models; Various Communication interfacing Models; RTOS Concepts; Target Architectures.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on Communication Interfacing Models, Processor Technology, State Machines, Kernel Objects, ARM and SHARC Controllers.

CO2. Analyze Various problems in Optimization of Single Purpose Processor, Synchronization among the Processes, Clock Driven and Event Driven Scheduling and Debugging Techniques.

CO3. Design and develop embedded system to suit a particular Application.

CO4. Choose suitable Hardware and software components of a system that Work together to solve engineering problems to exhibit a specific behavior.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (12 Periods)

Embedded systems overview, classification, applications, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), Custom single purpose processor design (RT-level), Optimizing custom single purpose processors, Basic architecture, operation, Pipelining, Programmer's view, Development environment.

UNIT-II: STATE MACHINE AND CONCURRENT PROCESS MODELS (08 Periods)

Introduction, Models versus languages, Finite State Machines with Data path model (FSMD) using state machines, Program State Machine model (PSM), Concurrent process model, Concurrent processes, Communication among processes, Synchronization among processes, Implementation, Data flow model.

UNIT-III: COMMUNICATION INTERFACE (07 Periods)

Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Fire wire, Ethernet, I^2C bus and CAN.

UNIT-IV: RTOS CONCEPTS (10 Periods)

CONCEPTS 1: Architecture of the Kernel, Tasks and Task scheduler, Types of real-time tasks, Task periodicity, Task scheduling, Classification of scheduling algorithms, Clock driven Scheduling, Event driven Scheduling, Resource sharing, Commercial RTOS.

CONCEPTS 2: Interrupt service routines, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem.

UNIT-V: TARGET ARCHITECTURES (08 Periods)

Host and target machines, Linkers, Loading software into target machine, Debugging techniques, ARM microcontroller, ARM pipeline, Instruction set architecture, THUMB instructions, Exceptions in ARM, Salient features of SHARC microcontroller and comparison with ARM microcontroller.

Total Periods: 45

TEXT BOOKS:

1. Frank Vahid, Tony D. Givargis, *Embedded System Design – A Unified Hardware/Software Introduction,* John Wiley, 2002.
2. KVKK Prasad, *Embedded/Real Time Systems,* Dramatic Press, 2005.

REFERENCE BOOKS:

1. Raj Kamal, *Embedded System Architectures Programming & Design*, Tata MCGraw Hill Publising, 2003.
2. David E.Simons, *An Embedded Software Premier*, Pearson Educational, 2004.

IV B. Tech – I Semester

14BT70403: **LIGHT WAVE COMMUNICATIONS**

Int. Marks: 30 **Ext. Marks: 70** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: Courses on Engineering physics, Semiconductor devices and Circuits, Digital communications.

COURSE DESCRIPTION: Ray theory; Single mode fibers; Fiber materials; Fiber losses; Optical sources and detectors; Power launching into the fiber; Optical links; WDM; Introduction to optical networks.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in

- Mode theory of optical communication
- Various losses occurring in optical fibers
- Optical sources and detectors
- Power Launching and coupling techniques
- Optical links
- WDM concepts
- Optical Networks.

CO2. Analyze single & multimode fibers and analog & digital links.

CO3. Design and Develop Optical sources, Detectors and links.

CO4. Solve problems in Optical fibers, Sources and detectors for better Optical communication system.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO OPTICAL FIBER WAVEGUIDES (08 Periods)

Historical Development, The General System, Advantages of Optical Fiber Communications, Ray Theory Transmission, Electromagnetic Mode Theory for Optical Propagation, Cylindrical Fiber. Single Mode Fibers, Fiber Materials, Fiber Fabrication, Mechanical Properties of Fibers, Fiber Optic Cables.

UNIT II: FIBER LOSSES (07 Periods)

Attenuation, Absorption, Scattering, Bending and Core & Cladding losses. Signal Distortion in Fibers - Pulse Broadening,Intramodal Dispersion, Intermodal Dispersion, Overall Fiber Dispersion in Multi Mode and Single Mode Fibers, Polarization.

UNIT III: OPTICAL SOURCES AND DETECTORS (11 Periods)

OPTICAL SOURCES: LED Structures, Light Source Materials, Quantum Efficiency and LED Power, Modulation of LED, Laser Diode Modes and Threshold Conditions, Laser Diode Rate Equations, External Quantum Efficiencies, Resonant Frequencies.

OPTICAL DETECTORS: Physical Principles of Photo Diodes, Photo Detector Noise, Detector Response Time, Avalanche Multiplication Noise, Structures for InGaAs & APDs, Temperature Effect on Avalanche Gain, Comparison of Photo Detectors.

UNIT IV: POWER LAUNCHING AND COUPLING (07 Periods)

Source to Fiber Power Launching, Lensing Schemes for Coupling Improvement, Fiber-to-Fiber Joints, Fiber alignment and joint loss, LED coupling to single mode fibers, Fiber Splices, Fiber Connectors.

UNIT V: (12 Periods)

DIGITAL LINKS: Point-to-Point Links, Power Penalties, Error Control.

ANALOG LINKS: Overview, Carrier to Noise Ratio, Multi-channel Transmission Techniques, RF over Fiber, Radio over Fiber Links.

WDM CONCEPTS AND COMPONENTS:

Overview, Passive Optical Couplers, Isolators & Circulators, Fiber Grating Filters, Dielectric Thin Film Filters, Phased Array based Devices, Diffraction Gratings.

OPTICAL NETWORKS:

Network Concepts, Network Topologies, SONET/SDH.

Total Periods: 45

TEXT BOOKS:

1. Gerd keiser, *Optical Fiber Communications*, McGraw Hill International, 4th Edition, 2009.

REFERENCE BOOKS:

1. John M. Senior, *Optical Fiber Communications*, PHI, 3rd Edition, 2011.
2. Max Ming-Kang Liu, *Principles and Applications of Optical Communications*, TMH, 2010.
3. S.C.Gupta, *Optical Fiber Communication and its Applications*, PHI, 2011.

IV B.Tech – I Semester

14BT51201: **COMPUTER NETWORKS**

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: A Course on Digital Communications.

COURSE DESCRIPTION: Introduction to Computer Networks; The Physical Layer; The Data Link Layer; The Medium Access Sub layer; The Network Layer; The Transport Layer; The Application Layer; Network Security.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on
- concepts of computer networks
- functionality of reference models layers
- 3G Mobile Phone Networks, 802.11

CO2. Analyze the issues in data link layer by using error detection and correction techniques, medium access sub layer by channel allocation schemes and transport layer by connection management schemes.

CO3. Acquire problem solving skills to assess the routing of the packet by selecting the appropriate routing algorithms.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND PHYSICAL LAYER (09 Periods)

Uses of Computer Networks, Network Hardware, Network Software, Reference Models: OSI, TCP/IP, Example Networks: Internet, 3G Mobile Phone Networks, 802.11, Guided Transmission Media, Wireless Transmission.

UNIT-II: DATA LINK LAYER AND MEDIUM ACCESS SUBLAYER (10 Periods)

Data Link Layer Design Issues, Error detection and correction-CRC, Hamming codes, Elementary Data Link Protocols, Sliding Window Protocols. Channel Allocation problem, Multiple Access protocols: ALOHA, CSMA, CSMA/CD protocols, Collision free protocol, Limited contention protocol, Ethernet, DLL Switching.

UNIT-III: NETWORK LAYER (10 Periods)

Network Layer Design Issues, Routing Algorithms: Shortest path, Flooding, Distance vector, Hierarchical, Broadcast, Multicast and Any cast, Congestion Control Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet.

UNIT-IV: TRANSPORT LAYER (08 Periods)

Transport Service, Elements of transport protocol, Internet Transport layer protocols: UDP, TCP;
UDP– Introduction, Remote Procedure Call, Real-Time Transport Protocol; TCP- Introduction, Service Model, Protocol, Segment Header, Connection Establishment, Connection Release, Connection Management Modeling, Sliding Window, Timer Management, Congestion Control, The Future of TCP.

UNIT-V: APPLICATION LAYER AND NETWORK SECURITY (08 Periods)

Domain Name System (DNS), Electronic Mail, World Wide Web: Architectural Overview, Dynamic Web Document, HTTP.

INTRODUCTION TO NETWORK SECURITY: Cryptography - Substitution Techniques, Transposition Techniques, One-Time Pads.

Total Periods: 45

TEXT BOOKS:

1. Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks*, Pearson Education, 5th edition, 2012.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *Data communication and Networking*, Tata McGraw Hill, 4th edition, 2006.
2. James F. Kurose and Keith W. Ross, *Computer Networking A Top-Down Approach Featuring the Internet*, Pearson Education, 2nd edition, 2003.

IV B.Tech - I Semester

14BT6HS01: **BANKING AND INSURANCE**

(OPEN ELECTIVE)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: Managerial Economics and Principles of Accountancy

COURSE DESCRIPTION: Origin and growth of Banking, functions and importance, RBI; Debtor and Creditor relationship, Types of Accounts, Loans and Advances; e-payment, e-cash, NEFT, RTGS, Credit and Debit cards; Insurance elements and risk; LIC, GIC, IRDA.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in

- Tools and concepts of Banking and Insurance
- Basic Principles and concepts of Insurance and Banking
- Provides life skills for effective utilization of Banking and Insurance facilities
- e-fund transfers, e-payments and e-business models.

CO2. Develop analytical skills in understanding problems pertaining to

- Online banking and e – payments
- Risk Management through insurance benefits the society at large
- money management by leveraging on technology, banking and insurance services.

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION TO BANKING (09 Periods)

Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT – II: BANK-CUSTOMER RELATIONSHIP (09 Periods)

Debtor-creditor relationship, anti money laundering, products or services, payment and collection of cheques and other negotiable instruments. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances- principles of lending, types of loans.

UNIT – III: BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM (09 Periods)

Features, types of e-payment system, e-cash, NEFT, RTGS, Electronic purses, Credit and Debit cards. Business models- B2B, B2C, C2C and B2G.

UNIT–IV: INTRODUCTION TO INSURANCE (09 Periods)

Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT–V: INSURANCE OVERVIEW (09 Periods)

Principles of insurance, insurance types, LIC & GIC insurance contract- nature, elements, functions, IRDA, Insurance Players in India.

Total periods: 45

TEXT BOOKS:

1. A.V. Ranganadha Chary, R.R. Paul, *Banking and Financial system*, Kalyani Publisher, New Delhi, 2nd Edition.
2. P.K.Gupta, *Insurance and Risk Management*, Himalaya Publishing House, New Delhi, **ISBN:** 9789350516676.

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma, *Electronic Commerce- A Manager's Guide to E-Business*, Vanity Books International, Delhi, 2002, **ISBN-13:** 978- 8174462039.
2. Kalakota Ravi and Whinston Andrew B, *Frontiers of Electronic Commerce*, Pearson Education India, 1996 New Delhi, **ISBN:** 978-81-7758-392-2.
3. Schneider, Grey P, *Electronic Commerce, Course Technology*, Cengage Learning, 2008, 8th Edition, New Delhi, **ISBN-13**:978-1-4239-0305-5.

IV B. Tech - I Semester

14BT6HS02: **COST ACCOUNTING AND FINANCIAL MANAGEMENT**

(OPEN ELETIVE)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: --

COURSE DESCRIPTION: Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: Concept of Risk and Returns on Investment.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1.Demonstrate Knowledge in
- Elements of Costing
- Basic concepts of Financial Management
- Risk and Return
- Financial Accounting
- Using advanced tools like tally and SAP
- Significance of Economics and Accountancy.

CO2. Do cost, risk and return of investment analysis.

CO3. Develop skills in providing solutions for
- Material, Labor, Overheads control
- Excellence and ability to minimize the cost of the organization
- Effective investment decisions.

CO4. Prepare cost sheets pertaining to manufacturing of products.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO COST ACCOUNTING (09 Periods)

Cost and Cost Accounting, Scope, Objectives, Advantages and Disadvantages– Cost Accounting Vs Management Accounting – Elements of Costing– Installation of costing system – Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

UNIT-II: COST ANALYSIS (09 Periods)

Analysis of Cost – Preparation of cost sheet, Estimate, Tender and quotation (Simple problems) – Importance of Costing while pricing the products.

UNIT-III: STANDARD COSTING (09 Periods)

Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labor variances (Simple Problems).

UNIT-IV: FINANCIAL MANAGEMENT (09 Periods)

Financial Management-Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

UNIT-V:RISK AND RETURNS ON INVESTMENT (09 Periods)

Investment-Meaning and Definition- Concept of risk and returns-Investment Alternatives- Introduction to Behavioral Finance – Anomalies– Key Concepts– Anchoring – Mental Anchoring-Confirmation and Hindsight Bias-Gambler's Fallacy-Herd Behavior-Over Confidence-Overreaction and Availability Bias-Prospect Theory.

Total Periods: 45

TEXT BOOKS:

1. S.P. Jain and K.L. Narang, *Cost Accounting*, Kalyani Publishers, Ludhiana, 6th Edition, 2002.
2. James C Van Horne, *Financial Management and Policy*, Prentice-Hall of India/Pearson, 12th Edition, 2001 ISBN-10: 0130326577.

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, *Cost and Management Study Material*, New Delhi.
2. I.M. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd., 10th Edition, 2010, ISBN-13: 9788125937142.

IV B.Tech - I Semester

14BT6HS03: **ENTREPRENEURSHIP FOR MICRO SMALL AND MEDIUM ENTERPRISES**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: --

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate Knowledge in
- Schemes and Institutions Encouraging Entrepreneurship
- Basic Principles and Concepts of Accountancy
- Significance of Entrepreneurship.

CO2. (i) Develop analytical skills in understanding problems pertaining to
- Personal Excellence Through Financial and Professional Freedom
- Women Entrepreneurship acts as Contrivance in the Societal Development

(ii) Develop Critical Thinking and Evaluation Ability.

CO3. Generate Ideas for Formulating Business Plans.

DETAILED SYLLABUS:

UNIT–I: INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT (09 Periods)

Concept of Entrepreneurship– Growth of Entrepreneurship in India **-** Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur – Functions of Entrepreneur – Need for an Entrepreneur – Entrepreneurial Decision Process – Types of Entrepreneurs – Distinction between an Entrepreneur and a manager – Intrapreneur - Entrepreneur Vs Intrapreneur.

UNIT–II: IDEA GENERATION AND FORMULATION OF BUSINESS PLANS (09 Periods)

Sources of Ideas – Methods of idea generation – Product Identification – Opportunity Selection – Steps in Setting up of a Small Business Enterprise - Contents Of Business Plans – Significance – Formulation of Business Plan – Business Opportunities in Various Sectors – Common Errors in Business Plan Formulation – Project Report Preparation.

UNIT–III: MICRO AND SMALL ENTERPRISES (09 Periods)

Meaning and Definition – Micro and Macro units – Essentials – Features – Characteristics – Relationship between Micro and Macro Enterprises – Rationale behind Micro and Small Enterprises – Scope of Micro and Small Enterprises – Objectives of Micro Enterprises - Problems of Micro and Small Enterprises.

UNIT–IV: INSTITUTIONAL FINANCE AND SUPPORT TO ENTREPRENEUR (09 Periods)

Need for Institutional Finance **-** Commercial Banks - Industrial Development Bank of India (IDBI) – Industrial Finance Corporation of India Ltd. (IFCI) – Industrial Credit Investment Corporation of India Ltd. (ICICI)– State Financial Corporations (SFCs) - State Industrial Development Corporations (SIDCs) – Small Industries Development of Bank of India (SIDBI) – Need For Institutional Support – National Small Industries Corporation Ltd. (NSIC) – Small Industries Development Organisation (SIDO) – Small Industries Service Institutes (SISIs) – District Industries Centres (DICs) – National Institute of Entrepreneurship and Small Business Development (NIESBUD) – Technical Consultancy Organizations (TCOS)(Origin, Mission and credit facility/support).

UNIT–V: WOMEN ENTREPRENEURSHIP (09 Periods)

Concept of Women Entrepreneur - Functions of Women Entrepreneurs - Growth of Women Entrepreneurship in India - Challenges of Women Entrepreneurs- Programmes Supporting Women Entrepreneurship – Rural Entrepreneurship – Meaning, Need for Rural Entrepreneurship, Problems of Rural Entrepreneurship, Role of NGOs.

Total Periods: 45

TEXT BOOKS:

1. Dr.S.S.Khanka*, Entrepreneurial Development*, S. Chand and Company Ltd., Revised Edition, 2012, **ISBN**: 9788121918015.
2. Madhurima Lall & Shikha Sahai, *Entrepreneurship***,** Excel Books India, 2nd Edition 2008, **ISBN**: 9789350620953.

REFERENCE BOOKS:

1. Nandan.H, *Fundamentals of Entrepreneurship*, PHI Learning Pvt. Ltd., New Delhi, 3rd Edition, 2013, **ISBN**: 9788120347502.
2. Vasanth Desai, *The Dynamics of Entrepreneurial Development and Management*, Himalaya Publishing House, 4th Edition, 2009, **ISBN**: 9788183184113.
3. Bholanath Dutta, *Entrepreneurship Management* – Text and Cases, Excel Books, 1st Edition, 2009, **ISBN**: 9789350621257.

IV B.Tech - I Semester

14BT70105: **DISASTER MITIGATION AND MANAGEMENT**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Natural Disasters and Hazards – Earthquakes – Floods and Cyclones, Droughts – Landslides – Disaster Management.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Explain various types of disasters and mitigation strategies.
CO2. Analyze and interpret the Guidelines for hazard assessment and vulnerability analysis.
CO3. Use historical data of disaster losses and inform the people over preparedness.
CO4. Address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society.
CO5. Function in multidisciplinary teams for the effective displacement of people during disasters.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION **(08 Periods)**

Types of Disasters – Natural Disasters – Impact of Disasters on Environment – Infrastructure and Development – Concepts of Hazards and Vulnerability Analysis– Hazard Assessment **–** Guidelines for Hazard Assessment and Vulnerability Analysis – Basic Principles and Elements of Disaster Mitigation.

UNIT-II: EARTHQUAKES **(11 Periods)**

Introduction to Earthquakes – Intensity scale (MSK–64) – Seismic activity in India – Seismic zones of India – Earthquakes in A.P. – Action plan for earthquake disaster preparedness – Elements at risk, Recovery and Rehabilitation after earthquake – Earthquake resistant design and construction of buildings. Tsunami – Onset, types and causes – Warning – Element at risk – Typical effects – Specific preparedness and mitigation strategies.

UNIT-III: FLOODS AND CYCLONES **(11 Periods)**

Onset, Types, Warnings – Elements at risk – Typical effects – Indian floods and cyclones – Hazard zones – Potential for reducing hazards – Mitigation strategies and Community based mitigation.

DROUGHTS: Onset, Types and Warning – Kinds of droughts – Causes of droughts – Impact of droughts – Early warning and response mechanisms – Mitigation strategies – Droughts in India.

UNIT-IV: LANDSLIDES **(07 Periods)**

Onset, Types and Warning – Causes of landslides – Elements at risk – Indian land slides – Hazard zones – Typical effects – Mitigation strategies and community based mitigation.

UNIT-V: DISASTER MANAGEMENT **(08 Periods)**

Disaster Management organization and methodology – Disaster management cycle – Disaster management in India – Typical cases – Cost – Benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Total Periods: 45

TEXT BOOKS:

1. V.K. Sharma, *Disaster Management,* National Centre for Disaster Management, IIPE, 1999.
2. A.S. Arya, Anup Karanth and Ankush Agarwal, *Hazards, Disasters and Your Community: A Primer for Parliamentarians,* GOI–UNDP Disaster Risk Management Programme, 2005.

REFERENCE BOOKS:

1. *Disaster Management in India*, A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. R. B. Singh, *Natural Hazards and Disaster Management*, Rawat Publications, 2009.
3. Pardeep sahni, Alka Dhameja & Uma Medury, *Disaster Mitigation*, 4th Edition, PHI Learning Pvt. Ltd., 2011.
4. Sanjay K. Sharma, *Environment Engineering and Disaster Management,* 1st Edition, USP Publishers, 2011.

IV B.Tech - I Semester

14BT70106: **ENVIRONMENTAL POLLUTION AND CONTROL**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Introduction, Sources and Effects of Air Pollution – Dispersion of Pollutants and their control – Surface and Ground Water Pollution and Control–Soil Pollution and remediation– Management of Municipal Solid Wastes.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Explain various pollutants, characteristics and their dispersion

CO2. Analyze the major pollutants that causes environmental pollution.

CO3. Conduct research and select suitable techniques to control pollution.

CO4. Understand the effects of environmental pollutions on human beings and vegetation.

CO5. Communicate the methods of management and control of environmental pollution.

UNIT-I: INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS (08 Periods)

Scope – Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, Point and Non–Point, Line and Area Sources of Air Pollution – Stationary and Mobile Sources – Dispersion of Pollutants – Dispersion Models – Applications.

UNIT-II: EFFECTS AND CONTROL OF PARTICULATES (09 Periods)

Effects of Air Pollutants on Man, Material and Vegetation – Global Effects of Air Pollution – Green House Effect, Heat Island, Acid Rains, Ozone Holes – Control of Particulates – Control at Sources– Process Changes – Equipment Modifications – Design and Operation of Control Equipment – Settling Chambers – Centrifugal Separators – Bag Filters, Dry and Wet Scrubbers – Electrostatic Precipitators.

UNIT-III: WATER POLLUTION (10 Periods)

Introduction–Water Quality in Surface Waters – Nutrients – Controlling Factors in Eutrophication–Effects of Eutrophication – Ground Water Pollution – Thermal Pollution – Marine Pollution – Sewage Disposal in Ocean – Types of Marine Oil Pollution – Cleanup of Marine Oil Pollution – Control of Water Pollution – Case Study on Tanneries – Drinking Water Quality Standards.

UNIT-IV: SOIL POLLUTION (09 Periods)

Soil Pollutants – Sources of Soil Pollution – Causes of Soil Pollution and their Control – Effects of Soil Pollution–Diseases Caused by Soil Pollution – Methods to Minimize Soil Pollution – Effective Measures to Control Soil Pollution – Case Study on Fertilizer.

UNIT-V: MUNICIPAL SOLID WASTE MANAGEMENT (09 Periods)

Introduction– Types of Solid Wastes– Principles of Excreta Disposal– Domestic Solid Waste Production– Collection of Solid Wastes– Transport of Solid Wastes– Management of Solid Wastes– Methods of Land Disposal– Sanitary Landfill– Composting– Incineration.

Total Periods: 45

TEXT BOOKS:

1. C.S.Rao, *Environmental Pollution Control Engineering*, 2nd Edition, New Age International Pvt. Ltd., 2007.
2. Y.Anjaneyulu, *Introduction to Environmental Science,* 1st Edition, BS Publications, 2009.

REFERENCE BOOKS:

1. M.N. Rao and H.V.N. Rao, *Air Pollution,* 19th Edition, Tata McGraw Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, *Fundamentals of Air Pollution,* 5th Edition, Academic Press (Elsevier), 2014.
3. S.M.Khopkar, *Environmental Pollution Monitoring and Control,* 2nd Edition, New Age International Pvt. Ltd., 2007.
4. S.Deswal and K.Deswal, *Environmental Science,* 2nd Edition, Dhanpat Rai & Co., 2011.

IV B.Tech - I Semester

14BT70107: CONTRACT LAWS AND REGULATIONS

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: —-

COURSE DESCRIPTION: Construction Contracts – Tenders – Arbitration – Legal Requirements – Labour Regulations.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Explain contract documents and tendering processes.

CO2. Analyze the legal issues in arbitration and in contracts documents.

CO3. Address the legal issues in collecting taxes.

CO4. Follow ethics while bidding, sale and purchase of property.

CO5. Develop and Prepare tender documents as per the standards.

DETAILED SYLLABUS:

UNIT-I: CONSTRUCTION CONTRACTS (09 Periods)

Indian Contracts Act – Elements of Contracts – Types of Contracts– Features – Suitability – Design of Contract Documents– International Contract Document and laws – Standard Contract Document – Law of Torts.

UNIT-II: TENDERS (09 Periods)

Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Financial Points of View – Two Cover System – Preparation of the Documentation – Contract Formation and Interpretation – Potential Contractual Problems – Price Variation Clause – Comparison of Actions and Laws – Subject Matter – Violations.

UNIT-III: ARBITRATION (09 Periods)

Arbitration – Comparison of Actions and Laws – Agreements – Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Arbitration Disputes – Dispute Review Board.

UNIT-IV: LEGAL REQUIREMENTS (09 Periods)

Legal Requirements for Planning – Property Law – Agency Law – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties – Local Government Approval – Statutory Regulations – Insurance and Bonding – Laws Governing Purchase and Sale – Use of Urban and Rural Land – Land Revenue Codes – EMD – Security Deposits – Liquidated Damages.

UNIT-V: LABOUR REGULATIONS (09 Periods)

Social Security – Welfare Legislation – Laws Relating to Wages, Bonus and Industrial Disputes – Labour Administration – Insurance and Safety Regulations – Workmen's Compensation Act – Maternity Benefit Act – Child Labour Act – Other Labour Laws.

Total Periods: 45

TEXT BOOKS:

1. G.C.V. Subba Rao *Law of Contracts I & II*, 11th Edition, S. Gogia & Co., 2011.
2. Jimmie Hinze, *Construction Contracts,* 2nd Edition, Mc Graw Hill, 2001.

REFERENCE BOOKS:

1. Gajaria G.T, Kishore Gajaria, *Laws Relating to Building and Engineering Contracts in India*, 4th Edition, Lexis Nexis Butterworths India, 2000.
2. B. S. Patil, *Civil Engineering Contracts and Estimates*, 3rd Edition, University Press (India) Private Ltd., 2013.
3. Joseph T. Bockrath, *Contracts and the Legal Environment for Engineers and Architects*, 7th Edition, McGraw Hill Education, 2010.
4. Akhileshwar Pathak, *Contract Law*, 1st Edition, Oxford University Press, 2011.

IV B.Tech - I Semester

14BT70108: **PLANNING FOR SUSTAINABLE DEVELOPMENT**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: --

COURSE DESCRIPTION: Introduction to Sustainable Development – Environment, Sciences and Sustainability – Sustainable Development Politics and Governance – Tools, Systems and Innovations for Sustainability – Communication and Learning for Sustainability.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate the knowledge of Planning, Environment, Tools and Systems for Sustainable Development.
CO2. Analyze the current challenges to sustainability.
CO3. Use theoretical frameworks and provide solutions to the real world sustainability issues.
CO4. Conduct awareness of contemporary issues on globalization in terms of sustainability.
CO5. Give recommendations for the sustainability issues and solutions using a holistic approach.
CO6. Explain a sense of civic responsibility, including reflection on the student's own role in developing and nurturing sustainable communities.
CO7. Participate in decision making as individual and responsible for collective decision.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO SUSTAINABLE DEVELOPMENT (08 Periods)

Definition and Concepts of Sustainable Development – Capitalization of Sustainability – National and Global Context – The Millennium Development Goals – Emergence and Evolution of Sustainability and Sustainable Development – Theories of Sustainability – Case Studies.

UNIT-II: ENVIRONMENT, SCIENCES AND SUSTAINABILITY (08 Periods)

Climate Change – Science, Knowledge and Sustainability – Unforeseen Environmental Impacts on Development – Challenges of Sustainable Development – Centrality of Resources in Sustainable Development – Case Studies.

UNIT-III: SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE (10 Periods)

Governance and Democracy and Eco–Welfare – Global Civil Society and World Civil Politics – Civic Environmentalism – Policy Responses to Sustainable Development – Economics of Sustainability – Social Responsibility in Sustainability – National Action.

UNIT-IV: TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY (11 Periods)

Need for System Innovation – Transition and Co–Evolution – Theories and Methods for Sustainable Development – Strategies for Eco–Innovation – Ecological Foot Print Analysis – Socio Ecological Indicators – Eco Labels – Policy Programmes for System Innovation – Case Studies.

UNIT-V: COMMUNICATION AND LEARNING FOR SUSTAINABILITY 08 Periods)

Role of Emerging Media – Remarkable Design and Communication Art, Activism and the Public Interest – Education for Sustainability – Participation in Decision Making – Critical Thinking and Reflection – Case Studies.

Total Periods: 45

TEXT BOOKS:

1. John Blewitt, *Understanding Sustainable Development*, Earth Scan Publications Ltd., 2nd Edition, 2008.
2. Jennifer A. Elliot, *An Introduction to Sustainable Development*, Earth Scan Publications Ltd., 4th Edition, 2006.

REFERENCE BOOKS:

1. Peter Rogers, Kazi F Jalal & John A Boyd, *An introduction to sustainable development*, Earth Scan Publications Ltd., 1st Edition, 2006.
2. Simon Dresner, *The Principles of Sustainability*, Earth Scan Publications Ltd., 2nd Edition, 2008.
3. Peter Bartelmus, *Environment Growth and Development: The Concepts and Strategies of Sustainability*, Routledge, 3rd Edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, Mirilia Bonnes, Jose Antonio Corraliza & Maria Vittoria Giuliani, *People Places and Sustainability*, Hogrefe & Huber Publishers, 2nd Edition, 2003.

IV B.Tech - I Semester

14BT70109: **RURAL TECHNOLOGY**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: --

COURSE DESCRIPTION: Research & Development – Non Conventional Energy – Community Development – IT Management.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Acquire the knowledge of various nonconventional energy systems and technologies for rural development.
CO2. Apply the principles of IT for the rural development.
CO3. Responsible for the development of technologies in rural areas.
CO4. Understand the impact of technologies in societal and environmental aspects.

DETAILED SYLLABUS:

UNIT-I: RESEARCH & DEVELOPMENT (09 Periods)

India – Ancient Indian Technologies – Rural India Life – Indian Farmer – Role of Science and Technology in Rural Development – Rural Technology and Poverty Eradication – Rural Business Hubs– Technology in improving rural infrastructure – Various organizations related to innovation – Issues of technology transfer: CAPART, NABARD, CSIR, NIF.

UNIT-II: NON CONVENTIONAL ENERGY (09 Periods)

Definition of Energy, Types of alternative sources of energy, Sources of non conventional energy– Solar energy– Solar Cooker– Solar Heater– Biogas– Recycling & Management and Wastes Conservation– Assessment & Production of biomass products & their utilization.

UNIT-III: TECHNOLOGIES FOR RURAL DEVELOPMENT (09 Periods)

Food & Agro based technologies – Tissue culture – Building and Construction technologies – Cultivation and processing of economic plants – Cottage and social Industries.

UNIT-IV: COMMUNITY DEVELOPMENT (09 Periods)

Water conservation – Rain water Harvesting – Drinking water – Environment and Sanitation – Bio fertilizers – Medical and Aromatic plants – Employment generating technologies – Apiculture – Piciculture – Aquaculture.

UNIT-V: IT IN RURAL DEVELOPMENT (09 Periods)

The Role of Information Technology in Rural Areas – Impact of Information Technology in Rural development – Need and Necessity of Technology – Corporate Social Responsibilities – Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and Saansad Adarsh Gram Yojana (SAGY) – Village adoptions schemes.

Total Periods: 45

TEXT BOOKS:

1. M.S Virdi, *Sustainable Rural Technologies*, Daya Publishing House, New Delhi, 1st Edition, 2009.
2. S.V. Prabhath & P. Ch. Sita Devi, *Technology and Rural India*, Serials Publications, New Delhi, 1st Edition, 2012.

REFERENCE BOOKS:

1. P. R. S. Murthy, R.C. Chackravarthy, *Information Technology & Rural Development*, Pacific Books International, 1st Edition, 2011.
2. Shivakanth Singh, *Rural Development Policies and Programmes,* Northern book centre, New Delhi, 1st Edition, 2002.
3. L.M.Prasad, *Principles and Practice of Management*, Sultan Chand & Sons, New Delhi, 8th Edition, 2014.
4. Venkata Reddy. K, *Agriculture and Rural Development Gandhian Perspective*, Himalaya Publishing House, 1st Edition, 2001.

IV B. Tech – I Semester

14BT60305: **ARTIFICIAL INTELLIGENCE AND ROBOTICS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: --

COURSE DESCRIPTION: Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.

CO2. Employ effective methods to analyze a robot motion control while executing a specific task.

CO3. Design and Implement appropriate solutions for search Problems such as playing two person games and for planning problems which involve actions of a robot.

CO4. Apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance.

DETAILED SYLLABUS:

UNIT-I: ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING (10 Periods)

The Underlying assumption of AI; AI Technique: Simple Tic-Tac-Toe program; Problem solving: State space search; Production systems: Control Strategies, Search space control: Depth-first, Breadth-First search; Heuristic search: Hill climbing, Best-first search, Branch and Bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT-II: KNOWLEDGE REPRESENTATION & LEARNING (09 Periods)

Knowledge Representation; Predicate Logic: Simple facts in logic, Resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; Slots; Conceptual dependency; Scripts; Non-Monotonic Reasoning, Probabilistic reasoning, Use of certainty factors, Fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.

UNIT-III: ROBOTICS– VISION & SENSING (08 Periods)

ROBOTICS: Robot Classification, Robot Specification, Notation; Sensing: Range sensing: Triangulation; Proximity sensing: Inductive, Capacitive and Ultrasonic sensing; Touch sensing: Tactile sensing, Artificial skins; Force and Torque sensing: Wrist force sensors; Vision: Low-level vision, High-level vision.

UNIT-IV: ROBOT PROGRAMMING & CONTROL (10 Periods)

Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: Characteristics, Specifications; Task level languages; Language structure: VAL II.

UNIT-V: ROBOT INTELLIGENCE & TASK PLANNING (08 Periods)

Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; Graph search technique; Problem solving and problem reduction; Robot learning; Task planning: Modelling, Task specification, Obstacle avoidance, Grasp planning; Expert system.

Total Periods: 45

TEXT BOOKS:

1. E. Rich and K. Knight, *Artificial Intelligence*, Tata Mc Graw Hill, 2nd Edition, 1992.
2. K.S. Fu, R.C. Gonzalez & C.S.G. Lee, *Robotics: Control, Sensing, Vision and Intelligence*, McGraw Hill, International Edition, 1987.

REFERENCE BOOKS:

1. Mikell P. Groover, *Industrial Robotics, Technology, Programming, and Applications*, Tata Mc Graw Hill, 9th reprint 2011.
2. D.W. Patterson, *Introduction to AI and Expert Systems*, PHI, 1992.
3. N.J. Nilsson, *Principles of AI*, Narosa Publ., House, 2000.
4. George Luger, *Al-Structures and Strategies for and Strategies for Complex Problem solving*, Pearson Educations, 4th Edition, 2002.

IV B.Tech – I Semester

14BT60306: **Global Strategy and Technology**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: --

COURSE DESCRIPTION: Introduction to Strategic Management, strategic management process, Principles of good strategy, Globalisation, Globalisation strategies, Research & development strategies, Technology management and transfer, Significance, Elements of transfer process, Corporate governance: The Indian scenario.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Decide upon a Macroscopic Management Strategy to optimize the impact of decisions with limited resources.

CO2. Identify the Impact of Globalization in a given Engineering scenario. Participate in Elementary Discussions on Corporate Governance.

CO3. Analyse an Industrial Engineering Problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO STRATEGIC MANAGEMENT (09 Periods)

Definitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT II: GLOBALISATION (09 Periods)

Meaning and Dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouring Globalisation; Globalisation strategies.

UNIT-III: RESEARCH & DEVELOPMENT STRATEGIES (09 Periods)

Introduction, Concept, Evolution of R & D Management, R & D as a business, R & D and competitive advantage, Integration of R & D, Elements of R & D strategies, Selection of R & D strategies, Implementation strategies, R & D trends, Responses to changes.

UNIT-IV: TECHNOLOGY MANAGEMENT AND TRANSFER TECHNOLOGY MANAGEMENT: (09 Periods)

Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.

TECHNOLOGY TRANSFER: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT–V: CORPORATE GOVERNANCE: THE INDIAN SCENARIO (09 Periods)

Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance – Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family – Owned business in India, Corporate Governance and the Indian Ethos.

Total Periods: 45

TEXT BOOKS:

1. Francis Cherunilam, *Stategic Management*, Himalaya Publishing House, 3rd Edition, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan, *Management of Technology*, Stategic Management, Himalaya Publishing House, 2nd Edition, 2012.

REFERENCE BOOKS:

1. White and Bruton, *The Management of Technology and Innovation; A Strategic Approach*, Cengage Learning, 1st Edition, 2007.
2. S.K.Mandak, *Ethics in Business and Corporate Governance*, TMH, 2nd Edition, 2012.

IV B.Tech –I Semester

14BT60307: **Intellectual Property Rights & Management**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: --

COURSE DESCRIPTION: Protection of ideas, Innovation and artistic endeavors; Acts and procedure related to patents, Trademarks, Passing off, Copy right, Design registration, Trade secrets and cyber laws, Case studies in each.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Prepare documents and fill applications needed for filing a patent, design, copy right and trade mark.

CO2. Ensure smooth transition from concept to final product.

CO3**.** Exercise discretion in following ethical aspects in dealing with intellectual property rights.

DETAILED SYLLABUS:

UNIT–I: OVERVIEW OF INTELLECTUAL PROPERTY RIGHTS (09 Periods)

Introduction and importance of intellectual property rights (IPRs), Types of Intellectual property, International scenario in IPR: WIPO, WTO, RIPS, International and National patent acts: United States of America patent act, United Kingdom patent act, India patent act, Recent amendments in India patent act 1972.

UNIT–II: PATENTS (09 Periods)

Introduction, Basic concepts, Object and value of patent law, Advantages of patent to inventor, Patentable inventions, Not patentable inventions, 0verview of patent procedure, Bio technology patents, Patents on computer program, Patent rights on micro organism, Plant breeding and breeders right, Protection of bio diversity, Protection of traditional knowledge, Infringement of patents and remedy for infringement.

UNIT–III: TRADEMARKS (09 Periods)

TRADE MARKS: Basic concepts, Definition, Functions, Kinds of trademarks: Service trademarks, Collective trademarks, Certification trademarks, Textile trade marks, Registrable and non registrable trademarks, Registration of trademarks, Examination process, Establishing trade mark right, Good will, Infringement and action for trademarks, Passing off, Trade mark and eco label, Comparison with patents industrial design and copy right.

UNIT-IV: INDUSTRIAL DESIGN, TRADE SECRETS, CYBER LAWS (09 Periods)

INDUSTRIAL DESIGN: Basic concepts, Scope and nature of rights, Process of registration rights, Rights after registration, Transfer of interest or rights, Reliefs and remedies and action for infringement of rights, Appeals.

TRADE SECRETS: Definition, significance, Tools to protect trade secrets in India.

CYBER LAWS: Co-relation to intellectual property.

UNIT-V: COPY RIGHTS (09 Periods)

COPY RIGHTS: Introduction, Nature and scope, Subject matter, Related or allied rights, Works in which copy rights subsists, registration of copy rights, Conferred by copy right, Copy right protection in India, Transfer of copy rights, Right of broad casing organizations and of performer, Computer software.

Total Periods: 45

TEXT BOOKS:

1. P.Narayan, *Intellectual Property Law*, Eastern Law House, New Delhi and Kolkata, 2005.
2. Deborah E. Bouchoux, *Intellectual Property Rights*, Cengage Learning, India edition, 2011.

REFERENCE BOOKS:

1. Bainbridge David, *Intellectual Property Rights: Key to New Wealth, National Research Development Corporation*, Pearson Education, New Delhi.
2. W.R.Cornesh, *Intellectual Property Rights: Patent, Copy Right, Trade Mark, Allied Rights*, Universal law publishing private limited, Delhi, 2001.
3. S.R. Myneni, *Law of Intellectual Property*, Asia law house, Hyderabad, 2001.
4. Prabuddha Ganguly, *Intellectual Property Rights: Unleasing Knowledge Economy*, TMH New Delhi, 1st edition, 2001.

IV B.Tech – I Semester

14BT60308**: MANAGING INNOVATION AND ENTREPRENEURSHIP**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: --

COURSE DESCRIPTION: Evolution of Entrepreneurship from Economic Theory Managerial and Entrepreneurial Competencies; Concepts Shifting Composition of the Economy Purposeful Innovation & 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1: Define, Explain and Illustrate theories of Business innovation and entrepreneurship, the evolution of industries and economies and the roles of Entrepreneurs.

CO2: Develop a comprehensive and well structured business plan for a new venture.

CO3: Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan.

CO4: Work effectively in multidisciplinary, Cross-cultural teams towards the development of a Team Project.

UNIT-I: ENTREPRENEURSHIP (07 Periods)

Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, Entrepreneurial growth and Development.

UNIT-II: CREATIVITY AND INNOVATION (11 Periods)

Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process;

Innovative Strategies: Strategies that aim at introducing an innovation, Innovation & entrepreneurship, Planning -incompatible with Innovation & Entrepreneurship.

UNIT-III: THE INDIVIDUAL ENTREPRENEUR (07 Periods)

Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation Entrepreneurial motivation (nAch story); Achievement Motivation in Real life- Case Study. Entrepreneurs versus Inventors.

UNIT-IV: INTERNATIONAL ENTREPRENEURSHIP OPPORTUNITIES (11 Periods)

International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Entrepreneurial entry in to international business, Strategic Issues in International Entrepreneurship.

UNIT-V: CREATIVE PROBLEM SOLVING (09 Periods)

Problem Identification and Problem Solving: Problem Identification, Problem solving Innovation and Diversification.

Total Periods: 45

TEXT BOOKS:

1. Martin, M.J., *Managing Innovation and Entrepreneurship in Technology based Firm*, John Wiley Interscience, 1994.
2. Ettlie, J.E., *Managing Technology Innovation*, John Wiley & Sons, 2000.
3. Robert D Hisrich., Michael P Peters., Dean A Shepherd, *Entrepreneurship,* The McGraw-Hill Companies, 6th Edition, 2011.

REFERENCE BOOKS:

1. Christensen, C. M. and Raynor, M. E. *The Innovators Solution: Creating and Sustaining Successful Growth*, Boston, MA: Harvard Business School Press, 2003.
2. Drucker, P. F., *Innovation and Entrepreneurship*, New York: Harper, 1985.
3. *Harvard Business Review on Innovation* (Collection of articles), Harvard Business School Press 2001.
4. *Harvard Business Review on Entrepreneurship* (Collection of articles), Harvard Business School Press 1999.
5. Rogers, E.M., *Diffusion of Innovations*, New York: Simon and Schuster, 5th Edition, 2003.
6. Drucker, P. F. *The Discipline of Innovation*, Harvard Business Review, May, 2000. (Originally published 1985, May-June).

IV B.Tech – I Semester

14BT60309**: MATERIALS SCIENCE**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES:

Courses on Engineering Chemistry, Engineering Physics.

COURSE DESCRIPTION:

Structure and Bonding in metals; Steels, Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semi conductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics Engineering, Material Selection and Manufacturing of Optical fibers.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Understand how materials are formed and their classification based on atomic arrangement.

CO2. Illustrate how the design of the various types of steels, cast Irons and Non ferrous alloys influence various engineering applications.

CO3. Understand the basic difference in properties of various conductors, Insulators and Semiconductors and application of various advanced materials for different branches of Engineering.

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION TO MATERIALS SCIENCE (07 Periods)

Structure of Metals: Bonds in Solids – Metallic bond - Crystallization of metals, Grain and grain boundaries, Effect of grain boundaries on the properties of metal / alloys – Determination of grain size.

Constitution of alloys: Necessity of alloying, Types of solid solutions, Hume Rotherys rules, Intermediate alloy phases and Electron compounds.

UNIT – II: CAST IRONS, STEELS & NON-FERROUS METALS (12 Periods)

Structure and Properties of White Cast iron, Malleable Cast iron, Grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, Structure and Properties of plain carbon steels. Structure and Properties of Copper and its alloys, Aluminum and its alloys.

UNIT – III: ELECTRIC CONDUCTORS & INSULATORS (12 Periods)

Type of materials selected for conductors, Insulators and semi conductors. Introduction to ceramics-Bonding and microstructure-DC properties of ceramic materials–AC properties– Mechanical Properties - Ceramics as Conductors, Insulators and Capacitors, Introduction to Plastics-DC properties-AC properties-Mechanical properties.

UNIT – IV: SEMICONDUCTORS AND MAGNETIC MATERIALS (09 Periods)

Fabrication of Semiconductors-Producing a silicon wafer-Lithography and Deposition-Packaging of semiconductors materials-Types of magnetic materials- Measuring Magnetic properties-Application of soft magnetic materials in Electromagnets and Relays, AC transformers, Generators and Motors.

UNIT –V: ADVANCED MATERIALS AND APPLICATIONS (05 Periods)

Composites – Fiber reinforced, Metal Matrix, Ceramic Matrix – properties and applications; Ceramics – Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Glasses– properties and applications, Manufacturing of Optical fibers.

Total Periods: 45

TEXT BOOKS:

1. Kodigre V D, *Material Science and Metallurgy*, Everest Publishing House, Pune, 31st edition, 2011.
2. Ian.P.Jones, *Material Science for Electrical and Electronic Engineers*, Oxford University Press, New Delhi,2000.

REFERENCE BOOKS:

1. V. Raghavan, *Physical Metallurgy: Principles and Practices,* PHI, New Delhi, 2nd edition, 2006.
2. William. D. Callister, *Materials Science & Engineering-An Introduction,* John Wiley and sons, New Delhi, 6th edition, 2002.
3. A.J. Dekkar, *Electrical Engineering Materials*, PHI, New Delhi, 1970.

IV B. Tech – I Semester

14BT60502: **ENGINEERING SYSTEMS ANALYSIS AND DESIGN**

(Open-Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: --

COURSE DESCRIPTION:

Overview of the Systems Process, Technologies for systems, System Development Life Cycle, System Analysis and Modeling, Levels of management, Project Management, Systems Implementation and Importance of UML Prototyping, Maintaining and Managing the Systems Output Process.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on:

- Systems Process and System Design
- Systems Analysis and Modeling
- System Development Life Cycle
- Design Management and Maintenance Tools.

CO2. Apply the CASE Tools for System Process and Estimation the given models.

CO3. Design, Develop and Implement new Techniques for modeling the systems.

CO4. Work effectively as Team member on Projects.

CO5. Manage and Maintain the System Process.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (09 Periods)

Introduction- Systems, Types of systems, Integrating technologies for systems, Need for system analysis and design, Roll of the systems analyst, The system development life cycle, CASE tools for analysis and design.

UNIT-II: ANALYSIS AND MODELING ORGANIZATIONAL SYSTEMS (09 Periods)

Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, Levels of management, Organizational culture.

UNIT-III: PROJECT MANAGEMENT (09 Periods)

Project Initiation, Problem in organization, Determining feasibilities, Ascertaining hardware and software needs, Identifying, Forecasting, Comparing costs and benefits, Activity planning and control, Managing the project.

UNIT-IV: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (09 Periods)

Object oriented analysis and design- Introduction, Object modeling, Dynamic modeling, Functional modeling, Packages and other UML artifacts, The importance of using UML for modeling.

UNIT-V: DESIGNING EFFECTIVE OUTPUT (09 Periods)

Output design objectives, Relating output content to output method, Realizing how output bias affects users, Designing output for display, Case studies- Designing a web site management, Online exam management.

Total Periods: 45

TEXT BOOKS:

1. Kenneth E.Kendall and Julie E.Kendall, *System analysis and Design*, 8th Edition, Pearson Education, India, 2011.

REFERENCE BOOKS:

1. Dennis, Wixom and Roth, *Systems Analysis and Design,* 5th Edition, John Wiley, 2012.
2. Shelly and Rosenblatt, *Systems Analysis and Design,* 9th Edition, Cengage Learning, 2012.

IV B. Tech. – I Semester

14BT71005: **MICROELECTROMECHANICAL SYSTEMS**

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Basic knowledge in Physics.

COURSE DESCRIPTION: Overview of Micro Electro Mechanical Systems (MEMS), Scaling laws, Working principles of microsensors and microactuators, Materials, Microfabrication processes, Packaging of Microsystems.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on MEMS devices, Scaling Laws, Microsensors and Microactuators.

CO2. Identify the Suitable Materials, Fabrication Techniques, Packaging Methodologies to Develop MEMS devices.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF MEMS AND SCALING LAWS (09 Periods)

Introduction, MEMS and Microelectronics, Miniaturization, Applications of MEMS in the automotive industry and in other industries.

Scaling Laws of Miniaturization: Introduction to scaling, Scaling in: Geometry, Rigid-body dynamics, Electrostatic forces, Electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT-II: **WORKING PRINCIPLES OF MICROSYSTEMS (09 Periods)**

Microsensors, Acoustic wave sensors, Biomedical and Biosensors, Chemical sensors, Pressure sensors, Thermal sensors. Microactuation: Actuation using thermal forces, Shape-memory alloys, Piezoelectric crystals, Electrostatic forces. MEMS with Microactuators, Microgrippers, Micromotors, Microvalves, Micropumps. Microaccelerometers, Microfludics.

UNIT-III: MATERIALS FOR MEMS AND MICROSYSTEMS (09 Periods)

Substrate and Wafers, Silicon as a substrate material, Silicon compounds, Silicon piezoresistors, Gallium arsenide, Quartz, Piezoelectric crystals, Polymers, Carbon Nano Tube (CNT), Development of CNTs, Application of CNTs.

UNIT-IV: MEMS FABRICATION PROCESS AND MICROMANUFACTURING (09 Periods)

Photolithography, Ion implantation, Diffusion, Oxidation, Chemical Vapor Deposition, Physical Vapor Deposition, Deposition by Epitaxy, Etching, Bulk micromanufacturing, Surface micromanufacturing, LIGA process.

UNIT-V: MEMS PACKAGING (09 Periods)

Introduction to Microsystem packaging, Objectives and General considerations in packaging design, Three levels of microsystem packaging, Interfaces in microsystem packaging, Packaging technologies, Three-dimensional packaging, Selection of packaging materials, Signal mapping and transduction, Design case: Pressure sensor packaging.

Total Periods: 45

TEXT BOOKS:

1. Tai-Ran Hsu, *MEMS & Microsystems, Design and Manufacture*, McGraw Hill Education, India Pvt. Ltd., 2002.

REFERENCE BOOKS:

1. G.K.Ananthasuresh, K.J.Vinoy, *Micro and Smart Systems*, Wiley India, Ist edition, 2010.
2. Nitaigour Premchand Mahalik, *MEMS*, McGraw Hill Education India Pvt. Ltd., eighth reprint, 2013.

IV B. Tech – I Semester

14BT61205: **BIO INFORMATICS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: --

COURSE DESCRIPTION: Introduction to Bioinformatics; Biology and Information; Sequence alignment and Dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on concepts of Biological databases, Genome and Proteome.

CO2. Analyze biological database management system.

CO3. Create, select and apply appropriate techniques and tools to manage the biological data.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO BIOINFORMATICS (08 Periods)

Internet basics, Scope of bioinformatics, Elementary commands and protocols, FTP, Telnet, http, Primer on information theory, Introduction to perl and bioperl.

UNIT-II: BIOLOGY AND INFORMATION (07 Periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT-III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 Periods)

Heuristic alignment algorithms, Global sequence alignments- Needleman-Wunsch algorithm, Local sequence alignments- Smith-Waterman algorithm, Amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and Phylogenetic analysis.

UNIT-IV: PRIMARY DATABASES AND THEIR USE (11 Periods)

Introduction to Biological databases- Organization and management, Searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), Primary databases NCBI, EMBL, DDBJ.

UNIT-V: SECONDARY DATABASES (09 Periods)

Introduction to secondary databases- Organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-Organization and Management of databases, KEGG, ExPASy, BRENDA.

Total Periods: 45

TEXT BOOKS:

1. David W. Mount, *Bioinformatics: Sequence and Genome Analysis*, CSHL Press, 2nd edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, *Bioinformatics Basics, Applications in Biological Science and Medicine*, CRC Press, Taylor & Francis Group, 2nd edition,2005.
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, *Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery*, PHI Learning Pvt. Ltd.,3rd edition, 2011.

IV B.Tech – I Semester

14BT61206: **CYBER SECURITY AND LAWS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: --

COURSE DESCRIPTION: Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in Cyber security, Cyber crimes and its related laws in Indian and Global Act.

CO2. Analyze the legal perspectives and laws related to cyber crimes in Indian context.

CO3. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO CYBER CRIMES (09 Periods)

Introduction, Definition, Origin, Cyber Crime and Information Security, Cyber Criminals, Classifications of Cyber Crimes, The Legal Perspectives and Indian Perspective, Cyber Crime and Indian ITA 2000, Global Perspective on Cyber Crimes.

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Cafe and Crimes, Botnets.

UNIT-II: TOOLS AND METHODS USED IN CYBER CRIME (09 Periods)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT-III: CYBER CRIMES AND CYBER SECURITY-LEGAL PERSPECTIVES (08 Periods)

Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT-IV: CYBER SECURITY-ORGANIZATIONAL IMPLICATIONS (10 Periods)

Introduction, Cost of Cyber Crimes and IPR issues, Web Threats for Organizations – Evils and Perils, Security and Privacy Implications from Cloud Computing, Social Media Marketing-Security Risks and Perils for Organizations, Social Computing and Associated Challenges for Organizations, Protecting People's Privacy in Organization, Organizational Guidelines for Internet Usage, Safe Computing and Usage Policy, Incident Handling and Best Practices, Media and Asset Protection.

UNIT-V: CYBER TERRORISM AND INFORMATION WARFARE (09 Periods)

Introduction, Intellectual Property in the Cyber Space, The Ethical Dimension of Cyber Crimes, The Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.

Cyber Crime Illustrations: Indian Banks lose Millions of Rupees, Justice Vs Justice, Parliament Attack, The Indian case of online Gambling, Bank and Credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam.

Total Periods: 45

TEXT BOOKS:

1. Nina Gobole, Sunit Belapure, *Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,* Wiley India, 1st edition, 2011.

REFERENCE BOOKS:

1. Ferrara et al., *Cyber Law: Text and Cases,* Cengage Learning, 3rd edition, 2012.
2. Vivek Sood, *Cyber Law Simplified,* Tata McGraw Hill, 1st edition, 2012.
3. Prashant Mali, *Cyber Law and Cyber Crimes,* Snow White Publications Pvt. Ltd., 1st edition, 2013.

IV B. Tech – I Semester

14BT70404: **ADVANCED DIGITAL SIGNAL PROCESSING**

(PE-II)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Course on Digital Signal Processing.

COURSE DESCRIPTION:

Design of digital filter banks; Power spectral estimation; Digital signal processing algorithms; DSP applications.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Filter banks and Wavelets
- Efficient power Spectral Estimation Techniques
- Adaptive filters
- Applications of Multirate signal processing.

CO2. Analyze complex engineering problems critically for conducting research in Adaptive filter design.

CO3. Design and develop digital filters and multirate systems to optimize system performance and their realization.

CO4. Solve engineering problems by designing computationally efficient DSP algorithms for feasible and optimal solutions in digital signal processing field.

DETAILED SYLLABUS:

UNIT I: MULTIRATE FILTER BANKS (10 Periods)

Decimation, Interpolation, Sampling rate conversion by a rational factor I/D, Multistage Implementation of sampling rate conversion.

Digital Filter Banks: Two-Channel Quadrature-Mirror Filter Bank, Elimination of aliasing, Condition for Perfect Reconstruction, Polyphase form of QMF bank, Linear phase FIR QMF bank, IIR QMF bank, Perfect Reconstruction of Two-Channel FIR QMF Bank .

UNIT II: POWER SPECTRAL ESTIMATIONS (08 Periods)

Estimation of spectra from finite duration observation of signals.

Non-Parametric Methods: Bartlett, Welch, Blackmann & Tukey Methods. Performance Characteristics of Nonparametric Power Spectrum Estimators, Computational Requirements of Nonparametric Power Spectrum Estimates.

UNIT-III: PARAMETRIC METHODS OF POWER SPECTRAL ESTIMATION (09 Periods)

Autocorrelation & Its Properties, Relation between auto correlation & model parameters, Yule-Walker & Burg Methods, MA & ARMA models for power spectrum estimation.

UNIT-IV: DSP ALGORITHMS (09 Periods)

Fast DFT algorithms based on Index mapping, Sliding Discrete Fourier Transform, DFT Computation Over a narrow Frequency Band, Split Radix FFT, Linear filtering approach to Computation of DFT using Chirp Z-Transform.

UNIT-V: APPLICATIONS OF DIGITAL SIGNAL PROCESSING (09 Periods)

Digital cellular mobile telephony, Adaptive telephone echo cancellation, High quality A/D conversion for digital Audio, Efficient D/A conversion in compact hi-fi systems, Acquisition of high quality data, Multirate narrow band digital filtering, High resolution narrow band spectral analysis.

Total Periods: 45

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital signal processing, principles, Algorithms and applications,* Prentice Hall, 4th Edition, 2007.
2. Sanjit K Mitra, *Digital signal processing, A computer base approach,* McGraw Hill Higher Education, 4th Edition, 2011.

REFERENCE BOOKS:

1. Emmanuel C Ifeacher Barrie. W. Jervis, *DSP-A Practical Approach*, Pearson Education,2nd Edition, 2002.
2. A.V. Oppenheim and R.W. Schaffer, *Discrete Time Signal Processing,* PHI, 2nd Edition, 2006.

IV B. Tech – I Semester

14BT70405: **DIGITAL CMOS IC DESIGN**

(PE-II)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Courses on Digital IC Applications and VLSI Design.

COURSE DESCRIPTION: Design styles and characteristics of CMOS digital circuits; Transistor sizing and memory design; Design strategies; Layout design rules; Design of sub-systems.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate advanced knowledge in

- Static and dynamic characteristics of CMOS
- Alternative CMOS Logics
- Transistor sizing
- Adders Design
- Design rules to develop layouts
- Estimation of Delay and Power.

CO2. Analyze complex engineering problems critically in the domain of CMOS Digital Integrated Circuits for conducting research.

CO3. Solve engineering problems for feasible and optimal solutions in the core area of CMOS Digital ICs.

DETAILED SYLLABUS:

UNIT-I: CMOS INVERTERS CHARACTERSTICS and DESIGN STYLES (08 Periods)

Static and Dynamic characteristics, Static and Dynamic CMOS design- Domino and NORA logic - Combinational and Sequential circuits.

UNIT-II: **HIGH SPEED NETWORK AND MEMORY DESIGN (09 Periods)**

Methods of Logical Effort for transistor sizing - Power consumption in CMOS Gates, Low power CMOS design. CMOS Memory design – SRAM, DRAM.

UNIT-III: **DESIGN METHODOLOGY AND TOOLS (10 Periods)**

Introduction, Structured Design Strategies, Design Methods, Design Flows, Design Economics, Data Sheets and Documentation.

UNIT-IV: **LAYOUT DESIGN RULES (10 Periods)**

Need for Design Rules, Mead Conway Design Rules for the Silicon Gate NMOS Process, CMOS Based Design Rules, Simple Layout Examples, Sheet Resistance, Area Capacitance, Wire Capacitance, Drive Large Capacitive Load**.**

UNIT-V: **SUBSYSTEM DESIGN PROCESS (08 Periods)**

General arrangement of 4-bit Arithmetic Processor, Design of 4-bit shifter, Design of ALU sub-system, Implementing ALU functions with an adder, Multipliers, Modified Booth's algorithm.

Total Periods: 45

TEXT BOOKS:

1. Eugene D Fabricus, *Introduction to VLSI Design*, McGraw Hill International Edition, 1990.
2. Kamran Eshranghian, Douglas A.Puknell and Sholh Eshranghian, *Essential of VLSI Circuits and Systems*, PHI, 1st Edition, 2005.
3. Neil H. E. Weste, David Money Harris, *CMOS VLSI Design-A Circuit and Systems Perspective*, Pearson 4th Edition, 2011.

REFERENCE BOOKS:

1. John P.Uyemura, *Introduction to VLSI Circuits and Systems*, Wiley Edition, 2002.
2. Sung-Mo Kang & Yusuf Leblebici, *CMOS Digital Integrated Circuits- Analysis & Design*, McGraw Hill, 2nd edition, 1999.
3. Jan M Rabaey, *Digital Integrated Circuits-A Design Perspective*, Prentice Hall, 1st Edition, 1997.

IV B. Tech – I Semester

14BT70406: **TELECOMMUNICATION SWITCHING SYSTEMS**

(PE – II)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: Courses on Analog & DigitalCommunications.

COURSE DESCRIPTION:

Overview of telecommunication switching systems, telephone networks, signaling techniques in telephone networks, ISDN, DSL technology and SONET.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1.Demonstrate fundamental knowledge in:

- Switching systems
- Subscriber loop systems, numbering plan, charging plan and transmission plan
- Signaling techniques and traffic in the context of telecommunication network
- Integrated Services Digital Network (ISDN)
- Frame relay and ATM
- DSL technologies and SONET networks.

CO2. Perform analysis of traffic load parameters like blocking probability and grade of service.

CO3. Solve engineering problems pertaining to telecommunications.

DETAILED SYLLABUS:

UNIT-I: PRINCIPLES AND EVOLUTION OF SWITCHING SYSTEMS (13 Periods)

Evolution of telecommunications, Simple telephone communication, Basics of a switching system, Manual switching system, Crossbar switching, Electronic space division switching, Time division switching, Combination switching.

UNIT-II: TELEPHONE NETWORKS (06 Periods)

Subscriber loop systems, Switching hierarchy and routing, Transmission plan, Numbering plan, Charging plan.

UNIT-III: SIGNALLING TECHNIQUES (06 Periods)

In-channel signaling, common channel signaling, Network traffic load and parameters, Grade of service and blocking probability.

UNIT-IV: DATA NETWORKS (12 Periods)

Data transmission in PSTNs, Switching techniques for data transmission, Motivation for ISDN, Services, network and protocol architecture, Transmission channels and user network interfaces, Signaling , Numbering and addressing, ISDN standards ,Broadband ISDN, Introduction to the basic principles of frame relay, ATM.

UNIT-V: (08 Periods)

DSL TECHNOLOGY: ADSL, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS.

SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries.

Total Periods: 45

TEXT BOOKS:

1. Thyagarajan Viswanath, *Telecommunication Switching Systems and Networks*, PHI, 2008.
2. B.A. Forouzan, *Data Communication & Networking*, TMH, 4th Edition, 2007.

REFERENCE BOOKS:

1. Wayne Tomasi, *Advanced electronic communications systems*, Pearson Education, 6th Edition, 2004.
2. Achyut. S .Godbole, *Data Communications & Networks*, TMH, 2004.

IV B.Tech - I Semester

14BT51501: **OPERATING SYSTEMS**

(PE-II)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: A course on Computer Organization.

COURSE DESCRIPTION:

Operating systems operations, Scheduling; Critical section problem, Deadlocks; Paging, Segmentation; File Concept, Disk scheduling; I/O interface, Concepts of Protection.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on Operating system operations, Services, I/O management and protection.

CO2. Analyze

- CPU scheduling algorithms
- Synchronization issues
- Disk scheduling algorithms
- Memory allocation algorithms
- Page replacement algorithms
- File and Directory maintenance.

DETAILED SYLLABUS:

UNIT-I: OPERATING SYSTEMS OVERVIEW AND PROCESS MANAGEMENT (09 Periods)

Operating systems operations, Distributed systems, Special purpose systems, Operating systems services, System calls, Operating system structure.

Process Management: Process scheduling, Operations on process, Inter process communication, Multi threading models, Threading issues, Scheduling criteria, Scheduling algorithms - First come first served, Shortest-job-first, Priority, Round-robin, Multilevel queue, Multilevel feedback queue.

UNIT-II: SYNCHRONIZATION AND DEADLOCKS (10 Periods)

Synchronization: The critical-section problem, Peterson's Solution, Synchronization hardware, Semaphores, Classic problems of synchronization, Monitors.

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock detection, Deadlock avoidance, Deadlock recovery.

UNIT-III: MEMORY MANAGEMENT (09 Periods)

Memory-Management Strategies: Swapping, Contiguous memory allocation, Paging, Structure of the page table, Segmentation.

Virtual Memory Management: Demand paging, Copy-on-Write, Page replacement, Allocation of frames, Thrashing.

UNIT-IV: STORAGE MANAGEMENT (08 Periods)

File System: File Concept, Access methods, Directory structure, File system structure, File system implementation, Directory implementation, Allocation methods.

Secondary Storage Structure: Disk structure, Disk attachment, Disk scheduling, Swap-space management, Stable-storage implementation, Tertiary storage structure.

UNIT-V: I/O SYSTEMS AND PROTECTION (09 Periods)

I/O Systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem.

Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights.

Total periods: 45

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, *Operating System Principles*, 7th Edition, Wiley India Edition, 2011.

REFERENCE BOOKS:

1. William Stallings, *Operating Systems, Internals and Design Principles*, 7th Edition, Pearson Education, 2013.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 3rd Edition, PHI, 2009.

IV B. Tech – I Semester

14BT70421: **DIGITAL SIGNAL PROCESSING LAB**

Int. Marks: 25	**Ext. Marks: 50**	**Total Marks: 75**	**L**	**T**	**P**	**C**
			-	**-**	**3**	**2**

PREREQUISITES: A Course on Digital Signal Processing.

COURSE DESCRIPTION: Implementation of Convolution; DFT and FFT; Design of Analog FIR and IIR filters.

COURSE OUTCOMES: On successful completion of the course, the students will be able to

CO1. Demonstrate simulation of basic concepts and algorithms such as convolution, DFT, FFT in signal processing using CCS.

CO2. Design and simulation of Digital and Analog filters such as IIR, FIR.

CO3. Solve engineering problems for feasible and optimal solutions in the core area of signal processing.

CO4. Use MATLAB Toolboxes to complex engineering activities in the domain of Signal processing.

LIST OF EXPERIMENTS:

(Minimum of Twelve experiments to be conducted)

1. To verify linear convolution on DSP Processors.
2. To verify the circular convolution on DSP Processors.
3. To verify N-point DFT & IDFT on DSP Processors.
4. To verify N-point FFT algorithm on DSP Processors.
5. To design FIR filter (LP/HP/BP/BR) using windowing technique
   a) Using Rectangular window
   b) Using Triangular window
6. To design FIR filter (LP/HP/BP/BR) using windowing technique
   a) Using Hamming window
   b) Using Hanning window
   c) Using Blackmann window
7. To design FIR filter (LP/HP/BP/BR) using Kaiser window.
8. To find the frequency response of analog Butterworth prototype filters (LP/HP/BP/BR).
9. To find the frequency response of analog Chebyshev prototype filters (LP/HP/BP/BR).
10. To Implement IIR Butterworth filter (LP/HP/BP/BR) using transformation techniques.
11. To Implement IIR Chebyshev filter (LP/HP/BP/BR) using transformation techniques.
12. Design of FIR filters using frequency sampling method.

IV B. Tech - I Semester

14BT70422: **MICROWAVE AND LIGHT WAVE COMMUNICATIONS LAB**

Int. Marks: 25 **Ext. Marks: 50** **Total Marks: 75**

L	T	P	C
-	-	3	2

PREREQUISITES: Courses on Microwave Engineering and Light wave communications.

COURSE DESCRIPTION:
Design and study of various Microwave and Light wave communication circuits, Characteristics of Microwave power supplies and components, Optical fibers and sources.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Analyze the characteristics and working of various microwave components like attenuators, directional couplers, Horn antennas etc.
CO2. Simulate and design various Lightwave communication circuits and study their characteristics.
CO3. Solve problems given in Lightwave and microwave communication systems.

LIST OF EXPERIMENTS:
Minimum Twelve Experiments to be conducted:

Part – A (Any 6 Experiments):

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Attenuation Measurement
4. Directional Coupler Characteristics
5. VSWR Measurement
6. Impedance Measurement
7. Waveguide parameters measurement
8. Scattering parameters of Circulator.

Part – B (Any 6 Experiments):

1. Characterization of LED
2. Characterization of Laser diode
3. Intensity modulation of Laser output through an optical fiber
4. Measurement of Data rate for Digital optical link
5. Measurement of Numerical Aperture
6. Measurement of losses for Analog optical link
7. Demonstration of Optical Simulator.

IV B. Tech – I Semester

14BT70423: **SEMINAR**

Int. Marks: - **Ext. Marks: 50** **Total Marks: 50**

L	T	P	C
-	-	-	2

PREREQUISITES: All the courses of the program up to III B. Tech.– I Semester.

COURSE DESCRIPTION: Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Demonstrate in-depth knowledge on the seminar topic.

CO2. Analyze critically, Chosen seminar topic for substantiated conclusions.

CO3. Undertake investigation of issues related to seminar topic providing valid conclusions.

CO4. Function effectively as individual on the chosen seminar topic.

CO5. Develop communication skills, both oral and written for preparing and presenting seminar report.

CO6. Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

IV B.Tech - II Semester

14BT5HS02: **MANAGEMENT SCIENCE**

Int. Marks: 30 **Ext. Marks: 70** **Total Marks: 100**

L	T	P	C
3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION: Concepts of Management; Evolution of thought of Management; Functions of Management; Environmental Scanning; SWOT analysis; Social Responsibility of Management; Operations Management; Forecasting Methods; Work study; Method Study; Work measurement; Statistical Quality Control; Inventory Management; Marketing; Marketing functions; Human Resource Management; Job evaluation; Merit rating; Theories of motivation; Project Management; CPM; PERT; Project cost analysis; Project crashing; Entrepreneurship; Entrepreneur Vs Manager; Contemporary Management practices; Just-in-time; Enterprise Resource Planning; Business Process Outsourcing; Intellectual property rights and Supply chain management.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Employ fundamental knowledge on 'Management Thought' and 'Management of a business organization'.

CO2. Apply various Managerial concepts & contexts to attain 'Optimum Utilization of available organizational resources'.

CO3. Contribute to the group, as an individual, in accomplishing the stated objective of the business organization.

CO4. Apply gained knowledge on Management to establish and run his/her own organization, if he/she deserve to be an 'Entrepreneur'.

CO5. Imbibe contemporary practices in applying Management and exercise discernment in implementing managerial decisions for ethical, safe and sustainable operations of the business.

DETAILED SYLLABUS:

UNIT-I:INTRODUCTION TO MANAGEMENT AND ORGANIZATION (09 Periods)

Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills - Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management. Basic concepts related to organization- Objectives, Procedure and Principles; Types of organizations - Merits, demerits and adoptability to modern firms.

UNIT-II: OPERATIONS MANAGEMENT (12 Periods)

Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling. Materials management objectives; Inventory - Types of inventory - Classical EOQ model- ABC analysis - Purchase procedure - Stores management. Marketing: Functions of marketing - Marketing mix - Channels of distribution.

UNIT-III:HUMAN RESOURCES MANAGEMENT (HRM) (06 Periods)

Nature and scope of HRM - Functions of HRM - Role of HR Manager in an organization, Job evaluation and merit rating - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT-IV:PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (09 Periods)

Network analysis - Program evaluation and review technique (PERT)- Critical path method (CPM) - Probability of completing the project within given time - Project cost analysis - Project crashing.

Introduction to entrepreneurship - Entrepreneurial traits - Entrepreneur vs. manager - Role of entrepreneurship in economic development - Women as an entrepreneur.

UNIT-V: CONTEMPORARY MANAGEMENT PRACTICES 09 Periods)

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO)-Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making.

Total Periods: 45

TEXT BOOKS:

1. O.P. Khanna, Industrial Engineering and Management, Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, Management, 6th Edition, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, Marketing Mangement, 12th Edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, Essentials of Management, 6th Edition, TMH, New Delhi, 2007.
3. N.D. Vohra, Quantitative Techniques in Management, 2nd Edition, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz, Management- A Global Perspective,10th Edition, McGraw-Hill International.

IV B.Tech - II Semester

14BT80401: CELLULAR AND MOBILE COMMUNICATIONS

Int. Marks: 30	Ext. Marks: 70	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: Courses on Analog and Digital Communications and Antennas.

COURSE DESCRIPTION: Concepts of cellular systems; Lee-model for cellular coverage; Desired C/I; Interference and reduction techniques; Frequency management in cellular systems; Handoff techniques; Various modulation techniques and Multiple Access techniques; 2G Systems-GSM, IS-95.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Cellular systems
- Interference and cell coverage in Cellular systems
- Handoffs and Dropped calls
- Modulation techniques for cellular systems
- 2G and 3G Wireless communication systems.

CO2. Analyze low interference cellular systems.

CO3. Design omni-directional and directional antenna systems.

CO4. Solve engineering problems with wide range of solutions in cellular communications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO CELLULAR MOBILE SYSTEMS (10 Periods)

A basic cellular system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, planning a cellular system, overview of generations of cellular systems.

ELEMENTS OF CELLULAR RADIO SYSTEMS DESIGN AND INTERFERENCE

General description of the problem, concept of frequency reuse channels, co-channel interference reduction factor, desired C/I from a normal case in an omni directional antenna system, cell splitting, consideration of the components of cellular systems, Introduction to co-channel interference, co-channel measurement design of antenna system, antenna parameter and their effects.

UNIT-II: CELL COVERAGE FOR SIGNAL & ANTENNA STRUCTURES (09 Periods)

General introduction, obtaining the mobile point to point model, propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point to point prediction model - characteristics, cell site, antenna heights and signal coverage cells, mobile to mobile propagation, Characteristics of basic antenna structures, antenna at cell site, mobile antennas.

UNIT- III: FREQUENCY MANAGEMENT & CHANNEL ASSIGNMENT, HAND OFF & DROPPED CALLS (05 Periods)

Frequency Management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment, Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation.

UNIT-IV: MODULATION METHODS AND CODING FOR ERROR DETECTION AND CORRECTION (08 Periods)

Modulation methods in cellular wireless systems, OFDM, Block Coding, Convolution coding and Turbo coding.

UNIT-V: MULTIPLE ACCESS TECHNIQUES (13 Periods)

FDMA, TDMA, CDMA: Time-Division Multiple Access (TDMA), Code Division Multiple Access (CDMA), CDMA capacity, Probability of bit error considerations, CDMA compared with TDMA.

SECOND GENERATION DIGITAL WIRELESS SYSTEMS

GSM, IS-136 (D-AMPS), IS-95, Mobile Management, Voice Signal Processing and Coding, Introduction to 3G.

Total Periods: 45

TEXT BOOKS:

1. William C. Y. Lee, *Mobile Cellular Telecommunications*, McGraw Hill, 2nd Edition, 1990.
2. Mischa Schwartz, *Mobile Wireless Communications*, Cambridge University Press, UK, 2005.

REFERENCE BOOKS:

1. *Mobile Communication Hand Book*, IEEE Press, 2nd Edition.
2. Theodore S Rappaport, *Wireless Communication Principles and Practice*, Pearson Education, 2nd Edition, 2002.
3. Lawrence Harte, *3G Wireless Demystified*, McGraw Hill Publications, 2001.

IV B. Tech - II Semester

14BT80402: **MIXED SIGNAL DESIGN**

(PE-III)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: A Course on Analog IC Design.

COURSE DESCRIPTION: Switched Capacitor Integrated Circuits; Biquad Filters; Charge Pump PLL; Delay Locked Loops; Nyquist rate D/A & A/D Converters; Oversampling Converters.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate in-depth knowledge in
- Switched Capacitor Circuits
- PLL
- Data Converters - ADC and DAC.

CO2. Analyze complex engineering problems critically for conducting research in Data Converters for Communication Systems.

CO3. Design and Develop Switched Capacitor Circuits and PLL.

CO4. Solve engineering problems with wide range of solutions to increase Data Rate of ADC and DAC.

DETAILED SYLLABUS:

UNIT-I: SWITCHED CAPACITOR CIRCUITS **(10 Periods)**

Introduction to Switched Capacitor circuits- basic building blocks, Operation and Analysis, Non-ideal effects in switched capacitor circuits, Switched capacitor integrators first order filters, Switch sharing, Biquad filters.

UNIT-II: PHASED LOCK LOOP (PLL) **(08 Periods)**

Basic PLL topology, Dynamics of simple PLL, Charge pump PLLs-Lock acquisition, Phase/Frequency detector and charge pump, Basic charge pump PLL, Non-ideal effects in PLLs-PFD/CP non-idealities, Jitter in PLLs, Delay Locked Loops, applications.

UNIT-III: DATA CONVERTER FUNDAMENTALS **(10 Periods)**

DC and dynamic specifications, Quantization noise, Nyquist rate D/A Converters- Decoder based Converters, Binary-Scaled Converters, Thermometer-code Converters, Hybrid Converters.

UNIT-IV: NYQUIST RATE A/D CONVERTERS **(08 Periods)**

Successive Approximation Converters, Flash Converter, Two-step A/D Converters, Interpolating A/D Converters, Folding A/D Converters, Pipelined A/D Converters, Time-Interleaved Converters.

UNIT-V: OVERSAMPLING CONVERTERS **(09 Periods)**

Noise shaping modulators, Decimating filters and interpolating filters, Higher order modulators, Delta sigma modulators with multibit quantizers, Delta sigma D/A.

Total Periods: 45

TEXT BOOKS:

1. Behzad Razavi, *Design of Analog CMOS Integrated Circuits*, TMH Edition, 2008.
2. Philip E. Allen and Douglas R. Holberg, *CMOS Analog Circuit Design*, Oxford University Press, International 2nd Edition/ Indian Edition, 2010.
3. David A. Johns, Ken Martin, *Analog Integrated Circuit Design*, Wiley Student Edition, 1997.

REFERENCE BOOKS:

1. Rudy Van De Plassche, *CMOS Integrated Analog-to-Digital and Digital-to-Analog converters*, Kluwer Academic Publishers, 2007.
2. Richard Schreier, *Understanding Delta-Sigma Data converters*, Wiley Interscience, 2005.
3. R. Jacob Baker, *CMOS Mixed-Signal Circuit Design*, Wiley Interscience, 2014.

IV B.Tech - II Semester

14BT80403: SATELLITE COMMUNICATIONS

(PE - III)

Int. Marks: 30	Ext. Marks: 70	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: Courses on Analog Communications and Digital Communications.

COURSE DESCRIPTION: Orbital Aspects; Satellite Subsystems; Satellite Link Design; Earth Station Technology; Multiple Access; Orbit Considerations; Global Positioning System.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in
- Basic concepts of satellite communications
- Satellite Orbits and Sub-Systems
- Satellite link design
- Earth station subsystems
- FDMA, TDMA, CDMA
- Geostationary satellite systems
- Satellite navigation and global positioning system.

CO2. Perform analysis of complex engineering problems pertaining to satellite systems.

CO3. Design and develop satellite links.

CO4. Solve engineering problems with feasible and economical solutions in satellite communications.

DETAILED SYLLABUS :

UNIT-I: INTRODUCTION, ORBITAL MECHANICS AND LAUNCHERS (09 Periods)

Origin of Satellite Communications, Historical Background, Basic Concepts of Satellite Communications, Frequency Allocations for Satellite Services, Applications, Future Trends of Satellite, Orbital Mechanics-Kepler's Laws of planetary motion, Look Angle Determination, Orbit Determination. Launches and Launch Vehicles, Orbital Perturbations, Orbital Effects in Communication Systems Performance.

UNIT-II: SATELLITE SUBSYSTEMS AND SATELLITE LINK DESIGN (10 Periods)

Satellite Subsystems - Attitude and Orbital Control System, Telemetry, Tracking, Command and Monitoring, Power Systems, Communication Subsystems, Satellite Antennas. Equipment Reliability and Space Qualification, Basic Transmission Theory, System Noise Temperature and G/T ratio, Design of Uplink and Down Links, Design of Satellite Links for specified C/N, System Design examples.

UNIT-III: EARTH STATION SUBSYSTEMS AND MULTIPLE ACCESS (09 Periods)

EARTH STATION: Introduction, Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Primary Power and Test Methods.

MULTIPLE ACCESS: Frequency Division Multiple Access (FDMA), Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA) Frame Structure, Examples, Satellite Switched TDMA Onboard Processing, DAMA, Code Division Multiple Access (CDMA), Spread Spectrum Transmission and Reception.

UNIT-IV: LOW EARTH ORBIT AND NON-GEOSTATIONARY SATELLITE SYSTEMS (08 Periods)

Orbit Consideration, Coverage and Frequency Considerations, Delay and Throughput Considerations, System Considerations, Operational NGSO Constellation Designs and comparisons.

UNIT-V: SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM (09 Periods)

Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers and Codes, Satellite Signal Acquisition, GPS Navigation Message, GPS Signal Levels, Timing Accuracy, GPS Receiver Operation, GPS C/A Code Accuracy.

Total Periods: 45

TEXT BOOKS:

1. Timothy Pratt, Charles W Bostian and Jeremy E Allnutt, WSE, *Satellite Communications*, Wiley publications, 2nd Edition, 2010.
2. Wilbur L.Pritchard, Henri G.Suyderhoud and Robert A. Nelson, *Satellite Communication Systems Engineering*, Pearson Publications, LPE, 2nd Edition, 2008.

REFERENCE BOOKS:

1. Dennis Roddy, *Satellite communications*, McGraw Hill, 4th Edition, 2009.
2. K. N. Raja Rao, *Fundamentals of Satellite communication*, Prentice Hall of India Pvt. Ltd, 2006.

IV B. Tech - II Semester

14BT80531: **WIRELESS SENSOR NETWORKS**

(PE-III)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L**	**T**	**P**	**C**
			3	**1**	**-**	**3**

PREREQUISITES: A Course on Cellular and Mobile Communications.

COURSE DESCRIPTION: Concepts of wireless sensor networks; Physical, Data link, Network and Transport layers.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in fundamentals of Wireless Sensor Networks and WSN layers
- Physical layer
- Data link layer
- Network layer
- Transport layer.

CO2. Analyze protocols at MAC layer, Network layer and Transport layer in Wireless Sensor Networks.

CO3. Apply routing protocols in wireless sensor networks to solve real world problems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO WIRELESS SENSOR NETWORKS (10 Periods)

Challenges for wireless sensor networks, Comparison of sensor network with adhoc network, Single node architecture - Hardware components, energy consumption of sensor nodes.

Network architecture: Sensor network scenarios - types of sources and sinks, single hop versus multi-hop networks, multiple sinks and sources. Design principles for wireless sensor networks.

UNIT-II: PHYSICAL LAYER (09 Periods)

Introduction, wireless channel and communication fundamentals- frequency allocation, modulation and demodulation, wave propagation effects and noise, channel models, spread spectrum communication, packet transmission and synchronization, quality of wireless channels and measures for improvement. Physical layer and transceiver design consideration in wireless sensor networks- Energy usage profile, choice of modulation, Power Management.

UNIT-III: DATA LINK LAYER (09 Periods)

MAC PROTOCOLS: fundamentals of wireless MAC protocols, Low duty cycle protocols and wakeup concepts, Contention-based protocols- CSMA protocols, PAMAS. Schedule-based protocols - SMAC, BMAC, Traffic-Adaptive Medium Access Protocol (TRAMA). Link Layer protocols - fundamentals, task and requirements, error control, Framing, Link management.

UNIT-IV: NETWORK LAYER (09 Periods)

Gossiping and agent-based uni-cast forwarding, Energy-efficient Uni-cast, Broadcast and Multicast - Source-based tree protocols, Shared, core-based tree protocols, Mesh-based protocols. Geographic routing, Mobile nodes , Data-centric routing - SPIN, Directed Diffusion, Energy aware routing, Gradient-based routing.

UNIT-V: TRANSPORT LAYER (08 Periods)

The transport layer and QoS in wireless sensor networks - Quality of service/reliability, Transport protocols. Coverage and deployment, Reliable data transport, Single packet delivery, Congestion control and rate control - Congestion situations in sensor networks, Mechanisms for congestion detection and handling, Protocols with rate control, The CODA congestion-control framework.

Total Periods: 45

TEXT BOOKS:

1. Holger Karl, Andreas Willig, *Protocol and Architecture for Wireless Sensor Networks*, John Wiley, Oct-2007.

REFERENCE BOOKS:

1. Feng Zhao, Leonidas J Guibas, *Wireless Sensor Networks: an information processing approach*, Morgan Kaufmann, 2004.
2. Edgar H. Callaway, *Wireless Sensor Networks: Architectures and protocols*, CRC Press, 2003.

IV B.Tech - II Semester

14BT81202: **CRYPTOGRAPHY AND NETWORK SECURITY**

(Common to CSE, IT, CSSE & ECE)

(PE-III)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: A Course on Computer Networks.

COURSE DESCRIPTION: Principles and practice of cryptography and network security: classical systems, symmetric block ciphers-DES; Public-key cryptography-RSA, Diffie-Hellman; Hash functions; Authentication; key management; key exchange; Signature schemes; E-mail; web security and firewalls.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on Cryptographic algorithms, their mathematical models, Message Authentication, Digital Signatures and firewall.

CO2. Analyze vulnerabilities and threats on information systems based on various security parameters.

DETAILED SYLLABUS:

Unit-I: CLASSICAL ENCRYPTION TECHNIQUES (08 Periods)

INTRODUCTION: Services, Mechanisms and Attack Concepts, The OSI Security Architecture, Model for Network Security.

CLASSICAL ENCRYPTION TECHNIQUES: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques.

Unit-II: BLOCK CIPHERS AND PUBLIC-KEY CRYPTOGRAPHY (09 Periods)

BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD: Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Block Cipher Design Principles, Block Cipher Modes of Operation.

PUBLIC-KEY CRYPTOGRAPHY: Principles of Public-Key Cryptosystems, the RSA Algorithm, Diffie-Hellman Key Exchange.

UNIT-III:

MESSAGE AUTHENTICATION CODES, HASH FUNCTIONS AND DIGITAL SIGNATURES (09 Periods)

MESSAGE AUTHENTICATION CODES: Message Authentication Requirements, Message Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, Hash algorithms-SHA, HMAC.

DIGITAL SIGNATURES: Digital Signatures, Digital Signature Standard (DSS), Authentication applications- Kerberos, X.509 Authentication Service.

UNIT-IV: ELECTRONIC MAIL SECURITY, IP SECURITY AND WEB SECURITY (10 Periods)

ELECTRONIC MAIL SECURITY: Pretty Good Privacy (PGP), S/MIME-Multipurpose Internet Mail Extensions (MIME), S/MIME Functionality, Messages, Certificate Processing.

IP SECURITY: IP Security Overview, Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations.

WEB SECURITY: Web security Considerations, Secure Sockets Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction.

Unit-V: INTRUDERS, MALICIOUS SOFTWARE AND FIREWALLS (09 Periods)

INTRUDERS: Intrusion Detection, Password Management-Password Protection, Password selection.

MALICIOUS SOFTWARE: Viruses and Related Threats, Virus Countermeasures.

FIREWALLS: Firewall Design Principles, Trusted Systems.

(Total Periods: 45)

TEXT BOOKS:

1. William Stallings, *Cryptography and network Security principles and Practice*, Pearson Education, 3rd Edition, 2003.

REFERENCE BOOKS:

1. William Stallings, *Network Security Essentials Applications and Standards,* Pearson Education, 3rd Edition.
2. Behrouz A Forouzan and Debdeed Mukhopadhyay, *Cryptography and Network Security*, McGraw Hill Education, 2nd Edition, 2010.

IV B. Tech - II Semester

14BT80404: **LOW POWER CMOS VLSI DESIGN**

(PE-IV)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: Courses on Switching Theory and Logic Design, VLSI Design.

COURSE DESCRIPTION: Power dissipation in MOSFETs; Estimation of Power; Design, Optimization and Testing of Low Power Circuits; Low power SRAM; Energy Recovery Techniques and Low Power Software Design.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

CO1. Demonstrate knowledge in CMOS Power Dissipation, Optimization Techniques at various abstraction levels, design and test Low Power circuits, Low Power SRAM Architectures, Energy Recovery Techniques and software design.

CO2. Perform analysis of Low Power CMOS Circuits.

CO3. Design and develop Energy Recovery Circuits.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO LOW POWER VLSI DESIGN **(06 Periods)**

Need For Low Power VLSI Chips, Charging and Discharging Capacitances, Short Circuit Current in CMOS, CMOS Leakage Current, Static Current, Basic Principles of Low Power Design, Low Power Figure Of Merits.

UNIT-II: **(11 Periods)**

SIMULATION POWER ANALYSIS:

Spice Circuit Simulation, Discrete Transistor Modeling and Analysis, Gate Level Logic Simulation, Architecture Level Analysis, Data Correlation Analysis, Monto Carlo Simulation.

PROBABILISTIC POWER ANALYSIS:

Random Logic Signals, Probability and frequency, Probabilistic Power Analysis Techniques, Signal Entropy.

UNIT-III: CIRCUIT ANALYSIS: **(13 Periods)**

Transistor and Gate Sizing, Equivalent Pin Ordering, Network Restructuring and Reorganization, Special latches and Flip flops, Low Power Digital Cell Library, Adjustable Device threshold Voltage.

LOGIC ANALYSIS:

Gate Reorganization, Signal Gating, Logic Encoding, State Machine Encoding, Precomputation Logic.

UNIT-IV: SPECIAL TECHNIQUES **(07 Periods)**

Power Reduction in Clock Networks, CMOS Floating Node, Low Power Bus, Delay Balancing, Low Power Techniques for SRAM.

UNIT-V: ARCHITECTURE AND SYSTEM **(08 Periods)**

Power and Performance Management, Switching Activity Reduction, Parallel Architecture with Voltage Reduction, Flow Graph Transformation.

Total Periods: 45

TEXT BOOKS:

1. Gary Yeap, *Practical Low-Power Digital VLSI Design*, Springer Publication, 1998.

REFERENCE BOOKS:

1. Kaushik Roy, Sharat Prasad, *Low-Power CMOS VLSI Circuit Design*, Wiley Student Edition, 2000.

IV B. Tech - II Semester

14BT80405: **SPEECH PROCESSING**

(PE - IV)

Int. Marks: 30	**Ext. Marks: 70**	**Total Marks: 100**	**L T P C**
			3 1 - 3

PREREQUISITES: Courses on Signals & Systems and Digital Signal Processing

COURSE DESCRIPTION: Acoustic Theory of speech production; model for speech signals and speech processing systems; Mathematical analysis of speech signal -Homomorphic and LPC models; Speech and Speaker recognition systems.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate fundamental knowledge in
- Digital Model representation of speech signal
- STFT analysis
- LPC analysis
- Homomorphic models.

CO2. Analyze complex engineering problems critically for conducting research in speech signal processing.

CO3. Solve engineering problems using efficient algorithms for feasible and optimal solutions in speech signal processing field.

DETAILED SYLLABUS: UNIT-I: DIGITAL MODEL FOR THE SPEECH SIGNAL (11 Periods)

The process of speech production - the mechanism of speech production, acoustic phonetics. The Acoustic theory of speech production- sound propagation, uniform lossless tubes, Effect of losses in the vocal tract, Effect of radiation at the lips, Vocal tract transfer functions for vowels, the effect of nasal coupling, Excitation of sound in the vocal tract. Digital models for speech signals.

UNIT-II: TIME DOMAIN MODELS FOR SPEECH PROCESSING (08 Periods)

Introduction, Window considerations, Short time energy and average magnitude, Short time average zero crossing rate, Speech Vs silence discrimination using Average energy and zero crossing, Pitch period estimation using parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Pitch period estimation using the autocorrelation function.

UNIT-III: HOMOMORPHIC SPEECH PROCESSING (10 Periods)

SHORT TIME FOURIER TRANSFORM: Definition, Fourier transform interpretation, linear filter interpretation, Filter Bank summation method, Overlap addition method. Homomorphic systems for convolution - properties of the complex Cepstrum, computational considerations. The complex Cepstrum of speech, pitch detection, formant estimation, Homomorphic vocoder.

UNIT-IV: LINEAR PREDICTIVE CODING OF SPEECH (10 Periods)

Basic principles of linear predictive analysis - Auto correlation method, The covariance method. Computation of the gain for the model, solution of LPC Equations - Cholesky Decomposition solution for the covariance method. Durbin's Recursive solution for the autocorrelation equations. Comparison between methods of solutions of LPC analysis equations. Applications of LPC parameters- Pitch detection using LPC parameters, Formant analysis using LPC parameters.

UNIT-V: SPEECH AND SPEAKER RECOGNITION SYSTEMS (06 Periods)

Speaker recognition system- speaker verification system, speaker identification systems. Speech recognition system- isolated digit recognition system, continuous digit recognition system, LPC distance measure.

Total Periods: 45

TEXT BOOKS:

1. L R Rabiner and SW Schafer, *Digital processing of speech signals*, Pearson Education, 2006.
2. L R Rabiner, BH Juang, B Yegnanarayana, *Fundamentals of Speech Recognition*, Pearson Education, 2009.

REFERENCE BOOKS:

1. Thomas F Quateri, *Discrete time speech signal processing*, Pearson Education, 2006.
2. Ben Gold & Nelson Morgan, *Speech & audio signal processing*, John Wiley, 2006.
3. Douglas O Shaughnessy, *Speech Communications*, Oxford University Press, 2nd Edition, 2000.

IV B. Tech - II Semester

14BT80406: **SPREAD SPECTRUM COMMUNICATIONS**

(PE - IV)

Int. Marks: 30	Ext. Marks: 70	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: A Course on Digital Communications.

COURSE DESCRIPTION: Fundamentals of spread spectrum systems; Analysis of spread spectrum systems; Detection of spread spectrum signals; Applications of spread spectrum to communications.

COURSE OUTCOMES: On successful completion of the course, the students will be able to

CO1. Demonstrate knowledge in various types of spread spectrum techniques, generation and detection of spread spectrum signals and their applications in communications.

CO2. Analyze problems in direct sequence and avoidance-type spread spectrum systems.

CO3. Consider design and development issues in spread spectrum communication systems.

CO4. Solve engineering problems pertaining to spread spectrum communications.

DETAILED SYLLABUS :

UNIT-I: FUNDAMENTALS OF SPREAD SPECTRUM SYSTEMS (07 Periods)

General concepts, Direct sequence (DS), Frequency Hopping (FH), Time Hopping (TH), Comparison of modulation methods, Hybrid spread spectrum systems, Chirp spread spectrum.

UNIT-II: ANALYSIS OF DIRECT SEQUENCE SPREAD SPECTRUM SYSTEMS (09 Periods)

Properties of Pseudo noise (PN) sequences, m-sequences and their properties, Partial Correlation, PN signal from PN sequences, Partial correlation of PN signals, The PN Signal, De-spreading the PN signal, Interference rejection, Output signal to noise ratio, Anti-jam characteristics, Interception, Energy bandwidth efficiency.

UNIT-III: ANALYSIS OF AVOIDANCE-TYPE SPREAD SPECTRUM SYSTEMS & GENERATION OF SPREAD SPECTRUM SIGNALS (07 Periods)

ANALYSIS OF AVOIDANCE - TYPE SPREAD SPECTRUM SYSTEMS:

The frequency hopped signal, Interference rejection in a frequency hopping receiver, The time hopped signal.

GENERATION OF SPREAD SPECTRUM SIGNALS:

Shift register sequence generators, Discrete frequency synthesizers, SAW device PN generators.

UNIT-IV: DETECTION OF SPREAD SPECTRUM SIGNALS

(12 Periods)

TRACKING: Coherent direct sequence receivers, other method of carrier tracking, Delay lock loop analysis, Tau - Dither loop, Coherent carrier tracking, Non-coherent frequency hop receiver.

ACQUISITION: Acquisition of spread spectrum signals, Acquisition by cell-by-cell searching, Reduction of acquisition time, Acquisition with matched filters, Matched filters for PN sequences, Matched filters for frequency hopped signals, Matched filters with acquisition- aiding waveform.

UNIT-V: APPLICATION OF SPREAD SPECTRUM TO COMMUNICATIONS (10 Periods)

General capabilities of spread spectrum, Multiple access considerations, Energy and bandwidth efficiency in multiple access, Selective calling and Identification, Anti-jam considerations, Error correction coding, Intercept consideration (AI), Miscellaneous considerations, Examples of spread spectrum systems.

Total Periods: 45

TEXT BOOKS:

1. George R. Cooper and Clare D. McGillem, *Modern Communications and Spread Spectrum*, McGraw Hill, 1986.

REFERENCE BOOKS:

1. Roger L. Peterson, Rodger E.Ziemer & David E. Borth, *Introduction to Spread Spectrum Communications*, Prentice Hall, 2013.
2. Dr. Kamilo Feher, Wireless Digital Communications: *Modulation & Spread Spectrum Applications*, Pearson Education, 2006.
3. Andrea Goldsmith, *Wireless Communications, Cambridge University Press*, 2009.
4. Upendra Dalal, *Wireless Communication*, Oxford University Press, 2009.

IV B. Tech - II Semester

14BT40502: DATABASE MANAGEMENT SYSTEMS

(PE-IV)

Int. Marks: 30	Ext. Marks: 70	Total Marks: 100	L	T	P	C
			3	1	-	3

PREREQUISITES: A course on Programming in C and Data Structures.

COURSE DESCRIPTION: Introduction to Database Systems; Database Design; Relational Model; SQL Queries, Constraints and Triggers; Schema Refinement and Normal Forms; Transaction Management; Concurrency Control; Overview of Storage and Indexing.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge on
- Fundamentals of DBMS
- Database design
- Normal forms
- Storage and Indexing.

CO2. Apply Structured Query Language (SQL) in retrieval and management of data in real time applications.

CO3. Develop skills in designing, managing databases and its security.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO DATABASE SYSTEMS & DATABASE DESIGN (09 Periods)

INTRODUCTION TO DATABASE SYSTEMS: Database System Applications, Purpose of Database Systems, View of Data-Data Abstraction, Instances and Schemas, Data Models, Database Languages - DDL, DML, Database Architecture, Database Users and Administrators.

INTRODUCTION TO DATABASE DESIGN: ER diagrams, Beyond ER design, Entities, Attributes and Entity Sets, Relationships and Relationship sets, Additional features of ER model, Conceptual Design with ER model.

UNIT-II: THE RELATIONAL MODEL & RELATIONAL ALGEBRA AND CALCULUS (08 Periods)

RELATIONAL MODEL: Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical database Design, Introduction to Views-Destroying/altering Tables and Views.

RELATIONAL ALGEBRA AND CALCULUS: Preliminaries, Relational Algebra Operators, Relational Calculus- Tuple and Domain Relational Calculus, Expressive Power of Algebra and calculus.

UNIT-III: SQL & SCHEMA REFINEMENT (10 Periods)

SQL: Form of Basic SQL Query- Examples of Basic SQL Queries, Introduction to Nested Queries, correlated Nested Queries, Set- Comparison Operators, Aggregate Operators, NULL values-Comparison using Null values- Logical connectives- AND, OR and NOT- Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL, Triggers and Active Databases.

SCHEMA REFINEMENT: Problems Caused by redundancy Decompositions - Problem related to decomposition, Functional Dependencies- Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms- BCNF, Multi valued Dependencies- FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT-IV: TRANSACTIONS AND CONCURRENCY CONTROL (09 Periods)

TRANSACTIONS: Transaction Concept- Transaction State- Implementation of Atomicity and Durability- Concurrent Executions- Serializability- Recoverability - Implementation of Isolation - Testing for serializability.

CONCURRENCY CONTROL: Lock Based Protocols - Timestamp Based Protocols- Validation Based Protocols - Multiple Granularity, Deadlock Handling.

UNIT-V: STORAGE AND INDEXING (09 Periods)

STORAGE AND INDEXING: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

TREE STRUCTURED INDEXING: Intuitions for tree Indexes, Indexed Sequential Access Methods(ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Total Periods: 45

TEXT BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, Tata McGraw Hill, 3rd Edition, 2007.
2. A.Silberschatz, H.F.Korth, S.Sudarshan, *Database System Concepts*, Tata McGraw Hill , 5th Edition, 2005.

REFERENCE BOOKS:

1. Ramez Elmasri, Shamkant B.Navathe, *Database Systems*, 6th Edition, Pearson Education, 2013.
2. Peter Rob and Carlos Coronel, *Database Systems Design, Implementation and Management*, Cengage Learning, 7th Edition, 2009.

IV B. Tech - II Semester
14BT80421: **COMPREHENSIVE VIVA-VOCE**

Int. Marks: -- **Ext. Marks: 100** **Total Marks: 100**

L	T	P	C
-	-	-	2

PREREQUISITES: All courses of the program.

COURSE DESCRIPTION: Assessment of student learning outcomes.

COURSE OUTCOMES: Comprehensive Viva-Voce enables a successful student to:

CO1. Demonstrate knowledge in the program domain.

CO2. Exhibit professional etiquette suitable for career progression.

CO3. Present views cogently and precisely.

IV B. Tech - II Semester
14BT80422: **PROJECT WORK**

Int. Marks: 60 **Ext. Marks: 140** **Total Marks: 200**

L	T	P	C
-	-	20	10

PREREQUISITES: All courses up to IV B. Tech. - I Semester.

COURSE DESCRIPTION: Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES: On successful completion of project work, the students will be able to:

CO1. Demonstrate in-depth knowledge on the project topic.
CO2. Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.
CO3. Design solutions to the chosen project problem.
CO4. Undertake investigation of project problem to provide valid conclusions.
CO5. Use the appropriate techniques, resources and modern engineering tools necessary for project work.
CO6. Understand professional and ethical responsibilities while executing the project work.
CO7. Function effectively as individual and a member in the project team.
CO8. Develop communication skills, both oral and written for preparing and presenting project report.
CO9. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.
CO10. Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE

ELECTRICAL AND ELECTRONICS ENGINEERING

I Year B.Tech. (Yearly Pattern)

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT1HS01	Technical English	2	-	-	4	30	70	100
14BT1BS01	Engineering Physics	2	1	-	4	30	70	100
14BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
14BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
14BT1BS04	Mathematical Methods	3	1	-	6	30	70	100
14BT1ES01	Programming in C and Data Structures	3	1	-	6	30	70	100
14BT1ES03	Computer-Aided Engineering Drawing	-	1	3	3	25	50	75
14BT1BS05	Engineering Physics and Engineering Chemistry Lab.	-	-	3	3	25	50	75
14BT1ES04	Programming in C and Data Structures Lab.	-	-	3	3	25	50	75
14BT1ES06	Engineering and IT Workshop	-	-	3	3	25	50	75
14BT1HS02	English Language Communication Skills Lab.	-	-	3	3	25	50	75
	TOTAL	**15**	**6**	**15**	**45**	**305**	**670**	**975**

ELECTRICAL AND ELECTRONICS ENGINEERING
B.Tech. II Year - I SEMESTER

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS02	Special Functions and Complex Analysis	3	1	-	3	30	70	100
14BT3HS01	Environmental Sciences	3	1	-	3	30	70	100
14BT30201	Electromagnetic Fields	3	1	-	3	30	70	100
14BT30202	DC Machines	3	1	-	3	30	70	100
14BT30203	Electric Circuits	3	1	-	3	30	70	100
14BT30402	Semiconductor Devices and Circuits	3	1	-	3	30	70	100
14BT30221	Electric Circuits Lab	-	-	3	2	25	50	75
14BT30421	Semiconductor Devices and Circuits Lab	-	-	3	2	25	50	75
	Total	**18**	**6**	**6**	**22**	**230**	**520**	**750**

ELECTRICAL AND ELECTRONICS ENGINEERING
B.Tech. II Year - II SEMESTER

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT4HS02	Professional Ethics	3	1	-	3	30	70	100
14BT40201	Signals and Networks	3	1	-	3	30	70	100
14BT40202	Generation of Electric Power	3	1	-	3	30	70	100
14BT40203	Electrical and Electronic Measurements	3	1	-	3	30	70	100
14BT40204	Transformers and Induction Machines	3	1	-	3	30	70	100
14BT40405	Switching Theory and Logic Design	3	1	-	3	30	70	100
14BT40431	Analog Electronic Circuits	3	1	-	3	30	70	100
14BT40221	Electrical Measurements and Testing Lab	-	-	3	2	25	50	75
14BT40222	DC Machines Lab	-	-	3	2	25	50	75
	Total	**21**	**7**	**6**	**25**	**260**	**590**	**850**

ELECTRICAL AND ELECTRONICS ENGINEERING
B.Tech. III Year - I SEMESTER

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT4HS01	Business Communication and Presentation Skills	3	1	-	3	30	70	100
14BT5HS01	Managerial Economics and Principles of Accountancy	3	1	-	3	30	70	100
14BT50201	Control Systems	3	1	-	3	30	70	100
14BT50202	Computer Organization and Architecture	3	1	-	3	30	70	100
14BT50203	Synchronous Machines	3	1	-	3	30	70	100
14BT50204	Transmission of Electric Power	3	1	-	3	30	70	100
14BT51003	Linear and Digital IC Applications	3	1	-	3	30	70	100
14BT50423	Analog Electronics and IC lab	-	-	3	2	25	50	75
14BT50221	AC Machines Lab	-	-	3	2	25	50	75
	Total	**21**	**7**	**6**	**25**	**260**	**590**	**850**

ELECTRICAL AND ELECTRONICS ENGINEERING
B.Tech. III Year - II SEMESTER

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS02	Management Science	3	1	-	3	30	70	100
14BT60201	Microprocessors and Microcontrollers	3	1	-	3	30	70	100
14BT60202	Power Electronics	3	1	-	3	30	70	100
14BT60203	Switchgear and Protection	3	1	-	3	30	70	100
14BT60204	Distribution of Electric Power	3	1	-	3	30	70	100
	Professional Elective – I	3	1	-	3	30	70	100
14BT60205	Instrumentation							
14BT60206	Advanced Control Systems							
14BT60207	High Voltage Engineering							
14BT60208	Computer Aided Electrical Machine Design							
14BT51201	Computer Networks							
14BT60221	Electrical Systems and Simulation Lab	-	-	3	2	25	50	75
14BT60222	Microprocessors and Microcontrollers Lab	-	-	3	2	25	50	75
	Total	**18**	**6**	**6**	**22**	**230**	**520**	**750**

ELECTRICAL AND ELECTRONICS ENGINEERING
B.Tech. IV Year - I SEMESTER

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT70201	Power Semiconductor Drives	3	1	-	3	30	70	100
14BT70202	Power System Operation and Control	3	1	-	3	30	70	100
14BT70203	Power System Analysis	3	1	-	3	30	70	100
14BT60401	Digital Signal Processing	3	1	-	3	30	70	100
	Open Elective	3	1	-	3	30	70	100
	Professional Elective – II	3	1	-	3	30	70	100
14BT70204	Reactive Power Compensation and Management							
14BT70205	Soft Computing Techniques							
14BT70206	Advanced Microcontrollers							
14BT60431	Principles of Communication							
14BT70531	Advanced Data Structures							
14BT70221	Power Electronics and Drives Lab	-	-	3	2	25	50	75
14BT70222	Power Systems and Simulation Lab	-	-	3	2	25	50	75
14BT70223	Seminar	-	-	-	2	-	50	50
	Total	**18**	**6**	**6**	**24**	**230**	**570**	**800**

ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech. IV Year - I SEMESTER

Open Electives

Offering Dept	Course Code	Course Title
BS&H	14BT6HS01	Banking and Insurance
BS&H	14BT6HS02	Cost Accounting and Financial Management
BS&H	14BT6HS03	Entrepreneurship for Micro, Small and Medium Enterprises
CE	14BT70105	Disaster Mitigation and Management
CE	14BT70106	Environmental Pollution and Control
CE	14BT70107	Contract Laws and Regulations
CE	14BT70108	Planning for Sustainable Development
CE	14BT70109	Rural Technology
ME	14BT60305	Artificial Intelligence and Robotics
ME	14BT60306	Global Strategy and Technology
ME	14BT60307	Intellectual Property Rights and Management
ME	14BT60308	Managing Innovation and Entrepreneurship
ME	14BT60309	Material Science
CSE	14BT60502	Engineering Systems Analysis and Design
EIE	14BT71005	Microelectromechanical Systems
IT	14BT61203	Bio-Informatics
IT	14BT61204	Cyber Security and Laws

ELECTRICAL AND ELECTRONICS ENGINEERING
B.Tech. IV Year - II SEMESTER

Course Code	Course Title	Periods per week			Credits	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT80201	Utilization of Electrical Energy	3	1	-	3	30	70	100
14BT80202	HVDC and FACTS	3	1	-	3	30	70	100
	Professional Elective - III	3	1	-	3	30	70	100
14BT80203	Power Quality							
14BT80204	Reliability Engineering and Applications to Power Systems							
14BT80205	EHVAC Transmission							
14BT80206	Smart Grid Technology							
14BT60403	VLSI Design							
	Professional Elective - IV	3	1	-	3	30	70	100
14BT80207	Energy Audit and Demand Side Management							
14BT80208	Power System Deregulation							
14BT80209	Solar and Wind Energy Conversion Systems							
14BT70402	Embedded Systems							
14BT40502	Database Management Systems							
14BT80221	Comprehensive Viva-Voce	-	-	-	2	-	100	100
14BT80222	Project Work	-	-	-	10	60	140	200
	Total:	**12**	**4**	**-**	**24**	**180**	**520**	**700**

B.Tech I Year

14BT1HS01: **TECHNICAL ENGLISH**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

DETAILED SYLLABUS:

UNIT – I: (10 periods)

My Early Days by **A. P. J. Abdul Kalam** from **All About English** by Cambridge University Press India Pvt Ltd. 2014.

Communication: Importance of Communication – Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-Verbal Communication.

UNIT – II: (10 periods)

A Speech by N. R. Narayana Murthy from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: (10 periods)

The Town by the Sea by Amitav Ghosh from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: (10 periods)

Sir. C. V. Raman: The Celebrated Genius from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Reading: Reading and Interpretation – Intensive and Extensive Reading–Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: (10 periods)

The Model Millionaire by **Oscar Wilde** from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Writing: Characteristics – Language – Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism - Referencing and Styling.

Total Periods: 50

TEXT BOOKS:

1. *All About English,* Cambridge University Press India Pvt. Ltd., First Edition, 2014.
2. Meenakshi Raman and Sangeetha Sharma, *Technical Communication,* Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, *Effective Technical Communication,* Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.
2. Martin Hewings, *Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,* Cambridge University press, First South Asian Edition, New Delhi, 1999.

B.Tech. I Year

14BT1BS01**: ENGINEERING PHYSICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

COURSE OUTCOMES :

After completion of the course a successful student will be able to

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context.

DETAILED SYLLABUS:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, Ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: (16 periods)

SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III : (17 periods)

PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative treatment), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: (17 periods)

DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V : (17 periods)

MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS

Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total Periods: 85

TEXTBOOKS:

1. S. Mani Naidu*, Engineering Physics*, Pearson Education, 2013.

2. P. K. Palaniswamy, *Engineering Physics,*Scitech Publications

REFERENCE BOOKS:

1. R. K. Gaur and S. L. Gupta*, Engineering Physics,* DhanpatRai Publications (P) Ltd., 8th Edition, 2001.

2. M. R. Srinivasan, *Engineering Physics,* New Age International (P) Limited, Publishers, 1st Edition,2010.

B.Tech. I Year
14BT1BS02 **: ENGINEERING CHEMISTRY**
(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.

COURSE OUTCOMES:

After successful completion of the course the student is able to:

1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.
2. Develop analytical skills in:
   a. Determination of hardness of water.
   b. Determination of viscosity, flame and fire points, cloud and pour points.
   c. Determination of calorific value of fuels.
3. Develop skills in design of:
   a. Methods for control of corrosion
   b. Chemical methods for the synthesis of Nanomaterials.
4. Develop skills for providing solutions through:
   a. Mitigation of hardness of water.
   b. Control of corrosion
   c. Newer Nanomaterials for specific applications
5. Acquire awareness to societal issues on:
   a. Chemical materials utility and their impact.
   b. Quality of water.
   c. Phenomenon of corrosion.
6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:
   a. Green computing
   b. Green construction
   c. Green manufacturing systems

DETAILED SYLLABUS:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.

Conducting Polymers – Definition, types of conducting polymers and their engineering applications. **Composites** – Introduction, advantages of composites, constituents of composites, types of composites, applications of composites. **Sensors** - Introduction, types of sensors, electrochemical sensors, applications. **Insulators** – Definition, characteristic properties of insulators and classification of insulators.

UNIT–II: WATER TECHNOLOGY (15 periods)

Introduction, types of water, impurities in water and their consequences. Hardness of water, units of hardness, measurement of hardness by EDTA method, disadvantages of hardness. Softening methods – Ion exchange process, Zeolite process-Municipal water treatment. Boiler Troubles. Desalination of brackish water by Electro dialysis and Reverse osmosis. Numerical problems on measurement of hardness of water.

UNIT–III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst's equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, H_2 – O_2 fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT–IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY (17 periods)

Nano Chemistry: Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

Green Chemistry: Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems.

Total periods: 85

TEXT BOOKS:

1. P.C.Jain & Monika Jain*, Engineering Chemistry,* Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah *Engineering Chemistry,* Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2013.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, *Hand book of Nanostructured materials and Nanotechnology,* New Age international publishers, 2nd edition, 2010.
2. Paul T. Anastas, John C Warner, *Green Chemistry: Theory and practice,* Oxford University Press, 2000.

B.Tech. I Year

14BT1BS03 **: ENGINEERING MATHEMATICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas , surfaces and volumes of revolutions.
3. Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton's Law of cooling and heat transfer.
4. Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

DETAILED SYLLABUS:

UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS (20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton's Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for Q(x) = e^{ax}, *sin ax*, *cos ax*, x^n, e^{ax} *V(x)*, *x V(x)*. Method of variation of parameters . Applications to L-R-C circuits.

UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES (22 periods)

Functions of two or more variables – Homogeneous functions – total derivatives – derivatives of implicit function – Jacobian – maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers. Radius ,centre and circle of curvature, tracing of curves in cartesian, parametric and polar forms.

UNIT-III: APPLICATIONS OF INTEGRATION (18 periods)

Applications of integration to – length of curves, area of surfaces of revolution and volume of solids of revolution – Double integrals – change of variables and change of order of integration. Evaluation of Triple integrals -volume as double integral.

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS (20 periods)

Laplace transforms of standard functions – Properties of Laplace transforms–First and second shifting Theorems. Laplace transforms of derivatives and integrals–Laplace transforms of periodic functions – Unit step function – Dirac delta function – Inverse transforms–Convolution theorem. Applications of Laplace transforms to linear differential equations with constant coefficients.

UNIT-V : VECTOR CALCULUS (20 periods)

Vector differentiation – gradient, divergence, curl and vector identities. Laplacian Operator. **Vector integration**: Line integrals independent of path – work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals. Verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

Total periods: 100

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, *Engineering Mathematics,* Vol. 1, S. Chand & Company, 12thedition, 2013.

REFERENCE BOOKS:

1. Grewal, B.S., *Higher Engineering Mathematics*, Khanna Publishers, 42nd edition, 2012.
2. Kreyszig, E., *Advanced Engineering Mathematics*, John Wiley and Sons, 8th edition, 2006.

B.Tech. I Year

14BT1BS04 **: MATHEMATICAL METHODS**

(Common to CSE, CSSE, IT, ECE, EIE and EEE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: This course deals with obtaining the numerical solutions for algebraic and transcendental equations. Fundamentals of matrix theory including introduction to Eigen values, Cayley-Hamilton's theorem, numerical solutions to differential equations, transformation techniques for solving engineering problems and applications of partial differential equations are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire basic knowledge in
   (a) solving linear equations through matrix methods.
   (b) solving algebraic and transcendental equations by various mathematical methods.
   (c) fitting of various types of curves to the given data
   (d) finding the numerical values to derivatives and integrals through different mathematical methods.
   (e) solving differential equations numerically through various methods.
   (f) solving difference equations using z –transforms.
2. Develop analytical skills in
   (a) evaluating the properties of functions through Fourier series and Fourier transforms.
   (b) solving boundary value problems in engineering using Fourier transform
3. Design novel mathematical methods for
   (a) fitting geometrical curves to the given data.
   (b) for solving the differential equations.
   (c) the problems involving heat transformations.
   (d) constructing the interpolating polynomials to the given data and drawing inferences.

DETAILED SYLLABUS:

UNIT–I: MATRIX THEORY AND APPLICATIONS (20 periods)

Rank of a matrix, echelon form, normal form, inverse of a matrix by normal form. Homogenous and non-homogenous linear systems, consistency and solutions of linear system of equations. Solutions of equations by Gauss elimination method. Eigen values, Eigen vectors and properties. Cayley– Hamilton Theorem (without proof), inverse and powers of a matrix using Cayley– Hamilton Theorem, diagonalization of a matrix, quadratic forms, nature of quadratic form and reduction of quadratic form to its normal form.

UNIT-II: NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION (19 periods)

Solutions of Algebraic and Transcendental equations by bisection method, Regula – Falsi method, Newton – Raphson method. Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves. Interpolation, forward difference operator, backward difference operator, central difference operator. Relationship between different operators. Interpolation using Newton's forward formula, Newton's backward formula, Lagrange's interpolation formula.

UNIT-III:

NUMERICAL DIFFERENTIATION AND INTEGRATION, SOLUTIONS OF O D E (20 periods)

Numerical differentiation using Newton's forward formula, Newton's backward formula. Numerical integration using trapezoidal rule, Simpsons 1/3 rule, Simpsons 3/8 rule. Numerical solutions of first order ordinary differential equations using Taylor series, Euler's method modified Euler's method, Runge – Kutta method (4^{th} order only).

UNIT-IV : TRANSFORMATION TECHNIQUES (25 periods)

Fourier series , Dirichlets conditions, determination of Fourier coefficients (Euler's formulae), even and odd functions. Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, inverse transforms. Z – transforms, inverse Z– transform, properties, damping rule, shifting rule, initial and final value theorems. Convolution theorem, solution of difference equations by Z– transforms.

UNIT – V: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS (16 periods)

Formation of partial differential equations . Method of separation of variables for second order partial differential equations – solutions of one dimensional wave equation – heat equation -Laplace equation.

Total periods: 100

TEXTBOOK:

1. T.K.V. Iyenger, B. Krishna Gandhi, S. Ranganadham and M.V.S.S.N. Prasad, *Mathematical Methods,* S.Chand and Company, 8^{th} edition, 2013.

REFERENCE BOOKS:

1. B.S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 42^{nd} edition, 2012.
2. S.S.Sastry, *Introductory Methods of Numerical Analysis*, Prentice Hall of India, 4^{th} edition, 2005.

B.Tech. I Year

14BT1ES01**: PROGRAMMING IN C & DATA STRUCTURES**

(Common to ECE, EEE, EIE, ME and CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Nil

COURSE DESCRIPTION: This course deals with fundamentals of programming in C language such as syntax of C, mechanisms of input and output processing, derived data types like arrays, strings and pointers. Also file in C and data structures are discussed.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Gain knowledge on developing algorithms and programming techniques.
2. Gain analytical skills on
    a. Searching and sorting
    b. File management functions.
    c. Various Data Structures
3. Design various applications using basic data structures like linked list, stacks and queues
4. Gain competence to represent and solve real time problems using tree data structures.

DETAILED SYLLABUS:

Unit-I: (15 periods)

Programming Languages- Compiler, Interpreter, Loader, and Linker- Program execution- Classification of programming-Algorithms and flowcharts .

Basics of C: Introduction, Standardizations of C language, Developing Programs in C, Structure of C program, Variables, Data Types, Declaration, Token, Operators and expressions, L values and R values, Type Conversion in C.

Unit-II: (20 periods)

Input and Output: Basic screen and key board I/O in C , Non formatted input and output , Formatted Input and output. Control Statements: Specifying Test Condition for Selection and Iteration, Writing Test Expressions, Conditional Execution and Selection, Iterative and Repetitive Execution, GOTO Statement, Special Control statements, Nested loops.

Unit-III: (20 periods)

Arrays and Strings: One dimensional Array, Strings: One-Dimensional Character Arrays, Multidimensional Arrays, Arrays of Strings. Functions: Concept of function, Call by Value Mechanism, passing arrays to Functions, Scope and extent, Storage classes, Inline function, Recursion, Searching and sorting.

Unit-IV: (25 periods)

Pointers: Introduction, Understanding Memory Address, Address Operators, pointer, Void pointer, Null pointer, use of pointers, arrays and pointers, Pointer and strings, pointer arithmetic, pointers to pointers, pointer to arrays, Pointers to functions, Dynamic memory allocation, Pointer and const Qualifier. User-defined data types and variables: Structures, union, Enumerations types, Bitfields.

Files in C: Working with text files, Binary files, Random Access files, other file management functions, Command line arguments, C preprocessor, Type qualifier.

Unit-V: (20 periods)

Linked Lists: Singly Linked Lists, Circular Linked lists, Doubly Linked list Applications of Linked Lists. Stacks and Applications, Queues, Other Variations of Queues, Applications, Tree-Binary tree, Traversals, Kinds of binary tress, Binary Search tree, Application of tree

Total periods: 100

TEXT BOOK:

1. PradipDey and Manas Ghosh, *Programming in C*, 2nd edition, Oxford University Press, New Delhi, 2007

REFERENCE BOOKS:

1. D. Samanta, *Classic Data Structures*, 2nd edition, PHI Learning, New Delhi, 2004
2. Behrouz A. Forouzan and Richard F. Gilberg, *A Structured Programming Approach using C*, 3rd edition, Cengage Learning, New Delhi, 2007.

B.Tech. I Year

14BT1ES03**: COMPUTER AIDED ENGINEERING DRAWING**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	1	3	3

PREREQUISITE: Nil

COURSE DESCRIPTION: This course deals with the concepts of computer-aided sketching, and orthographic and isometric projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES: After completion of the course, a successful student is able to :

1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general audience.

DETAILED SYLLABUS:

UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING (20 periods)

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, Different types of lines, Material conventions and free hand practicing, Definitions of Principle planes and other planes. Computer screen, layout of the software, Creation of 2D/3D environment, Selection of drawing size and scale, Standard tool bar/menus, Coordinate system, and description of most commonly used toolbars, Navigational tools, Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS (20 periods)

Introduction, Definitions- Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), Projection of lines inclined to one plane, inclined to both the planes, finding true lengths and true inclinations (No application problems).

UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES (20 periods)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS (20 periods)

Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS (20 periods)

Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.

Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts.

Total periods: 100

TEXT BOOKS:

1. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, *Engineering Graphics with Auto CAD*, PHI Learning Private Limited, Revised Edition, August 2010.
2. N D Bhat & V M Panchal, *Engineering Drawing,* Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, *AutoCAD 2013 For Engineers And Designers,* Dreamtech Press, 2013
2. T Jeyapoovan, *Engineering Drawing and Graphics Using Autocad,* Vikas Publishing House, 3rd Edition, 2010.
3. Jolhe, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2007.
4. Basant Aggarwal, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

B.Tech. I Year

14BT1BS05: **ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wave length of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:

After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.

Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of P^H of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments :

Engineering Physics:

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
4. Characteristics of LED source.
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee's method
9. Melde's experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
12. Characteristics of laser source.
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum

Engineering Chemistry:

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Conductometric titration of strong acid Vs strong base
6. Determination of P^H of a given solution by P^H metry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
10. Synthesis of Nano metal-oxide using sol– gel process.
11. Determination of the capacity of the given cation-exchange Resin.
12. Measurement of viscosity by Redwood viscometer.

Duration: 3 Periods for each experiment

TEXT BOOKS:

1. *Physics Laboratory Manual*
2. K. Mukkanti, *Practical Engineering Chemistry*, BS Publications, 2013.
3. K.N. Jayaveera, K.B. Chandra Sekhar, *Chemistry laboratory manual,* S.M. Enterprises Limited, 2013.

B.Tech. I Year

14BT1ES04**: PROGRAMMING IN C & DATA STRUCTURES LAB**

(Common to ECE, EEE, EIE, ME and CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION: This course provides programming practice in C language specifically syntax of C, input-output processing, derived data types, file processing, and data structures.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Design, code, test, debug and execute programs in C.
2. Implement and use common features found in C programs – arrays, pointers, strings, stacks and queues.
3. Select the appropriate data structure and algorithm design method for a specified problem.

Week 1:

a. Write a C program to print the string "SVEC" at four corners and center of the screen using single printf statement.

b. Mr. Gupta deposits Rs.1000 in a bank. The bank gives simple interest of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I=PTR/100)

c. Write a program to exchange the values of two variables without using the third variable.

Week 2:

a. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

b. In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.

c. Assume that any month is of 30 days. Input total days through keyboard. Find out the exact number of Years, Months & Days.

Week-3

a. Write a program that reads in a number, then reads in a single digit and determines whether the first number contains the digit. If it does, the program should display how many times the digit occurs in the number.

b. Write a program to print Pythagoras triplets a = m* n , b=$(n^2 + m^2)/2$, c=$(n^2-m^2)/2$ where m = 1,3, 5 ……; n = m + 2, m + 4 ……

c. Write a program to produce the following pattern:

a.
```
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7
1 2 3 4 5 6
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

b.
```
1 2 3 4 5 6 7 8 9 10
  2 3 4 5 6 7 8 9 10
    3 4 5 6 7 8 9 10
      4 5 6 7 8 9 10
        5 6 7 8 9 10
          6 7 8 9 10
            7 8 9 10
              8 9 10
                9 10
                  10
```

Week-4

a. Write a C program to generate Pascal's triangle.

b. Write a C program to construct a pyramid of numbers.

Week-5

a. The formula used to calculate the amount of interest on a bank account that compounds interest daily is

$$i = p\,(1 + r)^d - p$$

where:
i is the total interest earned,
p is the principal (the amount originally deposited in the account),
r is the rate of interest as a decimal less than 1 (for example, 15 percent is expressed as 0.15), and
d is the number of days the money is earning interest.
Write a program that accepts values for p, r and d and calculates the interest earned.

b. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127

c. Write a C program to convert a given decimal number into its equivalent
   i. Binary Number
   ii. Octal Number
   iii. Hexadecimal Number
   iv. Quinary Number(base 5)

Week-6

a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %, use switch statement)
b. Write a program to find the sum of individual digits of a positive integer.
c. A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.
d. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to find the largest and smallest number in a list of integers.
b. Write a program to perform the following:
   i) Addition of two matrices.
   ii) Multiplication of two matrices.

Week-8

a. Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
b. Write a C program to determine if the given string is a palindrome or not
c. Write a C Program to implement all string operations.
   1. Find the length of string 2. Reverse the string.
   3. Comparing the two strings. 4. Copy the string .

Week -9:

a. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 10:

a. Write a C program to count the lines, words and characters in a given text.
b. Write a program that simulates a password entry.
c. Write a program to read a five letter word and generate all possible combinations of two-letter words using those five letters.

Week 11:

Write a program to perform the following:
i) Linear search ii) Binary search

Week 12:

Write a program to perform the following:
i) Selection sort ii) Insertion sort
iii) merge Sort iv) Quick sort

Week 13:

Write programs to perform the following using recursion

i) To find the factorial of a given integer.

ii)To solve Towers of Hanoi problem

Week-14

a. Write a C Program to return a substring from a main string using pointers.

b. Write a C program to return character frequency count in a text using pointers

Week-15

a. Write a C program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

b. Write a Program to enter records of students display in sorted order according to ID number.

c. Define a structure to store employee's data with the following specifications:
Employee-Number, Employee-Name, Basic pay, Date of Joining

i) Write a function to store 10 employee details.

ii) Write a function to implement the following rules while revising the basic pay.
If Basic pay <= Rs.5000 then increase it by 15%.
If Basic pay > Rs.5000 and <= Rs.25000 then it increase by 10%.
If Basic pay > Rs.25000 then there is no change in basic pay.

iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

Week-16

a. Write a program which copies one text file to another.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

c. Consider the following text file:

Input File:

S.No.	Customer_ID	Item No.	Qty.	Price Per Item (Rs.)
1.	C01	I1	2	10
2.	C02	I2	5	50
3.	C03	I2	5	50
4.	C04	I4	10	10

S.V. PROVISION STORES
TIRUPATI
Customer_ID: C01 Date: 12-08-2010

Item	Qty	Price
I1	2	20
Total		20

Week - 17:

Write a program to implement the following operations on Singly Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week -18:

Write a program to implement the following operations on Circular Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week -19 :

Write a program to implement the following operations on Doubly Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week- 20:

Write a program to implement stack operations using:

i) Arrays ii) Pointers

Week -21 :

Write a program to implement linear queue operations using:

i) Arrays ii) Pointers

Week -22:

a) Write a program to implement circular queue operations using arrays
b) Write a program to implement traversals of a Binary tree
   i. Preorder ii. Post order iii. Inorder

Week- 23

Write a program to implement insertion and deletion in a binary search tree.

REFERENCE BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "**A Structured Programming Approach using C**," Third Edition, Cengage Learning, New Delhi, 2007.
2. PradipDey and Manas Ghosh, "**Programming in C**", Second Edition, Oxford University Press, New Delhi, 2007
3. D. Samanta, "**Classic Data Structures**", Second Edition, PHI Learning, New Delhi, 2004.

B.Tech. I Year

14BT1ES06**: ENGINEERING & IT WORKSHOP**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

After completion of the course, a successful student is able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a) Carpentry Shop : Cross lap joint, mortise and tenon, T-joint, dove tail joint.

b) Fitting Shop : Square fit and V-fit, semi circular fit, dove tail fit.

c) Sheet Metal Shop : Trapezoidal tray, square tin, funnel, cylinder.

d) House wiring : Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.

(e) Foundry : Preparation of casting using single piece pattern, Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) Welding
b) Metal Cutting
c) Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

TWORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

I

b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources.

Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.

Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.

Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.

Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, *Engineering Work shop practice,* VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, *Work shop Manua***l**, SciTech Publishers, 2009.
3. K. Venkata Reddy, *Workshop Practice Manual, B*S Publications, 2008

IT WORKSHOP:

1. Vikas Gupta, *Comdex Information Technology Course Tool Kit,* 2nd edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, *Introduction to Information Technology*, 2nd edition, Pearson Education, New Delhi, 2005.
3. *IT Workshop Laboratory Manual,* Department of IT, SVEC, 2014.

B.Tech. I Year

14BT1HS02: **ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which are classified into software based learning, grammar and activities. English Speech Sounds and Phonemic Transcription, Word Stress and Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features, Vocabulary Building, are aided by software. Grammar sessions include Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays, Telephonic Etiquette, Listening Skills, Describing People, Places and Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to

1. Gain practical knowledge in
   - English Speech Sounds
   - Stress Patterns in word and sentence
   - Intonation Patterns
   - Paralinguistic Features
   - Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts.
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.
6. Demonstrate various language functions by participating in
   - Just A Minute
   - Impromptu Speech
   - Elocution
   - Role Plays
   - Presentations
7. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes c. Idioms and Phrases–Homophones–Homonyms–Homographs.
6. Functional Grammar
   a. Parts of Speech b. Tenses
   c. Change of Speech d. Change of Voice
   e. Word Order and Error Correction f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India.

II B.Tech. I Semester
14BT3BS02:SPECIAL FUNCTIONS AND COMPLEX ANALYSIS
(Common to ECE, EEE, and EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Mathematics

COURSE DESCRIPTION: Beta, Gamma functions and their properties; Limits and continuity of functions, analyticity of complex functions; Integration, power series, singularities, residues; conformal mapping with applications.

COURSE OUTCOMES: On successful completion of the course, the student will be able to

1. acquire knowledge in
   - beta and Gamma functions
   - expressing complex functions in power series
   - differentiation and integration of complex functions
   - conformal mappings and bilinear transformations
   - Expressing complex functions in terms of graphs and power series
2. develop analytical skills in providing solutions for problems involving
   - fluid, Electrical and Magnetic Potential functions
   - integration of complex functions
   - improper real integrals
3. develop skills in analyzing
   - the properties exhibited by complex functions in Argand plane.
   - the properties of complex functions by expressing them in power series and graphs.
   - properties of improper integrals through residue theory.

DETAILED SYLLABUS:

UNIT-I: SPECIAL FUNCTIONS (10 periods)

Beta and gamma functions - properties - relationship between beta and gamma functions. Applications - evaluation of improper integrals using beta and gamma functions. Bessel function - generating function (without proof) - recurrence relations - orthogonality.

UNIT-II: ANALYTIC FUNCTIONS (10 periods)

Function of a complex variable - limits and continuity of functions. Differentiability - analyticity, Cauchy - Riemann equations (both cartesian and polar). Conjugate and harmonic conjugate functions - Milne Thompson method. Potential functions.

UNIT-III: COMPLEX INTEGRATION AND POWER SERIES (08 periods)

Line integral - Evaluation of line integrals along curves and closed contours - Cauchy's Integral theorem (without proof) - Cauchy's integral formula - Derivatives of analytic function - Generalized integral formula- Evaluation of integrals using integral formula. Taylor's theorem (without proof) - Laurent's theorem (without proof) - Power series expansion of complex functions.

UNIT-IV: RESIDUE THEOREM - APPLICATIONS (09 periods)

Zeros and Singularities - Types of singularities - Residues - Evaluation of Residues at poles - Pole of order m and pole at infinity - Residue theorem - Evaluation of integrals using residue theorem - Evaluation of improper and real integrals of the type:

i) $\int_0^{2\pi} f(\cos\theta, \sin\theta)\, d\theta$ **ii)** $\int_{-\infty}^{\infty} f(x)\, dx$ **iii)** $\int_{-\infty}^{\infty} e^{imx} f(x)\, dx$

UNIT-V: CONFORMAL MAPPINGS (08 periods)

Definition, examples and mappings defined by Translation, Rotation, Inversion. Bilinear transformation - Properties - Fixed points, Cross ratio. Invariance of circles under bilinear transformation. Determination of bilinear transformation using three given points.

Total periods: 45

TEXT BOOKS:

1.T.K.V. Iyenger, B. Krishna Gandhi,...et. al. *Text book of Engineering Mathematics*, Vol - III, S. Chand & Company, 8**th** edition, 2011.

REFERENCE BOOKS:

1.Grewal, B.S, *Higher Engineering Mathematics*, Khanna Publishers, Delhi, 42**nd** edition, 2012.

2.Shahnaz Bathul, *Special Functions and Complex Variables*, PHI Learning, 2**nd** edition, 2010.

II B.Tech. I Semester

14BT3HS01: **ENVIRONMENTAL SCIENCES**

(Common to ECE, EEE & EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Physics and Engineering Chemistry

COURSE DESCRIPTION: Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES : On successful completion of this course, the students will be able to

1. acquire knowledge in
   - diverse components of environment and natural resources
   - ecosystem and biodiversity & its conservation methods
   - population growth and human health
   - green technology
2. identify and resolve the issues related to sources of different types of pollutions.
3. provide solutions to individuals, industries and government for stainable development of natural resources.
4. create awareness on environmental degradation and to bring best management practices to protect environment.
5. develop skills in analyzing reports on environment for sustainable development.
6. apply environmental ethics in protection of diversified ecosystems.

DETAILED SYLLABUS: (11 periods)

UNIT - I: MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES

Multidisciplinary nature of environment: Definition, scope and importance of multidisciplinary nature of environment, segments of environment -lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness.

Natural Resources: Renewable and Non-renewable resources and associated problems - (a) forest resources: use and over exploitation, deforestation - causes, effects and remedies, case studies, (b) water resources - use and over utilization of surface & ground water, conflicts over water - benefits and problems of large dams, case studies, (c) mineral resources - mining, adverse effects, case studies (d) food resources -world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer - pesticide problem, water logging and salinity, case studies (e)energy resources - growing needs, renewable energy resources - solar, wind, hydropower, hydrogen fuel and non-renewable energy resources - coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT - II: ECOSYSTEMS AND BIODIVERSITY (10 periods)

Ecosystems: Definition and concept of an ecosystem, structure and function of an ecosystem - producers, consumers and decomposers, food chains, food webs and ecological pyramids - introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem - ponds, lakes & oceans, energy flow in the ecosystem, ecological succession. Biodiversity: Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity - habitat loss, poaching of wildlife, man-wild life conflicts, endemic, endangered and extinct species of India, conservation of biodiversity-in-situ and ex-situ.

UNIT - III: ENVIRONMETAL POLLUTION AND CONTROL (08 periods)

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management - causes, effects and control measures of urban and industrial wastes, hazards and disaster management - floods, earthquakes, tsunamis, case studies.

UNIT - IV: SOCIAL ISSUES AND THE ENVIRONMENT (08 periods)

From unsustainable to sustainable development, urban problems related to energy, environmental ethics - issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

UNIT - V: HUMAN POPULATION AND THE ENVIRONMENT (08 periods)

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies. Field work: visit to a local area to document environmental assets – pond / forest / grassland / hill / mountain / Environment Impact Assessment procedures for local environmental issues or assignment/seminar.

Total periods: 45

TEXT BOOKS:

1. A.Kaushik and C.P. Kaushik, *Environmental Studies*, New Age nternational (P) Ltd Publications, 4**th** Edition, 2014**.**
2. Erach Barucha, *Environmental Studies, Orient Blackswan*, 2**nd** Edition, 2013.

REFERENCE BOOKS:

1. R. Rajagopalan, *Environmental Studies*, Oxford University Press, 2**nd** Edition, 2011.
2. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2**nd** Edition, 2009.
3. Dr. B S Chauhan, *Environmental Studies*, University Science Press, 1**st** Edition, 2008.
4. M. Anji Reddy, Textbook of *Environmental Sciences and Technology*, BS Publications, 2007.
5. Larry W Canter, *Environmental Impact Assessment*, McGraw-Hill Education, 2**nd** edition, 1996.

II B.Tech. I Semester
14BT30201: **ELECTROMAGNETIC FIELDS**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Mathematics, Engineering Physics

COURSE DESCRIPTION: Static electric fields; Gauss's law and its applications; Potential and Potential Gradient; steady magnetic fields; Ampere's circuital law and its applications; force in magnetic fields; behavior of various materials in electric and magnetic fields; inductance and capacitance calculations; Maxwell's equations for both time variant and time invariant fields.

COURSE OUTCOMES: on successful completion of the course, student will be able to

1. demonstrate knowledge on:
   - static electric fields due to electric charges
   - static magnetic fields due to steady currents
   - time varying electric and magnetic fields
2. analyze the Maxwell's equations for both time variant and time invariant electric and magnetic fields.
3. evaluate
   - electric field and capacitance by applying Gauss's law.
   - Magnetic field and inductance by applying Ampere's circuital law.
4. apply various laws of electromagnetics to investigate the performance of electric machines.

DETAILED SYLLABUS:

UNIT - I: ELECTROSTATICS - I (09 periods)

Introduction to electrostatic fields, coulomb's law in vector form, electric field intensity (EFI), EFI due to various charge distributions, electric flux density, Gauss's law, application of Gauss's law - symmetrical charge distributions, differential volume element, Divergence theorem, Maxwell's first equation in point and integral form. Energy expended in moving a point charge in an electric field, electric potential, potential for different charge distributions, potential gradient, Maxwell's second equation in point and integral form - numerical problems.

UNIT - II: ELECTROSTATICS - II (09 periods)

Electric Dipole, Dipole moment, Potential and EFI due to an electric Dipole. Current density, conduction and convection current density, Ohm's law in point form, current continuity equation, Conductors and Dielectric materials, properties, boundary conditions between conductor and dielectric material, two perfect dielectric materials, law of refraction, polarization, capacitance, capacitance of a parallel plate capacitor (with and without composite dielectric), energy density in electrostatic field - numerical problems.

UNIT - III: MAGNETOSTATICS (10 periods)

Introduction to Magnetic fields, relation between Magnetic flux density and Magnetic Field Intensity (MFI), Biot-Savart's law, MFI due to various current carrying elements, Ampere's Circuital law, Maxwell's third equation in point and integral form, Stoke's theorem, applications of Ampere's Circuital law - infinite line current, infinite sheet of current, infinitely long co-axial transmission line, solenoid and toroid. Maxwell's fourth equation in point and integral form. Scalar magnetic potential and vector magnetic potential - numerical problems.

UNIT - IV: FORCE IN MAGNETIC FIELDS (09 periods)

Force due to magnetic fields, Lorentz force equation, force on a straight and long current carrying conductor in a magnetic field, force between two straight long and parallel current carrying conductors. Magnetic dipole and dipole moment, torque on a current loop placed in a magnetic field, magnetization, magnetic materials, magnetic boundary conditions between different magnetic materials, self-inductance of a solenoid, toroid, co-axial cable and two wire transmission line, energy density in magnetic field - numerical problems.

UNIT - V: TIME VARYING FIELDS (08 periods)

Introduction to time varying fields, Faraday's laws of electromagnetic induction, statically and dynamically induced EMF, concept of displacement current, modifications of Maxwell's equations for time varying fields, poynting theorem - numerical problems.

Total periods: 45

TEXT BOOKS:

1. William H. Hayt and John A. Buck, *Engineering Electromagnetics*, McGraw Hill Education (India) Pvt. Ltd., 8th edition, 2014.
2. Matthew N.O. Sadiku, *Principles of Electromagnetics*, Oxford University Press, New Delhi, 4th edition, 2007.

REFERENCE BOOKS:

1. Gangadhar K.A. and Ramanathan P.M., *Electromagnetic Field Theory*, Khanna Publishers, New Delhi, 2011.
2. Joseph A. Edminister, *Theory and Problems of Electromagnetics*, Schaum's Outline Series, Tata McGraw Hill Inc., New Delhi, 2009.

II B.Tech. I Semester

14BT30202: **DC MACHINES**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Physics, Engineering Physics and Engineering Chemistry Lab.

COURSE DESCRIPTION: Electromechanical energy conversion; construction, operation, characteristics, performance evaluation and applications of various DC machines.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
   - different types of singly- and multi- excited magnetic field systems.
   - construction, operation and characteristics of DC machines.
   - starting and speed control of DC motors.
   - testing of DC machines.
   - armature reaction and commutation.
   - armature windings for DC machines.
   - starters for DC motors
2. analyze the operation of DC machine for various operating conditions.
3. design armature windings for DC machines and starters for DC motors.
4. evaluate the performance of DC machines.
5. select suitable DC machine for domestic and industrial applications.

DETAILED SYLLABUS:

UNIT - I: ELECTROMECHANICAL ENERGY CONVERSION (08 periods)

Electromechanical Energy Conversion: Forces and torque in magnetic field systems, energy balance, energy and force in a singly-excited magnetic field system, determination of magnetic force, co-energy, multi-excited magnetic field systems.

Fundamentals of DC Machine: Principle and operation of generator and motor, constructional details.

UNIT - II: DC GENERATORS (10 periods)

Armature windings - lap and wave, simplex and multiplex, single layer and multi layer, equalizer rings and dummy coils. Losses - constant, variable and minimization of losses. Calculation of efficiency - condition for maximum efficiency. EMF equation and methods of excitation. Armature reaction - cross magnetizing and de-magnetizing AT/pole, compensating winding. Commutation - reactance voltage, methods of improving commutation - numerical problems.

UNIT - III: CHARACTERISTICS OF DC GENERATORS (09 periods)

Build-up of EMF, critical field resistance and critical speed, causes for failure of self excitation and remedial measures. Internal and external characteristics of shunt, series and compound generators. Applications. Parallel operation of DC generators - conditions for parallel operation, use of equalizer bars and cross connection of field windings, load sharing - numerical problems.

UNIT - IV: DC MOTORS (09 periods)

Back EMF, torque equation. Characteristics and applications of shunt, series and compound motors. Speed control of DC motors (shunt and series) - armature voltage, field flux control and Ward-Leonard methods. 2, 3 and 4-point starters - numerical problems.

UNIT - V: TESTING OF DC MACHINES (09 periods)

Brake test, Swinburne's test, Hopkinson's test, field's test, retardation test, separation of stray losses test - numerical problems.

Total periods: 45

TEXT BOOKS:

1. J. B Gupta, *Theory and performance of Electrical Machines (DCmachines, Poly phase Circuits & AC machines) in SI Units*, S.K. Kataria & Sons, New Delhi,14**th** edition, 2013.
2. I.J. Nagrath& D.P. Kothari, *Electric Machines*, Tata Mc Graw – Hill Publishers, New Delhi,4**th** edition, 2010.

REFERENCE BOOKS:

1. S.K. Bhattacharya, *Electrical Machines*, Tata McGraw Hill Publishers, New Delhi, 4th edition,2014.
2. P.S. Bimbhra, *Electrical Machinery*, Khanna Publishers, Delhi, 7**th** edition, 2011.
3. R.K.Rajput, *Electrical Machines in S.I. Units*, Laxmi Publications (P) Ltd, New Delhi, 15**th** edition,2012.
4. B.L. Theraja and A.K. Theraja, *A Text Book of Electrical Technology in S.I.Units*, Vol.2, S.Chand Company Ltd, New Delhi, 2012.

II B.Tech. I Semester

14BT30203: **ELECTRIC CIRCUITS**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Mathematics and Engineering Physics

COURSE DESCRIPTION: Fundamentals of electric circuit parameters; nodal and mesh analysis;analysis of single phase and polyphase systems; analysis of coupled circuits; network theorems.

COURSE OUTCOMES: On successful completion of this course, students will be able to

1. demonstrate knowledge on
   - voltage and current relationships for various electric elements.
   - network reduction techniques.
   - concepts of 1-phase and 3-phase electric circuits.
   - concepts of magnetic circuits.
   - various network theorems.
2. analyze electric and magnetic circuits.
3. design series and parallel resonant circuits.
4. solve
   - electric circuits for voltage, current and power using conventional techniques and network theorems.
   - Magnetic circuits.

DETAILED SYLLABUS:

UNIT - I: FUNDAMENTALS OF ELECTRIC CIRCUITS (10 periods)

Introduction to the circuit elements, voltage and current relationship for passive elements, independent and dependent sources, Ohm's law, Kirchhoff's laws, current division and voltage division rules, network reduction techniques-series, parallel, series-parallel circuits, star-delta and source transformation, nodal analysis and super node concept, mesh analysis and super mesh concept, dual and duality - problems.

UNIT - II: SINGLE PHASE CIRCUITS (12 periods)

Introduction, types of waveforms (symmetrical and unsymmetrical), basic definitions of AC quantities, determination of average, RMS value, form factor and peak factor for different alternating waveforms, j-notation, phase and phase difference, sinusoidal response of R, L and C, combination of R, L & C circuits, impedance and power triangle, power factor. Resonance, bandwidth and quality factor for series and parallel networks. Current locus diagrams for series R-L and R-C circuits -problems.

UNIT - III: THREE PHASE CIRCUITS (07 periods)

Introduction to polyphase system and its advantages, generation of 3-phase voltages, phase sequence, star and delta connections, relationship between phase and line quantities, analysis and measurement of power in three phase circuits using wattmeters for balanced and unbalanced loads - problems.

UNIT - IV: MAGNETICALLY COUPLED CIRCUITS (06 periods)

Coupled circuits, self and mutual inductance, DOT convention, coefficient of coupling, analysis of magnetic circuits: series, parallel and composite systems, comparison of electrical and magnetic circuits - problems.

UNIT - V: NETWORK THEOREMS (10 periods)

Superposition, Thevenin's, Norton's, Maximum power transfer, Tellegen's, Millman's, reciprocity and compensation theorems for DC and sinusoidal excitations - applications and problems.

Total periods: 45

TEXT BOOKS:

1. A. Chakrabarthi, *Circuit Theory (analysis and synthesis)*, Dhanpat Rai & Co, New Delhi, 6th edition, 2014.
2. Charles KAlexander, Mathew N O Sadiku, *Fundamentals of Electric Circuits*, Tata McGraw hill education Pvt. Ltd, New Delhi, 3rd edition, 2010.

REFERENCE BOOKS:

1. M.E. Van Valkenberg, *Network Analysis*,Pearson Publications, New Delhi, 3rd edition, 2006.
2. W H Hayt, J E Kemmerly, S M Durbin, *Engineering Circuit Analysis*, Tata Mc GrawHill publishing company Ltd., New Delhi, 6th edition, 2008.
3. J.A.Edminister, M.D.Nahvi, *Theory and Problems of Electric Circuits*, Schaum's outline series, Tata McGraw Hill company, New Delhi, 4th edition, 2004.
4. A. Sudhakar Shyammohan S Palli, *Electrical circuits*, Tata McGraw Hill Education private limited, New Delhi, 2nd edition, 2011.
5. Ravish R. Singh, *Electrical Networks*, Tata McGrawHill publishing company Ltd., New Delhi, 2009.

II B.Tech. I Semester

14BT30402: **SEMICONDUCTOR DEVICES AND CIRCUITS**

(Common to ECE, EEE & EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Physics.

COURSE DESCRIPTION: Characteristics of general and special purpose electronic devices; Rectifiers, filters and regulators; Biasing and small signal analysis of BJT and FET.

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate fundamental knowledge in
   - p-n junction diode and its characteristics
   - zener diode and its characteristics
   - rectifiers, Filters and Regulators
   - characteristics of BJT, FET, MOSFET and special purpose electronic devices
2. analyze numerical and analytical problems in
   - rectifiers using Filters
   - regulated Power Supplies
   - transistor biasing circuits and stabilization
   - transistor amplifiers
   - FET biasing circuits and amplifiers
3. design electronic circuits like
   - BJT and FET biasing circuits
   - BJT and FET amplifiers
4. solve engineering problems and arrive at solutions pertaining to electronic circuits.

DETAILED SYLLABUS:

UUNIT - I: PN JUNCTION DIODE, RECTIFIERS AND REGULATORS (12 periods)

PN-Junction Diode: p-n Junctionas a diode, p-n Junction diode equation, Volt-Ampere (V-I) characteristics, temperature dependence of p-n characteristics, diode resistance - static and dynamic resistances, transition and diffusion capacitances, break down mechanisms in semiconductor diodes, Zener diode characteristics.

Rectifiers and Regulators:

Half-Wave rectifier and Full-Wave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter, section filter, comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT - II: BIPOLAR JUNCTION TRANSISTOR, BIASING AND STABILIZATION (09 periods)

Transistor construction, BJT Operation, Transistor currents and their relations, Input and Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications, Transistor Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Base Feedback Bias, Voltage Divider Bias, Bias Stability, Transistor as an amplifier, Thermal Runaway, Problems on biasing circuits.

UNIT - III: SMALL SIGNAL ANALYSIS OF BJT AMPLIFIERS (10 periods)

BJT Modeling, Hybrid Modeling, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Millers Theorem, Analysis of CE, CB and CC configurations using simplified Hybrid Model, Comparison of CB, CE and CC configurations.

UNIT - IV: FIELD EFFECT TRANSISTOR (09 periods)

Construction, Principle of operation and characteristics of JFET and MOSFET (Enhancement & Depletion), Biasing of FET, Small Signal Model of JFET, Common Source and Common Drain Amplifiers using JFET, Generalized FET Amplifier, FET as Voltage Variable Resistor, Comparison of BJT and FET.

UNIT - V: SPECIAL PURPOSE ELECTRONIC DEVICES (05 periods)

Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR). Principle of operation of Schottky, Barrier Diode.

Total periods: 45

TEXT BOOKS:

1. J. Millman, Christos C. Halkias and SatyabrataJit, *Electronic Devices and Circuits*, TMH, 3rd edition, 2010.

REFERENCE BOOKS:

1. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits*, PHI, 10th edition, 2009.
2. David A. Bell, *Electronic Devices and Circuits*, Oxford University press, 5th edition, 2014.
3. S. Salivahanan, N. Suresh Kumar, *Electronic Devices and Circuits*, Mc-Graw Hill, 3rd edition 2013.

II B.Tech. I Semester

14BT30221: **ELECTRIC CIRCUITS LAB**

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITE: Electric circuits

COURSE DESCRIPTION: Verification of network theorems; Determination of Two port network parameters; analysis of AC and DC circuits using PSPICE; determination of resonant frequency in series and parallel RLC circuits.

COURSE OUTCOMES:

On successful completion of the course, student will be able to

1. demonstrate knowledge on
    - identification of various circuit elements and their values.
    - concepts of electrical and magnetic circuits.
2. analyze and relate physical observations and measurements in electric circuits to theoretical principles and theorems.
3. design electric circuits and magnetic circuits.
4. demonstrate skills in
    - obtaining the current locus diagrams.
    - determining the parameters of magnetically coupled circuits.
    - measuring of active and reactive powers.
5. apply PSPICE simulation tool to analyze electrical circuits.
6. function effectively as individual and as member in a team.
7. communicate effectively both oral and written.

LIST OF EXPERIMENTS:

Any EIGHT experiments are to be conducted from Part A

Part-A:ELECTRIC CIRCUITS

1. Verification of KVL and KCL.
2. Mesh and Nodal analysis.
3. Series and Parallel resonance.
4. Current locus diagram of R-L and R-C series circuits.
5. Determination of self and mutual inductance and coefficient of coupling.
6. Measurement of three phase active power and reactive power for balanced loads.
7. Verification of Superposition and Reciprocity theorems.
8. Verification of Thevenin's and Norton's theorem.
9. Verification of Maximum Power transfer theorem for DC and AC excitations.
10. Verification of Millman's and Compensation theorems.
11. Verification of Tellegen's theorem.

Part-B: PSPICE SIMULATION:

1. Simulation of DC circuits
2. Mesh analysis
3. Nodal Analysis
4. Simulation of AC circuits

II B.Tech. I Semester
14BT30421: SEMICONDUCTOR DEVICES AND CIRCUITS LAB

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITE(S): Semiconductor Devices and Circuits

COURSE DESCRIPTION: Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; Transistor and FET characteristics; UJT and SCR characteristics; BJT and FET amplifiers.

COURSE OUTCOMES: On successful completion of this course, the students will be able to:

1. analyze the characteristics of different electronic devices, like
    - diode
    - zener Diode
    - transistor
    - FET and UJT
2. design and analyze the electronic circuits like transistor and FET amplifiers
3. solve engineering problems and arrive at solutions pertaining to electronics.

LIST OF EXPERIMENTS:

PART A:

Electronic Workshop Practice (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs.
2. Identification, Specifications and Testing of Active Devices, Diodes: BJTs, Low-power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.

3.study and operation of

- multimeters (Analog and Digital)
- Function Generator
- Regulated Power Supplies
- CRO.

PART B: (Minimum of 10 experiments to be conducted)

1. Forward and Reverse bias characteristics of PN Junction diode.
2. Zener diode characteristics and Zener as Voltage Regulator.
3. Input and Output characteristics of Transistor in CB Configuration.
4. Input and Output characteristics of Transistor in CE Configuration.
5. Halfwave Rectifier with and without filters.
6. Fullwave Rectifier with and without filters.
7. FET characteristics.
8. Measurement of h-parameters of transistor in CE configurations.
9. Frequency response of CE Amplifier.
10. Frequency response of CC Amplifier.
11. Frequency response of Common Source FET Amplifier.
12. SCR Characteristics.
13. UJT Characteristics.

II B.Tech. II Semester
14BT4HS02: PROFESSIONAL ETHICS
(Common to ECE, EEE & EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRPTION: Engineering Ethics, Moral autonomy and Moral dilemmas - Professional and Ideal Virtues, Professional Responsibility and Moral Leadership - Engineering as Social Experimentation, Conscientiousness and Law of Engineering - Responsibilities and Rights, Whistle Blowing - Global Issues, Managerial Ethics.

COURSE OUTCOMES: On successful completion of this course, the students will be able to

1. apply the principles of ethics to solve engineering problems
2. analyze the problems in the implementation of moral autonomy and resolve through consensus
3. responsible to follow the codes of ethics
4. practice professionalism in Engineering and assess the issues pertaining to moral dilemmas
5. function as a member, consultant, Manager, Advisor and Leader in multi-disciplinary teams
6. write reports without bias and give instructions to follow ethics

DETAILED SYLLABUS:

UNIT - I: ENGINEERING ETHICS (08 periods)

Scope and Aim of Engineering Ethics - Senses of Engineering Ethics - Variety of Moral Issues - Types of Inquiry - Moral Dilemmas - Moral Autonomy- Kohlberg's Theory, Gilligan's theory, Consensus and Controversy.

UNIT - II: PROFESSIONAL IDEALS AND VIRTUES (10 periods)

Theories about Virtues, Professions, Professionalism - characteristics, expectations, Professional Responsibility, Integrity, Self-respect, Sense of "Responsibility". Self-interest, Customs and Religion - Self-interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories - resolving moral dilemmas and moral leadership.

UNIT - III: ENGINEERING AS SOCIAL EXPERIMENTATION (09 periods)

Engineering as experimentation - Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters - Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT - IV: RESPONSIBILITIES AND RIGHTS (09 periods)

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, the bart case, employee rights and discrimination.

UNIT - V: GLOBAL ISSUES (09 periods)

Multinational corporations - Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers - Managerial ethics applied to Engineering Profession, moral leadership.

Total periods: 45

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, *Ethics in Engineering*, 3rd Edition, Tata McGraw-Hill, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, *Engineering Ethics*, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, *Fundamental of Ethics for Scientists and Engineers*, 1st Edition, Oxford University Press, 2001.
3. Charles F. Fledderman, *Engineering Ethics*, Pearson Education, 2004.
4. R. Subramanaian, *Professional Ethics*, Oxford Higher Education, 2013.

II B.Tech. II Semester

14BT40201: SIGNALS AND NETWORKS

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Electric circuits

COURSE DESCRIPTION: Overview of signals and linear systems with continuous-time and discrete-time emphasis; different passive filters; transient analysis of DC and AC circuits; two-port networks and network synthesis.

COURSE OUTCOMES: On successful completion of the course, students will be able to

1. demonstrate knowledge on
   - different types of signal and systems.
   - parameters of two-port networks·
   - transient behavior of various circuits.
   - synthesis of network functions.
2. analyze
   - time variant & time invariant signals and systems.
   - a Two-port network for various network parameters.
   - the transient behavior of the circuits.
3. design
   - different types of filters based on frequency and impedance.
   - two-port network for the given parameters.
4. demonstrate skills to
   - evaluate the response of various linear time invariant signals.
   - evaluate the transient response of a circuit for different excitations.
   - evaluate different synthesis functions.

DETAILED SYLLABUS:

UNIT - I: SIGNALS AND SYSTEMS (09 periods)

Signals: Definition, classification and representation, test signals - unit step, unit impulse, unit ramp and unit exponential. Operation on signals - shifting, scaling and time reversal. Sampling theorem - problems.
Systems: Definition, classification based on linearity, time variance, causality and stability. Response of continuous time system using differential equation method - problems.

UNIT - II: FILTERS (09 periods)

Classification of filters, filter networks, equations of filter networks, classification of pass band & stop band filters, characteristic impedance in pass band & stop band filters, constant k- low pass filter, k- high pass filter, m-derived T-section, band pass filter and band elimination filter.

UNIT - III: TRANSIENT ANALYSIS (10 periods)

DC Transients: Transient response of R-L, R-C and R-L-C series circuits, initial conditions, solution method using differential equation and Laplace transforms response of R-L, R-C and R-L-C networks to unit step excitation - problems. AC Transients: Transient response of R-L, R-C and R-L-C series circuits, initial conditions, solution method using differential equation and Laplace transforms response of R-L, R-C and R-L-C networks to sinusoidal excitation - problems.

UNIT - IV: TWO-PORT NETWORKS (09 periods)

Z-parameters, Y-parameters, ABCD parameters and h-parameters, symmetry and reciprocity property in two-port networks, inter-relationships of different parameters, inter-connection of Two-port networks - problems.

UNIT - V: NETWORK SYNTHESIS (08 periods)

Network Functions, Hurwitz polynomials, positive real function, frequency response of reactive one port, synthesis of reactive one port by Foster's and Cauer method, synthesis of R-L and R-C networks by Foster's and Cauer method - problems.

Total periods: 45

TEXT BOOKS:

1. A Chakrabarthi, *Circuit Theory (Analysis and Synthesis)*, Dhanpat Rai & Co., New Delhi, 1st edition, 2014.
2. A Sudhakar, Shyammohan S Palli, *Circuits and Networks (Analysis and Synthesis)*, McGraw-Hill education Private Limited, New Delhi, 4th edition, 2010.

REFERENCE BOOKS:

1. A. Anand Kumar, signals and systems, *PHI Learning Private Limited*, New Delhi, 2011.
2. Simon Haykin and Barry Van Veen, *Signals and Systems*, John Wiley &Sons Private Limited, New Delhi, 2nd edition, 2008.

II B.Tech. II Semester

14BT40202: GENERATION OF ELECTRIC POWER

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): DC Machines

COURSE DESCRIPTION: Generation of electric power using hydro, thermal, nuclear, gas, diesel and combined operation of different power stations; economic aspects of power generation.

COURSE OUTCOMES: On completion of the course, student will be able to

1.demonstrate knowledge on
- layout of various power plants and their operation.
- combined operation of power stations.
- concept of different types of turbines and their usage in different types of power generation stations.
- economical aspects of power generation.
- Nonconventional energy sources.

2. analyze
- the water power equation.
- load sharing between power stations.

3. develop skills to
- evaluate Tariffs by different methods.
- calculate reserve capacity of hydel power plant using mass curve.

DETAILED SYLLABUS:

UNIT - I: HYDRO POWER STATIONS (08 periods)

Selection of site for hydro electric power station, layout, classification of hydro electric power stations-concept of pumped storage plants, available hydro power, mass curve - numerical problems.

Hydraulic turbines - classification, description of various turbines- impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working principles, specific speed, efficiency - numerical problems.

UNIT - II: STEAM POWER STATIONS (07 periods)

Layout of steam power plant -fuel handling, combustion equipment for steam boilers, fluidized bed combustion, ash handling, dust collectors, boilers, condenser, chimney and cooling towers.

Steam turbines - classification of steam turbines, simple impulse turbine, reaction turbine, comparison between impulse and reaction turbine.

UNIT - III: NUCLEAR POWER STATIONS & COMBINED OPERATION OF DIFFERENT POWER PLANTS (11 periods)

Nuclear power stations - Nuclear fission, chain reaction, site selection, layout of nuclear power station, nuclear reactors - classification, essential components and power, PWR, BWR and breeder reactor.

Combined operation of different power plants - Advantage of combined power plants, load division between power stations, hydro electric plant with steam power plant, run-of-river plant with steam power plant, pumped storage plant with steam power plant or nuclear power plant, coordination of hydro electric and gas turbine stations, coordination of different types of power plants.

UNIT - IV: PEAK LOAD POWER PLANTS & RENEWABLE ENERGY RESOURCES (10 periods)

Diesel engine power plant - introduction, applications, site selection, classification of internal combustion engines, essential components, operation of diesel power plant. Gas turbine Power plants - Gas turbines, site selection, simple gas turbine plant, energy cycle, Layout and essential components of gas turbine power plant. RENEWABLE ENERGY RESOURCES: Solar, wind, ocean and Biomass (Qualitative treatment only). Impacts of renewable energy generation on environment.

UNIT - V: ECONOMIC ASPECTS OF POWER GENERATION AND TARIFF (09 periods)

Introduction, terms and definitions - connected load, maximum demand, load factor, demand factor, diversity factor, plant capacity factor, utilization factor and Plant use factor. Types of loads, load curve, load duration curve, dump power, firm power, prime power, cold reserve, hot reserve, spinning reserve, cost analysis - initial cost, interest and methods of depreciation. Tariffs - simple, flat rate, block rate, maximum demand, two-part, three-part and power factor tariffs - numerical problems.

Total periods: 45

TEXT BOOKS:

1. Wadhwa C. L., Generation, *Distribution and Utilization of Electrical Energy*, New Age International, 2005.
2. R.K.Rajput, *A textbook of power system engineering*, Laxmi Publications (P) Ltd, 1st edition, 2006.

REFERENCE BOOKS:

1. V.K.Mehta and Rohith Mehta, *Principles of Power Systems*, Schand & Company Ltd, New Delhi 2013.
2. Dr. P. N. Modi, Dr. S.M. Seth, *Hydraulics And Fluid Mechanics Including Hydraulics Machines*, Standard Book House, 18th edition, 2011.

II B.Tech. II Semester

14BT40203: ELECTRICAL AND ELECTRONIC MEASUREMENTS

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering physics, Engineering Mathematics, Electric circuits

COURSE DESCRIPTION: Measurement of electrical quantities; construction, working, design, calibration and applications of various measuring instruments, their advantages and its limitations.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
    - various errors and compensation
    - construction, working and testing of various measuring instruments.
    - measurement of various electrical parameters and quantities
2. analyze
    - different types of errors and compensations
    - DC and AC bridges.
3. design extension of meter ranges of various measuring instruments.
4. evaluate various electrical circuit parameters/elements using bridges.
5. apply various measuring instruments in domestic and industrial applications.

DETAILED SYLLABUS:

UNIT - I: MEASUREMENT OF VOLTAGE AND CURRENT (14 periods)

Significance of measurements and methods of measurements, static characteristics, limiting and relative limiting errors, combination of quantities with limiting errors, types of errors. Classification of analog instruments, essential operating forces and systems. D'Arsonaval galvanometer - construction, working, equation of motion (critically damped case only). PMMC and MI instruments - construction, working, torque equation, extensions, errors and compensations, advantages and disadvantages - numerical problems.

UNIT - II: MEASUREMENT OF POWER AND ENERGY (08 periods)

Measurement of power: Power measurements in DC and AC circuits. EDM type wattmeter - construction, working and torque equation, shape of scale, errors and compensations, LPF wattmeter.

Measurement of energy: Single phase induction type energy meter - theory, driving and braking torques, lag adjustment devices, compensations and errors. Three phase energy meter - numerical problems.

UNIT - III: INSTRUMENT TRANSFORMERS AND POWER FACTOR METERS (07 periods)

Current and Potential transformers - construction, theory, phasor diagram, errors, characteristics. Measurement of power using instrument transformers - numerical problems. Power Factor meters - single phase and three phase electrodynamometer (EDM) type.

UNIT - IV: DC AND AC BRIDGES (07 periods)

Measurement of medium resistance - Wheatstone bridge, Measurement of low resistance - Kelvin's double bridge. Measurement of high resistance - loss of charge method - numerical problems.

Measurement of inductance, quality factor - Maxwell's inductance bridge, Hay's bridge, Anderson's bridge, Owens's bridge. Measurement of capacitance and loss angle - Desauty's bridge, Schering bridge, Modified Schering bridge, loss factor. Measurement of frequency - Wien's bridge - numerical problems.

UNIT - V: POTENTIOMETERS, DIGITAL VOLTMETERS AND CRO (09 periods)

POTENTIOMETERS: Basic slide wire potentiometer circuit. D.C Crompton's potentiometer - principle, operation, standardization, applications - numerical Problems. AC Potentiometers: Principle and operation of polar and coordinate types, standardization, applications - numerical Problems.

DIGITAL VOLTMETERS AND CRO: Digital voltmeters and it types (ramp, integrating, successive approximation). Cathode ray oscilloscope, cathode ray tube, time base generator, horizontal and vertical amplifiers, measurement of phase and frequency, lissajous patterns - numerical problems.

Total periods: 45

TEXT BOOKS:

1. A.K.Sawhney, *Electrical & Electronics Measurements & Instrumentation*, Danpat Rai Publishers, 2014.
2. Golding & F.C.Widdis, *Electrical Measurements and Measuring Instruments*, Wheeler Publishers, 5th edition, 1997.

REFERENCE BOOKS:

1. J.B. Gupta, *Electrical Measurements*, S.K. Kataria publishers, 14th edition, 2014.
2. U.A. Bakshi, A. V. Bakshi , *Electrical measurements and Instrumentation*, Kataria and sons, 13th edition, 2009.
3. H S Kalsi, *Electronic Instrumentation*, Tata Mcgraw-Hill companies, 2nd edition, 2009

II B.Tech. II Semester

14BT40204: TRANSFORMERS AND INDUCTION MACHINES

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Electric Circuits, DC Machines.

COURSE DESCRIPTION: Single phase transformers;auto transformer; testing of single phase transformer; three phase transformers; three phase induction motors and their characteristics; circle diagram; starting and speed control methods.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
   - construction and working of transformers, auto transformers and induction machines.
   - testing of transformers and induction machines.
   - speed control of induction motors.
   - parallel operation of transformers.
2. analyze the behavior of transformers and induction machines for various operating conditions.
3. design suitable accessories/techniques for the starting and speed control of induction motors.
4. demonstrate skills in investigating the performance of transformers and induction machines.
5. identify the suitable transformer and induction machine for domestic, agriculture and industrial applications.

DETAILED SYLLABUS:

UNIT - I: SINGLE PHASE TRANSFORMERS (09 periods)

Single phase transformers - working principle, constructional details,types, ideal transformer, EMF equation, operation on no-load and on-load, phasor diagrams, equivalent circuit, losses, efficiency and regulation. Effect of variations of frequency and supply voltage on iron losses - numerical problems.

UNIT - II: TRANSFORMER TESTING AND AUTO TRANSFORMER (09 periods)

OC and SC tests, polarity test, Sumpner's test, predetermination of efficiency and regulation, separation of losses test. All day efficiency.Parallel operation with equal and unequal voltage ratios. Auto transformers - equivalent circuit, comparison with two winding transformers - numerical problems.

UNIT - III: THREE PHASE TRANSFORMERS (09 periods)

Three phase transformers - three-phase connections, star/star, star/delta, delta/star and open delta, third harmonics in phase voltages. Three winding transformers - tertiary windings, determination of Z_p, Z_s and Z_t. OFF-load and ON-load tap changing, Scott connection - numerical problems.

UNIT - IV: THREE PHASE INDUCTION MOTORS (09 periods)

Three phase induction motors - construction details of cage and wound rotor machines, production of rotating magnetic field, principle of operation, rotor EMF and rotor frequency, rotor reactance, rotor current and power factor at standstill and during operation, torque equation, deduction from torque equation - expressions for maximum torque and starting torque, torque-slip characteristics, rotor power input, rotor copper loss and mechanical power developed and their inter relation. Double-cage and deep bar rotors. Equivalent circuit and phasor diagram - numerical problems.

UNIT - V: CIRCLE DIAGRAM, STARTING AND SPEED CONTROL METHODS (09 periods)

No-load and blocked rotor tests, stator resistance test, circle diagram, predetermination of performance. Methods of starting, starting current and torque calculations. Crawling and cogging. Speed control - change of frequency, change of poles, cascade connection, injection of an EMF into rotor circuit (qualitative treatment only). Induction generator - principle of operation - numerical problems.

Total periods: 45

TEXT BOOKS:

1. JB Gupta, *Theory and performance of Electrical Machines (DC machines*, *Poly phase circuits & AC machines) in SI Units*, S.K. Kataria & Sons, New Delhi, 14th edition, 2013.
2. P.S. Bimbhra, *Electrical Machiner*y, Khanna Publishers, New Delhi, 7th dition, 2011.

REFERENCE BOOKS:

1. A.E. Fitzgerald, C.Kingsley and S.Umans, *Electric Machinery*, Mc Graw-Hill, New Delhi, 6th edition, 2008.
2. R.K.Rajput, *Electrical Machines in S.I. Units*, Laxmi Publications (P) Ltd., New Delhi, 15th edition,2012.
3. B.L. Theraja,A.K.Theraja, A text book of *Electrical Technology in SIunits* Vol: 2, S. Chand, New Delhi, 2012.

II B.Tech. II Semester

14BT40405: **SWITCHING THEORY AND LOGIC DESIGN**

(Common to ECE, EEE & EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Basic algebra.

COURSE DESCRIPTION: Number system and Boolean algebra; Minimization; Analysis and synthesis of digital circuits; Asynchronous Sequential Logic & Programmable Memories.

COURSE OUTCOMES:On successful completion of this course, the students will be able to

1. demonstrate knowledge in:
   - conversion of number systems, Binary Codes.
   - basic theorems, properties and postulates of Boolean algebra.
   - minimization of switching functions using Map method and Tabular method.
   - design of combinational and sequential circuits.
   - realization of Boolean functions using PLDs.
2. rerform the analysis of reduction of Boolean function and implementation using PLDs.
3. design and develop various combinational and sequential circuits.
4. solve engineering problems and arrive at solutions pertaining to Digital Electronics.

DETAILED SYLLABUS:

UNIT - I: NUMBER SYSTEM & BOOLEAN ALGEBRA (08 periods)

Digital systems, Binary Numbers, Number base conversions, Complements of numbers, Signed binary numbers, Binary codes, Error detection and correction codes. Boolean Algebra - Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, logical operations & Logic gates.

UNIT - II: GATE LEVEL MINIMIZATION (08 periods)

The map method, four variable, five variable K-map, POS & SOP Simplification, Don't care conditions, NAND & NOR Implementation, Other two level Implementation, Ex-or Function, Tabular Method-Simplification of Boolean function using tabulation Method.

UNIT - III: ANALYSIS AND SYNTHESIS OF COMBINATIONAL CIRCUITS (09 periods)

Combinational circuits, Analysis & Design procedure, Binary Adder - sub tractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers.

UNIT - IV: ANALYSIS AND SYNTHESIS OF SEQUENTIAL CIRCUITS (11 periods)

Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers & Counters - Registers, Shift Registers, Synchronous counters and Asynchronous counters.

UNIT - V: ASYNCHRONOUS SEQUENTIAL LOGIC & PROGRAMMABLE MEMORIES (09 periods)

Introduction, Analysis procedure, Circuits with Latches, Design Procedure, Reduction of State and flow tables, Race-free State Assignment, Hazards. ROM, PLA, PAL.

Total periods: 45

TEXT BOOKS:

1. M.Morris Mano, *Digital Design*, Pearson, 3rd edition, 2001.

REFERENCE BOOKS:

1. ZviKohavi and NirahK.Jha, *Switching theory and Finite Automata Theory*, Tata McGraw-Hill, 2nd Edition, 1978.
2. Charles H. Roth, *Fundamentals of Logic Design*, Thomson Publications, 5th Edition, 2004.
3. A. Anand Kumar, *Switching Theory and Logic Design*, PHI, 2008.

II B.Tech. II Semester
14BT40431: **ANALOG ELECTRONIC CIRCUITS**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Semiconductor Devices and Circuits.

COURSE DESCRIPTION: BJT frequency response; Feedback amplifiers and Oscillators; Power amplifiers; Wave-shaping circuits; Multivibrators.

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate fundamental knowledge in
   - BJT Frequency Response
   - feedback Amplifiers
   - oscillators
   - power Amplifiers
   - wave-shaping circuits
   - multivibrators
2. perform analysis of any electronic circuit.
3. design and develop different circuits like feedback amplifiers, oscillators, power amplifiers and Multivibrators.
4. solve problems arising due to poor circuit design by choosing the appropriate design.

DETAILED SYLLABUS:

UNIT - I: BJT FREQUENCY RESPONSE (09 periods)

Review of BJT simplified hybrid model, analysis of CE amplifier with emitter resistance, emitter follower and RC coupled amplifier. Frequency response of BJT amplifier, analysis at low and high frequencies, effect of coupling and bypass capacitors, The hybrid-pi common-emitter transistor model, CE short circuit current gain, current gain with resistive load, gain-bandwidth product, emitter follower at high frequencies.

UNIT - II: FEEDBACK AMPLIFIERS AND OSCILLATORS (09 periods)

The feedback concept, The transfer gain with feedback, feedback amplifier topologies, general characteristics of negative feedback amplifiers, effect of feedback on input resistance and output resistance - voltage series, voltage shunt, current series and current shunt feedback configuration.

Oscillators: Conditions for oscillations, RC phase shift oscillator, Colpitts, Hartley oscillators, Wein bridge oscillators, crystal oscillator.

UNIT - III: LARGE SIGNAL AMPLIFIERS (08 periods)

Class A amplifiers - series-fed, transformer coupled, efficiency. Second harmonic distortion, higher-order harmonic generation. Class B amplifier, Push pull amplifiers - class A push-pull and class B complementary symmetry push-pull amplifier.

UNIT - IV: (10 periods)

WAVE SHAPING CIRCUITS AND SWITCHING CHARACTERISTICS OF DEVICES

Wave-shaping circuits: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. Diode clippers, clipping at two independent levels, clamping operation, clamping circuits taking source and diode resistances into account, practical clamping circuits.

Switching characteristics of Devices: Diode as a switch, diode forward recovery time, reverse recovery time, transistor as a switch, break down voltages, transistor switching times.

UNIT - V: MULTIVIBRATORS (09 periods)

Bistable multivibrator - Stable states of a bistable multivibrator, fixed bias transistor bistable multivibrator, commutating capacitors, unsymmetrical triggering, symmetrical triggering and Schmitt trigger. Monostable Multivibrator - Monostable multivibrator, collector coupled monostable multivibrator, triggering of the monostable multivibrator. Astable multivibrator - Astable collector coupled multivibrator.

Total periods: 45

TEXT BOOKS:

1. Jacob Milliman, Christors C Halkias, *Integrated Electronics*, Tata McGraw-Hill, 1991.
2. J.Millman and H.Taub, Pulse, *Digital and Switching Waveforms*, McGraw-Hill, 2000.

REFERENCE BOOKS:

1. S.Salivahana, N.Suresh Kumar, *Electronic Devices and Circuits*, Tata McGraw-Hill, 3rd edition, 2012.
2. A.Anand Kumar, *Pulse and Digital Circuits*, Prentice Hall India, 2nd edition, 2008.

II B.Tech. II Semester

14BT40221: **ELECTRICAL MEASUREMENTS AND TESTING LAB**

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITE(S): Electrical and Electronic Measurements

COURSE DESCRIPTION: Measurement of resistance, inductance, capacitance, power and power factor; Testing of single phase energy meter, reverse power relay and transformer oil.

COURSE OUTCOMES: On successful completion of this course, the students will be able to

1. demonstrate knowledge on measurement of electrical parameters.
2. identify various bridges for resistance, inductance and capacitance.
3. develop skills and methods in measurement of power and energy.
4. application of different measuring instruments in the field of electrical engineering.
5. function effectively as individual and as member in a team.
6. present a cohesive and detailed laboratory report.

LIST OF EXPERIMENTS: PART-A:

1. Calibration and testing of single phase energy meter
2. Calibration of dynamometer power factor meter
3. Crompton D.C. Potentiometer - Calibration of PMMC ammeter and PMMC voltmeter
4. Kelvin's double Bridge and Wheatstone's bridge
5. C.T testing by Silsbee's method.
6. Schering bridge & Anderson bridge.
7. Measurement of three phase power using one wattmeter with two no. of C.Ts
8. Measurement of parameters of a choke coil using three voltmeter and three ammeter methods.

Any Four of the experiments to be conducted from PART-B.

1. Measurement of 3-phase active and reactive power.
2. Measurement of earth and insulation resistance.
3. Calibration of LPF wattmeter by phantom loading.
4. Dielectric oil testing using HT testing kit.
5. LVDT and capacitance pickup.
6. Resistance strain gauge.
7. Transformer turns ratio measurement using AC Bridge.
8. AC potentiometer - Calibration of AC voltmeter, parameters of choke.

II B.Tech. II Semester

14BT40222: **DC MACHINES LAB**

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITE(S): DC Machines

COURSE DESCRIPTION: Speed control and performance characteristics of DC Machines; determination of losses in a DC machine.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. identify various parts of DC machine and different types of starters.
2. analyze the performance of various DC machines.
3. design the experimental circuit based on loading and rating of the DC machine.
4. demonstrate skills in
   - obtaining various characteristics of DC machines.
   - determining the performance of DC machines.
   - determining and separating losses in DC machines.
5. function effectively as individual and as member in a team.
6. communicate effectively both oral and written.

LIST OF EXPERIMENTS:

1. Magnetization characteristic of DC shunt generator.
2. Load test on DC shunt generator.
3. Load test on DC series generator.
4. Load test on DC compound generator (cumulative and differential connections).
5. Hopkinson's test.
6. Field's test.
7. Swinburne's test.
8. Speed control of DC shunt motor.
9. Brake test on DC compound motor.
10. Brake test on DC shunt motor.
11. Brake test on DC series motor.
12. Separation of losses in DC shunt machine.

III B.Tech. I Semester

14BT4HS01: **BUSINESS COMMUNICATION AND PRESENTATION SKILLS**

(Common to ECE, EEE & EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Basic grammar and fundamentals of Listening, Speaking, Reading and Writing skills.

COURSE DESCRIPTION: Nature and Scope of Communication; Non-Verbal Communication; Writing Business Documents; Business Presentations and Public Speaking; Careers and Resume.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. acquire knowledge in
   - managerial Communication
   - corporate Communication
   - business Writing
   - presentation Skills
   - career Building
2. analyze and judge the situation through non-verbal communication for effective organizational communication.
3. achieve personal excellence and ability to work in groups.
4. develop effective communication to meet professional needs.

DETAILED SYLLABUS:

UNIT - I: NATURE AND SCOPE OF COMMUNICATION (09 periods)

Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks - Informal Communication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication.

UNIT - II: NON-VERBAL COMMUNICATION (09 periods)

Introduction - Significance of Non-verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non-verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross-cultural Communication Strategies - Corporate Communication: Introduction - Crisis Management / Communication - Case Study.

UNIT - III: WRITING BUSINESS DOCUMENTS (10 periods)

Business Writing: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters - Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT - IV: BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 periods)

Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non-functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT - V: CAREERS AND RESUME (07 periods)

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - Resume Writing: Resume Formats; Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non-verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

Total periods: 45

TEXT BOOK:

1. Meenakshi Raman and Prakash Singh, *Business Communication*, Oxford University Press, New Delhi, 2nd Edition, 2012.

REFERENCE BOOKS:

1. M K Sehgal and VandanaKhetarpal, *Business Communication*, Excel Books, New Delhi, 2011.
2. M Ashraf Rizvi, *Effective Technical Communication*, Tata McGraw-Hill, 2009.

III B.Tech. I Semester

14BT5HS01: **MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY**

(Common to EEE, ECE and EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1.acquire Knowledge in
- tools and concepts of Micro Economics.
- basic Principles and concepts of Accountancy.
- provides life skills for effective utilization of scarce resources.
- financial Accounting.
- using advanced tools like tally and SAP.
- significance of Economics and Accountancy

2. develop skills in analyzing problems for
- managerial decisions of an organization.
- demand & Supply, Production & Cost and Markets & Price through Economic theories.

3. develop effective communication in Business and Accounting transactions.

DETAILED SYLLABUS: (09 periods)

UNIT - I: INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS

Definition, Nature and Scope of Managerial Economics. Demand: Determinants of demand - Demand function - Law of demand, assumptions and exceptions - Elasticity of demand - Types of elasticity of demand -Demand forecasting and methods of demand forecasting, Supply- Determinants of Supply and Supply function.

UNIT - II: THEORY OF PRODUCTION AND COST ANALYSIS (09 periods)

Production Function: Isoquants and Isocosts - Input-output relationship - Law of returns. Cost Concepts: Total, Average and Marginal Cost - Fixed vs. Variable costs - Opportunity Costs Vs Outlay Costs - Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs - Avoidable Costs Vs Unavoidable Costs - Break Even Analysis (BEA) - Assumptions, Merits and demerits - Determination of Break Even Point (Simple problems).

UNIT - III: INTRODUCTION TO MARKETS AND PRICING (09 periods)

Market Structure: Types of Markets - Features of perfect competition - Monopoly and monopolistic competition - Price and Output determination in perfect competition and monopoly.

Pricing : Objectives and policies of pricing - Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - Market penetration - Market skimming - Block pricing - Peak load pricing - Cross subsidization. Capital: Significance - Types of capital - Sources of Capital.

UNIT - IV: INTRODUCTION AND PRINCIPLES OF ACCOUNTING (09 periods)

Accountancy: Introduction - Concepts - Conventions - Accounting Principles - Double Entry Book Keeping - Journal - Ledger - Trial Balance (Simple problems).

UNIT - V : FINAL ACCOUNTS (09 periods)

Introduction to Final Accounts - Trading account - Profit and Loss account and Balance Sheet with simple adjustments (Simple problems). Computerization of Accounting System : Manual Accounting Vs Computerized Accounting - Advantages and Disadvantages of Computerized Accounting.

Total periods: 45

TEXT BOOKS:

1. A.R. Aryasri, *Managerial Economics and Financial Analysis*, Tata Mc-Graw Hill, New Delhi, 3rd edition, 2007. ISBN 13: 9780070078031
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, *Managerial Economics*, S. Chand and Company, New Delhi, 2nd edition, 2010.

REFERENCE BOOKS:

1. Vershaney and Maheswari, *Managerial Economics*, Sultan Chand and Sons, New Delhi, 19th edition, 2005.
2. H. Craig Petersen and W. Cris Levis, *Managerial Economics*, Pearson education, 4th edition, 2009.
3. Lipsy and Chrystel, *Economics*, Oxford University Press, New Delhi, 12th edition, 2011.
4. S.P. Jain and K.L. Narang, *Financial Accounting*, Kalyani Publishers, Ludhiana, 6th edition, 2002.

III B.Tech. I Semester

14BT50201: **CONTROL SYSTEMS**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Electric Circuits

COURSE DESCRIPTION: Concepts of control system; transfer function of various physical systems; time response analysis; frequency response analysis; compensators; stability analysis; state space analysis

COURSE OUTCOMES: On successful completion of this course, the students will be able to

1. demonstrate knowledge on
    - modelling of physical systems
    - time and frequency domain specifications used for stability analysis.
    - various methods of determining the stability of the system
    - realization of various compensators
    - concept of controllability and observability.
2. analyze the stability of the system in time and frequency domains.
3. demonstrate problem solving skills in
    - deriving the transfer function using block diagram reduction technique and signal flow graph.
    - determination of steady state error and static error constants.
    - evaluating the system stability in time and frequency domains.
    - solving the state equations of a system.
    - evaluating controllability and observability of a system.

DETAILED SYLLABUS:

UNIT - I: CONTROL SYSTEMS CONCEPTS (09 periods)

Classification of control systems, effects of feedback. Mathematical models - mechanical and electrical systems, analogous systems. Block diagram reduction methods, signal flow graph, Mason's gain formula, transfer function of DC servo motor, AC servo motor, synchros.

UNIT-II: TIME RESPONSE ANALYSIS (08 periods)

Test signals, time response of first and second order systems, transient response of second order systems, time domain specifications, steady state response, steady state error, error constants and generalized error coefficients, response with proportional, integral and derivative controllers.

UNIT - III: STABILITY ANALYSIS IN TIME DOMAIN (09 periods)

The concept of stability, Routh's stability criterion, difficulties in the formation of Routh table, application of R-H criterion. Root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root loci, relative stability analysis.

UNIT - IV: FREQUENCY RESPONSE ANALYSIS (09 periods)

Frequency domain specifications, Bode plots, determination of frequency domain specifications and transfer function from the Bode plot, stability analysis from Bode plots, Polar plots, phase margin and gain margin. Nyquist stability criterion, stability analysis. Compensation techniques - realization of Lag, Lead and Lag-Lead compensators.

UNIT - V: STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS (10 periods)

Concepts of state, state variables and state model, derivation of state models from physical systems, diagonalization, solution of state equations - state transition matrix and it's properties. Concept of controllability and observability, Kalman's test only.

Total periods: 45

TEXT BOOKS:

1. A. Anand kumar, *Control Systems*, PHI learning Pvt Ltd., 2nd edition, 2014.
2. I. J. Nagrath and M. Gopal, *Control Systems Engineering*, New Age International (P) Limited, 5th edition, 2007.

REFERENCE BOOKS:

1. K. Ogata, *Modern Control Engineering*, Prentice Hall of India, 4th edition, 2006.
2. A. NagoorKani, *Control Systems*, RBA Publications, 2nd edition, 2006.

III B.Tech. I Semester

14BT50202: **COMPUTER ORGANIZATION AND ARCHITECTURE**

(Common to EEE & EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Switching theory and logic design

COURSE DESCRIPTION: Basic structure of computers; register transfer language and microoperations; microprogrammed control; memory system; architecture, programming and interfacing of 8085 microprocessor.

COURSE OUTCOMES: On completion of the course, the student will be able to

1. demonstrate knowledge on
    - internal details of a computer
    - various memories, their hierarchy and significance in a computer
    - architecture, instruction set, addressing modes and interfacing of 8085 microprocessor
2. critically analyze the requirements to meet the specifications.
3. design and develop hardware to meet the requirements.
4. exhibit programming skills to solve engineering problems.

DETAILED SYLLABUS:

UNIT - I: BASIC STRUCTURE OF COMPUTERS AND COMPUTER ARTHMETIC (09 periods)

Basic structure of computers: Computer types, functional units, basic operational concept, bus structures, software, performance, multiprocessors and multicomputers.

Computer arithmetic: Addition, subtraction, multiplication and division algorithms.

UNIT - II:REGISTER TRANSFER AND MICROOPERATIONS (09 periods)

Register transfer language, register transfer, bus and memory transfers, arithmetic micro operations, logic micro operations, shiftmicro operations, arithmetic logic shift unit, instruction codes, computer registers, computer instructions, instruction cycle, Reduced Instruction Set computer.

UNIT - III: MICROPROGRAMMED CONTROL AND MEMORY SYSTEM (10 periods)

Microprogrammed Control: Control memory, address sequencing, design of control unit, hard wired control, microprogrammed control.

Memory System: Semiconductor RAM memories: Internal organization of memory chips, SRAM, DRAM. Read-only memories, cache memory: mapping functions, replacement algorithms.Performance considerations, virtual memory.

UNIT- IV: 8085 ARCHITECTURE (09 periods)

Microprocessor evolution and types, introduction to 8085 architecture, pin description, register organization, timing diagram - T-state, Machine cycle, instruction cycle, instruction set - data transfer, arithmetic and logic, branch control, I/O and machine control instructions, addressing modes.

UNIT- V: PROGRAMMING, INTERRUPTS AND INTERFACING (08 periods)

Simple programs, interrupts of 8085 - types, response, enabling and disabling, interfacing - memory, I/O devices - memory mapped I/O and I/O mapped I/O.

Total periods: 45

TEXT BOOKS:

1. M.Moris Mano, *Computer System Architecture*, Pearson Education, 3rd edition, 2006.
2. Ramesh S Goankar, *Microprocessor - Architecture, Programming and Applications with the 8085*, 5th edition, Penram International Publishing Private Limited.

REFERENCES:

1. V.CarlHamacher, Zvonko G. Varanesic and Safat G. Zaky, *Computer Organization*, 6th edition, Mc Graw Hill.

III B.Tech. I Semester

14BT50203: SYNCHRONOUS MACHINES

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): DC Machines, Transformers and Induction machines

COURSE DESCRIPTION: Construction, operation, characteristics, regulation and parallel operation of alternators; operation and performance characteristics of synchronous motors; construction, operation, characteristics and applications of fractional kilowatt motors.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
   - construction details, working, characteristics and performance of a synchronous machine, fractional kilowatt motors.
   - armature reaction, regulation and synchronization of alternator.
   - starting methods of synchronous motor and its performance evaluation using circlediagrams.
   - Parallel operation of alternators.
2. analyze the operation of synchronous and single phase machines for various operating conditions.
3. evaluate the performance and various parameters of synchronous machine and fractional kW motors.
4. identify a suitable machine for domestic and industrial applications.

DETAILED SYLLABUS:

UNIT - I: SYNCHRONOUS GENERATORS (10 periods)

Constructional features of round rotor and salient pole machines. Armature windings - integral slot and fractional slot, distributed and concentrated, single layer and multi layer, winding factors. EMF equation, harmonics in generated EMF, suppression of harmonics. Armature reaction, leakage reactance, synchronous reactance (X_S) and impedance(Z_S), experimental determination of Z_S, phasor diagrams. Operating characteristics and ratings of alternators - numerical problems.

UNIT - II: REGULATION OF SYNCHRONOUS GENERATOR (08 periods)

Synchronous impedance method (EMF method), ampere turns method (MMF method), ZPF method and new ASA method. Salient pole alternators, two-reaction theory, experimental determination of X_d and X_q (slip test), phasor diagrams, regulation of salient pole alternators. Power flow equations in synchronous generator - numerical problems.

UNIT - III: PARALLEL OPERATION OF SYNCHRONOUS GENERATORS (08 periods)

Methods of synchronizing alternators. Synchronizing current, power and torque. Effect of reactance, change of excitation and mechanical power input, unequal voltages. Load sharing between alternators. Synchronous machines on infinite bus bars. Time period of oscillation - numerical problems.

UNIT - IV: SYNCHRONOUS MOTORS (09 periods)

Principle of operation, phasor diagram, variation of current and power factor with excitation, synchronous condenser, power flow in synchronous motor. Circle diagram - excitation and power circles. Hunting and its suppression. Methods of starting - auxiliary-motor, damper winding, synchronous - induction motor - numerical problems.

UNIT - V: FRACTIONAL KILOWATT MOTORS (10 periods)

Single phase induction motor - constructional features, double revolving field theory, split-phase motors, shaded pole motor. Construction, principle, characteristics and applications of AC series motor, universal motor, reluctance motors, stepper motor (types), AC and DC servo motors.

Total periods: 45

TEXT BOOKS:

1. P.S. Bimbhra, *Electrical Machinery*, Khanna Publishers, New Delhi, 7th edition, 2011.
2. JB Gupta, *Theory and performance of Electrical Machines*, S.K. KATARIA and Sons, New Delhi, 14th edition, 2011.

REFERENCE BOOKS:

1. M.G. Say, *The Performance and Design of A.C.Machines*, CBS publishers, New Delhi, 3rd edition, 2002.
2. P.S. Bimbhra, *Generalized Theory of Electrical Machines*, Khanna Publishers, Delhi, 7th edition, 2005.
3. R.K.Rajput, *Electrical Machines*, Laxmi Publications (P) Ltd, New Delhi, 15th edition, 2012.

III B.Tech. I Semester

14BT50204:**TRANSMISSION OF ELECTRIC POWER**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Electromagnetic Fields, Signals and Networks

COURSE DESCRIPTION: Calculation of Transmission line parameters; classification and performance of transmission lines, corona; travelling wave phenomenon; types of insulators; sag and tension calculations; underground cables.

COURSE OUTCOMES: On sucessfull of the course, student will be able to

1. demonstrate knowledge on
   - per unit system.
   - transmission line configurations and their performance.
   - transients in transmission lines.
   - insulation system for transmission system.
   - corona, classification of cables and their performance.
2. analyze
   - the electrical and mechanical aspects of transmission lines.
   - the capacitance of cable for different configurations.
3. design
   - electrical and mechanical systems to improve the overall performance of transmission lines and cables.
   - insulators.
4. demonstrate skills in
   - evaluating the parameters and performance of transmission lines and cables.
   - evaluating the electrical and mechanical aspects of transmission lines, cables and insulators.

DETAILED SYLLABUS:

UNIT - I: TRANSMISSION LINE PARAMETERS (10 periods)

Per unit system representation of different components and networks, numerical problems. Resistance of transmission lines, inductance of single phase, three phase transmission line - single and double circuit lines. Self GMD and mutual GMD. Capacitance of single phase transmission line, three phase transmission line, effect of earth on capacitance - numerical problems.

UNIT - II: PERFORMANCE OF TRANSMISSION LINES (09 periods)

Classification of transmission lines, short transmission lines and their model representations, medium transmission lines - end condenser, nominal-T, nominal-pie methods. Rigorous solution for long transmission lines, surge impedance and surge impedance loading of long lines, ferranti effect, generalized circuit (ABCD) constants, regulation and efficiency of all types of lines - numerical problems.

UNIT - III: POWER SYSTEM TRANSIENTS (08 periods)

Transients in simple circuits, travelling waves on transmission lines - open end line, short circuited line, line terminated through a resistor, line connected to a cable, line connected to a T-junction and lumped reactive junctions. Beweley's Lattice diagram for all the cases mentioned above - numerical problems.

UNIT - IV: CORONA AND OVER HEAD LINE COMPONENTS (09 periods)

Skin effect, Proximity effect.Corona phenomenon - factors affecting corona, critical voltages and power loss, radio interference, advantages and disadvantages - numerical problems.

Over head transmission line: Line supports - wooden poles, RCC poles, steel poles and steel towers. Over head line insulators - types of insulators, string efficiency and methods for improvement - numerical problems.

UNIT - V: SAG, TENSION CALCULATIONS AND UNDERGROUND CABLES (09 periods)

Sag in over head lines - sag and tension calculations with equal and unequal heights of towers, effect of wind and ice on sag, stringing chart, vibration and vibration dampers - numerical problems.

Underground cables - construction, types of insulating materials, classification of cables, laying of cables, insulation resistance, capacitance of single and 3-core belted cables, grading of cables - capacitance and inter sheath grading - numerical problems.

Total periods: 45

TEXT BOOKS:

1. C.L.Wadhwa, *Electrical Power Systems*, New Age International (P) Limited, publishers, 4th edition, 2006.
2. M.L.Soni, P.V.Gupta, V.S. Bhatnagar, A.Chakravarthy, *A text book on Power System Engineering*, Dhanpat Rai and Co.private Limited, 2009.

REFERENCE BOOKS:

1. V.K.Mehta and Rohith Mehta, *Principles of Power Systems*, S.Chand & Company Ltd, New Delhi,2006.
2. J.B.Gupta, *A Course in Electrical Power*, S.K.Kataria& sons, New Delhi, 11th edition, 2009.
3. R.K.Rajput, *A textbook of Power System Engineering*,Laxmi Publications (P) Ltd, 1st edition, 2006.

III B.Tech. I Semester

14BT51003: **LINEAR AND DIGITAL IC APPLICATIONS**

(Common to EEE & EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Semiconductor Devices & Circuits, Switching Theory & Logic Design

COURSE DESCRIPTION: Op-Amps characteristics, Applications of Op-Amp, 555 timer, PLL; Digital logic families and interfacing, Digital IC Applications, Programming of digital IC's in Verilog.

COURSE OUTCOMES: On successful completion of course, the students will be able to:

1. demonstrate Knowledge on Op-Amps and its Characteristics, Digital logic families, programming in VERILOG.
2. apply analytical skills to determine the op-amp parameters, logic of digital circuits.
3. design Linear and nonlinear systems using op-amps, Digital circuits using logic families.
4. develop skills for programming of digital circuits using VERILOG.

DETAILED SYLLABUS:

UNIT - I: OPERATION AMPLIFIER (09 periods)

Op-amp block diagram, Differential Amplifier, Level Translator, Output stage. Transfer Characteristics, IC 741 op-Amp, Basic information of Op-Amp. Ideal & Practical operational Amplifier - Inverting, non-Inverting & Difference Amplifier, Voltage follower.

DC Characteristics - Input Bias Current, Input Offset Current, Input Offset Voltage, Total Output Offset Voltage. AC Characteristics - Frequency Response, Frequency Compensation, Slew Rate .CMRR, PSRR & Thermal Drift.

UNIT - II: LINEAR & NON LINEAR APPLICATIONS, FILTERS (09 periods)

Linear Applications - Integrator and differentiator, Instrumentation amplifier, AC amplifier, V to I, I to V converters. Non-Linear Applications - Comparators & its applications, Log and Antilog amplifiers. Filters: First-Order LPF, HPF, Butterworth Filters, Second Order LPF, HPF.

UNIT - III: IC 555 TIMER, PLL & CONVERTERS (09 periods) Introduction to 555 timer, functional diagram, monostable and astable operations and applications. PLL - introduction, block schematic, principles and description of individual blocks. Voltage Controlled Oscillator (IC 566). Applications of PLL - frequency multiplication, frequency translation.

D-A Converters: R-2R ladder & Inverted R-2R ladder. A-D converters: Flash type, Successive Approximation type and Dual slope ADC.

UNIT - IV: CMOS & BIPOLAR LOGIC (08 periods)

Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior. Bipolar Logic - TTL & ECL, Low voltage CMOS Logic & CMOS/TTL interfacing, Comparison of logic families.

UNIT - V: MODELING & DESIGN OF DIGITAL CIRCUITS USING VERILOG (10 periods)

Introduction To Verilog: HDL based design flow, program structure, language elements, operators, User defined primitives, data flow modeling, behavioral modeling, structural modeling. Design & Programming using Verilog: 74x283 adder, 74x151 multiplexer, 74x138 decoder, 74x148 encoder, Flip-flops - SR & JK, 74x163 Counter.

Total periods: 45

TEXTBOOKS:

1. D. Roy Chowdhury, *Linear Integrated Circuits*, 4th edition, New Age International Pvt. Ldt, 2010.
2. John F. Wakerly, *Digital Design Principles & Practices*, 4th edition, Pearson Education, Asia 2009.
3. T. R. Padmanabhan, B. Bala Tripura Sundari, *Design through Verilog HDL*, Wiley India, 2004.

REFERENCE BOOKS:

1. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs*, 3rd edition, PHI, 1987.
2. J. Bhasker, *VERILOG Primer*, 2nd Edition, BS Publications, 2001.
3. Stephen Brown, ZvonkoVranesic, F*undamentals of Digital Logic with VERILOG Design*, 2nd edition, TMH, 2007.

III B.Tech. I Semester

14BT50423:**ANALOG ELECTRONICS AND IC LAB**

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITE(S): Semiconductor Devices and Circuits, Analog Electronic Circuits, Linear IC and Digital IC Applications.

COURSE DESCRIPTION: Design and verification of OPAMP applications; Filters; VCO; Multivibrators; Linear and non-linear Wave-shaping circuits; Feedback amplifiers and Oscillators.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

1. perform analysis of digital and electronic circuits.
2. design and develop different circuits like Multivibrators, Power amplifiers, Feedback amplifiers and oscillators.
3. solve problems arising due to poor circuit design by choosing the appropriate design parameters.

LIST OF EXPERIMENTS: (Minimum Twelve Experiments to be conducted)

PART A: Analog Electronic Circuits (Minimum of six experiments to be conducted)

1. Voltage series Feedback Amplifier
2. Current shunt Feedback Amplifier
3. Class A Power Amplifier (with transformer load).
4. Hartley and Colpitt's Oscillators.
5. Non Linear wave shaping - Clippers and Clampers.
6. Bistable Multivibrator.
7. Monostable Multivibrator.
8. Astable Multivibrator.

PART B: Linear and Digital ICs (Minimum of six experiments to be conducted)

1. OP AMP Applications-Adder, Subtractor, Comparator circuits.
2. Active Filter Applications-LPF, HPF (first and second order).
3. IC 555 Timer - Monostable and Astable Operation circuit.
4. IC 566-VCO Applications.
5. Logic Gates - 74XX.
6. 4 bit Comparator - 74X85.
7. D Flip-Flop 74X74 and JK Flip-Flop 74X109.
8. Universal shift register - 74X194.

III B.Tech. I Semester

14BT50221:**AC MACHINES LAB**

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITE(S): Transformers and Induction Machines

COURSE DESCRIPTION: Determination of performance of transformers and induction motors; regulation of alternator;V and inverted V curves, determination of Xd and Xq of a salient pole synchronous machine.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on identification of parts of transformers and AC machines.
2. analyze the performance of transformers and AC machines.
3. design the experimental circuit based on loading and rating of the transformers and AC machines.
4. demonstrate skills in
   - obtaining the various characteristics of transformers and AC machines.
   - determining the performance characteristics of transformers and AC machines.
   - Determining and separation of losses in transformers and AC machines.
5. function effectively as an individual and as member in a team.
6. communicate effectively both oral and written.

LIST OF EXPERIMENTS:

The following experiments are required to be conducted as compulsory experiments:

1. O.C. and S.C. tests on single phase transformer.
2. Sumpner's test on a pair of single phase transformers.
3. Scott connection of transformers.
4. No-load & blocked rotor tests on three phase induction motor.
5. Regulation of a three phase alternator by E.M.F and M.M.F. methods.
6. V and inverted V curves of a three phase synchronous motor.
7. Equivalent circuit of a single phase induction motor.
8. Determination of Xd and Xq of a salient pole synchronous machine.

In addition to the above eight experiments, at least any FOUR of the following experiments are required to be conducted from the following list:

1. Parallel operation of single phase transformers.
2. Separation of core losses of a single phase transformer.
3. Brake test on three phase induction motor.
4. Separation of no-load losses of three phase induction motor.
5. Brake test on single phase induction motor.
6. Regulation of three phase alternator by Z.P.F. and A.S.A methods.
7. Efficiency of a three phase alternator.
8. Heat run test on a bank of single phase delta connected transformers.
9. Measurement of sequence impedance of a three phase alternator.
10. Performance characteristics of a schrage motor.

III B.Tech. II Semester

14BT5HS02: **MANAGEMENT SCIENCE**

(Common to EEE & EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Concepts of Management, Evolution of thought of Management, Functions of Management, Environmental Scanning, SWOT analysis, Social Responsibility of Management, Operations Management, Forecasting Methods, Work study, Method Study, Work measurement, Statistical Quality Control, Inventory Management, Marketing, Marketing functions, Human Resource Management, Job evaluation, merit rating, Theories of motivation, Project Management, CPM, PERT, Project cost analysis, Project crashing, Entrepreneurship, Entrepreneur vs Manager, Contemporary Management practices, Just-in-time, Enterprise Resource Planning, Business Process Outsourcing, Intellectual property rights and Supply chain management.

COURSE OUTCOMES: On successful completion of this course, the student will be able to:

1. employ fundamental knowledge on 'Management Thought' and 'Management of a business organization'.
2. apply various Managerial concepts & contexts to attain 'Optimum Utilization of available organizational resources'.
3. contribute to the group, as an individual, in accomplishing the stated objective of the business organization.
4. apply gained knowledge on Management to establish and run his/her own organization, if he/she deserve to be an 'Entrepreneur'.
5. imbibe contemporary practices in applying Management and exercise discernment in implementing managerial decisions for ethical, safe and sustainable operations of the business.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO MANAGEMENT AND ORGANIZATION (09 periods)

Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills - Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management. Basic concepts related to organization- Objectives, Procedure and Principles; Types of organizations - Merits, demerits and adoptability to modern firms.

UNIT - II: OPERATIONS MANAGEMENT (12 periods)

Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling. Materials management objectives; Inventory - Types of inventory - Classical EOQ model - ABC analysis - Purchase procedure - Stores management. Marketing: Functions of marketing - Marketing mix - Channels of distribution.

UNIT - III: HUMAN RESOURCES MANAGEMENT (HRM) (06 periods)

Nature and scope of HRM - Functions of HRM - Role of HR Manager in an organization, Job evaluation and merit rating - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT - IV: PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (09 periods)

Network analysis - Program evaluation and review technique (PERT) - Critical path method (CPM) - Probability of completing the project within given time - Project cost analysis - Project crashing.

Introduction to entrepreneurship - Entrepreneurial traits - Entrepreneur Vs manager - Role of entrepreneurship in economic development - Women as an entrepreneur.

UNIT - V: CONTEMPORARY MANAGEMENT PRACTICES (09 periods)

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) - Globalization - Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making. **Total periods: 45**

TEXT BOOKS:

1. O.P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, *Management*, 6th edition, Pearson education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, *Marketing Management*, 12th edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, *Essentials of Management*, 6th edition, TMH, New Delhi, 2007.
3. N.D. Vohra, *Quantitative Techniques in Management*, 2nd edition, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz, *Management - A Global Perspective*, 10th edition, Mc Graw-Hill International.

III B.Tech. II Semester

14BT60201: **MICROPROCESSORS AND MICROCONTROLLERS**

(Common to EEE, ECE and EIE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Computer Organization and Architecture.

COURSE DESCRIPTION: Architecture, Instruction set and programming of 8086; Programmable interfacing devices: 8255, 8251, 8259, 8257 - their architecture and programming; Interfacing Memory and I/O devices with 8086; Architecture, programming, interrupts, and applications of 8051 Microcontroller.

COURSE OUTCOMES: On successful completion of this course, the students will be able to

1. demonstrate potential knowledge in
- internal hardware details of Intel 8086, 8051 and programmable devices like 8255, 8251, 8259, 8257.
- interfacing various peripherals to build stand alone systems.
2. critically analyze the requirements to meet the specifications.
3. design suitable interfaces for real time applications.
4. exhibit programming skills, choose suitable hardware and program the devices to solve engineering problems.

DETAILED SYLLABUS:

UNIT - I: 8086 ARCHITECTURE AND PROGRAMMING (10 periods)

Microprocessor Evolution and types, 8086 internal Architecture - register organization, memory segmentation, memory organization. Introduction to programming the 8086 - Assembler directives, addressing modes, instruction set, simple programs, procedures and macros.

UNIT - II: 8086 INTERFACING AND INTERRUPTS (08 periods)

Pin description, minimum & maximum mode operation of 8086, timing diagram. Interfacing memory (RAM and EPROM) to 8086. 8086 Interrupts - types and interrupt responses, Interrupt vector table, priority of interrupts. 8259 priority interrupt controller - architecture, system connections and cascading, initialization of 8529.

UNIT - III: PROGRAMMABLE DATA COMMUNICATION DEVICES (11 periods)

Introduction to serial and parallel communication, methods of parallel data transfer. 8255 PPI - internal architecture and system connections, operational modes and initialization, interfacing stepper motor, ADC, DAC. Methods of serial data transfer, 8251 USART - architecture and its initialization, sending and receiving characters. Serial communication standard RS232C, USB. Architecture and operation of 8257 DMA controller.

UNIT - IV: 8051 MICROCONTROLLER AND PROGRAMMING (08 periods)

Microcontroller Vs general purpose microprocessor. 8051/8052 Microcontroller - architecture, features, register organization, pin diagram, internal and external memories & their interfacing, instruction set, addressing modes, simple programs.

UNIT - V: 8051 INTERFACING (08 periods)

Timer/Counters - Registers, modes and programming. Serial communication - registers, programming 8051 for serial communication. Interrupts - registers, programming. 8051 applications - Interfacing key board, LEDs and LCD.

Total periods: 45

TEXT BOOKS:

1. Douglas V. Hall, *Microprocessors and Interfacing: Programming and Hardware*, Tata McGraw-Hill,revised 2nd edition, 2006.
2. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, Prentice Hall of India, 2000.

REFERENCE BOOKS:

1. A.K. Ray and K.M. Bhurchandi, *Advanced Microprocessors and Peripherals- Architecture*, *Programming and Interfacing*, Tata McGraw Hill, 2002 reprint.
2. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design*, Prentice Hall of India, 2006.

III B.Tech. II Semester

14BT60202: **POWER ELECTRONICS**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Physics, Electrical Circuits, Semiconductor Devices and Circuits

COURSE DESCRIPTION: Power semiconductor devices; Silicon Controlled Rectifier - Turn-on methods, Triggering and Commutation circuits for SCR; Single phase and three phase Rectifiers; AC voltage controllers; Cycloconverters; Choppers and Inverters.

COURSE OUTCOMES: On successful completion of this course, the students will be able to

1. demonstrate potential knowledge on
   - the characteristics of various power transistors.
   - operation, switching characteristics, ratings, protection and combinations of SCR.
   - various triggering methods and commutation techniques for SCR.
   - operation of line commutated converters and SCR based force commutated converters.
2. critically analyze the performance of different power converters subjected to various loads.
3. design static and dynamic equalizing circuits, snubber circuits and commutating elements.
4. demonstrate problem solving skills in evaluating
   - number of SCRs required for desired series /parallel operation,
   - electrical parameters and different variables of various power electronic circuits.

DETAILED SYLLABUS:

UNIT - I: POWER SEMICONDUCTOR DEVICES (11 periods)

Introduction, Power transistors - power BJT, power MOSFET, IGBT and their characteristics. Thyristor - basic theory and operation, static and dynamic characteristics, two transistor analogy, turn-on methods, R, RC and UJT firing circuits, natural commutation technique, series and parallel operation, ratings, protection against dv/dt and di/dt, design of snubber circuit, numerical problems. Other devices in thyristor family - TRIAC, GTO and their characteristics.

UNIT - II: PHASE CONTROLLED RECTIFIERS (11 periods)

Single phase controlled rectifiers - half wave controlled rectifier, midpoint and bridge connections - semi and fully controlled rectifiers with R and RL loads, derivation of average load voltage and current, effect of freewheeling diode, effect of source inductance, numerical problems.

Three phase controlled rectifiers - half and fully controlled rectifiers - midpoint and bridge connections, derivation of average load voltage with R and RL loads, numerical problems.

UNIT - III: DUAL CONVERTERS & AC VOLTAGE CONTROLLERS (06 periods)

Dual converters - circulating and non-circulating current modes of operation of single phase and three phase dual converters with R-Load.

Single phase AC voltage controllers - two SCRs in anti-parallel with R and RL loads, derivation of rms load voltage and load current, numerical problems. Cycloconverters - single phase midpoint and bridge type (step-up and step-down operations) with R and RL loads.

UNIT - IV: CHOPPERS (08 periods)

Thyristor forced commutation circuits, basic chopper operation, control strategies, step-up chopper, derivation of load voltage and load currents with R and RL loads, chopper configurations (type - A,B,C,D and E), Morgan's chopper, Jones' chopper, AC chopper.

UNIT - V: INVERTERS (09 periods)

Single phase inverters - basic operation, voltage source inverters, basic series and parallel inverters, current source inverter, modified Mc Murray and Mc Murray-Bedford half bridge inverters (operation and waveforms), voltage control by pulse width modulation techniques (single pulse, multiple pulse and sinusoidal), numerical problems. Three phase bridge inverters - 180^{o} and 120^{o} conduction modes of operation.

Total periods:45

TEXT BOOKS:

1. Dr. P. S. Bimbhra, *Power Electronics*, 4^{th} edition, Khanna Publishers, Delhi, 2008.
2. K. L. Rao, Ch. Saibabu, *Theory of Power Electronics*, Revised Edition, S. Chand & Co. Ltd, New Delhi, 2009.

REFERENCE BOOKS:

1. Muhammad H. Rashid, *Power Electronics Handbook*, 3^{rd} edition, Butterworth-Heinemann, San Diego, 2010.
2. P.C. Sen, *Power Electronics*, Tata Mc Graw-Hill Education Pvt. Ltd., New Delhi, 2009.
3. Mohan, Undeland, Robbins, *Power Electronics*: *Converters, Applications and Design*, 3^{rd} edition, Wiley, 2007.

III B.Tech. II Semester

14BT60203: SWITCHGEAR AND PROTECTION

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Transformers and Induction Machines, Transmission of Electric Power and Synchronous Machines

COURSE DESCRIPTION: Short circuit studies; Fuses and their ratings; circuit breakers; relays; static and microprocessor based relays; protection schemes for various equipment and over voltage protection.

COURSE OUTCOMES: on successful completion of the course, student will be able to

1. demonstrate knowledge on
   - symmetrical component theory and sequence networks
   - operation of various protective devices.
   - protection principles for power system components.
2. analyze
   - fault levels for different faults
   - operating aspects of protective devices
3. design proper protection scheme for different power system components.
4. demonstrate skills in evaluating
   - operating parameters of various protecting devices
   - settings of protection devices in different protection schemes.

DETAILED SYLLABUS:

UNIT-I: FAULT ANALYSIS (10 periods)

Symmetrical component theory - voltages, currents, power, symmetrical component transformation matrix. Sequence networks -positive, negative and zero sequence networks. Fault analysis - LG, LL, LLG, LLL & LLLG faults with and without fault impedance, short circuit current and MVA calculations, application of reactors - numerical problems.

UNIT - II: RELAYS (10 periods)

Introduction - types of relays, electromagnetic Relays - construction, operation and torque equation of induction type relays, differential relays and biased differential relays. Characteristics of over current, directional and distance relays (R-X). Static relays - advantages and disadvantages, block diagram of a basic static relay, definite time, inverse and inverse definite minimum time (IDMT) static relays. Comparators - amplitude and phase comparators. Microprocessor based relays - advantages and disadvantages, block diagram for over current (definite, inverse and IDMT) and distance relays with flow charts.

UNIT - III: PROTECTION OF GENERATORS AND TRANSFORMERS (08 periods)

Protection of generators - differential protection, restricted earth fault protection and inter turn fault protection, rotor fault protection, numerical problems on % winding unprotected.

Transformer protection - differential protection, percentage differential protection, protection against internal faults, Buchholtz relay, numerical problems on design of CT's ratio.

UNIT- IV: PROTECTION OF FEEDERS AND TRANSMISSION LINES (08 periods)

Protection of feeders (Radial and Ring main) using over current relays. Protection of transmission lines - three-zone protection using distance relays, carrier current protection. Protection of bus bars.

Protection against Over Voltages: Generation of over voltages in power systems, protection against lightning over voltages - Non-Linear (Valve type) and Metal Oxide (Zinc-Oxide) surge arresters. Insulation coordination, basic impulse insulation level (BIIL).

UNIT - V: CIRCUIT BREAKERS (09 periods)

Fuses - Types, characteristics and their ratings. Isolators. Circuit Breakers - elementary principles of arc interruption, recovery, restriking voltage, restriking phenomenon, average and maximum rate of rise of restriking voltage, current chopping and resistance switching. Construction and principle of minimum oil circuit breaker, air blast circuit breaker, vacuum circuit breaker and SF6 circuit breaker.

Total periods: 45

TEXT BOOKS:

1. Badri Ram, D.N.Viswakarma, *Power system Protection and Switchgear*, Mc Graw Hill education (India) Private Limited, New Delhi, 2nd edition, 2011.
2. Sunil S. Rao, *Switchgear Protection and Power Systems (Theory, practice and Solved Problems)*, Khanna Publishers, New Delhi, 11th edition, 2005.

REFERENCE BOOKS:

1. C.L.Wadhwa, *Electrical Power systems*, New Age International (P) Limited, Publishers, New Delhi, 5th edition, 2009.
2. T.S.Madhava Rao, *Power System Protection: Static Relays with Microprocessor Applications*, TATA McGraw-Hill Publishing Company Limited, NewDelhi, 2nd edition, 2004.

III B.Tech. II Semester

14BT60204: **DISTRIBUTION OF ELECTRIC POWER**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	**70**	**100**	**3**	**1**	**-**	**3**

PREREQUISITE(S): Generation of Electric Power and Transmission of Electric Power

COURSE DESCRIPTION: Introduction to Distribution Systems; DC and AC distribution systems; substations; analysis and protection of distribution systems.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
   - distribution system and its configurations.
   - importance of power factor and methods to improve power factor.
   - different types of loads and distribution feeders.
   - different parameters and protection schemes for distribution feeders.
2. analyze
   - different feeder configurations
   - optimal capacitor placement.
   - the criteria for economical power factor.
   - different grounding methods for protection
3. design proper rating of capacitor to improve power factor.
4. demonstrate skills in evaluating
   - load parameters of different types of loads.
   - voltage drop, losses and fault currents in distribution system.
   - optimal capacitor size and location in distribution system.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTION TO DISTRIBUTION SYSTEMS (09 periods)

Introduction to distribution systems, load modeling and characteristics - coincidence factor, contribution factor, loss factor, relationship between the load and loss factors. Classification of loads (residential, commercial, agricultural and industrial) and their characteristics. Classification of distribution systems - radial, loop, ring main. Comparison of DC Vs AC and under-ground Vs over-head distribution systems, features of distribution systems.

UNIT-II: DC AND AC DISTRIBUTION SYSTEMS (08 periods)

Voltage drop calculations (numerical problems) in DC distributors - radial DC distributor fed at one end, at both the ends (equal/unequal voltages) and ring main distributor.

Voltage drop calculations (numerical problems) in AC distributors - power factors referred to receiving end voltage and respective load voltages. High voltage Distribution systems (HVDS)

UNIT - III: SUBSTATIONS (10 periods)

Classification of substations - indoor and outdoor, gas and air insulated substations. Substation layout - different bus bar schemes, location of substations - rating of distribution substations, service area with 'n' primary feeders. Neutral Grounding - Grounded and ungrounded systems, effects of ungrounded neutral on system performance, methods of neutral grounding - solid, resistance, reactance and Arc suppression coil (Peterson coil) grounding. Arcing grounds and grounding practices.

UNIT- IV: ANALYSIS AND PROTECTION OF DISTRIBUTION SYSTEMS (09 periods)

Analysis of radial networks - voltage drop, power loss calculations, three phase and non-three phase balanced primary lines. Protection of distribution systems - objectives, coordination of protective devices, circuit reclosures and line sectionalizer, types of common faults, fault current calculations.

UNIT - V: POWER FACTOR CORRECTION (09 periods)

Causes of low power factor, methods of improving power factor - power capacitors, series and shunt capacitors (fixed and switched) for power factor correction, most economical power factor for constant kW load and constant kVA type loads, economic justification for capacitors, procedure to determine the optimum capacitor allocation - numerical problems.

Total periods: 45

TEXT BOOKS:

1. Turan Gonen, *Electric Power Distribution System Engineering*, Mc Graw-Hill Book Company, 2nd edition, 2012.
2. V.K.Mehta, Rohit Mehta, *Principles of Power System*,S.Chand& Company Ltd, revised edition, 2013.

REFERENCE BOOKS:

1. Wadhwa, C. L., Generation, *Distribution and Utilization of Electrical Energy*, New Age International, 1993.
2. A.S.Pabla, *Electric Power Distribution*, Tata Mc Graw-Hill Publishing Company, 4th edition, 1997.
3. M.L.Soni, P.V.Gupta, V.S. Bhatnagar, A. Chakravarthy, *A Text Book on Power System Engineering*, Dhanpat Rai and Co Private Limited, 2007.

III B.Tech. II Semester

14BT60205: **INSTRUMENTATION**

(PROFESSIONAL ELECTIVE - I)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Mathematics, Electrical Circuits and Electrical and Electronic Measurements.

COURSE DESCRIPTION: Various instrumentation systems, performance characteristics; resistive, capacitive and inductive transducers; digital voltmeters, oscilloscopes and storage oscilloscopes data acquisition systems.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. gain knowledge on
- characteristic parameters of various measuring instruments.
- various types of digital voltmeters, transducers, signal analyzers, oscilloscopes, storage oscilloscopes and data acquisition systems.

2. analyze
- the performance characteristics of various measuring instruments
- various digital voltmeters, transducers, signal analyzers, oscilloscopes, storage oscilloscopes and data acquisition systems.

3. develop skills to evaluate
- various non electrical quantities, performance characteristics of measuring instruments
- magnitude, phase and frequency of signal or spectral with oscilloscopes

4. select a suitable instruments to meet the requirements of industrial applications.

DETAILED SYLLABUS:

UNIT - I: CHARACTERISTICS OF MEASURING SYSTEMS (09 periods)

Classification of instruments, elements of a generalized measurement system. Measurement system performance - static and dynamic characteristics. Limiting and relative limiting errors - combination of quantities with limiting errors, types of errors - numerical problems

UNIT - II: DIGITAL METERS

Digital voltmeters and it types (10 periods)

Ramp type DVM and its types, micro processor based ramp type DVM. Digital frequency meter. Time and period measurement. Phase meter, digital phase meter. Q-meter. Vector impedance meter. Peak responding and true RMS voltmeters.

UNIT - III: SIGNAL ANALYZERS & CRO (10 periods)

Analyzers: wave analyzers - frequency selective, logic, heterodyneanalyzers, application of wave analyzers and harmonic distortion, spectrum analyzers, basic spectrum analyzers, spectral displays.

Oscilloscopes: cathode ray oscilloscope, cathode ray tube, time base generator, horizontal and vertical amplifiers, measurement of phase and frequency, lissajous patterns- numerical problems. Storage oscilloscope: sampling oscilloscope-digital storage oscilloscope.

UNIT - IV: TRANSDUCERS (08 periods)

Definition of transducer, classification of transducers, advantages of electrical transducers, characteristics and choice of transducers- principle operation of resistor, inductor, LVDT and capacitor transducer, LVDT Applications, RVDT. Strain gauge and its principle of operation, gauge sensitivity, gauge factor. Thermistors, thermocouples, Synchros, piezo electric transducers, photo diodes, photo transistors.

UNIT - V: DATA ACQUISITION SYSTEMS (08 periods)

Generalized data acquisition system and its components. Types of multiplexing systems - time division and frequency division multiplexing. Digital data acquisition system, use of data acquisition systems and recorders in digital systems. Digital recording systems -block diagram and its working, modern digital DAS (only block diagram)

Total periods: 45

TEXT BOOKS:

1. A.K. Sawhney, *A course in Electrical and Electronic Measurements and Instrumentation*, Dhanpat Rai & Co. (Pvt.) limited, New Delhi, 2014.
2. H. S. Kalsi, *Electronic Instrumentation*-by Tata MC Graw Hill Company, 3rd edition, 2010.

REFERENCE BOOKS:

1. D. Helfrick and W. D. Cooper, *Modern Electronic Instrumentation and Measurement Techniques* by Prentice Hall of India, 2nd edition, India.
2. D.V.S Murthy, *Transducers and Instrumentation*, Prentice Hall of India, New Delhi, 2nd edition,2010.

III B.Tech. II Semester

14BT60206: **ADVANCED CONTROL SYSTEMS**

(PROFESSIONAL ELECTIVE -I)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Control Systems

COURSE DESCRIPTION: Linear control system design;design of compensators and controllers; non-linear systems; describing function; phase plane and stability analysis; design of controllers and observers; formulation of various optimal control problems; minimization of functional.

COURSE OUTCOMES: On successful completion of this course, student will be able to

1. gain knowledge on
   - need for control system design, tuning of PID controller and Two-degrees-of-Freedom control.
   - non-linear system stability.
   - modal and optimal control.
2. analyze
   - stabilityof a non-linear system using describing functions and phase plane analysis.
   - non-linear system stability using Lyapunov's stability criterion.
   - Minimization of functional with different cases.
3. demonstrate design skills in
   - compensators and controllers using Root locus and Bode plot
   - controllers,observer and regulators using state space.
4. demonstrate problem solving skills in
   - evaluating stability of systems using describing functions and liapunov stability
   - application of calculus of variations

UNIT – I: LINEAR CONTROL SYSTEM DESIGN (10 periods)

Introduction to control system design, types of compensators, design of compensators using bode plot and root locus technique. Types of controllers, design of PI, PD and PID controllers using bode plot and root locus technique. Tuning rules for PID controllers, two-degrees-of-freedom control.

UNIT - II: ANALYSIS OF NONLINEAR SYSTEMS (10 periods)

Introduction to non-linearsystems, different types of physical nonlinearities, describing functions, derivation of describing functions for dead zone, saturation, backlash, relay and hysteresis. Stability analysis of non linear systems through describing functions, Phase-Plane analysis, singular points, methods for constructing trajectories - Isoclines' method, delta method.

UNIT- III: STABILITY ANALYSIS (09 periods)

Stability in the sense of Lyapunov. Lyapunov's stability theorems. Stability analysis of linear time invariant systems by Lyapunov second method. Generation of Lyapunov functions, variable gradient method, Krasovskii's method.

UNIT - IV: DESIGN OF CONTROL SYSTEMS IN STATE SPACE (09 periods)

Necessity of pole placement, design by pole placement, necessary and sufficient conditions for arbitrary pole placement. Determination of feedback gain matrix using direct substitution method and Ackermann's formula. Full order observer and reduced order observer, quadratic optimal regulator systems.

UNIT - V: OPTIMAL CONTROL (07 periods)

Introduction to optimal control, formulation of optimal control problems, calculus of variations, minimization of functional of single function, functional involving n independent functions, constrained minimization. **Total periods: 45**

TEXT BOOKS:

1. M. Gopal, *Modern Control System Theory*, New Age International (P) Ltd., 2nd edition, 2000.
2. K. Ogata, *Modern Control Engineering*, Prentice Hall of India, 4th edition, 2006.

REFERENCE BOOKS:

1. A. Nagoorkani, *Advanced control theory*, RBA publications, 2nd edition, 1999.
2. I.J. Nagrath and M.Gopal, *Control Systems Engineering*, New Age International (P) Ltd., 2007.

III B.Tech. II Semester

14BT60207: **HIGH VOLTAGE ENGINEERING**

(PROFESSIONAL ELECTIVE- I)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Mathematics, Electromagnetic fields and Electrical Circuits.

COURSE DESCRIPTION: Breakdown mechanisms in solids, liquids, gases and composite dielectrics materials; conventional methods of generation and measurement of high DC, AC, impulse voltages and currents; test the ability of an electrical apparatus to meet guaranteed test procedures and standards.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
   - behaviour of various insulation materials
   - generation of high voltage and currents
   - measuring techniques for high voltage and currents
   - testing of various electrical apparatus
   - overvoltage phenomena and protection against them
2. analyze the behaviour of insulation systems, circuits for generation and measurement of highvoltages, materials used and measuring methods. 3. evaluate various parameters of high voltage generating and measuring circuits.
4. apply a suitable testing method for a high voltage apparatus.

DETAILED SYLLABUS:

UNIT - I: HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS (09 periods)

Electric field stresses, gas/vacuum as insulator, liquid dielectrics, solids and composites, estimation and control of electric stress. Applications of insulating materials - transformers, rotating machines, circuit breakers, cables, power capacitors and bushings.

UNIT - II: BREAKDOWN IN DIELECTRIC MATERIALS (10 periods)

Breakdown in liquids and gases: liquid as insulator, pure and commercial liquids, conduction and breakdown in pure, commercial liquids. Gases as insulating media, ionization process, collision process, Townsend's current growth equation criteria, current growth in the presence of secondary, Townsend's criterion for breakdown in gases, pachen's law - numerical problems.

Breakdown in solids: Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, breakdown in composite dielectrics, solid dielectrics used in practice - numerical problems.

UNIT - III: GENERATION OF HIGH VOLTAGES AND CURRENTS (12 periods)

Generation of high DC voltages: half and full wave rectifier circuits, voltage doubler circuits, voltage multiplier circuits, voltage drop and regulation. Electrostatic machines - basic principle, vande-Graaff generator, electrostatic generator.

Generation of high alternating voltages: cascade transformers, resonant transformers, generation of high frequency AC high voltages - numerical problems

Generation of impulse voltages: standard impulse waveshapes, theoretical representation of impulse wave shapes, circuits for producing impulse waves, waveshape control, multistage impulse generators Marx circuit - components of multi stage impulse generator - numerical problems. Generation of impulse currents: definition of impulse current waveforms, circuit for producing impulse current waves, generation of high impulse currents, tripping and control of impulse generator - numerical problems.

UNIT - IV: MEASUREMENT OF HIGH VOLTAGES AND CURRENTS (07 periods)

Classification, measurement of high DC voltages, measurement of high AC voltages and impulse voltages, electrostatic voltmeters for measurement of high voltages.

Measurement of high DC, AC and impulse currents, cathode ray oscillographs for impulse voltage and current measurements - numerical problems

UNIT-V:NON-DESTRUCTIVE TESTING OF MATERIAL AND APPARATUS (07 periods)

Measurement of dc resistivity, measurement of dielectric constant and loss factor. Partial discharge measurements. Testing of devices - insulators and bushings, isolators and circuit breakers, cables, transformers and surge arresters. Radio interference measurements. **Total periods: 45**

TEXT BOOKS

1. M. S. Naidu and V. Kamaraju, *High Voltage Engineering*, TMH Publications, 4th edition, 2008.

2. E. Kuffel, W. S. Zaengl, J. Kuffel, *High Voltage Engineering: Fundamentals*, Elsevier, 2nd edition, 2005.

REFERENCE BOOKS

1. C. L. Wadhwa, *High Voltage Engineering*, New Age Internationals(P) Limited, New Delhi, 2007.

2. Ravindra Arora, Wolfgang Mosch, *High Voltage Insulation Engineering*, New Age International (P) Limited, 1995.

III B.Tech. II Semester

10BT60208:**COMPUTER AIDED ELECTRICAL MACHINE DESIGN**

(PROFESSIONAL ELECTIVE - I)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): DC Machines, Transformers and Induction Machines, DC Machines Lab, Synchronous Machines and AC Machines Lab.

COURSE DESCRIPTION: Design concepts, optimal design of transformers, DC machines, induction machines and alternators.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on optimal design concepts of various electrical machines and transformers.
2. analyze the specific electrical and magnetic loadings and performance using design values of electrical machines.
3. evaluate the design parameters of various electrical machines and static devices.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION (08 periods)

Major considerations in electrical machine design, electrical engineering materials, space factor,choice of specific electrical and magnetic loadings.Thermal considerations, heat flow, temperature rise, rating of machines, standard specifications.Mathematical formulation of the problem, programming techniques (LP & NLP only) - numerical problems.

UNIT - II: DC MACHINES (09 periods)

Output equations, main dimensions, magnetic circuit calculations, carter's coefficient, net length of iron, real & apparent flux densities, selection of number of poles, design of armature, design of commutator and brushes,selection of variables for optimal design, formulation of design equations, objective function, constraint functions, algorithms for optimal design - numerical problems.

UNIT - III: TRANSFORMERS (09 periods)

Output equations, main dimensions, kVA output for single and three phase transformers, window space factor, overall dimensions, operating characteristics, regulation, no load current, temperature rise in transformers, design of tank, methods of cooling of transformers, selection of variables for optimal design, formulation of design equations, objective function, constraint functions, algorithms for optimal design - numerical problems.

UNIT - IV: INDUCTION MOTORS (09 periods)

Output equation of induction motor, main dimensions, length of air gap, rules for selecting rotor slots of squirrel cage machines, design of rotor bars & slots, design of end rings, design of wound rotor, magnetic leakage calculations, leakage reactance of poly phase machines, magnetizing current, short circuit current, selection of variables for optimal design, formulation of design equations, objective function, constraint functions, algorithms for optimal design - numerical problems.

UNIT - V: SYNCHRONOUS MACHINES (10 periods)

Output equations, choice of loadings, design of salient pole machines, short circuit ratio, shape of pole face, armature design, armature parameters, estimation of air gap length, design of rotor, design of damper winding, determination of full load field mmf, design of field winding, design of turbo alternators, rotor design, selection of variables for optimal design, formulation of design equations, objective function, constraint functions, algorithms for optimal design - numerical problems. **Total periods: 45**

TEXT BOOKS:

1. A.K. Sawhney, A. Chakrabarthi, *A Course in Electrical Machine Design*, Dhanpat Rai & Co, Delhi, 6th edition,2010.
2. M. Ramamoorthy, *Computer - Aided Design of Electrical Equipment*, Affiliated East-West press Pvt. Ltd. New Delhi, 1st edition, 2008.

REFERENCE BOOKS:

1. Albert E Clayton & N.N. Hancock, *Performance and Design of DirectCurrent Machines*, CBS Publishers and distributors, New Delhi, 3rd edition, 2012.
2. M.G. Say,*The Performance and Design of Alternating CurrentMachines*, CBS Publishers and distributors Pvt. Ltd, New Delhi, 3rd edition, 2002.
3. R.K. Agarwal, *Principles of Electrical Machine Design*, S.K.Kataria & Sons, New Delhi, 5th edition, 2014.
4. V.N.Mittle, Arvind Mittal, *Design of Electrical Machines*, Standard Publications, New Delhi, 5th edition, 2013.
5. M.V.Deshpande, *Design and Testing of ElectricalMachines*, PHI learning Pvt. Ltd, New Delhi, 3rd edition, May 2010.

III B.Tech. II Semester

14BT51201:**COMPUTER NETWORKS**

(PROFESSIONAL ELECTIVE - I)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Introduction to Computer Networks; The Physical Layer; The Data Link Layer; The Medium Access Sub layer; The Network Layer; The Transport Layer; The Application Layer; Network Security.

COURSE OUTCOMES: On successful completion of this course, the students will be able to:

1. demonstrate knowledge on
   - concepts of computer networks
   - functionality of reference models layers
   - 3G Mobile Phone Networks, 802.11
2. analyze the issues in data link layer by using error detection and correction techniques, medium access sub layer by channel allocation schemes and transport layer by connection management schemes.
3. acquire problem solving skills to assess the routing of the packet by selecting the appropriate routing algorithms.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND PHYSICAL LAYER (09 periods)

Uses of Computer Networks, Network Hardware, Network Software, Reference Models: OSI, TCP/IP, Example Networks: Internet, 3G Mobile Phone Networks, 802.11.Guided Transmission Media, Wireless Transmission.

UNIT-II: DATA LINK LAYER AND MEDIUM ACCESS SUBLAYER (10 periods)

Data Link Layer Design Issues, Error detection and correction - CRC, Hamming codes, Elementary Data Link Protocols, Sliding Window Protocols.

Channel Allocation problem, Multiple Access protocols: ALOHA, CSMA, CSMA/CD protocols, Collision free protocol, Limited contention protocol, Ethernet, DLL Switching.

UNIT-III: NETWORK LAYER (10 periods)

Network Layer Design Issues, Routing Algorithms: Shortest path, Flooding, Distance vector, Hierarchical, Broadcast, Multicast and Any cast, Congestion Control Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet.

UNIT-IV: TRANSPORT LAYER (08 periods)

Transport Service, Elements of transport protocol, Internet Transport layer protocols: UDP, TCP;

UDP - Introduction, Remote Procedure Call, Real-Time Transport Protocol

TCP - Introduction, Service Model, Protocol, Segment Header, Connection Establishment, Connection Release, Connection Management Modeling, Sliding Window, Timer Management, Congestion Control, The Future of TCP.

UNIT-V: APPLICATION LAYER AND NETWORK SECURITY (08 periods)

Domain name system (DNS), Electronic Mail, World Wide Web: Architectural Overview, Dynamic Web Document, HTTP.

Introduction to Network Security: Cryptography - Substitution Techniques, Transposition Techniques, One-Time Pads. **Total periods: 45**

TEXT BOOK:

1. Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks*, Pearson education, 5th edition, 2012.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *Data communication and Networking*, Tata McGraw-Hill, 4th edition, 2006.
2. James F. Kurose and Keith W. Ross, *Computer Networking A Top-Down Approach Featuring the Internet*, Pearson Education, 2nd edition, 2003.

III B.Tech. II Semester

14BT60221:**ELECTRICAL SYSTEMS AND SIMULATION LAB**

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITE(S): Control Systems, Power Electronics, Electric Circuits

COURSE DESCRIPTION: Time response of second order system, application of PLC's, effect of feedback, effect of PID controller on second order system; characteristics of AC servo motor; simulation of physical systems using PSPICE, stability analysis and time domain specifications of a given transfer function using MATLAB; Simulation of single phase full-converter, resonant pulse commutation, buck chopper, inverter and cycloconverter using PSPICE.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
    - the effect of feedback and different controllers
    - operation of power semiconductor devices such as SCR, BJT, MOSPET and IGBT
    - gate firing circuits
2. analyze
    - characteristics of servomotors
    - physical variations of various power converters
3. design
    - ladder network for PLC to verify Boolean expressions
    - power electronic circuits and validate using PSPICE
4. develop skills to evaluate stability and time domain specifications of second order system using MATLAB
5. apply
    - control engineering concepts in DC position control and temperature control systems
    - power converters for speed control of DC motor
6. exhibit personal excellence and ability to work in group.
7. develop skills to communicate effectively through preparation of laboratory records and viva-voce.

LIST OF EXPERIMENTS:

Any SIX of the following experiments are to be conducted from part A

PART A:

1. Time response of second order system
2. Programmable logic controller- study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
3. Effect of feedback on DC servomotor.
4. Transfer function of DC machine.
5. Effect of P, PD, PI and PID controllers on a second order systems.
6. Temperature control using PID controller.
7. Characteristics of AC servomotor.

Any SIX of the following experiments are to be conducted from part B

PART B

1. Unit step response of given second order transfer function using MATLAB. Determination of peak overshoots, peak time, rise time and delay time.
2. Stability analysis (Bode, Root Locus and Nyquist) of linear time invariant system using MATLAB.
3. Design a PID controller for a given system to meet the desired response using MATLAB.
4. Analysis of three phase circuit using PSPICE.
5. Simulation of single phase Full-converter for RLE load using PSPICE.
6. Simulation of resonant pulse commutation circuit and Buck chopper using PSPICE.
7. Simulation of single phase inverter with PWM control using PSPICE.
8. Simulation of AC Voltage controller using PSPICE.
9. Simulation of cycloconverter using PSPICE.

III B.Tech. II Semester

14BT60222: **MICROPROCESSORS AND MICROCONTROLLERS LAB**

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITES: Switching Theory & Logic Design, Computer Organization and Architecture, Microprocessors and Microcontrollers

COURSE DESCRIPTION: Assembly language Programming for Intel 8086 & 8051; Interfacing standard peripherals & Programming - DAC, Stepper Motor, ADC, Logic Controller, Keyboard, Seven Segment Display.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. analyze various programming alternatives & interfacing methods to build a typical microcomputer based system.
2. design and develop microcomputer based system to solve various problems.

LIST OF EXPERIMENTS:

Any TWELVE experiments to be conducted

I Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

II Interfacing with 8086

1. Stepper motor
2. Logic controller
3. A/D converter
4. Seven segment display
5. Keyboard interfacing

III Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory
3. Programs using special instructions like SWAP, bit/byte, set/ reset etc.

IV Interfacing with 8051

1. Stepper Motor
2. Digital to Analog Converter
3. Square wave generation using Timers in Mode 0 and Mode 1

IV B.Tech. I Semester

14BT70201: POWER SEMICONDUCTOR DRIVES

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): DC machines, Transformers and Induction machines, Synchronous machines, Control systems and Power Electronics.

COURSE DESCRIPTION: Electrical drives - classification, dynamics, load torque components and closed loop control; DC motor drives - single and three phase full, half and dual converter control; Chopper fed DC drives- single and multi-quadrant control; Control of induction motors - with AC voltage controllers, VSI, CSI and Cycloconverters, Static Scherbius and Kramer drives; Control of synchronous motors - fed by VSI, CSI and Cycloconverters, stepper motor and switched reluctance motor drives.

COURSE OUTCOMES: On successful completion of course the student will be able to

1.demonstrate knowledge on

- dynamics of electrical drives.
- operation and speed control of various DC and AC drives in open loop.
- closed loop control of converter fed motors.

2. analyze single and multi-quadrant operations of DC and AC drives with speed - torque characteristics.
3. evaluate control parameters for speed control of electrical motors fed by power electronics modulators.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO ELECTRICAL DRIVES (08 periods)

Concept of electrical drives - advantages and parts. Dynamics of electrical drives - fundamental torque equations, speed torque conventions and multi quadrant operation, load torques - components, nature and classification. Steady state stability. Electric braking methods - regenerative, dynamic and plugging. Modes of operation of electrical drive. Speed control and drive classifications, closed loop control of drives.

UNIT - II: SINGLE PHASE AND THREE PHASE DC DRIVES (11 periods)

Control of DC separately excited and series motors by single-phase and three-phase half and full converters - voltage and current waveforms for continuous and discontinuous motor currents, speed-torque equations and characteristics. Dual converter control of DC separately excited motor. Numerical problems.

UNIT - III: DC CHOPPER DRIVES AND CLOSED LOOP OPERATION (08 periods)

Control of DC separately excited motor by one, two and four quadrant choppers, control of DC series motor by one quadrant chopper including electric braking (Regenerative and Dynamic) - voltage and current waveforms for continuous motor currents. Numerical problems. Closed loop model of separately excited DC motor, closed loop speed control scheme.

UNIT - IV: INDUCTION MOTOR DRIVES (10 periods)

Stator voltage control by AC voltage controllers. Variable frequency control from voltage sources - slip speed control, torque and power limitations, modes of operation. Variable frequency control by voltage source inverters, current source inverters and cycloconverters. Static rotor resistance control. Slip power recovery schemes - static Scherbius drive, static Kramer drive - Numerical problems.

UNIT - V: SYNCHRONOUS AND SPECIAL MOTOR DRIVES (08 periods)

Modes of variable frequency control. Operation of self-controlled synchronous motors by VSI, CSI and Cycloconverters. Load commutated CSI fed synchronous motor drive - operation and waveforms. Stepper motor drives - torque vs stepping rate characteristics, drive circuits. Switched reluctance motor drives - converter circuits, modes of operation and closed loop speed control.

Total periods: 45

TEXT BOOKS:

1.Gopal K. Dubey, *Fundamentals of Electric Drives*, Narosa Publications, 2nd edition, 2004.

2.M.D. Singh, K.B. Khanchandani, *Power Electronics*, Tata McGraw Hill, 2nd edition, 2013.

REFERENCE BOOKS:

1.Gopal K. Dubey, *Power Semiconductor controlled drives*, Prentice-Hall International, 1989.

2.Paresh C. Sen, *Thyristor DC Drives*, Wiley-Interscience, 1981.

IV B.Tech. I Semester

14BT70202:**POWER SYSTEM OPERATION AND CONTRO**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Generation of Electric Power and Control Systems

COURSE DESCRIPTION: Optimal operation of generators in thermal power stations; optimum generation allocation; optimal scheduling of hydrothermal system; unit commitment; modelling of turbine, generator and governor; analysis load frequency control in a single and two area systems.

COURSE OUTCOMES: On successful completion of this course, a successful student will be able to

1. gain knowledge on
   - characteristics of thermal and hydro units
   - optimal operation and unit commitment of thermal units.
   - scheduling of hydrothermal power plants.
   - modeling of power system components for LFC studies.
   - load frequency control of single area and two area systems.
2. analyze
   - the economic operation criteria for thermal and hydrothermal units with and without losses.
   - unit commitment of thermal units.
   - LFC parameters in single and two area power system.
3. design suitable controllers to improve LFC dynamics in a single area and two area power system.
4. acquire skills in
   - economic scheduling of thermal and hydrothermal units for optimal operation.
   - planning of generators operating schedule using unit commitment methods.
   - evaluating the steady state frequency deviations for a load disturbance in single and two area power system.

DETAILED SYLLABUS:

UNIT - I: ECONOMIC OPERATION OF POWER SYSTEM (12 periods)

Optimal allocation neglecting line losses: Characteristics of thermal plants - heat rate curve, incremental fuel and production costs, input-output characteristics. Optimum allocation with line losses neglected - numerical problems.

Optimal allocation with line losses: Optimal allocation with line losses (with and without generating limits), Penalty factor. Loss coefficients, general transmission line loss formula - numerical problems.

UNIT-II: HYDROTHERMAL SCHEDULING (07 periods)

Introduction - classification of hydro plants, scheduling of hydro plants - long-term, short-term, scheduling energy. Hydrothermal scheduling problem - formulation objective function, operational constraints. Short term scheduling - lagrange function, iteration method, penalty factor method - numerical problems.

UNIT-III: UNIT COMMITMENT (07 periods)

Unit commitment Vs economic dispatch. Constraints in unit commitment start-up and shut-down costs, up time and down time constraints. Unit commitment solution methods - Priority-List method, Dynamic Programming method - simple problems (maximum of three plants for three operating hours only).

UNIT-IV: MODELING OF POWER PLANT COMPONENTS (07 periods)

Modeling of speed governor, modeling of turbine - reheat and non-reheat, generator-load model. Block diagram representation of an isolated power system. Excitation systems - classification, components of excitation systems, block diagram representation of IEEE type-1 excitation system.

UNIT-V: LOAD FREQUENCY CONTROL IN POWER SYSTEM (12 periods)

Load frequency control of single area system: Necessity of keeping frequency constant, definition of control area, steady state response (controlled and uncontrolled case), dynamic response (uncontrolled case), proportional plus integral control. Load frequency control and economic dispatch control - numerical problems.

Load frequency control of two area system: Block diagram representation, uncontrolled and controlled case, tie-line bias control - numerical problems. State space representation and optimal controller.

Total periods: 45

TEXT BOOKS

1.K. Uma Rao, *Power system operation and control*, Wiley India Pvt. Ltd, 1st edition, 2013.
2.C.L.Wadhwa, *Electrical Power Systems*, New age International, New Delhi, 5th edition, 2009.

REFERENCE BOOKS:

1.I.J. Nagrath and D.P. Kothari, *Modern Power System Analysis*, Tata McGraw Hill, 4th edition, 2003.
2.A. Chakravarthi and S. Halder, *Power System Analysis Operation and Control*, Prentice Hall India, 3rd edition, 2006.

IV B.Tech. I Semester

14BT70203: **POWER SYSTEM ANALYSIS**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Electric Circuits and Transmission of Electric Power

COURSE DESCRIPTION: Review of basic concepts of power system component and their representation; formation of bus admittance matrix;computation of power flows in a power system network using various numerical techniques; power system stability analysis.

COURSE OUTCOMES: On successful completion of the course, student will be able

1. demonstrate knowledge on
   - the formation of network matrices.
   - load flow studies.
   - power system stability.
2. analyze
   - the power flows and losses in the power system network using load flow analysis for different conditions.
   - the stability of the power system for different loading and faulted conditions.
3. demonstrate skills in evaluating
   - bus impedance and bus admittance matrices.
   - the load flow solution for a power system network for different conditions.
   - the various stability limits for various operating conditions.
4. apply the load flow and stability concepts to investigate various power system problems.

DETAILED SYLLABUS:

UNIT-I: POWER SYSTEM NETWORK MATRICES (10 periods)

Representation of power system elements. Graph theory - formation of incidence matrices, primitive network matrices, numerical problems. Formation of network matrices by singular transformation, numerical problems.

UNIT-II: ALGORITHM FOR BUILDING OF ZBus (08 periods)

Formation of ZBus for partial network, algorithm for the modification of ZBus matrix, addition of element from a new bus to reference, addition of element from a new bus to an old bus, addition of element between an old bus to reference and addition of element between two old buses - numerical Problems. Representation of transformer - fixed tap settings and phase shifting transformers.Introduction to Clarke's transformation and Park's transformation.

UNIT-III: POWER FLOW STUDIES - I (10 periods)

Bus formation by direct and singular transformation methods - numerical problems. Power flow studies - Introduction, necessity, classification of buses, derivation of static load flow equations. Load flow solution using Gauss-Seidel method - with and without PV buses, acceleration factor, determination of bus voltage, line flows and losses, injected active, reactive powers, algorithm and flowchart - numerical problems(maximum of 3-buses for one iteration only).

UNIT-IV: POWER FLOW STUDIES - II (09 periods)

Newton-Raphson method in rectangular and polar co-ordinates - derivation of Jacobian elements, load flow solution with and without PV bus algorithm and flowchart, decoupled and fast decoupled methods - numerical problems (maximum of 3-buses for one iteration only). Comparison of different load flow methods.

UNIT-V: POWER SYSTEM STABILITY (09 periods)

Elementary concepts of stability. Steady state stability - description of steady state stability power limit, transfer reactance, power angle curve, Derivation of swing equation. Transient stability - equal area criterion -applications, critical clearing angle, critical clearing time. Solution of swing equation by point-by-point method, methods to improve stability - numerical problems. Applications of auto re-closure and fast operating circuit breakers

Total periods: 45

TEXT BOOKS:

1.G. W. Stagg and A.H. El-Abiad, *Computer Methods in Power SystemAnalysis*, Mc Graw-Hill, New Delhi, 1968.

2.C. L. Wadhwa, *Electrical Power Systems*, New Age International (P)Limited publishers, New Delhi, 5th edition, 2009.

REFERENCE BOOKS:

1.P. Venkatesh,B.V. Manikandan, S. Charles Raja and A. Srinivasan, *Electrical power systems analysis, Security and deregulation*, PHI learning private limited, Delhi, 2014.

2.Abhijit Chakrabarthi, Sunitahalder, *Power System analysis operation and control*, PHI learning private limited, Delhi, 2012.

3.Dr. S. Sivanagaraju, B. V. Rami Reddy, *Electrical Power System Analysis*, Laxmi Publications, revised edition, 2011.

IV B.Tech. I Semester

14BT60401: **DIGITAL SIGNAL PROCESSING**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Signals and Networks

COURSE DESCRIPTION: Continuous and discrete signals and sequences; systems; DFT and FFT algorithms for the analysis of discrete sequences; design and realization of Digital IIR and FIR filters; Multirate systems and some of the Signal processing applications.

COURSE OUTCOMES: On successful completion of this course, students will be able to

1.demonstrate knowledge in
- digital signals, sequences and systems.
- DFT and FFT transforms.
- analog & Digital Filter Design.
- digital Filter Realization.
- DSP Processors.

2.perform Frequency analysis of discrete time signals in suppressing un necessary frequency components.

3.design and develop digital filters to optimize system performance and their realization.

4.solve problems in processing of signals through digital systems and applying them in signal processing.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO DIGITAL SIGNAL PROCESSING (10 periods)

Review of Discrete-time signals, systems and their classification. Discrete-Time systems described by difference equations.

Frequency analysis of Discrete Time signals:

Fourier series for DT periodic signal and power density spectrum, the Fourier transform of DT aperiodic signals and energy density spectrum, convergence of Fourier transforms. Review of Z-transforms, Applications, solution for difference equations of digital filters.

UNIT - II: DISCRETE AND FAST FOURIER TRANSFORMS (09 periods)

DFS representation of periodic sequences, properties of Discrete Fourier Series.

Discrete Fourier Transforms(DFT): Properties of DFT, linear filtering methods based on DFT, Relationship of FT to Z Transform, frequency analysis of signals using DFT.

Fast Fourier transforms (FFT): Radix-2 Decimation in time (DIT) and Decimation in frequency (DIF) FFT algorithms, Inverse FFT.

UNIT - III: IIR DIGITAL FILTERS (08 periods)

Design of IIR digital filters from analog filters - IIR filter design by approximation of derivatives, impulse invariance and bilinear transformation. Characteristics of commonly used analog filters, Frequency transformations. Structural realization of IIR systems-direct, cascade and parallel form structures, Transposed form.

UNIT - IV: FIR DIGITAL FILTERS (08 periods)

Symmetric and anti-symmetric FIR filters, Design of linear phase FIR digital filters using windowing techniques, Frequency sampling technique, Comparison of IIR and FIR filters. Structural realization of FIR filters-direct, cascade-form structures and linear phase structures.

UNIT - V: INTRODUCTION TO DSP PROCESSORS (10 periods)

Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in P-DSPs, Multiple access memory, multiported memory, VLIW Architecture, Pipelining, Special addressing modes, On-Chip Peripherals.

Architecture of TMS 320C6X: Introduction, Features of 'C6X Processors, Internal Architecture, CPU, General-Purpose Register Files, Functional Units and Operation, Data Paths, Control Register File.

Total periods: 45

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital Signal Processing, Principles, Algorithmsand Applications*, Pearson Education/PHI, 4th edition, 2007.
2. Alan.V. Oppenheim, Ronald.W. Schafer, John R Buck, *Discrete Time Signal Processing*, Prentice Hall, 2nd edition, 2006.
3. B.Venkataramani, M. Bhaskar, *Digital Signal Processors - Architecture, Programming and Applications*, TATA McGraw Hill, 2nd edition, 2010

REFERENCE BOOKS:

1. Tarun Kumar Rawat, *Digital Signal Processing*, Oxford University Press, 1st edition, 2015.

IV B.Tech. I Semester

14BT6HS01: **BANKING AND INSURANCE**

(OPEN ELECTIVE)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Managerial Economics and Principles of Accountancy

COURSE DESCRIPTION: Origin and growth of Banking, functions and importance, RBI; Debtor and Creditor relationship, Types of Accounts, Loans and Advances; e-payment, e-cash, NEFT, RTGS, Credit and Debit cards; Insurance elements and risk; LIC, GIC, IRDA.

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. acquire Knowledge in
   - tools and concepts of Banking and Insurance.
   - basic Principles and concepts of Insurance and Banking.
   - provides life skills for effective utilization of Banking and Insurance facilities.
   - e-fund transfers, e-payments and e-business models.
2. develop analytical skills in understanding problems pertaining to
   - online banking and e-payments.
   - risk Management through insurance benefits the society at large.
   - money management by leveraging on technology, banking and insurance services.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO BANKING (09 periods)

Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT - II: BANK-CUSTOMER RELATIONSHIP (09 periods)

Debtor-creditor relationship, antimoney laundering, products or services, payment and collection of cheques and other negotiable instruments. Accounts - Types of accounts, procedure for opening and closing an account. Loans and Advances - principles of lending, types of loans.

UNIT - III: BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM (09 periods)

Features, types of e-payment system, e-cash, NEFT, RTGS, Electronic purses, Credit and Debit cards. Business models - B2B, B2C, C2C, and B2G.

UNIT - IV: INTRODUCTION TO INSURANCE (09 periods)

Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT - V: INSURANCE OVERVIEW (09 periods)

Principles of insurance, insurance types, LIC & GIC insurance contract - nature, elements, functions, IRDA, Insurance Players in India. **Total periods: 45**

TEXT BOOKS:

1 A.V. Ranganadha Chary, R.R. Paul, *Banking and Financial system*, Kalyani Publisher, New Delhi, 2nd edition.

2. P.K.Gupta, *Insurance and Risk Management*, Himalaya Publishing House, New Delhi, ISBN: 9789350516676.

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma, *Electronic Commerce- A Manager's Guide to E-Business*, Vanity Books International, Delhi, 2002.
2. Kalakota Ravi and Whinston Andrew B, F*rontiers of Electronic Commerce*, Pearson education India, New Delhi, 1996.
3. Schneider, Grey P, *Electronic Commerce, Course Technology,* Cengage Learning, 8thedition, New Delhi, 2008.

IV B.Tech. I Semester

14BT6HS02:**COST ACCOUNTING AND FINANCIAL MANAGEMENT**

(OPEN ELETIVE)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Scope, Objectives and Elements ofcost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Returns on Investment.

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. acquire Knowledge in
   - elements of Costing.
   - basic concepts of Financial Management.
   - risk and Return
   - financial Accounting.
   - using advanced tools like tally and SAP.
   - significance of Economics and Accountancy
2. do cost, risk and return of investment analysis.
3. develop skills in providing solutions for
   - material, Labor, Overheads control.
   - excellence and ability to minimize the cost of the organization
   - effective investment decisions
4. prepare cost sheets pertaining to manufacturing of products.

DETAILED SYLLABUS:

UNIT -I: INTRODUCTION TO COST ACCOUNTING (09 periods)

Cost and Cost Accounting, Scope, Objectives, Advantages and disadvantages - Cost Accounting Vs Management Accounting - Elements of Costing - Installation of costing system - Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

UNIT - II: COST ANALYSIS (09 periods)

Analysis of Cost - Preparation of cost sheet, estimate, tender and quotation (Simple problems) Importance of Costing while pricing the products.

UNIT - III: STANDARD COSTING (09 periods)

Introduction to Standard Costing & Variances - Variance Analysis: Material variances, Labor variances (Simple Problems).

UNIT -IV : FINANCIAL MANAGEMENT (09 periods)

Financial Management - Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

UNIT -V: RISK AND RETURNS ON INVESTMENT (09 periods)

Investment - Meaning and Definition - concept of risk and returns-Investment Alternatives - Introduction to Behavioral Finance - Anomalies - Key Concepts - Anchoring - Mental Anchoring - Confirmation and Hindsight Bias - Gambler's Fallacy- Herd Behavior - Over Confidence - Overreaction and Availability Bias- Prospect Theory.

Total periods: 45

TEXT BOOKS:

1. S.P. Jain and K.L. Narang, *Cost Accounting,* Kalyani Publishers, Ludhiana, 6th edition, 2002.
2. James C Van Horne, *Financial Management and Policy,* Prentice-Hall of India/Pearson, 12th edition, 2001.

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, *Cost and Management* Study Material, New Delhi.
2. I.M. Pandey, *Financial Management,* Vikas Publishing House Pvt. Ltd., 10th edition, 2010.

IV B.Tech. I Semester

14BT6HS03:**ENTREPRENEURSHIP FOR MICRO, SMALL AND MEDIUM ENTERPRISES**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. acquire Knowledge in
   - schemes and institutions encouraging entrepreneurship.
   - basic Principles and concepts of Accountancy.
   - significance of entrepreneurship.
2. (i) develop analytical skills in understanding problems pertaining to
   - personal excellence through financial and professional freedom.
   - women entrepreneurship acts as contrivance in the societaldevelopment

   (ii) develop Critical thinking and evaluation ability.
3. generate ideas for formulating business plans.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT (09 periods)

Concept of Entrepreneurship - Growth of Entrepreneurship in India - Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur - Functions of Entrepreneur - Need for an Entrepreneur - Entrepreneurial Decision Process - Types of Entrepreneurs - Distinction between an Entrepreneur and a manager - Intrapreneur - Entrepreneur Vs Intrapreneur.

UNIT - II: IDEA GENERATION AND FORMULATION OF BUSINESS PLANS (09 periods)

Sources of Ideas - Methods of idea generation - Product Identification - Opportunity Selection - Steps in Setting up of a Small Business Enterprise - Contents Of Business Plans - Significance - Formulation of Business Plan - Business Opportunities in Various Sectors - Common Errors in Business Plan Formulation - Project Report Preparation

UNIT - III: MICRO AND SMALL ENTERPRISES (09 periods)

Meaning and Definition - Micro and Macro units - Essentials - Features - Characteristics - relationship between Micro and Macro Enterprises - Rationale behind Micro and Small Enterprises - Scope of Micro and Small Enterprises - Objectives of Micro Enterprises - Problems of Micro and Small Enterprises

UNIT - IV: INSTITUTIONAL FINANCE AND SUPPORT TO ENTREPRENEUR (09 periods)

Need for Institutional Finance - Commercial Banks - Industrial Development Bank of India (IDBI) - Industrial Finance Corporation of India Ltd. (IFCI) - Industrial Credit Investment Corporation of India Ltd. (ICICI)- State Financial Corporations (SFCs) - State Industrial Development Corporations (SIDCs) - Small Industries Development of Bank of India (SIDBI) - Need For Institutional Support - National Small Industries Corporation Ltd (NSIC) - Small Industries Development Organisation (SIDO) - Small Industries Service Institutes (SISIs) - District Industries Centres (DICs) - National Institute of Entrepreneurship and Small Business Development (NIESBUD) - Technical Consultancy Organizations (TCOS)(Origin, Mission, and credit facility/support).

UNIT -V: WOMEN ENTREPRENEURSHIP (09 periods)

Concept of Women entrepreneur - Functions of Women entrepreneurs - Growth of women entrepreneurship in India - Challenges of Women entrepreneurs- Programmes supporting women entrepreneurship - Rural Entrepreneurship - Meaning, Need for Rural entrepreneurship, Problems of rural entrepreneurship, Role of NGOs.

Total periods: 45

TEXT BOOKS:

1.Dr. S.S.Khanka, *Entrepreneurial Development*, S. Chand and Company Ltd, Revised edition, 2012.

2.Madhurima Lall & Shikha Sahai, *Entrepreneurship*, Excel Books India, 2nd edition, 2008.

REFERENCE BOOKS:

1.Nandan, H., *Fundamentals of Entrepreneurship*, PHI Learning Pvt. Ltd., New Delhi, 3rd edition 2013.

2. Vasanth Desai, T*he Dynamics of Entrepreneurial Development and Management,* Himalaya Publishing House, 4th edition 2009.
3. Bholanath Dutta, *Entrepreneurship Management - Text and Cases*, Excel Books, 1st edition 2009.

IV B.Tech. I Semester

14BT70105:**DISASTER MITIGATION AND MANAGEMENT**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Environmental Sciences

COURSE DESCRIPTION: Natural disasters and hazards - Earthquakes - Floods and cyclones, droughts - Landslides - Disaster management.

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. explain various types of disasters and mitigation strategies
2. analyze and interpret the Guidelines for hazard assessment and vulnerability analysis
3. use historical data of disaster losses and inform the people over preparedness
4. address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society
5. function in multidisciplinary teams for the effective displacement of people during disasters

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION (08 periods)

Types of disasters - Natural disasters - Impact of disasters on environment - Infrastructure and development - Concepts of hazards and vulnerability analysis - Hazard Assessment - Guidelines for hazard assessment and vulnerability analysis - Basic principles and elements of disaster mitigation.

UNIT - II: EARTHQUAKES (11 periods)

Introduction to earthquakes - Intensity scale (MSK-64) - Seismic activity in India - Seismic zones of India - Earthquakes in AP - Action plan for earthquake disaster preparedness - Elements at risk, recovery and rehabilitation after earthquake - Earthquake resistant design and construction of buildings. Tsunami - Onset, types and causes - Warning - Element at risk - Typical effects - Specific preparedness and mitigation strategies.

UNIT - III: FLOODS AND CYCLONES (11 periods)

Onset, types, warnings - Elements at risk - Typical effects - Indian floods and cyclones - Hazard zones - Potential for reducing hazards - Mitigation strategies and community based mitigation.

DROUGHTS: Onset, types and warning - Kinds of droughts - Causes of droughts - Impact of droughts - Early warning and response mechanisms - Mitigation strategies - Droughts in India.

UNIT - IV: LANDSLIDES (07 periods)

Onset, types and warning - Causes of landslides - Elements at risk - Indian land slides - Hazards zones - Typical effects - Mitigation strategies and community based mitigation.

UNIT - V: DISASTER MANAGEMENT (08 periods)

Disaster management Organization and Methodology - Disaster management cycle - Disaster management in India - Typical cases - Cost-benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Total periods: 45

TEXT BOOKS

1. V.K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, 1999.
2. A.S. Arya, AnupKaranth, and Ankush Agarwal, Hazards, *Disasters and Your Community: A Primer for Parliamentarians*, GOI-UNDP Disaster Risk Management Programme, 2005.

REFERENCE BOOKS

1. Disaster Management in India, *A Status Report Publication of the Govt. of India*, Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. R. B. Singh, *Natural Hazards and Disaster Management*, Rawat Publications, 2009.
3. Pardeepsahni, AlkaDhameja, Uma Medury, *Disaster Mitigation,* 4th edition, PHI Learning Pvt. Ltd., 2011.
4. Sanjay K. Sharma, *Environment Engineering and Disaster Management*, 1st edition, USP Publishers, 2011.

IV B.Tech. I Semester

14BT70106:**ENVIRONMENTAL POLLUTION AND CONTROL**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Environmental Science

COURSE DESCRIPTION: Introduction; Sources and Effects of Air Pollution; Dispersion of Pollutants and their control; Surface and Ground Water Pollution and control; Soil Pollution and remediation; Management of Municipal Solid Wastes.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. explain various pollutants, characteristics and their dispersion
2. analyze the major pollutants that causes environmental pollution.
3. conduct research and select suitable techniques to control pollution.
4. understand the effects of environmental pollutions on human beings and vegetation
5. communicate the methods of management and control of environmental pollution

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS (08 periods)

Scope - Air Pollutants - Classifications - Natural and Artificial - Primary and Secondary, Point and Non-Point, Line and Area Sources of Air Pollution - Stationary and Mobile Sources - Dispersion of Pollutants - Dispersion Models - Applications.

UNIT - II: EFFECTS AND CONTROL OF PARTICULATES (09 periods)

Effects of Air Pollutants on Man, Material and Vegetation - Global Effects of Air Pollution - Green House Effect, Heat Island, Acid Rains, Ozone Holes - Control of Particulates - Control at Sources - Process Changes - Equipment Modifications - Design and Operation of Control Equipment - Settling Chambers - Centrifugal Separators - Bag Filters, Dry and Wet Scrubbers - Electrostatic Precipitators.

UNIT - III: WATER POLLUTION (10 periods)

Introduction - Water Quality in Surface Waters - Nutrients - Controlling Factors in Eutrophication - Effects of Eutrophication - Ground Water Pollution - Thermal Pollution - Marine Pollution - Sewage Disposal in Ocean - Types of Marine Oil Pollution - Cleanup of Marine Oil Pollution - Control of Water Pollution - Case Study on Tanneries - Drinking Water Quality Standards.

UNIT - IV: SOIL POLLUTION (09 periods)

Soil Pollutants - Sources of Soil Pollution - Causes of Soil Pollution and their Control - Effects of Soil Pollution - Diseases Caused by Soil Pollution - Methods to Minimize Soil Pollution - Effective Measures to Control Soil Pollution - Case Study on Fertilizer.

UNIT - V: MUNICIPAL SOLID WASTE MANAGEMENT (09 periods)

Introduction - Types of Solid Wastes - Principles of Excreta Disposal - Domestic Solid Waste Production - Collection of Solid Wastes - Transport of Solid Wastes - Management of Solid Wastes - Methods of Land Disposal - Sanitary Landfill - Composting - Incineration.

Total periods: 45

TEXT BOOKS

1. C.S.Rao, *Environmental Pollution Control Engineering*, 2nd edition, New Age International Pvt Ltd., 2007.
2. Y.Anjaneyulu, *Introduction to Environmental Science*, 1st edition, BS Publications., 2009.

REFERENCE BOOKS

1. M.N. Rao and H.V.N. Rao, *Air Pollution*, 19th edition, Tata McGraw-Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, *Fundamentals of Air Pollution*, 5th edition, Academic Press (Elsevier), 2014.
3. S.M.Khopkar, *Environmental Pollution Monitoring and Control*, 2nd edition, New Age International Pvt Ltd., 2007.
4. S.Deswal and K.Deswal, *Environmental Science*, 2nd edition, Dhanpat Rai & Co, 2011.

IV B.Tech. I Semester

14BT70107:**CONTRACT LAWS AND REGULATIONS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Construction Contracts - Tenders - Arbitration - Legal Requirements - Labour Regulations.

COURSE OUTCOMES: On successful completion of the course, a student will be able to

1. explain contract documents and tendering processes.
2. analyze the legal issues in arbitration and in contracts documents.
3. address the legal issues in collecting taxes.
4. follow ethics while bidding, sale and purchase of property.
5. develop and Prepare tender documents as per the standards.

DETAILED SYLLABUS:

UNIT - I: CONSTRUCTION CONTRACTS (09 periods)

Indian Contracts Act - Elements of Contracts - Types of Contracts - Features - Suitability - Design of Contract Documents - International Contract Document and laws - Standard Contract Document - Law of Torts.

UNIT - II: TENDERS (09 periods)

Prequalification - Bidding - Accepting - Evaluation of Tender from Technical, Contractual and Financial Points of View - Two Cover System - Preparation of the Documentation - Contract Formation and Interpretation - Potential Contractual Problems - Price Variation Clause - Comparison of Actions and Laws - Subject Matter - Violations.

UNIT - III: ARBITRATION (09 periods)

Arbitration - Comparison of Actions and Laws - Agreements - Appointment of Arbitrators - Conditions of Arbitration - Powers and Duties of Arbitrator - Rules of Evidence - Enforcement of Award - Arbitration Disputes - Dispute Review Board.

UNIT - IV: LEGAL REQUIREMENTS (09 periods)

Legal Requirements for Planning - Property Law - Agency Law - Tax Laws - Income Tax, Sales Tax, Excise and Custom Duties - Local Government Approval - Statutory Regulations - Insurance and Bonding - Laws Governing Purchase and Sale - Use of Urban and Rural Land - Land Revenue Codes - EMD - Security Deposits - Liquidated Damages.

UNIT - V: LABOUR REGULATIONS (09 periods)

Social Security - Welfare Legislation - Laws Relating to Wages, Bonus and Industrial Disputes - Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act - Maternity Benefit Act - Child Labour Act - Other Labour Laws.

Total periods: 45

TEXT BOOKS

1. G.C.V. Subba Rao, *Law of Contracts I & II*, 11th edition, S. Gogia& Co., 2011.
2. Jimmie Hinze, *Construction Contracts*, 2nd edition, Mc Graw Hill, 2001.

REFERENCE BOOKS

1. Gajaria G.T, Kishore Gajaria, *Laws Relating to Building and Engineering Contracts in India*, 4th edition, Lexis NexisButterworths India, 2000.
2. B. S. Patil, *Civil Engineering Contracts and Estimates*, 3rd edition, University Press (India) Private Ltd., 2013.
3. Joseph T. Bockrath, *Contracts and the Legal Environment for Engineers and Architects,* 7th edition, McGraw Hill Education, 2010.
4. Akhileshwar Pathak, *Contract Law*, 1st edition, Oxford University Press, 2011.

IV B.Tech. I Semester

14BT70108:**PLANNING FOR SUSTAINABLE DEVELOPMENT**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Introduction to Sustainable Development - Environment, Sciences and Sustainability - Sustainable Development Politics and Governance - Tools, Systems and Innovations for Sustainability - Communication and Learning for Sustainability.

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. demonstrate the knowledge of planning, environment, tools and systems for sustainable development
2. analyze the current challenges to sustainability
3. use theoretical frameworks and provide solutions to the real world sustainability issues
4. conduct awareness of contemporary issues on globalization in terms of sustainability
5. give recommendations for the sustainability issues and solutions using a holistic approach
6. explain a sense of civic responsibility, including reflection on the student's own role in developing and nurturing sustainable communities
7. participate in decision making as individual and responsible for collective decision

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO SUSTAINABLE DEVELOPMENT (08 periods)

Definition and Concepts of Sustainable Development - Capitalization of Sustainability - National and Global Context - The Millennium Development Goals - Emergence and Evolution of Sustainability and Sustainable Development - Theories of Sustainability - Case Studies.

UNIT - II: ENVIRONMENT, SCIENCES AND SUSTAINABILITY (08 periods)

Climate Change - Science, Knowledge and Sustainability - Unforeseen Environmental Impacts on Development - Challenges of Sustainable Development - Centrality of Resources in Sustainable Development - Case Studies.

UNIT - III: SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE (10 periods)

Governance and Democracy and Eco-Welfare - Global Civil Society and World Civil Politics - Civic Environmentalism - Policy Responses to Sustainable Development - Economics of Sustainability - Social Responsibility in Sustainability - National Action.

UNIT - IV: TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY (11 periods)

Need for System Innovation - Transition and Co-Evolution - Theories and Methods for Sustainable Development - Strategies for Eco-Innovation - Ecological Foot Print Analysis - Socio Ecological Indicators - Eco Labels- Policy Programmes for System Innovation - Case Studies.

UNIT - V: COMMUNICATION AND LEARNING FOR SUSTAINABILITY (08 periods)

Role of Emerging Media - Remarkable Design and Communication Art, Activism and the Public Interest - Education for Sustainability - Participation in Decision Making - Critical Thinking and Reflection - Case Studies.

Total periods: 45

TEXT BOOKS

1. John Blewitt, *Understanding Sustainable Development*, Earth Scan Publications Ltd., 2nd edition, 2008.
2. Jennifer A. Elliot, *An introduction to sustainable development,* Earth Scan Publications Ltd., 4th edition, 2006.

REFERENCE BOOKS

1. Peter Rogers, Kazi F Jalal , John A Boyd, *An introduction to sustainable development*, Earth Scan Publications Ltd., 1st edition, 2006.
2. Simon Dresner, *The Principles of Sustainability*, Earth Scan Publications Ltd., 2nd edition,2008.
3. Peter Bartelmus, *Environment growth and development: The concepts and strategies of sustainability*, Routledge, 3rd edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, MiriliaBonnes, Jose Antonio Corraliza, Maria Vittoria Giuliani, *People places and sustainability*, Hogrefe & Huber Publishers, 2nd edition, 2003.

IV B.Tech. I Semester

14BT70109: **RURAL TECHNOLOGY**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Research and Development - Non Conventional Energy - Community Development - IT Management

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. acquire the knowledge of various nonconventional energy systems and technologies for rural development.
2. apply the principles of IT for the rural development
3. responsible for the development of technologies in rural areas
4. understand the impact of technologies in societal and environmental aspects

DETAILED SYLLABUS:

UNIT - I: RESEARCH and DEVELOPMENT (09 periods)

India - Ancient Indian Technologies - Rural India Life - Indian Farmer - Role of Science and Technology in Rural Development - Rural Technology and Poverty Eradication - Rural Business Hubs - Technology in improving rural infrastructure - Various organizations related to innovation - Issues of technology transfer: CAPART, NABARD, CSIR, NIF.

UNIT - II: NON CONVENTIONAL ENERGY (09 periods)

Definition of Energy, Types of alternative sources of energy, Sources of non conventional energy - Solar energy - Solar Cooker - Solar Heater - Biogas - Recycling and Management and Wastes Conservation - Assessment & Production of biomass products & their utilization.

UNIT - III: TECHNOLOGIES FOR RURAL DEVELOPMENT (09 periods)

Food & Agro based technologies - Tissue culture - Building and Construction technologies - Cultivation and processing of economic plants - Cottage and social Industries.

UNIT - IV: COMMUNITY DEVELOPMENT (09 periods)

Water conservation - Rain water Harvesting - Drinking water - Environment and Sanitation - Bio fertilizers - Medical and Aromatic plants - Employment generating technologies - Apiculture - Piciculture - Aquaculture.

UNIT - V: IT IN RURAL DEVELOPMENT (09 periods)

The Role of Information Technology in Rural Areas - Impact of Information Technology in Rural development - Need and Necessity of Technology - Corporate Social Responsibilities - Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and SaansadAdarsh Gram Yojana (SAGY) - village adoptions schemes.

Total periods: 45

TEXT BOOKS:

1. M.S Virdi, *Sustainable Rural Technologies*, Daya Publishing House, New Delhi, 1st edition, 2009.
2. S.V. Prabhath& P. Ch. Sita Devi, *Technology and Rural India,* Serials Publications, New Delhi, 1st edition, 2012.

REFERENCE BOOKS

1. P. R. S. Murthy, R.C. Chackravarthy, *Information Technology & Rural Development,* Pacific Books International, 1st edition, 2011.
2. Shivakanth Singh, *Rural Development Policies and Programmes*, Northern book centre, New Delhi, 1st edition, 2002.
3. L.M.Prasad, *Principles and Practice of Management*, Sultan Chand & Sons, New Delhi, 8th edition, 2014.
4. Venkata Reddy. K, *Agriculture and Rural Development Gandhian Perspective*, Himalaya Publishing House, 1st edition, 2001.

IV B. Tech. I Semester

14BT60305:**ARTIFICIAL INTELLIGENCE AND ROBOTICS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning.

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.
2. employ effective methods to analyze a robot motion control while executing a specific task.
3. design and Implement appropriate solutions for search Problems such as playing two person games and for planning problems which involve defining a sequence of actions of a robot.
4. apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance.

DETAILED SYLLABUS:

UNIT - I: ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING (10 periods)

The Underlying assumption of AI; AI Technique: simple Tic-Tac-Toe program; Problem solving: State space search; Production systems: control strategies, search space control: depth-first, breadth-first search; Heuristic search: Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT - II: KNOWLEDGE REPRESENTATION & LEARNING (09 periods)

Knowledge Representation; Predicate Logic: Simple facts in logic, resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; slots; conceptual dependency; scripts; Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.

UNIT - III: ROBOTICS -VISION & SENSING (08 periods)

Robotics: Robot Classification, Robot Specification, notation; Sensing: Range sensing: Triangulation; proximity sensing: Inductive, Capacitive and Ultrasonic sensing; touch sensing: tactile sensing, artificial skins; Force and torque sensing: Wrist force sensors; Vision: low-level vision, high-level vision.

UNIT - IV: ROBOT PROGRAMMING & CONTROL (10 periods)

Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: characteristics, specifications; Task level languages; Language structure: VAL II.

UNIT - V: ROBOT INTELLIGENCE & TASK PLANNING (08 periods)

Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; graph search technique; Problem solving and problem reduction; robot learning; Task planning: Modelling, task specification, obstacle avoidance, grasp planning; Expert system.

Total periods: 45

TEXT BOOKS:

1. E. Rich and K. Knight, *Artificial intelligence*, Tata Mc Graw Hill, 2nd edition, 1992.
2. K.S. Fu, R.C. Gonzalez, C.S.G. Lee, *Robotics: Control, Sensing, Vision, and Intelligence*, Mc Graw Hill, International edition, 1987.

REFERENCE BOOKS:

1. Mikell P. Groover, *Industrial Robotics*, Technology, Programming, and Applications, Tata Mc Graw Hill, 9th reprint 2011.
2. D.W. Patterson, *Introduction to AI and Expert Systems*, PHI, 1992**.**
3. N.J. Nilsson, Principles of AI, Narosa Publ. House, 2000.
4. George Luger, *AI-Structures and Strategies for and Strategies for Complex Problem solving*, Pearson Educations, 4th edition, 2002.

IV B.Tech. I Semester

14BT60306:**GLOBAL STRATEGY AND TECHNOLOGY**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Introduction to strategic management, strategic management process, principles of good strategy, globalisation, globalisation strategies, research & development strategies, technology management and transfer, significance, elements of transfer process, corporate governance: the Indian scenario.

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. identify the impact of globalization in a given engineering scenario. Participate in elementary discussions on corporate governance.
2. analyse an industrial Engineering problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.
3. decide upon a macroscopic management strategy to optimize the impact of decisions with limited resources.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTION TO STRATEGIC MANAGEMENT (09 periods)

Definitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT - II: GLOBALISATION (09 periods)

Meaning and dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouringGlobalisation; Globalisation strategies.

UNIT - III: RESEARCH & DEVELOPMENT STRATEGIES (09 periods)

Introduction, Concept, Evolution of R & D Management, R & D as a business, R & D and competitive advantage, Integration of R & D, Elements of R & D strategies, Selection of R & D strategies, Implementation strategies, R & D trends, Responses to changes.

UNIT - IV: TECHNOLOGY MANAGEMENT AND TRANSFER (09 periods)

Technology Management: Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.

Technology Transfer: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT - V: CORPORATE GOVERNANCE: THE INDIAN SCENARIO (09 periods)

Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance - Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family - owned business in India, Corporate Governance and the Indian ethos,

Total periods: 45

TEXT BOOKS:

1. Francis Cherunilam, *Stategic Management*, Himalaya Publishing House, 3rd edition, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan, *Management of Technology*, Strategic Management, Himalaya Publishing House, 2nd edition, 2012.

REFERENCE BOOKS:

1. White and Bruton, *The management of Technology and innovation; a strategic approach*, Cengage Learning, 1st edition, 2007.
2. S.K.Mandak, *Ethics in business and Corporate Governance*, TMH, 2nd edition, 2012.

IV B.Tech. I Semester

14BT60307: **INTELLECTUAL PROPERTY RIGHTS AND MANAGEMENT**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION:

Protection of ideas, innovation and artistic endeavors; Acts and procedure related to patents, trademarks, passing off, copy right, design registration, trade secrets and cyber laws, case studies in each.

COURSE OUTCOMES: On successful completion of the course, a student will be able to

1.prepare documents and fill applications needed for filing a patent, design, copy right and trade mark

2.ensure smooth transition from concept to final product.

3.exercise discretion in following ethical aspects in dealing with intellectual property rights.

DETAILED SYLLABUS:

UNIT - I: OVERVIEW OF INTELLECTUAL PROPERTY RIGHTS (09 periods)

Introduction and importance of intellectual property rights (IPRs), types of intellectual property, International scenario in IPR: WIPO, WTO, TRIPS, international and national patent acts: United States of America patent act, United Kingdom patent act, India patent act, recent amendments in India patent act 1972.

UNIT - II: PATENTS (09 periods)

Introduction, Basic concepts, object and value of patent law, advantages of patent to inventor, patentable inventions, Not patentable inventions, overview of patent procedure, Bio technology patents, patents on computer program, patent rights on micro organism, plant breeding and breeders right, protection of bio diversity, protection of traditional knowledge, infringement of patents and remedy for infringement.

UNIT - III: TRADEMARKS (09 periods)

Trade Marks: Basic concepts, definition, functions, kinds of trademarks: service trademarks, collective trademarks, certification trademarks, textile trade marks, registrable and non registrable trademarks, registration of trademarks, examination process, establishing trade mark right, good will, infringement and action for trademarks, passing off, trade mark and eco label, comparison with patents industrial design and copy right.

UNIT - IV: INDUSTRIAL DESIGN, TRADE SECRETS & CYBER LAWS (09 periods)

Industrial Design: Basic concepts, scope and nature of rights, process of registration rights, rights after registration, transfer of interest or rights, reliefs and remedies and action for infringement of rights, appeals.

Trade Secrets: Definition, significance, tools to protect trade secrets in India

Cyber laws: Co relation to intellectual property

UNIT - V: COPY RIGHTS (09 periods)

Copy Rights: Introduction, nature and scope, subject matter, related or allied rights, works in which copy rights subsists, registration of copy rights, conferred by copy right, copy right protection in India, transfer of copy rights, right of broad casing organizations and of performer, computer software.

Total periods: 45

TEXT BOOKS:

1. P.Narayan, *Intellectual Property Law*, Eastern Law House, New Delhi and Kolkata, 2005,
2. Deborah E. Bouchoux, *Intellectual Property Rights*, Cengage Learning, India edition, 2011.

REFERENCE BOOKS:

1. Bainbridge David, *Intellectual Property Rights: Key to New Wealth*, National Research Development Corporation, Pearson Education, New Delhi.
2. W.R. Cornesh, *Intellectual Property Rights: Patent, Copy Right, Trade Mark, Allied Rights*, Universal law publishing private limited, Delhi, 2001.
3. S.R. Myneni, *Law of Intellectual Property*, Asia law house, Hyderabad 2001.
4. Prabuddha Ganguly, *Intellectual Property Rights: Unleasing Knowledge Economy*, TMH New Delhi, 1st edition, 2001.

IV B.Tech. I Semester

14BT60308:**MANAGING INNOVATION AND ENTREPRENEURSHIP**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts Shifting Composition of the Economy Purposeful Innovation and 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. define, explain and illustrate theories of business innovation and entrepreneurship, the evolution of industries and economies, and the roles of Entrepreneurs.
2. work effectively in multidisciplinary, cross-cultural teams, towards the development of a Team Project.
3. develop a comprehensive and well-structured business plan for a new venture.
4. present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan.

DETAILED SYLLABUS:

UNIT - I: ENTREPRENEURSHIP (07 periods)

Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, entrepreneurial growth and development.

UNIT - II: CREATIVITY AND INNOVATION (11 periods)

Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies: Strategies that aim at introducing an innovation, innovation & entrepreneurship, planning -incompatible with Innovation & entrepreneurship.

UNIT - III: THE INDIVIDUAL ENTREPRENEUR (07 periods)

Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation Entrepreneurial motivation (nAch story); Achievement Motivation in Real life - Case Study. Entrepreneurs versus inventors.

UNIT - IV: INTERNATIONAL ENTREPRENEURSHIP OPPORTUNITIES (11 periods)

International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Entrepreneurialentry in to international business, strategic Issues in International Entrepreneurship.

UNIT - V: CREATIVE PROBLEM SOLVING (09 periods)

Problem Identification and Problem Solving: Problem Identification. Problem solving Innovation and Diversification.

Total periods: 45

TEXT BOOKS:

1. Martin, M.J., *Managing Innovation and Entrepreneurship in Technology based Firm*, John Wiley Interscience, 1994.
2. Ettlie, J.E., *Managing Technology Innovation*, John Wiley & Sons, 2000.
3. Robert D Hisrich., Michael P Peters., Dean A Shepherd, *Entrepreneurship*, Mc Graw-Hill Companies, 6th Edition, 2011

REFERENCE BOOKS:

1. Christensen, C. M. and Raynor, M. E. *The Innovators Solution: Creating and Sustaining Successful Growth, Boston, MA*: Harvard Business School Press, (2003).
2. Drucker, P. F., I*nnovation and Entrepreneurship*, New York: Harper, 1985.
3. *Harvard Business Review on Innovation (Collection of articles)*, Harvard Business School Press (2001).
4. *Harvard Business Review on Entrepreneurship (Collection of articles)*, Harvard Business School Press (1999)
5. Rogers, E.M., *Diffusion of Innovations,* New York: Simon and Schuster, 5th edition,2003.
6. Drucker, P. F. *The Discipline of Innovation,* Harvard Business Review, May 2000. (Originally published 1985, May-June)

IV B.Tech. I Semester

14BT60309: **MATERIALS SCIENCE**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Engineering Physics, Engineering Chemistry.

COURSE DESCRIPTION: Structure and Bonding in metals; Steels, Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semiconductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics engineering, Material Selection and manufacturing of Optical fibers

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. understand how materials are formed and their classification based on atomic arrangement.
2. illustrate how the design of the various types of steels, cast Irons and Non ferrous alloys influence various engineering applications.
3. understand the basic difference in properties of various conductors, Insulators and Semiconductors and application of various advanced materials for different branches of Engineering.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO MATERIALS SCIENCE (07 periods)

Structure of metals: Bonds in Solids - Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys - determination of grain size.

Constitution of alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases and electron compounds.

UNIT - II: CAST IRONS, STEELS & NON-FERROUS METALS (12 periods)

Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels. Structure and properties of Copper and its alloys, Aluminum and its alloys.

UNIT - III: ELECTRIC CONDUCTORS & INSULATORS (12 periods)

Type of materials selected for conductors, Insulators and semi conductors. Introduction to ceramics - Bonding and microstructure - DC properties of ceramic materials - AC properties - mechanical properties - Ceramics as Conductors, Insulators and capacitors, introduction to Plastics - DC properties - AC properties - mechanical properties.

UNIT - IV: SEMICONDUCTORS AND MAGNETIC MATERIALS (09 periods)

Fabrication of Semiconductors - Producing a silicon wafer - Lithography and Deposition - Packaging of semiconductors materials - Types of magnetic materials - Measuring magnetic properties - Application of soft magnetic materials in Electromagnets and relays, AC transformers, Generators and motors.

UNIT -V: ADVANCED MATERIALS AND APPLICATIONS (05 periods)

Composites - Fiber reinforced, Metal Matrix, Ceramic Matrix - properties and applications; Ceramics - Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Glasses - properties and applications, manufacturing of Optical fibers.

Total periods: 45

TEXT BOOKS:

1. Kodigre V D, *Material Science and Metallurgy,* Everest Publishing House, Pune, 31st edition, 2011.
2. Ian. P. Jones, *Material Science for Electrical and Electronic Engineers*, Oxford University Press, New Delhi,2000

REFERENCE BOOKS:

1. V. Raghavan, *Physical Metallurgy: Principles and Practices*, PHI, New Delhi, 2nd edition, 2006.
2. William. D. Callister, *Materials Science & Engineering - An Introduction*, John Wiley and sons, New Delhi, 6th edition, 2002.
3. A.J. Dekkar, *Electrical Engineering Materials*, PHI, New Delhi, 1970.

IV B. Tech. I Semester

14BT60502:**ENGINEERING SYSTEMS ANALYSIS AND DESIGN**

(Open-Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Overview of the Systems Process, Technologies for systems, System Development Life Cycle, system Analysis and Modeling, levels of management, Project Management, Systems Implementation and importance of UML Prototyping, Maintaining and Managing the Systems output Process.

COURSE OUTCOMES: On successful completion of the course a student will be able to

1. gain knowledge on
   - systems Process and System Design
   - systems Analysis and Modeling
   - system Development Life Cycle
   - design Management and Maintenance Tools.
2. design, Develop and implement new Techniques for modeling the systems.
3. apply the CASE Tools for System Processand estimation the given models. 4.work effectively as team member on projects
5. manage and Maintain the System Process.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION (09 periods)

Introduction - Systems, Types of systems,integrating technologies for systems, Need for system analysis and design, Roll of the systems analyst, the system development life cycle, CASE tools for analysis and design.

UNIT - II: ANALYSIS AND MODELING ORGANIZATIONAL SYSTEMS (09 periods)

Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, levels of management, organizational culture.

UNIT - III: PROJECT MANAGEMENT (09 periods)

Project initiation, Problem in organization, Determining feasibilities, ascertaining hardware and software needs, identifying, forecasting, comparing costs and benefits, activity planning and control, managing the project.

UNIT - IV: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (09 periods)

Object oriented analysis and design- Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT - V: DESIGNING EFFECTIVE OUTPUT (09 periods)

Output design objectives, relating output content to output method, realizing how output bias affects users, designing output for display, Case studies - Designing a web site management, online exam management.

Total periods: 45

TEXT BOOKS:

1. Kenneth E.Kendall and Julie E.Kendall, *System analysis and Design*, 8th edition, Pearson Education, India, 2011.

REFERENCE BOOKS:

1. Dennis, Wixom, and Roth, *Systems Analysis and Design*, 5th edition, John Wiley, 2012.
2. Shelly and Rosenblatt, *Systems Analysis and Design*, 9th edition, Cengage Learning, 2012.

IV B. Tech. I Semester

14BT71005: **MICROELECTROMECHANICAL SYSTEMS**

(Open-Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Basic knowledge in Physics.

COURSE DESCRIPTION: Overview of Micro Electro Mechanical Systems (MEMS), scaling laws, working principles of microsensors and microactuators, materials, microfabrication processes, packaging of Microsystems.

Course Outcomes: On successful completion of the course, a student will be able to

1.demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators.

2.identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.

DETAILED SYLLABUS:

UNIT - I: OVERVIEW OF MEMS AND SCALING LAWS (09 periods)

Introduction, MEMS and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.

Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid - body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT - II: WORKING PRINCIPLES OF MICROSYSTEMS (09 periods)

Microsensors, acoustic wave sensors, biomedical and biosensors, chemical sensors, pressure sensors, thermal sensors. Microactuation: actuation using thermal forces, shape-memory alloys, piezoelectric crystals, electrostatic forces. MEMS with microactuators, microgrippers, micromotors, microvalves, micropumps.Microaccelerometers, microfludics.

UNIT - III: MATERIALS FOR MEMS AND MICROSYSTEMS (09 periods)

Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

UNIT - IV: MEMS FABRICATION PROCESS AND MICROMANUFACTURING (09 periods)

Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.

UNIT - V: MEMS PACKAGING (09 periods)

Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging. **Total periods: 45**

TEXT BOOKS:

1.Tai-Ran Hsu, *MEMS & Microsystems, Design and Manufacture,* McGraw Hill Education (India) Pvt. Ltd., 2002.

REFERENCE BOOKS:

1.G.K.Ananthasuresh, K.J.Vinoy, *Micro and Smart Systems*, Wiley India, 1st edition, 2010

2.Nitaigour Premchand Mahalik, *MEMS*, McGraw Hill Education (India) Pvt. Ltd., 8th reprint, 2013.

IV B.Tech. I Semester

14BT61203: **BIO INFORMATICS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION:

Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES: On successful completion of the course, a student will be able to

1.demonstrate knowledge on concepts of biological databases, Genome and proteome.

2.analyze biological database management system.

3.create, select and apply appropriate techniques and tools to manage the biological data.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO BIOINFORMATICS (08 periods)

Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

UNIT - II: BIOLOGY AND INFORMATION (07 periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT - III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 periods)

Heuristic alignment algorithms, global sequence alignments - Needleman-Wunsch algorithm, local sequence alignments - smith-waterman algorithm, amino acid substitution matrices - PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.

UNIT - IV: PRIMARY DATABASES AND THEIR USE (11 periods)

Introduction to biological databases - organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT-V: SECONDARY DATABASES (09 periods)

Introduction to secondary databases - organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases - organization and Management of databases, KEGG, ExPASy, BRENDA.

Total periods: 45

TEXT BOOKS:

1. David W. Mount, *Bioinformatics: Sequence and Genome Analysis*, CSHL Press, 2nd edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, *Bioinformatics Basics, Applications in Biological Science and Medicine*, CRC Press, Taylor & Francis Group, 2nd edition, 2005.
2. Rastogi S. C., Namita Mendiratta, Parag Rastogi, *Bioinformatics: Methods and Applications: Genomics, Proteomics and Drug Discovery*, PHI Learning Pvt. Ltd., 3rd edition, 2011.

IV B.Tech. I Semester

14BT61204: **CYBER SECURITY AND LAWS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION:

Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

COURSE OUTCOMES: On successful completion of the course, a student will be able to

1. demonstrate knowledge in Cyber security, Cyber crimes and its related laws in Indian and Global Act.
2. analyze the legal perspectives and laws related to cyber crimes in Indian context.
3. apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO CYBER CRIMES (09 periods)

Introduction, Definition, Origin, Cyber Crime and Information Security, Cyber Criminals, Classifications of Cyber Crimes, The Legal Perspectives and Indian Perspective, Cyber Crime and Indian ITA 2000, Global Perspective on Cyber Crimes.

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Cafe and Crimes, Botnets.

UNIT-II: TOOLS AND METHODS USED IN CYBER CRIME (09 periods)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT - III: CYBER CRIMES AND CYBER SECURITY - LEGAL PERSPECTIVES (08 periods)

Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT - IV: CYBER SECURITY - ORGANIZATIONAL IMPLICATIONS (10 periods)

Introduction, Cost of Cyber Crimes and IPR issues, Web Threats for Organizations - Evils and Perils, Security and Privacy Implications from Cloud Computing, Social Media Marketing - Security Risks and Perils for Organizations, Social Computing and Associated Challenges for Organizations, Protecting People's Privacy in Organization, Organizational Guidelines for Internet Usage, Safe Computing and Usage Policy, Incident Handling and Best Practices, Media and Asset Protection.

UNIT - V: CYBER TERRORISM AND INFORMATION WARFARE (09 periods)

Introduction, Intellectual Property in the Cyber Space, the Ethical Dimension of Cyber Crimes, the Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.

Cyber Crime Illustrations: Indian Banks lose Millions of Rupees, Justice vs. Justice, Parliament Attack, The Indian case of online Gambling, Bank and Credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam**.**

Total periods: 45

TEXT BOOK:

1. Nina Gobole, SunitBelapure, *Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives*, Wiley India, 1st edition, 2011.

REFERENCE BOOKS:

1. Ferrara et al., *Cyber Law: Text and Cases,Cengage Learning*, 3rd edition, 2012.
2. VivekSood, *Cyber Law Simplified*, Tata McGraw-Hill, 1st edition, 2012.
3. Prashant Mali, *Cyber Law and Cyber Crimes*, Snow White Publications Pvt. Ltd., 1st edition, 2013.

IV B.Tech. I Semester

14BT70204: **REACTIVE POWER COMPENSATION AND MANAGEMENT**

(PROFESSIONAL ELECTIVE - II)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Generation of electric power, Transmission of electric power, Power electronics, Power system operation and control.

COURSE DESCRIPTION: Need for reactive power compensation; reactive power compensation in transmission systems; reactive power coordination; quality of supply; demand side and distribution side management; reactive power management in domestic and industrial sectors.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
   - different methods of load and line compensations.
   - types of load patterns and loss reduction methods in distribution system.
2. analyze different types of compensations.
3. design compensators for reactive power management in domestic , commercial and industrial applications.
4. apply the concepts of compensation for various real time applications.

DETAILED SYLLABUS:

UNIT - I: REACTIVE POWER COMPENSATION (09 periods)

The requirement for reactive power compensation, objectives in load compensation, ideal compensator, practical considerations, reactive power characteristics, power factor correction and voltage regulation. Load compensator as a voltage regulator, phase balancing and power factor correction of unsymmetrical loads - examples.

UNIT - II: REACTIVE POWER COMPENSATION IN TRANSMISSION SYSTEM (09 periods)

Steady state reactive power compensation - uncompensated line. Compensated transmission lines - types of compensation, passive compensation - shunt, series and dynamic shunt - examples.Transient state reactive power compensation - four characteristic time periods, passive shunt compensation. Static compensators - series capacitor compensation. Synchronous condensers - examples.

UNIT - III: REACTIVE POWER COORDINATION (09 periods)

Reactive power coordination - utility objectives, mathematical modeling, operation planning, transmission benefits. Quality in electric power supply - disturbances, steady state variations, effects of under voltages, frequency, harmonics, radio frequency and electromagnetic interferences. IEEE and IEC standards on power quality.

UNIT - IV: REACTIVE POWER MANAGEMENT (09 periods)

Demand side management - load patterns, load shaping, power tariffs, kVAR based tariffs, penalties for voltage flickers and harmonic voltage levels.

Distribution side management - system losses, loss reduction methods -examples. Reactive power planning in distribution systems - objectives, economics planning for capacitor placement and retrofitting of capacitor banks.

UNIT - V:

REACTIVE POWER MANAGEMENT IN DOMESTIC AND INDUSTRIAL SECTORS (09 periods)

kVARrequirements for domestic appliance - purpose of using capacitors, selection of capacitors, deciding factors, types of available capacitors, characteristics and limitations. Typical layout of traction systems - reactive power control requirements. Electric arc furnaces. Textile and plastic industries. Furnace transformer. Filter requirements, remedial measures and power factor of an arc furnace.

Total periods: 45

TEXT BOOKS:

1.T.J.E.Miller, *Reactive power control in Electric power systems*, A Wiley-Interscience publications, New York, 1982.

2.D.M. Tagare, *Reactive power Management,* Tata McGraw-hill publishing company Ltd., New Delhi, 2004.

IV B.Tech. I Semester

14BT70205: **SOFT COMPUTING TECHNIQUES**

(PROFESSIONAL ELECTIVE - II)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Nil

COURSE DESCRIPTION: Architectures of artificial neural networks: feed forward and feedback networks,Learning strategies: Supervised; Un-supervised and reinforced; Fuzzy set theory; Fuzzy systems design; applications of neural networks and fuzzy systems, Terminologies and Operators of Genetic Algorithm; Encoding; Selection; Crossover; Mutation; Replacement.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate the knowledge on learning strategies of an artificial neural network, components of fuzzy logic system and operators of genetic algorithm.
2. design fuzzy systems, neural networks and genetic algorithm for real time problems.
3. exhibit problem solving skills in fuzzy set theory and learning methods of neuralnet works.
4. apply various configurations of neural networks, fuzzy systems and genetic algorithms to different engineering applications.

DETAILED SYLLABUS:

UNIT - I: FUNDAMENTALS OF ARTIFICIAL NEURAL NETWORKS (10 periods)

Neural networks - introduction, artificial neural network, advantages, biological neural network, architectures of artificial neural networks - activation functions, important terminologies of ANN, Mcculloch - pitts neuron model, learning strategies - supervised, unsupervised, reinforced, learning rules - Hebbian learning rule, perceptron learning rule, delta learning rule, widrow - hoff learning rule, correlation learning rule, winner - take - all learning rule, out star learning rule, concept of linear separability with AND & XOR examples.

UNIT - II: SUPERVISED, UNSUPERVISED NETWORKS & ASSOCIATIVE MEMORIES (10 periods)

Supervised networks: back propagation neural network-architecture, training algorithm, learning factors - initial weights, steepness of the activation function, leaning constant, momentum method and necessary number of hidden neurons. Un-supervised networks: Kohonen self-organizing map- competitive process, cooperation process, adaptive process, training algorithm. Counter propagation Networks-full counter propagation network - architecture, training algorithm.

Associative memories: concepts, Bidirectional Associative Memory (BAM) - architecture, discrete BAM - testing algorithm, analysis of hamming distance, energy function and storage capacity. Discrete Hopfield network-architecture and training algorithm.

Applications of artificial neural networks-short term electrical load forecasting, process identification.

UNIT - III: CLASSICAL AND FUZZY SETS (10 periods)

Introduction - classical sets - operations, properties. Fuzzy sets - operations, properties. Crisp relations - cardinality, operations, properties, cartesian product, composition. Fuzzy relations - cardinality, operations, properties, fuzzy cartesian product, composition. Linguistic hedges, membership functions - features, methods of membership value assignments - intuition, inference, rank ordering, neural networks, inductive reasoning.

UNIT -IV: FUZZY LOGIC SYSTEMS (09 periods)

Defuzzification: lamda - cuts for fuzzy sets and fuzzy relations, defuzzification methods - max membership principle, weighted average, centroid, center of sums. Fuzzy rule base - formation of rules, decomposition of rules, aggregation of rules, - design procedure. Applications of fuzzy logic- speed control of a dc motor, air conditioner control.

UNIT - V: GENETIC ALGORITHM (07 periods)

Introduction to evolutionary computing - GA, biological back ground of GA, terminologies and operators of GA - search space, individuals, genes, fitness function, population, encoding - binary encoding, breading, selection - roulette wheel, rank selection, tournament, crossover - single point and two point crossovers, mutation - flipping, interchanging, reversing. Probabilities of cross over & mutation. Replacement - random, weak parent replacement. Termination criteria, flow chart, advantages, limitations and applications.

Total periods: 45

TEXTBOOKS:

1.S.N. Sivanandam, S.N. Deepa, *Principles of Soft computing*, Wiley India private Ltd., 2nd edition, 2013.
2.Timothy J Ross, *Fuzzy Logic with Engineering Application*, McGraw Hill Inc.1997.

REFERENCES BOOKS:

1.Jacek M. Zurada, *Introduction to Artificial Neural Networks*, Jaico Publishing House.
2.Simon Haykin, *Neural Networks - A Comprehensive Foundation*, Prentice-Hall Inc, 1999.

IV B.Tech. I Semester

14BT70206: **ADVANCED MICROCONTROLLERS**

(PROFESSIONAL ELECTIVE - II)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Microprocessors and Microcontrollers

COURSE DESCRIPTION: Architecture, Instruction set and programming of ARM processor, PIC microcontroller

COURSE OUTCOMES: On successful completion of this course, the student will be able to

1. demonstrate knowledge on architecture of ARM and PIC microcontrollers.
2. critically analyze and develop a suitable interface with an appropriate microcontroller for control operations.
3. develop programs and design suitable hardware for stand-alone systems.
4. identify a suitable microcontroller for solving complex electrical engineering problems.

DETAILED SYLLABUS:

UNIT - I: ARM PROCESSOR (09 periods)

ARM processor fundamentals, registers, current program status register, pipeline, exceptions, core extensions, instruction set, thumb instruction set.

UNIT - II: ARM EXCEPTION AND INTERRUPT HANDLING, MEMORY MANAGEMENT (08 periods)

Exception handling, interrupts, interrupt handling schemes, memory protection unit, protected regions, memory management unit, virtual memory, details of ARM MMU.

UNNIT - III: PIC MICROCONTROLLERS (10 periods)

PIC18F architecture and features. Memory organization - program memory, data memory. PIC Register file - General purpose registers and SFRs.

Introduction to PIC Assembly Programming, PIC Data Format and Directives. PIC programming tools. Instruction set - data transfer, arithmetic, logical, bit manipulation, branch Instructions. I/O Port Programming. Addressing modes - Immediate, Direct, Register Indirect Addressing Modes. Macros and Modules.

UNIT - IV: SERIAL, INTERRUPT, I/O PORTS AND TIMER PROGRAMMING (09 periods)

I/O ports.Timer modules. Compare mode, capture mode. PIC Serial Port programming, PIC Interrupts, Programming Timer Interrupts, Programming the Serial Communication Interrupts, Port-B - Change Interrupt, Interrupt Priority in the PIC.

UNIT - V: PIC INTERFACING (09 periods)

ADC Characteristics, ADC Programming in the PIC, DAC Interfacing, Sensor Interfacing and Signal Conditioning, Standard and Enhanced CCP Modules, Compare Mode Programming, Capture Mode Programming, PWM Programming, ECCP Programming, Relays and Opto-isolators, Stepper Motor Interfacing, DC Motor Interfacing and PWM, PWM Motor Control with CCP, DC Motor Control with ECCP.

Total periods: 45

TEXT BOOKS:

1. Andrew N.Sloss, Dominic Symes, Chris Wright, *ARM system Developer's Guide, Designing and Optimizing Software*, Morgan Kaufmann Publishers, 2004.
2. M. Rafiquzzaman, *Microcontroller Theory and Applications with the PIC18F*, Wiley India Pvt. Ltd., 1stedition, 2014.

REFERENCE BOOKS:

1. John B.Peatman, *Design with PIC Microcontrollers*, Pearson Education, 2007.

IV B.Tech. I Semester

14BT60431: **PRINCIPLES OF COMMUNICATION**

(PROFESSIONAL ELECTIVE - II)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Signals and Networks

COURSE DESCRIPTION: Fundamentals of Communications; Analog and digital communications - modulation and Demodulation Techniques; Information theory and coding.

COURSE OUTCOMES: On successful completion of the course students will be able to:

1.demonstrate fundamental knowledge in

- Elements of communication systems.
- Amplitude, Frequency, and Phase Modulators and De-Modulators
- Data transmission and detection of digital signals
- Information theory and coding techniques

2.perform analysis of different modulations and calculate total power & bandwidth in the modulated wave.

3.design and develop modulators and demodulators for communication systems

4.solve engineering problems for feasible and optimal solutions in the core area of Analog and Digital Communication Systems

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION (08 periods)

Block diagram of Electrical Communication System, Types of Communications, Analog, Pulse and Digital types of Signals, Fourier Transform for various Signals, Fourier Spectrum, Power Spectral Density, Autocorrelation, Cross Correlation and Convolution.

UNIT - II: ANALOG MODULATION TECHNIQUES (11 periods)

Need for Modulation, Types of Amplitude Modulation, AM, DSBSC, SSBSC, Power and BW requirements, generation of AM, DSBSC, SSBSC, demodulation of AM: Diode detector, Product demodulation for DSBSC & SSBSC. Frequency & Phase Modulations, Advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, generation and demodulation of FM, Comparison of FM & PM.

UNIT - III: PULSE MODULATIONS (08 periods)

Sampling, Nyquist Rate of Sampling, Sampling theorem for Band limited Signals, PAM, Regeneration of Base band Signal, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

UNIT - IV: DIGITAL TRANSMISSION (10 periods)

Pulse Code Modulation: Advantages, Block diagram of PCM, Quantization, effect of Quantization, Quantization error, DM, ADM and Comparison.

Digital Modulation: ASK, FSK, PSK, QPSK, DPSK, Modulation and Demodulation, Coherent and Incoherent, Modems.

UNIT - V: INFORMATION THEORY AND CODING (08 periods)

Concept of Information, Entropy and Rate of Information, Coding efficiency, Shannon-Fano and Huffman Coding, Error Control Coding, Error Detection and Correction Codes, Block Codes, Convolutional Codes.

Total periods: 45

TEXT BOOKS:

1.R.P. Singh and S D Sapre, *Communication Systems - Analog and Digital*, TMH, 2nd edition2007.

2.Simon Haykin, *Communication Systems*, John Wiley, 2nd edition 2007.

REFERENCE BOOKS:

1.H. Taub and D. Schilling, *Principles of Communication Systems*, TMH, 2nd edition, 1991.

2.Sam Shanmugam, *Digital and Analog Communication Systems*, John Wiley, 2006.

IV B.TECH. I SEMESTER

14BT70531: **ADVANCED DATA STRUCTURES**

(PROFESSIONAL ELECTIVE - II)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Programming in C and Data Structures

COURSE DESCRIPTION: Concepts of Data Structure, Hashing, Linked List, Stacks, Queues, Trees and Graphs**.**

COURSE OUTCOMES: On successful completion of the course students will be able to:

1.gain Knowledge in

- principles of Data Structures.
- abstract Data Type.
- linear and Non-linear Data Structures.

2.analyze and Identify suitable data structure design techniques for problem solving.

3.develop programs to implement linear and non liner data structures.

DETAILED SYLLABUS:

UNIT - I: LINKED LISTS **(09 periods)**

Introduction, Single Linked List, Circular Linked List, Doubly Linked List, Multiply Linked List, Applications.

UNIT - II: STACKS AND QUEUES **(09 periods)**

STACKS: Introduction, Stack Operations, Applications,

QUEUES: Introduction, Operations on Queues, Circular Queues, Applications.

LINKED STACKS AND LINKED QUEUES: Introduction, Operations on Linked Stack and Linked Queues, Dynamic Memory Management and Linked Stacks.

UNIT - III: BINARY TREES AND SEARCH TREES **(09 periods)**

BINARY TREES: Basic Terminology and Types, Representation of Binary Trees, Binary Tree Traversal, Applications.

SEARCH TREES: Introduction, Binary Search Trees, AVL Trees, Applications.

UNIT - IV: GRAPHS AND B TREES **(09 periods)**

GRAPHS: Introduction, Definitions and Basic Terminology, Representation of Graphs, Graph Traversals, Applications.

B TREES: Introduction, m-way Search Trees, B Trees, Applications.

UNIT - V: HASH TABLES **(09 periods)**

Introduction, Hash Table Structure, Hash Functions, Linear Open Addressing, Chaining, Applications.

Total periods: 45

TEXT BOOKS:

1. G.A.V. Pai, *Data Structures and Algorithms*, Tata McGraw Hill, 2nd edition, 2009.

REFERENCE BOOKS:

1. Richard Gileberg, Behrouz A. Forouzan, *Data Structures: A Pseudo code Approach with C*, 2nd edition, 2007.
2. Reema Thareja, *Data Structures Using C*, 2nd edition, Oxford University Press, 2014.

IV B.Tech. I Semester

14BT70221: **POWER ELECTRONICS AND DRIVES LAB**

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITE(S): DC Machines, Transformers and Induction Machines and Power Electronics

COURSE DESCRIPTION: Operation and characteristics of power devices like SCR, MOSFET and IGBT, working of various power electronic converters, AC and DC drives.

COURSE OUTCOMES: On successful completion of course the student will be able to

1. demonstrate knowledge on characteristics of power devices, converters and AC and DC drives.
2. analyze different power electronic devices and their characteristics.
3. design different triggering and commutation circuits for SCR.
4. evaluate and compare various parameters from the operation of converters and drives.
5. solve problems arising in motor control and converters using power devices.
6. function effectively as individual and as member in a team.
7. prepare a report that clearly communicate experimental observations/findings.

LIST OF EXPERIMENTS:

Any eight of the experiments to be conducted from PART-A.

PART-A:

1. Characteristics of SCR, MOSFET & IGBT.
2. Gate firing circuits for SCR.
3. Forced commutation circuits for SCR.
4. Single phase half controlled bridge converter with R and RL loads**.**
5. Single phase fully controlled bridge converter with R and RL loads.
6. Single phase dual converter with RL loads.
7. DC Jones chopper with R and RL Loads.
8. Single phase AC voltage controller with R and RL Loads.
9. Single phase cycloconverter with R and RL loads.
10. Single phase parallelinverter with R and RL loads.
11. Single phase series inverter with R and RL loads.

Any Four of the experiments to be conducted from PART-B.

PART-B:

1. Speed control of separately excited DC motor using single phase semi converter.
2. Speed control of separately excited DC motor using single phase full converter.
3. Four quadrant chopper fed DC drive.
4. Speed control of single phase induction motor using cycloconverter.
5. Three phase fully controlled rectifier fed separately excited DC motor.
6. Speed control of single phase induction motor using IGBT based PWM inverter.

IV B.Tech. I Semester

14BT70222: POWER SYSTEMS AND SIMULATION LAB

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PREREQUISITE(S): Electric circuits lab, Electrical Systems and Simulation lab, Power System Operation and Control and Power System Analysis

COURSE DESCRIPTION: Relay testing; fault analysis; determination of sub-transient reactance; sequence impedances; sequence components and power angle characteristics of synchronous machine; determination of load flows, simulation of synchronous machine and load frequency problem using MATLAB software

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
   - determination of sequence parameters for synchronous machine and transformer.
   - power system protection and testing of relays.
   - The usage of MATLAB/SIMULINK.
   - various load flow methods and load frequency problem
2. analyze
   - faults on synchronous generator
   - the power flow in power system network using various load flow methods
   - protective schemes and testing of relays.
3. demonstrate skills in
   - obtaining the power angle characteristics of salient pole machine
   - obtaining various relay characteristics
   - determining phase sequence components of salient pole machine synchronous machine and transformer
   - identifying, selecting and developing suitable protection schemes for reliable operation of power system.
4. apply MATLAB
   - to determine Y-bus, Z-bus and power flow in power system network
   - to investigate load frequency problem using SIMULINK
5. execute real time projects in the field of power system operation and control.
6. function effectively as individual and as member in a team
7. communicate effectively both oral and written

LIST OF EXPERIMENTS:

PART A

Conduct any 6 experiments from the following:

1. Determination of sub-transient reactance's for salient pole synchronous machine.
2. Determination of sequence impedances for cylindrical rotor synchronous machine.
3. Fault analysis for LG, LL and LLG faults.
4. Reactive power compensation using tap changing transformer.
5. Power angle characteristic of three-phase salient pole synchronous machine.
6. Determination of sequence components for three phase transformer.
7. Characteristics of over current relay.
8. Characteristics of over voltage relay.
9. Testing of frequency relay.
10. Testing of reverse power relay.

PART B

Conduct any 6 experiments from the following:

1. Formation of bus admittance matrix with and without off-nominal ratios of transformer of a power system network using MATLAB
2. Formation of bus impedance matrix with and without mutual coupling of a power system network using MATLAB
3. Load flow solution by using MATLAB
4. Transient stability analysis using MATLAB
5. Economic dispatch using MATLAB
6. Modeling of standard test system with generator excitation and governor action using SIMULINK
7. Modeling and analysis of automatic load frequency control of multi-area power system using SIMULINK
8. Analysis of Transmission line parameters using PSCAD
9. Simulation of Capacitor switching transient using PSCAD
10. Transformer inrush currents measurement using PSCAD

IV B.Tech. I Semester
14BT70223: SEMINAR

Internal Marks	External Marks	Total Marks	L	T	P	C
-	50	50	-	-	-	2

PREREQUISITES: All the courses of the program up to III B. Tech. - II Semester.

COURSE DESCRIPTION:

Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES:

On succeful completion of seminar work, the student will be able to

1. demonstrate in-depth knowledge on the seminar topic.
2. analyze critically, chosen seminar topic for substantiated conclusions.
3. undertake investigation of issues related to seminar topic providing valid conclusions.
4. function effectively as individual on the chosen seminar topic.
5. develop communication skills, both oral and written for preparing and presenting seminar report.
6. engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

IV B.Tech. II Semester
14BT80201: UTILIZATION OF ELECTRICAL ENERGY

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): DC Machines, Transformers and Induction Machines, Synchronous Machines

COURSE DESCRIPTION: Types of electric drives; types of industrial loads; load equalization concepts; Methods of electric heating, welding and their applications; Laws of illumination; different types of lamps; types of lighting scheme and their control; traction motor and its characteristics; electrification; electric braking; speed time curves for different services; specific energy consumption calculations.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
    - different types of electric drives.
    - methods of electric heating, welding and illumination.
    - control of traction motors
    - mechanics of traction system
2. analyze
    - appropriate drive for the industrial purpose.
    - proper illumination strategy for good lighting system.
    - the traction system for better performance
3. design illumination system for proper lighting.
4. demonstrate skills in evaluating the illumination levels, performance of various electrical drives and traction effort.
5. apply suitable drive, heating, welding and illumination techniques for various purposes.

DETAILED SYLLABUS:

UNIT - I: LOAD CHARACTERISTICS OF ELECTRIC DRIVES (09 periods)

Types of electric drives,choice of motor, starting and running characteristics of motors, speed control. Temperature rise, types of industrial loads - continuous, intermittent and variable loads, load equalization. Industrial applications.

UNIT-II: ILLUMINATION (10 periods)

Introduction, terms used in illumination,laws of illumination, polar curves, photometry - integrating sphere. Sources of light -arc lamps, discharge lamps, mercury vapor and sodium vapor lamps, compact fluorescent lamp, comparison between tungsten filament lamps and fluorescent tubes. Basic principles of light control, types and design of good lighting schemes and practices, factory lighting, street lighting, flood lighting - problems.

UNIT- III: ELECTRIC HEATING AND ELECTRIC WELDING (08 periods)

ELECTRIC HEATING: Design of heating element, Advantages, methods and applications - resistance, induction and dielectric heating.

ELECTRIC WELDING: Classification, resistance and arc welding, electric welding equipment, comparison between AC and DC welding.

UNIT- IV: ELECTRIC TRACTION - I (09 periods)

Traction systems: System of electric traction and track electrification, review of existing electric traction systems in India, special features of traction motor. Methods of electric braking - plugging, rheostatic and regenerative braking - numerical problems.

UNIT-V: ELECTRIC TRACTION - II (09 periods)

Speed-time curves for different services, trapezoidal and quadrilateral speed-time curves, train movement and energy consumption, mechanics of train movement - calculations of tractive effort, power output, specific energy consumption, effect of varying acceleration and braking retardation, dead weight, accelerating weight, adhesive weight, coefficient of adhesion - problems.

Total periods: 45

TEXT BOOKS:

1. J.B.Gupta, *Utilization of Electric Power and Electric Traction*, S.K.Kataria and Sons, 10th edition, 2013.
2. H. Partab, *Art and Science of Utilisation of Electrical Energy*, Dhanpat Rai & Co., 3rd edition,2010.

REFERENCE BOOKS:

1. N.V.Suryanarayana, *Utilization of Electrical Power including Electric drives and Electrictraction*, New Age International (P) Limited, Publishers, 1996.
2. C.L.Wadhwa, Generation, *Distribution utilization of Electrical Energy*, New Age International Pvt. Ltd,2003.

IV B.Tech. II Semester

14BT80202: **HVDC AND FACTS**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Power Electronics, Transmission of electric power, Power system operation and control.

COURSE DESCRIPTION: Introduction to high voltage transmission; converter and HVDC system control; harmonics and filters; FACTS concepts; static shunt, series compensators and combined compensators.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge on
   - different conventional and modern methods for real and reactive power control in transmission system.
   - importance and operation of various HVDC and FACTS controllers in transmission system.
   - Various transformer and converter configurations used for HVDC and FACTS controllers.
2. analyze different converters and compensators for improving overall performance of the transmission system.
3. extend the applications of HVDC and FACTS devices to improve the overall performance of the transmission system.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO HIGH VOLTAGE DC TRANSMISSION (09 periods)

HVDC transmission system - Introduction, comparison of AC and DC transmission systems, application of DC transmission, types of DC links, typical layout of a HVDC converter station, introduction to HVDC converters, effect of pulse number, analysis of phase bridge circuit with and without overlap, converter bridge characteristics, equivalent circuit for rectifier and inverter configurations. Twelve pulse converters.

UNIT - II: CONVERTER AND HVDC SYSTEM CONTROL (09 periods)

Principles of DC link control, converter control characteristics, system control hierarchy. Firing angle control - current and extinction angle control, starting and stopping of DC link. Harmonics- Introduction, generation. AC and DC filters, reactive power requirements at steady state. Sources of reactive power, static VAR systems.

UNIT - III: FACTS CONCEPTS (09 periods)

Reactive power control in electrical power transmission, principles of conventional reactive power compensators. Introduction to FACTS, flow of power in AC parallel paths, meshed systems, basic types of FACTS controllers, definitions of FACTS controllers, brief description of FACTS controllers.

UNIT - IV: STATIC SHUNT AND SERIES COMPENSATORS (09 periods)

Shunt compensation - objectives of shunt compensation, methods of controllable VAR generation, static VAR compensators - SVC, STATCOM, SVC and STATCOM comparison. Series compensation - objectives of series compensation, thyristor switched series capacitors (TCSC), static series synchronous compensator (SSSC), power angle characteristics, basic operating control schemes.

UNIT - V: COMBINED COMPENSATORS (09 periods)

Unified power flow controller (UPFC) - Introduction, operating principle, independent real and reactive power flow controller and control structure. Interline power flow controller (IPFC), generalized and multidimensional FACTS controller.

Total periods: 45

TEXT BOOKS:

1. K.R. Padiyar, *High Voltage Power Transmission Systems Technology and System Interactions*, New age international Publishers, New Delhi, 2005.
2. Narain G.Hingorani, LasziGyugyi, *Understanding FACTS: Concepts and Technology of Flexible AC Transmission Systems*, IEEE press, Delhi, 2001.

REFERENCE BOOKS:

1. S Rao, EHVAC, H*VDC Transmission & Distribution Engineering,* Khanna Publishers, Delhi, 3rd edition, 2006.
2. Mohan Mathur, Rajiv K.Varma, *Thyristor - based FACTS controllers for Electrical Transmission Systems*, A John Wiley and Sons Publications, 2002.

IV B.Tech. II Semester

14BT80203: **POWER QUALITY**

(PROFESSIONAL ELECTIVE - III)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Transmission of Electric Power

COURSE DESCRIPTION: Power quality terminology, power quality issues, classification; interruptions; different sources of power quality disturbances; harmonic distortion; harmonic indices; principles for controlling harmonics; power quality measuring equipment; power quality monitoring standards; power quality enhancement devices.

COURSE OUTCOMES: On successful completion of this course, the student will be able to

1. gain knowledge on various sources of power quality disturbances, power quality issues, standards, measuring equipment and power quality enhancement devices.
2. analyze the voltage sag, harmonic distortion due to commercial and industrial loads
3. design a suitable harmonic filter for industrial application.
4. apply suitable custom power devices for enhancement of power quality
5. practice the power quality standards for enhancement of efficiency and life of electric systems.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTION TO POWER QUALITY (08 periods)

Power Quality - definition, terminology, issues, evaluation procedure, responsibilities of the suppliers and users of electric power, power quality standards, CBEMA and ITIC curves.

UNIT- II: POWER QUALITY DISTURBANCES (10 periods)

General classes of power quality problems - Impulsive and oscillatory transients, long duration voltage variations - over voltage, under voltage, sustained interruption, short duration voltage variations - interruption, sag, swell andoutage. Sources of sags and interruptions, estimating voltage sag performance - overview of mitigation methods.

UNIT -III: FUNDAMENTALS OF HARMONICS (10 periods)

Harmonic distortion, voltage Vs current distortion, harmonics Vs transients, power system quantities under non - sinusoidal conditions, harmonic indices. Harmonic sources from commercial and industrial loads. Effects of harmonic distortion. Applied harmonics - harmonic distortion evaluation, principles of controlling harmonics, devices for controlling harmonic distortion. Harmonic filter design and standards on harmonics.

UNIT -IV: POWER QUALITY MONITORING (09 periods)

Power quality benchmarking, monitoring considerations, choosing monitoring locations, permanent power quality monitoring equipment, historical perspective of power quality measuring instruments, power quality measurement equipment - types of instruments, assessment of power quality measurement data, power quality monitoring standards.

UNIT- V: POWER QUALITY ENHANCEMENT USING CUSTOM POWER DEVICES (08 periods)

Custom power devices(principle of operation only) - introduction, network reconfiguring type - solid state current limiter(SSCL), solid state breaker(SSB), solid state transfer switch(SSTS). Compensating type - distribution static compensator (DSTATCOM), dynamic voltage restorer (DVR), unified power quality conditioner(UPQC).

Total periods: 45

TEXT BOOKS:

1. Roger C. Dugan, Mark F. Mc Granaghan, Surya Santoso, H.WayneBeaty, *Electrical Power Systems Quality,* 3rd edition, TMH Education Pvt. Ltd., 2012.
2. C. Sankaran, *Power quality,* CRC Press, 2002.

REFERENCE BOOKS:

1. Math H. J. Bollen, *Understanding Power quality problems*, IEEE Press, 2007.
2. Arindam Ghosh, Gerard Ledwich, *Power quality enhancement using custom power devices*, Kluwer academic publishers, 2002.

IV B.Tech. II Semester

14BT80204: RELIABILITY ENGINEERING AND APPLICATIONS TO POWER SYSTEMS

(PROFESSIONAL ELECTIVE - III)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Power System Analysis

COURSE DESCRIPTION: Basic probability concepts, elements of probability theory; definition of reliability and component reliability, reliability functions; reliability evaluation of simple and complex system configurations; Markov chain & Markov process; frequency and duration concept; generation system model; transmission system model; basic reliability indices.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1.demonstrate knowledge on
- elements of probability theory and probability distributions
- types of failures, reliability block diagram reductions
- network reduction techniques and markov modelling
- generation and load modelling
- frequency and duration techniques
- distribution system reliability indices

2.analyze
- the failure rate distributions
- the network reduction techniques
- methods for identifying critical components
- cumulative probability cumulative frequencies
- generation system, customer, load and energy oriented indices

3.evaluate the power system networks using reliability concepts for adequacy and security

DETAILED SYLLABUS:

UNIT-I: PROBABILITY THEORY (09 periods)

Introduction - rules for combining probabilities of events - bernoulli's trials, probabilitydensity and distribution functions - examples.

Probability Distributions - discrete distributions - binomial distribution, poisson distribution. Continuous distributions - exponential distribution, weibull distribution and normal distribution - mean, standard deviation, variance - examples.

UNIT - II: NETWORK MODELLING AND RELIABILITY FUNCTIONS (10 periods)

Reliability block diagrams - series, parallel systems and combined series-parallel systems - examples.

Reliability evaluation of non series-parallel systems - decomposition method, cut-set method - deduction of the minimal cut-sets from the minimal paths, tie-set method – examples Concept of redundancy - stand by redundant systems, perfect switching, imperfect switching. Reliability analysis of series parallel networks using exponential distribution. Reliability functions f(t), F(T), R(T), H(T) and their relationships, bath tub curve, reliability measures - MTTF, MTTR, MTBF.

UNIT - III: MARKOV MODELLING AND FREQUENCY AND DURATION TECHNIQUES (10 periods)

Markov chain - concept of stochastic transitional probability matrix (STPM), evaluation of limiting state probabilities. Markov processes - time dependent probability evaluation - evaluation of limiting state probabilities using STPM - one, two component repairable models. Frequency and duration concept - evaluation of frequency of encountering state for one, two component repairable models - evaluation of cumulative probability and cumulative frequency of encountering of merged states.

UNIT - IV: GENERATION SYSTEM RELIABILITY ANALYSIS (08 periods)

Generation system reliability analysis - reliability model of a generation system - recursive relation for unit addition and removal. Load modelling - merging of generation load model - evaluation of transition rates for merged state model - cumulative probability, cumulative frequency of failure evaluation - LOLP, LOLE, LOEE - numerical problems.

UNIT - V:

COMPOSITE SYSTEM AND DISTRIBUTION SYSTEM RELIABILITY ANALYSIS (08 periods)

Transmission system reliability analysis - system and load point reliability indices weather effects on transmission lines, weighted average rate and Markov model.

Distribution system reliability analysis - radial networks - evaluation of basic reliability indices, performance indices - load point and system reliability indices - customer oriented, loss and energy oriented indices - numerical problems.

Total periods: 45

TEXT BOOKS:

1. Roy Billinton and Ronald N Allen, *Reliability Evaluation of Engineering Systems*, Springer, 2nd edition, 2007.
2. Roy Billinton and Ronald N Allen, *Reliability Evaluation of Power Systems*, Springer, 2nd edition, 2007.

REFERENCE BOOKS:

1. V. Sankar, *System Reliability Concepts*, Himalaya Publishing House, 2015.
2. Charles E. Ebeling, *An Introduction to Reliability and Maintainability Engineering*, Tata McGraw-Hill, 2000.
3. E. Balagurusamy, *Reliability Engineering*, Tata McGraw Hill, 2003.

IV B.Tech. II Semester

14BT80205: **EHVAC TRANSMISSION**

(PROFESSIONAL ELECTIVE - III)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Electromagnetic Fields, Transmission of Electric Power, Distribution of Electric Power, Power System Analysis

COURSE DESCRIPTION: Concept of EHVAC transmission; analysis and design of EHVAC lines; effects of EHVAC; Corona Effects; voltage control and compensation.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1. demonstrate knowledge in
   - EHVAC conductor parameters, configurations, electrical and mechanical aspects for design and analysis.
   - corona interference, effects and relevant parameters in EHVAC systems.
   - electrostatic field interference and effects.
   - voltage control methods in EHVAC system.
2. analyze
   - various electrical parameters of different conductor configurations.
   - various parameters of corona phenomenon in EHVAC system.
3. demonstrate skills in design of EHV lines based on steady state and transient limits
4. demonstrate skills in evaluating various electrical and relevant parameters of different conductor configurations in EHVAC system

DETAILED SYLLABUS:

UNIT - I: TRANSMISSION LINE TRENDS AND PRELIMINARIES (10 periods)

Role of EHV AC transmission. Power handling capacity and line loss, costs of transmission lines and equipment. Mechanical considerations in line performance - numerical problems.

Line and Ground parameters:

Calculation of resistance of conductors. Properties of bundled conductors - bundle spacing, bundle radius and geometric mean radius of bundle. Inductance of EHV line configurations - Inductance of two conductors, multi-conductor lines (Maxwell's co-efficient) and bundled conductor lines. Line Capacitance calculation - sequence inductances and capacitances - line parameters for modes of propagation, ground return - numerical problems.

UNIT-II: VOLTAGE GRADIENTS OF CONDUCTORS (10 periods)

Electrostatics, field of sphere gap, field of line changes and their properties, charge - potential relations for multi-conductors. Surface voltage gradient on conductors - distribution of voltage gradient on sub conductors of bundle - numerical problems.

UNIT-III: CORONA EFFECTS (10 periods)

Power loss: corona loss formulae, charge-voltage (Q-V) diagram.

Audible noise (AN): generation, characteristics, limits and measurements of AN, relation between 1-phase and 3-phase AN levels - numerical problems.

Radio interference (RI): Corona pulses - generation, properties and frequency spectrum. Limits for radio interference fields. Lateral profiles of RI and modes of propagation, excitation function, measurement of RI, RIV and excitation functions - numerical problems.

UNIT-IV: ELECTROSTATIC FIELDS (10 periods)

Electrostatic field: calculation of electrostatic field of EHV lines, effect on humans, animals and plants - electrostatic induction in un-energized circuit of double-circuit line - electromagnetic interference - numerical problems.

UNIT-V: POWER-FREQUENCY VOLTAGE CONTROL AND OVER VOLTAGES (05 periods)

No-load voltage conditions and charging currents, voltage control - synchronous condenser, shunt and series compensation. StaticVAR compensation - numerical problems. **Total periods: 45**

TEXT BOOKS:

1.Rakosh Das Begamudre, *Extra High Voltage AC Transmission Engineering*, New Age International Pvt. Ltd, 3rd edition, 2006.

REFERENCE BOOKS:

1.S. Rao, *EHVAC, HVDC Transmission and Distribution Engineering*, Khanna Publications, 2001.
2.Edison Electric Institution (GEC), *EHV Transmission line reference Book*, Edison House, 1968.

IV B.Tech. II Semester

14BT80206: **SMART GRID TECHNOLOGY**

(PROFESSIONAL ELECTIVE - III)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Transmission of Electric Power and Power system Analysis

COURSE DESCRIPTION: Concept of smart grid; various information and communication technologies for smart grid; information security for smart grid; smart metering; energy management systems.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1.gain knowledge on:
- Smart grid initiatives and technologies
- Information and communication technologies, information security for the smart grid.
- Sensing, measurement, control and automation.

2.analyze various communication technologies required for real time smart grid applications.

3.estimate fault currents and power flows in transmission and distribution systems.

4.follow IEEE and IEC standards for Communication and Information technologies used for smart grid.

DETAILED SYLLABUS:

UNIT - I: SMART GRID (08 periods)

Introduction, ageing assets and lack of circuit capacity, thermal constraints, operational constraints, security of supply, national initiatives, early smart grid initiatives, active distribution networks, virtual power plant, other initiatives and demonstrations, overview of the technologies required for the smart grid.

UNIT - II: COMMUNICATION TECHNOLOGIES FOR THE SMART GRID (10 periods)

Data communications: Introduction, dedicated and shared communication channels, switching techniques, circuit switching, message switching, packet switching, communication channels, wired communication, optical fiber, radio communication, cellular mobile communication, layered architecture and protocols, the ISO/OSI model, TCP/IP.

Communication technologies: IEEE 802 series, mobile communications, multi-protocol label switching, power line communication, standards for information exchange, standards for smart metering, MODBUS, DNP3, IEC61850.

UNIT - III: INFORMATION SECURITY FOR THE SMART GRID (09 periods)

Introduction, encryption and decryption, symmetric key encryption, public key encryption, authentication, authentication based on shared secret key, authentication based on key distribution center, digital signatures, secret key signature, public key signature, message digest, IEC 62351: power systems management and association information exchange - data and communication security.

UNIT - IV: SMART METERING (09 periods)

Introduction, smart metering - evolution of electricity metering, key components of smart metering, smart meters: an overview of the hardware used - signal acquisition, signal conditioning, analogue to digital conversion, computation, input/output and communication.

Communication infrastructure and protocols for smart metering - Home area network, Neighborhood Area Network, Data Concentrator, meter data management system, Protocols for communication.

UNIT - V: TRANSMISSION AND DISTRIBUTION MANAGEMENT SYSTEMS (09 periods)

Data sources, energy management system, wide area applications, visualization techniques, data sources and associated external systems, SCADA, customer information system, modelling and analysis tools, distribution system modelling, topology analysis, load forecasting, power flow analysis, fault calculations, state estimation, applications, system monitoring, operation, management, outage management system.

Total periods: 45

TEXT BOOKS:

1. Janaka Ekanayake, Liyanage, Wu, Akihiko Yokoyama, Jenkins, *Smart Grid Technology and Applications*, Wiley Publications, 2012.
2. James Momoh, *Smart Grid: Fundamentals of Design and Analysis*, Wiley, IEEE Press, 2012.

REFERENCE BOOKS:

1. Raj Samani, *Applied Cyber Security and the Smart Grid*, Syngress Publishers, 2012.

IV B.Tech. II Semester

14BT60403: **VLSI DESIGN**

(PROFESSIONAL ELECTIVE - III)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Switching Theory and Logic Design and Linear and Digital IC Applications.

COURSE DESCRIPTION: Introduction to the design and implementation of VLSI circuits for complex digital systems; CMOS technology; submicron design; clocking; subsystem design; CAD tools and algorithms; simulation; verification; testing and design methodology.

COURSE OUTCOMES: On successful completion of this course, the student will be able to:

1. demonstrate knowledge in
   - understanding the Fabrication of MOS Transistors.
   - electrical properties of CMOS and BiCMOS Circuits
   - designing Static Combinational and Sequential logic at transistor level, including Mask layout.
   - estimating and optimizing combinational RC Circuit delay using RC delay models and logical effort.
   - design methodology and tools.
   - testing the chip at various abstraction levels.
2. perform analysis of Circuit Characterization and Performance Estimation of CMOS device and Create models of moderately sized CMOS circuits that realize specified digital functions.
3. formulate and solve technology specific problems in developing an IC circuit using EDA tools.
4. use modern design tools to IC devices to create system on - chip (SOC) designs in FPGAs.

DETAILED SYLLABUS:

UNIT - I: FABRICATION & ELECTRICAL PROPERTIES OF MOS (09 periods)

Introduction to MOS, CMOS and Bi-CMOS technology, Fabrication of NMOS and CMOS, basic Electrical Properties of MOS & BiCMOS Circuits: Ids - Vds relationships, Threshold Voltage VT, gm, gds and Pass Transistor, nMOS inverter, Pull up to pull down ratio for an NMOS inverter, CMOS & Bi-CMOS Inverters.

UNIT - II: CMOS CIRCUIT DESIGN PROCESS (10 periods)

VLSI design flow, MOS layers, stick diagrams, n-MOS design style, CMOS design style, lambda based design rules, layouts for inverters, sheet resistance, capacitances of layers, Gate delays, Delay estimation, Driving large capacitive loads, Fan-in and Fan-out, choice of layers, Scaling and limitation of scaling.

UNIT - III: SUBSYSTEM DESIGN - I (09 periods)

Adders - Transmission based Adder, Carry look-ahead adder, Manchester carry chain adder, Carry Bypass Adder, Carry Skip Adder, Carry Select Adder , Shifters- Barrel Shifter, Logarithmic Shifter, Multipliers - Array Multiplier, Carry Save multiplier, Booth Multiplier, ALUs, Parity generators, Comparators, Zero/One Detectors

UNIT - IV: SUBSYSTEM DESIGN - II (09 periods)

Counters- Synchronous & Asynchronous Counter, High Density Memory Elements.

Design Approach, PLA, PAL - 22V10 PAL architecture, Programming of PALs, FPGAs, CPLDs, Cell based Design Methodology.

UNIT - V: SYNTHESIS AND CMOS TESTING (08 periods)

Types of Simulation, VHDL Synthesis, Layout Synthesis, Design capture tools, Design Verification Tools.

CMOS Testing: CMOS Testing, Need for testing, Test Principles, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

Total periods: 45

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, *Essentials of VLSI Circuits and Systems*, PHI, 2005 Edition.
2. Weste and EShraghian, *Principles of CMOS VLSI Design,* Pearson Ed, 1999.

REFERENCE BOOKS:

1. John M. Rabaey, *Digital Integrated Circuits: A Design Perspective*, 2nd edition, PHI, 1997.
2. John. P. Uyemura, *Introduction to VLSI Circuits and Systems* - John Wiley, 2003.
3. Eugene D. Fabricius, *Introduction to Very Large Scale Integration Design* Paperback, Aug 1990, McGraw-Hill Education (ISE Editions).
4. Stephen Brown, ZvonkoVranesic, *Fundamentals of Digital Logic with VHDL Design,* TMH 2007.

IV B.Tech. II Semester

14BT80207: **ENERGY AUDIT AND DEMAND SIDE MANAGEMENT**

(PROFESSIONAL ELECTIVE - IV)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Distribution of Electric Power, Electrical and Electronic Measurements, Transmission of Electric Power, Utilization of Electrical Energy, Power System Operation and Control.

COURSE DESCRIPTION: Energy Audit and energy management; energy efficient motors; lighting and energy instruments; demand side management and significance of energy economics.

COURSE OUTCOMES: On successful completion of the course, student will be able to

1.demonstrate knowledge on
- energy auditing practices, energy conservation schemes
- energy indices, graphical representations
- energy management concepts
- characteristics of energy efficient motors, good lighting

2.analyze
- various energy instruments such as wattmeter, data loggers, thermocouples, pyrometers, lux meters, tongue testers
- payback analysis, depreciation, taxes and tax credit

3.demonstrate skills in design for good lighting system

4.familiarize demand side management practices

DETAILED SYLLABUS:

UNIT - I: PRINCIPLES OF ENERGY AUDIT (09 periods)

Energy audit - definitions, concept, types of audit, energy index, cost index, pie charts, Sankey diagrams, load profiles, energy conservation schemes - energy audit of industries - energy saving potential, energy audit of process industry, thermal power station, building energy audit.

UNIT - II: ENERGY MANAGEMENT (08 periods)

Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting. Energy manger, Qualities and functions, language, Questionnaire - check list for top management.

UNIT - III: ENERGY EFFICIENT MOTORS AND LIGHTING (09 periods)

Energy efficient motors - factors affecting efficiency, loss distribution, constructional details, characteristics, variable speed, variable duty cycle systems, motor energy audit.

Lighting: Good lighting system design and practice, lighting control, lighting energy audit.

UNIT - IV: ENERGY INSTRUMENTS AND ECONOMIC ANALYSIS (09 periods)

Energy Instruments - watt meter, data loggers, thermocouples, pyrometers, lux meters, tongue testers. PLCs and applications.

Energy Economic Analysis - The time value of money concept.cash flow models, payback analysis, depreciation, taxes and tax credit - numerical problems.

UNIT - V: DEMAND SIDE MANAGEMENT (10 periods)

Introduction to DSM, concept of DSM, benefits of DSM, different techniques of DSM - time of day pricing, multi-utility power exchange model, and time of day models for planning. Load management, load priority technique, peak clipping, peak shifting, valley filling, strategic conservation, energy efficient equipment. Management and organization of energy conservation awareness programs.

Total periods: 45

TEXT BOOKS:

1. W.R. Murphy & G. Mckay Butter worth, *Energy management*, Heinemann publications, 2001
2. A S. Pabla, *Electrical Power distribution*,TMH, 5th edition, 2004.
3. Umesh Rathore, *Energy management*, S.K.Kataria& Sons, 2nd edition, 2014.

REFERENCES:

1. W.C.Turner, *Energy management hand book*, John wiley and sons.
2. D.P.Sen, K.R.Padiyar, IndraneSen, M.A.Pai, *Recent Advances in Control and Management of Energy Systems*, Interline Publisher, Bangalore, 1993.
3. Ashok V. Desai, Wiley Eastern, E*nergy Demand - Analysis, Management and Conservation Hand book on energy auditing - TERI* (Tata Energy Research Institute), 2005.

IV B.Tech. II Semester

14BT80208: **POWER SYSTEM DEREGULATION**

(PROFESSIONAL ELECTIVE - IV)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Power System Operation and Control

COURSE DESCRIPTION: Various entities and their operational aspects in deregulated power system; types of electricity markets and trading arrangements; transmission cost allocation methods and their comparison; different types of ancillary services and their management; calculation of available transfer capabilities and electricity pricing & forecasting methods.

COURSE OUTCOMES: On completion of the course, students will be able to

1. demonstrate knowledge on:
   - operation of deregulated power systems.
   - key issues of electricity markets models and their functions in different scenarios.
   - electricity pricing methods and ancillary service management in competitive market.
2. develop skills to envisage market models to provide power exchange among various entities of deregulated power system.
3. implement the forecasting methods for minimizing the energy price, transmission losses and to regulate congestion in tie-lines of interconnected deregulated power system.

DETAILED SYLLABUS:

UNIT - I: DEREGULATION OF ELECTRIC UTILITIES (08 periods)

Introduction - Traditional central utility model, reform motivations, separation of ownership and operation, competition and direct access in the electricity market, independent system operator (ISO), retail electric providers, different experiences.

UNIT - II:

COMPETITIVE WHOLESALE ELECTRICITY MARKETS & TRANSMISSION OPEN ACCESS (07periods)

Introduction, ISO, wholesale electricity market characteristics, market model, challenges. Transmission open access: Trading arrangements - the pool and bilateral trade - multilateral trades, congestion management.

UNIT - III: TRANSMISSION COST ALLOCATION METHODS (10 periods)

Introduction, Postage Stamp Rate Method - Contract Path Method - MW -Mile Method - Unused Transmission Capacity Method - MVA - Mile method - Comparison of cost allocation methods**.**

UNIT - IV: MARKET POWER & ANCILLARY SERVICES MANAGEMENT (08 periods)

Market power:Introduction - different types of market Power, mitigation of market power - Examples.

Ancillary services: Introduction, reactive power as an Ancillary Service - a review, synchronous generators as ancillary service providers.

UNIT - V: TRANSFER CAPABILITY CALCULATIONS AND ELECTRICITY PRICING (12 periods)

Transfer Capability calculations:definitions, transfer capability calculations - ATC, TTC, TRM, CBM calculations. Calculation of ATC based on power flow.

Electricity Pricing: Introduction, electricity price volatility, electricity price indexes, challenges to electricity pricing, construction of forward price curves, short-time price forecasting.

Total periods: 45

TEXT BOOKS:

1.Loi Lei Lai, *Power System Restructuring and Deregulation*, John Wiley & Sons Ltd., England, 2001.

REFERENCE BOOKS:

1. Kankar Bhattacharya, Math H.J. Boller and Jaap E. Daalder, *Operation of Restructured Power System*, Kulwer Academic Publishers, 2001.
2. Mohammad Shahidehpour and Muwaffaq alomoush, *Restructured Electrical Power Systems*, Marcel Dekker, Inc., New york, 2001.

IV B.Tech. II Semester

14BT80209: **SOLAR AND WIND ENERGY CONVERSION SYSTEMS**

(PROFESSIONAL ELECTIVE - IV)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Generation of Electric Power and Power Electronics

COURSE DESCRIPTION: Non-Conventional energy resources; Wind and Solar energy systems: design and operation; Power Conditioning Schemes for Solar and Wind Energy systems; Electrical Performance

COURSE OUTCOMES: on successful completion of the course, the student will be able to

1.gain advanced knowledge on role of power electronics for renewable energy.

2.analyze the power conditioning schemes for grid connected systems. 3.develop skills in designing wind, solar systems and their integration.

DETAILED SYLLABUS:

UNIT - I: DESIGN AND OPERATION OF WIND POWER SYSTEM (09 periods)

Wind Power System: Components, Turbine Rating, Electrical Load Matching, Variable-Speed Operation, System Design Features, Maximum Power Operation, System Control Requirements, Speed Control, Rate Control and Environmental Aspects. Wind Energy Conversion Systems and their Classification.

UNIT - II: DESIGN AND OPERATION OF PV SYSTEM (09 periods)

Solar Photovoltaic Power System: The PV Cell, Module and Array, Equivalent Electrical Circuit, Open Circuit Voltage and Short Circuit Current, I-V and P-V Curves, Array Design, Peak Power Point Operation, PV System Components.

Solar Thermal System: Energy Collection, Synchronous Generator, Equivalent Electrical circuit, Excitation Methods, Electrical Power Output, Transient Stability Limit, Commercial Power Plants.

UNIT - III: POWER CONDITIONING SCHEMES FOR SOLAR ENERGY SYSTEMS (09 periods)

Switching devices for solar energy conversion: DC power conditioning converters, maximum power point tracking algorithms, AC Power conditioners, Line commutated inverters, synchronized operation with grid supply, Harmonic reduction.

UNIT - IV: WIND ENERGY CONVERSION SYSTEMS (09 periods)

Wind energy Conversion system (WECS): Performance of Induction generators for WECS, Self - excited induction generator (SEIG) for isolated power generators. Controllable DC power from SEIGs, system performance, Grid related problems, generator control, AC voltage controllers, Harmonic reduction and Power factor improvement.

UNIT - V:

POWER QUALITY ISSUES IN INTEGRATION OF RENEWABLE ENERGY RESOURCES (09 periods)

Stand alone and Grid connected systems, Power Quality issues, Impact of power quality problems on DG, Mitigation of power quality problems, Role of custom power devices in Distributed Generation.

Total periods: 45

TEXT BOOKS:

1. Mukund. R. Patel, *Wind and Solar Power Systems*, CRC Press, 1999.
2. G.D. Rai, *Non-Conventional Energy Resources*, Khanna Publishers, 2002.

REFERENCES:

1. Daniel, Hunt. V, *Wind Power - A Hand Book of WECS*, Van Nostrend Co., Newyork, 1998.
2. Arindam Ghosh, Gerard Ledwich, *Power Quality Enhancement Using Custom Power Devices*, Springer, 2002.
3. Roger C. Dugan, Mark E. Mc. Granaghan, Surya Santosoh and H. Wayne Beaty, *Electrical Power Systems Quality*, TATA Mc Graw Hill, 2nd edition, 2010.

IV B.Tech. II Semester

14BT70402: **EMBEDDED SYSTEMS**

(PROFESSIONAL ELECTIVE - IV)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): Microprocessors and Microcontrollers.

COURSE DESCRIPTION: Introduction to Embedded System; State Machines and Concurrent Process Models; Various Communication interfacing Models; RTOS Concepts; Target Architectures.

COURSE OUTCOMES: On successful completion of this course the students will be able to:

1. demonstrate knowledge on Communication Interfacing Models, Processor Technology,State Machines, Kernel Objects, ARM and SHARC Controllers.
2. analyze Various problems in Optimization of Single Purpose Processor, synchronization among the Processes, Clock Driven and Event Driven scheduling and Debugging Techniques
3. design and develop embedded system to suit a particular Application.
4. choose suitable Hardware and software components of a system that work to getherto solve engineering problems to exhibit a specific behavior.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION (12 periods)

Embedded systems overview, classification, applications, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors, Basic architecture, operation, Pipelining, Programmer's view, development environment.

UNIT - II: STATE MACHINE AND CONCURRENT PROCESS MODELS (08 periods)

Introduction, models versus languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model.

UNIT - III: COMMUNICATION INTERFACE (07 periods)

Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Fire wire, Ethernet, I2C bus and CAN.

UNIT - IV: RTOS CONCEPTS (10 periods)

CONCEPTS 1: Architecture of the Kernel, Tasks and Task scheduler, Types of real-time tasks, Task periodicity, Task scheduling, Classification of scheduling algorithms, Clock driven Scheduling, Event driven Scheduling, resource sharing, Commercial RTOs.

CONCEPTS 2: Interrupt service routines, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem.

UNIT - V: TARGET ARCHITECUTERS (08 periods)

Host and target machines, linkers, loading software into target machine, debugging techniques, ARM microcontroller, ARM pipeline, Instruction set architecture, THUMB instructions, Exceptions in ARM, salient features of SHARC microcontroller and comparison with ARM microcontroller.

Total periods: 45

TEXT BOOKS:

1. Frank Vahid, Tony D. Givargis, *Embedded System Design - A Unified Hardware/Software Introduction*, John Wiley, 2002.
2. KVKK Prasad, *Embedded/Real Time Systems*, Dramatic Press, 2005.

REFERENCE BOOKS:

1. Raj Kamal, *Embedded System Architectures Programming & Design*, Tata MC Graw-Hill Publishing, 2003.
2. David E.Simons, *An Embedded Software Premier*, Pearson Educational, 2004.

IV B.Tech. II Semester

14BT40502: **DATABASE MANAGEMENT SYSTEMS**

(PROFESSIONAL ELECTIVE - IV)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE(S): -

COURSE DESCRIPTION: Introduction to Database Systems; Database Design; Relational Model; SQL Queries, Constraints and Triggers; Schema Refinement and Normal Forms; Transaction Management; Concurrency Control; Overview of Storage and Indexing.

COURSE OUTCOMES: On successful completion of this course the students will be able to:

1.gain knowledge on
- fundamentals of DBMS
- database design
- normal forms
- storage and Indexing

2.apply Structured Query Language (SQL) in retrieval and management of data in real time applications.

3.develop skills in designing, managing databases and its security.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTIONTO DATABASE SYSTEMS & DATABASE DESIGN (09 periods)

Introduction to Database Systems: Database System Applications, Purpose of Database Systems, View of Data-Data Abstraction, Instances and Schemas, Data Models, Database Languages - DDL, DML, Database Architecture, Database Users and Administrators.

Introduction to Database design: ER diagrams, Beyond ER design, Entities, Attributes and Entity Sets, Relationships and Relationship sets, Additional features of ER model, Conceptual Design with ER model

UNIT - II : THE RELATIONAL MODEL & RELATIONAL ALGEBRA AND CALCULUS (08 periods)

Relational Model: Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical database Design, Introduction to Views-Destroying/altering Tables and Views.

Relational Algebra and Calculus: Preliminaries, Relational Algebra Operators, Relational Calculus - Tuple and Domain Relational Calculus, Expressive Power of Algebra and calculus

UNIT - III : SQL & SCHEMA REFINEMENT (10 periods)

SQL: Form of Basic SQL Query- Examples of Basic SQL Queries, Introduction to Nested Queries, correlated Nested Queries, Set- Comparison Operators, Aggregate Operators, NULL values - Comparison using Null values - Logical connectives - AND, OR and NOT - Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL, Triggers and Active Databases.

Schema Refinement: Problems Caused by redundancy Decompositions - Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms - BCNF, Multi valued Dependencies - FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT IV: TRANSACTIONS AND CONCURRENCY CONTROL (09 periods)

Transactions: Transaction Concept- Transaction State - Implementation of Atomicity and Durability - Concurrent Executions - Serializability - Recoverability - Implementation of Isolation - Testing for serializability.

Concurrency Control: Lock Based Protocols - Timestamp Based Protocols - Validation Based Protocols - Multiple Granularity, Deadlock Handling.

UNIT V: STORAGE AND INDEXING (09 periods)

Storage and Indexing: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods(ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete

Total periods: 45

TEXT BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, Tata McGraw Hill, 3rd edition, 2007.
2. A. Silberschatz, H.F.Korth, S.Sudarshan, *Database System Concepts*, Tata McGraw hill , 5th edition, 2005.

REFERENCE BOOKS:

1. RamezElmasri, ShamkantB.Navathe, *Database Systems*, 6th edition, Pearson Education, 2013
2. Peter Rob and Carlos Coronel, *Database Systems Design*, *Implementation and Management*, Cengage Learing, 7th edition, 2009

IV B.Tech. II Semester
14BT80221: **COMPREHENSIVE VIVA-VOCE**

Internal Marks	External Marks	Total Marks	L	T	P	C
--	100	100	-	-	-	2

PREREQUISITES: All courses of B. Tech. EEE

COURSE DESCRIPTION: Assessment of student learning outcomes.

COURSE OUTCOMES: Comprehensive Viva-Voce enables a successful student to

1. demonstrate knowledge in the program domain.

2. exhibit professional etiquette suitable for career progression

3. present views cogently and precisely.

IV B.Tech. II Semester
14BT80222: **PROJECT WORK**

Internal Marks	External Marks	Total Marks	L	T	P	C
60	140	200	-	-	20	10

PREREQUISITES: --

COURSE DESCRIPTION: Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES: On completion of project work, the student will be able to

1. demonstrate in-depth knowledge on the project topic.
2. identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.
3. design solutions to the chosen project problem.
4. undertake investigation of project problem to provide valid conclusions.
5. use the appropriate techniques, resources and modern engineering tools necessary for project work.
6. understand professional and ethical responsibilities while executing the project work.
7. function effectively as individual and a member in the project team.
8. develop communication skills, both oral and written for preparing and presenting project report.
9. demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.
10. engage in lifelong learning to improve knowledge and competence in the chosen area of the project.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)
ELECTRONICS AND INSTRUMENTATION ENGINEERING
I Year B.Tech. (Yearly Pattern)

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT1HS01	Technical English	2	-	-	4	30	70	100
14BT1BS01	Engineering Physics	2	1	-	4	30	70	100
14BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
14BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
14BT1BS04	Mathematical Methods	3	1	-	6	30	70	100
14BT1ES01	Programming in C and Data Structures	3	1	-	6	30	70	100
14BT1ES03	Computer-Aided Engineering Drawing	-	1	3	3	25	50	75
14BT1BS05	Engineering Physics and Engineering Chemistry Lab.	-	-	3	3	25	50	75
14BT1ES04	Programming in C and Data Structures Lab.	-	-	3	3	25	50	75
14BT1ES06	Engineering and IT Workshop	-	-	3	3	25	50	75
14BT1HS02	English Language Communication Skills Lab.	-	-	3	3	25	50	75
	TOTAL	**15**	**6**	**15**	**45**	**305**	**670**	**975**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)
ELECTRONICS AND INSTRUMENTATION ENGINEERING
II B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS02	Special Functions & Complex Analysis	3	1	-	3	30	70	100
14BT3HS01	Environmental Sciences	3	1	-	3	30	70	100
14BT31001	Principles of Electrical Measurements	3	1	-	3	30	70	100
14BT31002	Sensors and Transducers	3	1	-	3	30	70	100
14BT30232	Network Analysis	3	1	-	3	30	70	100
14BT30402	Semiconductor Devices and Circuits	3	1	-	3	30	70	100
14BT31021	Measurements and Transducers Lab	-	-	3	2	25	50	75
14BT30421	Semiconductor Devices and Circuits Lab	-	-	3	2	25	50	75
Total		**18**	**6**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)
ELECTRONICS AND INSTRUMENTATION ENGINEERING
II B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT4HS02	Professional Ethics	3	1	-	3	30	70	100
14BT50201	Control Systems	3	1	-	3	30	70	100
14BT30231	Electrical Technology	3	1	-	3	30	70	100
14BT40402	Electronic Circuit Analysis and Design	3	1	-	3	30	70	100
14BT40404	Signals and Systems	3	1	-	3	30	70	100
14BT40405	Switching Theory and Logic Design	3	1	-	3	30	70	100
14BT50405	Pulse and Digital Circuits	3	1	-	3	30	70	100
14BT41021	Analog and Digital Circuits Lab	-	-	3	2	25	50	75
14BT30222	Electrical Technology Lab	-	-	3	2	25	50	75
Total		**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)
ELECTRONICS AND INSTRUMENTATION ENGINEERING
III B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT4HS01	Business Communication and Presentation Skills	3	1	-	3	30	70	100
14BT5HS01	Managerial Economics and Principles of Accountancy	3	1	-	3	30	70	100
14BT51001	Electronic Instrumentation	3	1	-	3	30	70	100
14BT51002	Industrial Instrumentation - I	3	1	-	3	30	70	100
14BT51003	Linear & Digital IC Applications	3	1	-	3	30	70	100
14BT50202	Computer Organization and Architecture	3	1	-	3	30	70	100
14BT60401	Digital Signal Processing	3	1	-	3	30	70	100
14BT51021	Linear & Digital IC Applications Lab	-	-	3	2	25	50	75
14BT51022	Signal Processing Lab	-	-	3	2	25	50	75
Total		**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)
ELECTRONICS AND INSTRUMENTATION ENGINEERING
III B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS02	Management Science	3	1	-	3	30	70	100
14BT61001	Industrial Instrumentation - II	3	1	-	3	30	70	100
14BT61002	Process Control Instrumentation	3	1	-	3	30	70	100
14BT60201	Microprocessors and Microcontrollers	3	1	-	3	30	70	100
14BT60431	Principles of Communication	3	1	-	3	30	70	100
Professional Elective – I								
14BT61003	a) Electromagnetic Theory	3	1	-	3	30	70	100
14BT61004	b) Industrial Electronics							
14BT70304	c) Industrial Automation & Robotics							
14BT41201	d) Object Oriented Programming							
14BT61021	Process Control Lab	-	-	3	2	25	50	75
14BT60222	Microprocessors and Microcontrollers Lab	-	-	3	2	25	50	75
Total		**18**	**6**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)
ELECTRONICS AND INSTRUMENTATION ENGINEERING

IV B.Tech. I Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT71001	Analytical Instrumentation	3	1	-	3	30	70	100
14BT71002	Biomedical Instrumentation	3	1	-	3	30	70	100
14BT71003	Logic and Distributed Control Systems	3	1	-	3	30	70	100
14BT60206	Advanced Control Systems	3	1	-	3	30	70	100
	Open Elective	3	1	-	3	30	70	100
Professional Elective – II								
14BT71004	a) Computer Control of Processes	3	1	-	3	30	70	100
14BT70205	b) Soft Computing Techniques							
14BT60403	c) VLSI Design							
14BT51201	d) Computer Networks							
14BT71021	Analytical & Biomedical Instrumentation Lab	-	-	3	2	25	50	75
14BT71022	Industrial Automation Lab	-	-	3	2	25	50	75
14BT71023	Seminar	-	-	-	2	-	50	50
Total		**18**	**6**	**6**	**24**	**230**	**570**	**800**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)
ELECTRONICS AND INSTRUMENTATION ENGINEERING

IV B.Tech. I Semester
Open Electives

Offering Dept	Course Code	Course Title
BS&H	14BT6HS01	Banking and Insurance
BS&H	14BT6HS02	Cost Accounting and Financial Management
BS&H	14BT6HS03	Entrepreneurship for Micro, Small and Medium Enterprises
CE	14BT70105	Disaster Mitigation and Management
CE	14BT70106	Environmental Pollution and Control
CE	14BT70107	Contract Laws and Regulations
CE	14BT70108	Planning for Sustainable Development
CE	14BT70109	Rural Technology
ME	14BT60305	Artificial Intelligence and Robotics
ME	14BT60306	Global Strategy and Technology
ME	14BT60307	Intellectual Property Rights and Management
ME	14BT60308	Managing Innovation and Entrepreneurship
ME	14BT60309	Material Science
CSE	14BT60502	Engineering Systems Analysis and Design
EIE	14BT71005	Microelectromechanical Systems
IT	14BT61203	Bio-Informatics
IT	14BT61204	Cyber Security and Laws

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)
ELECTRONICS AND INSTRUMENTATION ENGINEERING
IV B.Tech. II Semester

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT81001	Fiber Optics & Laser Instrumentation	3	1	-	3	30	70	100
14BT70402	Embedded Systems	3	1	-	3	30	70	100
Professional Elective - III								
14BT81002	a) Power Plant Instrumentation	3	1	-	3	30	70	100
14BT81003	b) Telemetry and Telecontrol							
14BT80431	c) DSP Processors and Architectures							
14BT60405	d) Image Processing							
Professional Elective - IV								
14BT81004	a) Aircraft Instrumentation	3	1	-	3	30	70	100
14BT81005	b) Automotive Instrumentation							
14BT81006	c) Instrumentation in Process Industries							
14BT80302	d) Mechatronics							
14BT81021	Comprehensive Viva -Voce	-	-	-	2	-	100	100
14BT81022	Project Work	-	-	20	10	60	140	200
Total		**12**	**4**	**20**	**24**	**180**	**520**	**700**

B.Tech I Year

14BT1HS01: **TECHNICAL ENGLISH**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

DETAILED SYLLABUS:

UNIT – I: (10 periods)

My Early Days by **A. P. J. Abdul Kalam** from **All About English** by Cambridge University Press India Pvt Ltd. 2014.

Communication: Importance of Communication – Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-Verbal Communication.

UNIT – II: (10 periods)

A Speech by N. R. Narayana Murthy from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: (10 periods)

The Town by the Sea by Amitav Ghosh from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: (10 periods)

Sir. C. V. Raman: The Celebrated Genius from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Reading: Reading and Interpretation – Intensive and Extensive Reading–Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: (10 periods)

The Model Millionaire by **Oscar Wilde** from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Writing: Characteristics – Language – Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism - Referencing and Styling.

Total Periods: 50

TEXT BOOKS:

1. *All About English,* Cambridge University Press India Pvt. Ltd., First Edition, 2014.
2. Meenakshi Raman and Sangeetha Sharma, *Technical Communication,* Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, *Effective Technical Communication,* Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.
2. Martin Hewings, *Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,* Cambridge University press, First South Asian Edition, New Delhi, 1999.

B.Tech. I Year

14BT1BS01**: ENGINEERING PHYSICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

COURSE OUTCOMES :

After completion of the course a successful student will be able to

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context.

DETAILED SYLLABUS:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, Ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: (16 periods)

SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III : (17 periods)

PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative treatment), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: (17 periods)

DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V : (17 periods)

MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS

Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total Periods: 85

TEXTBOOKS:

1. S. Mani Naidu*, Engineering Physics*, Pearson Education, 2013.

2. P. K. Palaniswamy, *Engineering Physics,*Scitech Publications

REFERENCE BOOKS:

1. R. K. Gaur and S. L. Gupta*, Engineering Physics,* DhanpatRai Publications (P) Ltd., 8th Edition, 2001.

2. M. R. Srinivasan, *Engineering Physics,* New Age International (P) Limited, Publishers, 1st Edition,2010.

B.Tech. I Year
14BT1BS02 **: ENGINEERING CHEMISTRY**
(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.

COURSE OUTCOMES:

After successful completion of the course the student is able to:

1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.
2. Develop analytical skills in:
   a. Determination of hardness of water.
   b. Determination of viscosity, flame and fire points, cloud and pour points.
   c. Determination of calorific value of fuels.
3. Develop skills in design of:
   a. Methods for control of corrosion
   b. Chemical methods for the synthesis of Nanomaterials.
4. Develop skills for providing solutions through:
   a. Mitigation of hardness of water.
   b. Control of corrosion
   c. Newer Nanomaterials for specific applications
5. Acquire awareness to societal issues on:
   a. Chemical materials utility and their impact.
   b. Quality of water.
   c. Phenomenon of corrosion.
6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:
   a. Green computing
   b. Green construction
   c. Green manufacturing systems

DETAILED SYLLABUS:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.

Conducting Polymers – Definition, types of conducting polymers and their engineering applications. **Composites** – Introduction, advantages of composites, constituents of composites, types of composites, applications of composites. **Sensors** - Introduction, types of sensors, electrochemical sensors, applications. **Insulators** – Definition, characteristic properties of insulators and classification of insulators.

UNIT–II: WATER TECHNOLOGY (15 periods)

Introduction, types of water, impurities in water and their consequences. Hardness of water, units of hardness, measurement of hardness by EDTA method, disadvantages of hardness. Softening methods – Ion exchange process, Zeolite process-Municipal water treatment. Boiler Troubles. Desalination of brackish water by Electro dialysis and Reverse osmosis. Numerical problems on measurement of hardness of water.

UNIT–III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst's equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, H_2 – O_2 fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT–IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY (17 periods)

Nano Chemistry: Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

Green Chemistry: Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems.

Total periods: 85

TEXT BOOKS:

1. P.C.Jain & Monika Jain*, Engineering Chemistry,* Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah *Engineering Chemistry,* Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2013.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, *Hand book of Nanostructured materials and Nanotechnology,* New Age international publishers, 2nd edition, 2010.
2. Paul T. Anastas, John C Warner, *Green Chemistry: Theory and practice,* Oxford University Press, 2000.

B.Tech. I Year

14BT1BS03 **: ENGINEERING MATHEMATICS**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas , surfaces and volumes of revolutions.
3. Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton's Law of cooling and heat transfer.
4. Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

DETAILED SYLLABUS:

UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS (20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton's Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for Q(x) = e^{ax}, *sin ax*, *cos ax*, x^n, e^{ax} *V(x)*, *x V(x)*. Method of variation of parameters . Applications to L-R-C circuits.

UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES (22 periods)

Functions of two or more variables – Homogeneous functions – total derivatives – derivatives of implicit function – Jacobian – maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers. Radius ,centre and circle of curvature, tracing of curves in cartesian, parametric and polar forms.

UNIT-III: APPLICATIONS OF INTEGRATION (18 periods)

Applications of integration to – length of curves, area of surfaces of revolution and volume of solids of revolution – Double integrals – change of variables and change of order of integration. Evaluation of Triple integrals -volume as double integral.

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS (20 periods)

Laplace transforms of standard functions – Properties of Laplace transforms–First and second shifting Theorems. Laplace transforms of derivatives and integrals–Laplace transforms of periodic functions – Unit step function – Dirac delta function – Inverse transforms–Convolution theorem. Applications of Laplace transforms to linear differential equations with constant coefficients.

UNIT-V : VECTOR CALCULUS (20 periods)

Vector differentiation – gradient, divergence, curl and vector identities. Laplacian Operator. **Vector integration**: Line integrals independent of path – work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals. Verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

Total periods: 100

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, *Engineering Mathematics,* Vol. 1, S. Chand & Company, 12thedition, 2013.

REFERENCE BOOKS:

1. Grewal, B.S., *Higher Engineering Mathematics*, Khanna Publishers, 42nd edition, 2012.
2. Kreyszig, E., *Advanced Engineering Mathematics*, John Wiley and Sons, 8th edition, 2006.

B.Tech. I Year

14BT1BS04 **: MATHEMATICAL METHODS**

(Common to CSE, CSSE, IT, ECE, EIE and EEE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: This course deals with obtaining the numerical solutions for algebraic and transcendental equations. Fundamentals of matrix theory including introduction to Eigen values, Cayley-Hamilton's theorem, numerical solutions to differential equations, transformation techniques for solving engineering problems and applications of partial differential equations are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire basic knowledge in
   (a) solving linear equations through matrix methods.
   (b) solving algebraic and transcendental equations by various mathematical methods.
   (c) fitting of various types of curves to the given data
   (d) finding the numerical values to derivatives and integrals through different mathematical methods.
   (e) solving differential equations numerically through various methods.
   (f) solving difference equations using z –transforms.
2. Develop analytical skills in
   (a) evaluating the properties of functions through Fourier series and Fourier transforms.
   (b) solving boundary value problems in engineering using Fourier transform
3. Design novel mathematical methods for
   (a) fitting geometrical curves to the given data.
   (b) for solving the differential equations.
   (c) the problems involving heat transformations.
   (d) constructing the interpolating polynomials to the given data and drawing inferences.

DETAILED SYLLABUS:

UNIT–I: MATRIX THEORY AND APPLICATIONS (20 periods)

Rank of a matrix, echelon form, normal form, inverse of a matrix by normal form. Homogenous and non-homogenous linear systems, consistency and solutions of linear system of equations. Solutions of equations by Gauss elimination method. Eigen values, Eigen vectors and properties. Cayley– Hamilton Theorem (without proof), inverse and powers of a matrix using Cayley– Hamilton Theorem, diagonalization of a matrix, quadratic forms, nature of quadratic form and reduction of quadratic form to its normal form.

UNIT-II: NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION (19 periods)

Solutions of Algebraic and Transcendental equations by bisection method, Regula – Falsi method, Newton – Raphson method. Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves. Interpolation, forward difference operator, backward difference operator, central difference operator. Relationship between different operators. Interpolation using Newton's forward formula, Newton's backward formula, Lagrange's interpolation formula.

UNIT-III:

NUMERICAL DIFFERENTIATION AND INTEGRATION, SOLUTIONS OF O D E (20 periods)

Numerical differentiation using Newton's forward formula, Newton's backward formula. Numerical integration using trapezoidal rule, Simpsons 1/3 rule, Simpsons 3/8 rule. Numerical solutions of first order ordinary differential equations using Taylor series, Euler's method modified Euler's method, Runge – Kutta method (4^{th} order only).

UNIT-IV : TRANSFORMATION TECHNIQUES (25 periods)

Fourier series , Dirichlets conditions, determination of Fourier coefficients (Euler's formulae), even and odd functions. Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, inverse transforms. Z – transforms, inverse Z– transform, properties, damping rule, shifting rule, initial and final value theorems. Convolution theorem, solution of difference equations by Z– transforms.

UNIT – V: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS (16 periods)

Formation of partial differential equations . Method of separation of variables for second order partial differential equations – solutions of one dimensional wave equation – heat equation -Laplace equation.

Total periods: 100

TEXTBOOK:

1. T.K.V. Iyenger, B. Krishna Gandhi, S. Ranganadham and M.V.S.S.N. Prasad, *Mathematical Methods,* S.Chand and Company, 8^{th} edition, 2013.

REFERENCE BOOKS:

1. B.S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 42^{nd} edition, 2012.
2. S.S.Sastry, *Introductory Methods of Numerical Analysis*, Prentice Hall of India, 4^{th} edition, 2005.

B.Tech. I Year

14BT1ES01**: PROGRAMMING IN C & DATA STRUCTURES**

(Common to ECE, EEE, EIE, ME and CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	6

PREREQUISITE: Nil

COURSE DESCRIPTION: This course deals with fundamentals of programming in C language such as syntax of C, mechanisms of input and output processing, derived data types like arrays, strings and pointers. Also file in C and data structures are discussed.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Gain knowledge on developing algorithms and programming techniques.
2. Gain analytical skills on
    a. Searching and sorting
    b. File management functions.
    c. Various Data Structures
3. Design various applications using basic data structures like linked list, stacks and queues
4. Gain competence to represent and solve real time problems using tree data structures.

DETAILED SYLLABUS:

Unit-I: (15 periods)

Programming Languages- Compiler, Interpreter, Loader, and Linker- Program execution- Classification of programming-Algorithms and flowcharts .

Basics of C: Introduction, Standardizations of C language, Developing Programs in C, Structure of C program, Variables, Data Types, Declaration, Token, Operators and expressions, L values and R values, Type Conversion in C.

Unit-II: (20 periods)

Input and Output: Basic screen and key board I/O in C , Non formatted input and output , Formatted Input and output. Control Statements: Specifying Test Condition for Selection and Iteration, Writing Test Expressions, Conditional Execution and Selection, Iterative and Repetitive Execution, GOTO Statement, Special Control statements, Nested loops.

Unit-III: (20 periods)

Arrays and Strings: One dimensional Array, Strings: One-Dimensional Character Arrays, Multidimensional Arrays, Arrays of Strings. Functions: Concept of function, Call by Value Mechanism, passing arrays to Functions, Scope and extent, Storage classes, Inline function, Recursion, Searching and sorting.

Unit-IV: (25 periods)

Pointers: Introduction, Understanding Memory Address, Address Operators, pointer, Void pointer, Null pointer, use of pointers, arrays and pointers, Pointer and strings, pointer arithmetic, pointers to pointers, pointer to arrays, Pointers to functions, Dynamic memory allocation, Pointer and const Qualifier. User-defined data types and variables: Structures, union, Enumerations types, Bitfields.

Files in C: Working with text files, Binary files, Random Access files, other file management functions, Command line arguments, C preprocessor, Type qualifier.

Unit-V: (20 periods)

Linked Lists: Singly Linked Lists, Circular Linked lists, Doubly Linked list Applications of Linked Lists. Stacks and Applications, Queues, Other Variations of Queues, Applications, Tree-Binary tree, Traversals, Kinds of binary tress, Binary Search tree, Application of tree

Total periods: 100

TEXT BOOK:

1. PradipDey and Manas Ghosh, *Programming in C*, 2nd edition, Oxford University Press, New Delhi, 2007

REFERENCE BOOKS:

1. D. Samanta, *Classic Data Structures*, 2nd edition, PHI Learning, New Delhi, 2004
2. Behrouz A. Forouzan and Richard F. Gilberg, *A Structured Programming Approach using C*, 3rd edition, Cengage Learning, New Delhi, 2007.

B.Tech. I Year

14BT1ES03**: COMPUTER AIDED ENGINEERING DRAWING**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	1	3	3

PREREQUISITE: Nil

COURSE DESCRIPTION: This course deals with the concepts of computer-aided sketching, and orthographic and isometric projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES: After completion of the course, a successful student is able to :

1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general audience.

DETAILED SYLLABUS:

UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING (20 periods)

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, Different types of lines, Material conventions and free hand practicing, Definitions of Principle planes and other planes. Computer screen, layout of the software, Creation of 2D/3D environment, Selection of drawing size and scale, Standard tool bar/menus, Coordinate system, and description of most commonly used toolbars, Navigational tools, Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS (20 periods)

Introduction, Definitions- Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), Projection of lines inclined to one plane, inclined to both the planes, finding true lengths and true inclinations (No application problems).

UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES (20 periods)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS (20 periods)

Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS (20 periods)

Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.

Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts.

Total periods: 100

TEXT BOOKS:

1. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, *Engineering Graphics with Auto CAD*, PHI Learning Private Limited, Revised Edition, August 2010.
2. N D Bhat & V M Panchal, *Engineering Drawing,* Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, *AutoCAD 2013 For Engineers And Designers,* Dreamtech Press, 2013
2. T Jeyapoovan, *Engineering Drawing and Graphics Using Autocad,* Vikas Publishing House, 3rd Edition, 2010.
3. Jolhe, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2007.
4. Basant Aggarwal, *Engineering Drawing,* Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

B.Tech. I Year

14BT1BS05: **ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wave length of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:

After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.

Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of P^H of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments :

Engineering Physics:

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
4. Characteristics of LED source.
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee's method
9. Melde's experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
12. Characteristics of laser source.
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum

Engineering Chemistry:

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Conductometric titration of strong acid Vs strong base
6. Determination of P^H of a given solution by P^H metry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
10. Synthesis of Nano metal-oxide using sol– gel process.
11. Determination of the capacity of the given cation-exchange Resin.
12. Measurement of viscosity by Redwood viscometer.

Duration: 3 Periods for each experiment

TEXT BOOKS:

1. *Physics Laboratory Manual*
2. K. Mukkanti, *Practical Engineering Chemistry*, BS Publications, 2013.
3. K.N. Jayaveera, K.B. Chandra Sekhar, *Chemistry laboratory manual,* S.M. Enterprises Limited, 2013.

B.Tech. I Year

14BT1ES04**: PROGRAMMING IN C & DATA STRUCTURES LAB**

(Common to ECE, EEE, EIE, ME and CE)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION: This course provides programming practice in C language specifically syntax of C, input-output processing, derived data types, file processing, and data structures.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Design, code, test, debug and execute programs in C.
2. Implement and use common features found in C programs – arrays, pointers, strings, stacks and queues.
3. Select the appropriate data structure and algorithm design method for a specified problem.

Week 1:

a. Write a C program to print the string "SVEC" at four corners and center of the screen using single printf statement.
b. Mr. Gupta deposits Rs.1000 in a bank. The bank gives simple interest of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I=PTR/100)
c. Write a program to exchange the values of two variables without using the third variable.

Week 2:

a. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.
b. In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.
c. Assume that any month is of 30 days. Input total days through keyboard. Find out the exact number of Years, Months & Days.

Week-3

a. Write a program that reads in a number, then reads in a single digit and determines whether the first number contains the digit. If it does, the program should display how many times the digit occurs in the number.
b. Write a program to print Pythagoras triplets a = m* n , b=$(n^2 + m^2)/2$, c=$(n^2-m^2)/2$ where m = 1,3, 5 ……; n = m + 2, m + 4 ……
c. Write a program to produce the following pattern:

a.
```
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7
1 2 3 4 5 6
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

b.
```
1 2 3 4 5 6 7 8 9 10
  2 3 4 5 6 7 8 9 10
    3 4 5 6 7 8 9 10
      4 5 6 7 8 9 10
        5 6 7 8 9 10
          6 7 8 9 10
            7 8 9 10
              8 9 10
                9 10
                  10
```

Week-4

a. Write a C program to generate Pascal's triangle.
b. Write a C program to construct a pyramid of numbers.

Week-5

a. The formula used to calculate the amount of interest on a bank account that compounds interest daily is

$$i = p\,(1 + r)^d - p$$

where:

i is the total interest earned,
p is the principal (the amount originally deposited in the account),
r is the rate of interest as a decimal less than 1 (for example, 15 percent is expressed as 0.15), and
d is the number of days the money is earning interest.
Write a program that accepts values for p, r and d and calculates the interest earned.

b. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127

c. Write a C program to convert a given decimal number into its equivalent
   i. Binary Number
   ii. Octal Number
   iii. Hexadecimal Number
   iv. Quinary Number(base 5)

Week-6

a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %, use switch statement)
b. Write a program to find the sum of individual digits of a positive integer.
c. A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.
d. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to find the largest and smallest number in a list of integers.
b. Write a program to perform the following:
   i) Addition of two matrices.
   ii) Multiplication of two matrices.

Week-8

a. Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
b. Write a C program to determine if the given string is a palindrome or not
c. Write a C Program to implement all string operations.
   1. Find the length of string 2. Reverse the string.
   3. Comparing the two strings. 4. Copy the string .

Week -9:

a. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 10:

a. Write a C program to count the lines, words and characters in a given text.
b. Write a program that simulates a password entry.
c. Write a program to read a five letter word and generate all possible combinations of two-letter words using those five letters.

Week 11:

Write a program to perform the following:
i) Linear search ii) Binary search

Week 12:

Write a program to perform the following:
i) Selection sort ii) Insertion sort
iv. iii) merge Sort iv) Quick sort

Week 13:

Write programs to perform the following using recursion

i) To find the factorial of a given integer.

ii)To solve Towers of Hanoi problem

Week-14

a. Write a C Program to return a substring from a main string using pointers.

b. Write a C program to return character frequency count in a text using pointers

Week-15

a. Write a C program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

b. Write a Program to enter records of students display in sorted order according to ID number.

c. Define a structure to store employee's data with the following specifications:
Employee-Number, Employee-Name, Basic pay, Date of Joining

i) Write a function to store 10 employee details.

ii) Write a function to implement the following rules while revising the basic pay.
If Basic pay <= Rs.5000 then increase it by 15%.
If Basic pay > Rs.5000 and <= Rs.25000 then it increase by 10%.
If Basic pay > Rs.25000 then there is no change in basic pay.

iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

Week-16

a. Write a program which copies one text file to another.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

c. Consider the following text file:

Input File:

S.No.	Customer_ID	Item No.	Qty.	Price Per Item (Rs.)
1.	C01	I1	2	10
2.	C02	I2	5	50
3.	C03	I2	5	50
4.	C04	I4	10	10

S.V. PROVISION STORES
TIRUPATI
Customer_ID: C01 Date: 12-08-2010

Item	Qty	Price
I1	2	20
Total		20

Week - 17:

Write a program to implement the following operations on Singly Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week -18:

Write a program to implement the following operations on Circular Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week -19 :

Write a program to implement the following operations on Doubly Linked List

a. List Creation b. Insertion c. Deletion d. Display

Week- 20:

Write a program to implement stack operations using:

i) Arrays ii) Pointers

Week -21 :

Write a program to implement linear queue operations using:

i) Arrays ii) Pointers

Week -22:

a) Write a program to implement circular queue operations using arrays
b) Write a program to implement traversals of a Binary tree
   i. Preorder ii. Post order iii. Inorder

Week- 23

Write a program to implement insertion and deletion in a binary search tree.

REFERENCE BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "**A Structured Programming Approach using C**," Third Edition, Cengage Learning, New Delhi, 2007.
2. PradipDey and Manas Ghosh, "**Programming in C**", Second Edition, Oxford University Press, New Delhi, 2007
3. D. Samanta, "**Classic Data Structures**", Second Edition, PHI Learning, New Delhi, 2004.

B.Tech. I Year

14BT1ES06**: ENGINEERING & IT WORKSHOP**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

After completion of the course, a successful student is able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a) Carpentry Shop : Cross lap joint, mortise and tenon, T-joint, dove tail joint.

b) Fitting Shop : Square fit and V-fit, semi circular fit, dove tail fit.

c) Sheet Metal Shop : Trapezoidal tray, square tin, funnel, cylinder.

d) House wiring : Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.

(e) Foundry : Preparation of casting using single piece pattern,
Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) Welding
b) Metal Cutting
c) Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

TWORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

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b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources.

Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.

Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.

Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.

Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, *Engineering Work shop practice,* VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, *Work shop Manua***l**, SciTech Publishers, 2009.
3. K. Venkata Reddy, *Workshop Practice Manual, B*S Publications, 2008

IT WORKSHOP:

1. Vikas Gupta, *Comdex Information Technology Course Tool Kit,* 2nd edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, *Introduction to Information Technology*, 2nd edition, Pearson Education, New Delhi, 2005.
3. *IT Workshop Laboratory Manual,* Department of IT, SVEC, 2014.

B.Tech. I Year

14BT1HS02: **ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY**

(Common to All Branches of Engineering)

Internal Marks	External Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	3

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which are classified into software based learning, grammar and activities. English Speech Sounds and Phonemic Transcription, Word Stress and Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features, Vocabulary Building, are aided by software. Grammar sessions include Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays, Telephonic Etiquette, Listening Skills, Describing People, Places and Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to

1. Gain practical knowledge in
   - English Speech Sounds
   - Stress Patterns in word and sentence
   - Intonation Patterns
   - Paralinguistic Features
   - Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts.
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.
6. Demonstrate various language functions by participating in
   - Just A Minute
   - Impromptu Speech
   - Elocution
   - Role Plays
   - Presentations
7. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling
   b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes
   c. Idioms and Phrases–Homophones–Homonyms–Homographs.

6. Functional Grammar
    a. Parts of Speech
    b. Tenses
    c. Change of Speech
    d. Change of Voice
    e. Word Order and Error Correction
    f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India.

II B. Tech. – I Semester

14BT3BS02: SPECIAL FUNCTIONS AND COMPLEX ANALYSIS

(Common to ECE, EEE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITE: Engineering Mathematics

COURSE DESCRIPTION: Beta, Gamma functions and their properties ; Limits continuity and analyticity of complex functions ; Integration, power series, singularities, residues; conformal mapping with applications.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Acquire **knowledge** in
- Beta and Gamma functions
- Expressing complex functions in power series
- Differentiation and integration of complex functions
- Conformal mappings and bilinear transformations
- Expressing complex functions in terms of graphs and power series

CO2. Develop analytical skills in **providing solutions** for problems involving
- Fluid, Electrical and Magnetic Potential functions
- Integration of complex functions
- Improper real integrals

CO3. Develop skills in **analyzing**
- The properties exhibited by complex functions in Argand plane.
- The properties of complex functions by expressng them in power series and graphs.
- Properties of improper integrals through residue theory.

Detailed syllabus:

UNIT-I: SPECIAL FUNCTIONS (10 periods)

Beta and gamma functions - properties - relationship between beta and gamma functions. Applications - evaluation of improper integrals using beta and gamma functions. Bessel function - generating function (without proof) - recurrence relations - orthogonality.

UNIT-II: ANALYTIC FUNCTIONS (10 periods)

Function of a complex variable - limits and continuity of functions. Differentiability - analyticity, Cauchy – Riemann equations (both cartesian and polar). Conjugate and harmonic conjugate functions - Milne Thompson method. Potential functions.

UNIT-III: COMPLEX INTEGRATION AND POWER SERIES (08 periods)

Line integral - Evaluation of line integrals along curves and closed contours - Cauchy's Integral theorem (without proof) - Cauchy's integral formula - Derivatives of analytic function - Generalized integral formula- Evaluation of integrals using integral formula. Taylor's theorem (without proof) - Laurent's theorem (without proof) - Power series expansion of complex functions.

UNIT-IV: RESIDUE THEOREM – APPLICATIONS (09 periods)

Zeros and Singularities – Types of singularities - Residues – Evaluation of Residues at poles- Pole of order m and pole at infinity- Residue theorem- Evaluation of integrals using residue theorem – Evaluation of improper and real integrals of the type.

i) $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$ ii) $\int_{-\infty}^{\infty} f(x)dx$ iii) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$

UNIT-V: CONFORMAL MAPPINGS (08 periods)

Definition, examples and mappings defined by $w = e^z, \log z, z^2, \sin z, \cos z.$ Translation, Rotation, Inversion. Bilinear transformation - Properties - Fixed points, Cross ratio. Invariance of circles under bilinear transformation. Determination of bilinear transformation using three given points.

Total Periods: 45

TEXT BOOK:

1. T.K.V. Iyenger, B. Krishna Gandhi,... etal, Text book of Engineering Mathematics, Vol - III, S. Chand & Company, 8th Edition, 2011.

REFERENCE BOOKS:

1. Grewal, B.S, Higher Engineering Mathematics, Khanna Publishers, Delhi, 42th Edition, 2012.
2. Shahnaz Bathul, Special Functions and Complex Variables, PHI Learning, 2nd Edition, 2010.

II B.Tech. - I Semester

14BT3HS01: **ENVIRONMENTAL SCIENCES**

(Common to ECE, EEE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Physics and Engineering Chemistry

COURSE DESCRIPTION: Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Acquire knowledge in
- · Diverse components of environment and natural resources.
- · Ecosystem and biodiversity & its conservation methods.
- · Population growth and human health.
- · Green technology.

CO2. Identify and resolve the issues related to sources of different types of pollutions.

CO3. Provide solutions to individuals, industries and government for sustainable development of natural resources.

CO4. Create awareness on environmental degradation and to bring best management practices to protect environment.

CO5. Develop skills in analyzing reports on environment for sustainable development.

CO6. Apply environmental ethics in protection of diversified eco systems.

Detailed Syllabus:

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES (11 periods)

Multidisciplinary nature of environment: Definition, scope and importance of multidisciplinary nature of environment, segments of environment-lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness. **Natural Resources:** Renewable and Non-renewable resources and associated problems- (a) forest resources: use and over exploitation, deforestation-causes, effects and remedies, case studies, (b) waterresources-use and over utilization of surface & ground water, conflicts over water-benefits and problems of large dams, case studies,

(c) mineral resources- mining, adverse effects, case studies, (d) food resources-world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging and salinity, case studies, (e) energy resources-growing needs, renewable energy resources–solar, wind, hydropower, hydrogen fuel and non-renewable energy resources-coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT-II: ECOSYSTEMS AND BIODIVERSITY (10 periods)

Ecosystems: Definition and concept of an ecosystem, structure and function of an ecosystem-producers, consumers and decomposers, food chains, food webs and ecological pyramids-introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem-ponds, lakes & oceans, energy flow in the ecosystem, ecological succession. **Biodiversity:** Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity–habitat loss, poaching of wildlife, man-wild life conflicts, endemic, endangered and extinct species of India, conservation of biodiversity–in-situ and ex-situ.

UNIT-III: ENVIRONMETAL POLLUTION AND CONTROL (8 periods)

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management–causes, effects and control measures of urban and industrial wastes, hazards and disaster management–floods, earthquakes, tsunamis, case studies.

UNIT-IV: SOCIAL ISSUES AND THE ENVIRONMENT (8 periods)

From unsustainable to sustainable development, urban problems related to energy, environmental ethics-issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

UNIT-V: HUMAN POPULATION AND THE ENVIRONMENT (8 periods)

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies.

Field work: visit to a local area to document environmental assets-pond/ forest/ grassland/ hill/ mountain/ Environment Impact Assessment procedures for local environmental issues or assignment/seminar.

Total Periods: 45

TEXT BOOKS:

1. A.Kaushik and C.P. Kaushik, *Environmental Studies*, New Age International (P) Ltd Publications, 4th edition, 2014.
2. Erach Barucha, *Environmental Studies*, Orient Blackswan, 2nd edition, 2013.

REFERENCE BOOKS:

1. R. Rajagopalan, *Environmental Studies*, Oxford University Press, 2nd Edition, 2011.
2. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2nd Edition, 2009.
3. Dr. B S Chauhan, *Environmental Studies*, University Science Press, 1st Edition, 2008.
4. M. Anji Reddy, *Textbook of Environmental Sciences and Technology*, BS Publications, 2007.
5. Larry W Canter, *Environmental Impact Assessment*, McGraw-Hill Education, 2nd Edition, 1996.

II B.Tech. - I Semester

14BT31001: PRINCIPLES OF ELECTRICAL MEASUREMENTS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Network Analysis, Engineering Physics.

COURSE DESCRIPTION: Science of Measurement; Construction and principle of operation of Ammeters, Voltmeters, Ohmmeters; Potentiometers; Power meter; Power Factor meter; Energy Meters; Design of Bridges : AC, DC.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in
- Construction and Principle of operation of different instruments used for Measurement of Voltage, Current and Resistance.
- The measurement of Power, Power factor, Energy.

CO2. Analyse, Identify and select instruments suitable for various electrical parameter measurements.

CO3. Design instruments and circuits for measurement of Power, Energy, Power factor, Voltage, Current, Resistance, Capacitance and Inductance.

Detailed Syllabus:

UNIT I: SCIENCE OF MEASUREMENT (9 periods)

Measurement systems, Significance of Measurements, Methods of Measurements: Direct and Indirect Methods; Classification of Instruments, Deflection and Null Type instruments, Elements of a Generalized Measurement System, Types of errors: Gross Error, Systematic Error, Random Error; Units: Fundamental and Derived Units, CGS System of Unit, Practical Units, M.K.S System, S.I Units; Standards and their Classification: Electrical Standards, Resistance Standards, Current Standards, Inductance Standards and Capacitance Standards.

UNIT-II: AMMETERS AND VOLTMETERS (11 periods)

Classification of analog instruments, Principle of operation of analog instruments, operating forces of electromechanical indicating instruments: deflecting, control and damping; Permanent Magnet Moving Coil (PMMC): Construction, working principle, Expression of torque equation, Errors in PMMC Instruments, Advantage and Disadvantages of PMMC Instruments; Moving Iron Instruments: Classification of Moving Iron Instruments, Construction, working principle and Expression of torque equation; Ammeter: Ammeter shunt, Effect of Temperature Change in Ammeter, Multi-range Ammeters; Voltmeter: Voltmeter Multipliers, Effect of Temperature Change in Voltmeters, Multi-range Voltmeter.

UNIT-III: OHMMETERS AND POTENTIOMETERS (9 periods)

Ohmmeters: Series type ohmmeter, shunt type ohmmeter, Multimeter.

DC Potentiometers: Basic potentiometer circuit, standardization, Compton's Potentiometers, Multiple-range potentiometer, applications: Calibration of Voltmeter, Calibration of Ammeter, Measurement of Resistance.

AC Potentiometers: Standardization, Types of A.C Potentiometers: Polar types, Coordinate types, applications: Voltmeter Calibration, Ammeter Calibration, Measurement of Self reactance of a coil.

UNIT-IV: POWER & ENERGY METERS (8 periods)

Power in D.C Circuits, Power in A.C Circuits, Electrodynamometer wattmeter: Construction, working principle, Torque equation, Errors in Electrodynamometer wattmeter, Three Phase Wattmeter.

Electrodynamometer Power Factor Meter: Single Phase, Three Phase.

Energy Meter: Single Phase Induction Type Energy Meter: Construction, Working Principle, Errors in Single Phase energy meter; Polyphase energy meters: Two element energy meter.

UNIT-V: BRIDGES (8 periods)

Measurement of Resistance: Medium Resistance Measurement: Wheatstone bridge, Kelvin Bridge; Low Resistance Measurement: Kelvin double bridge; High Resistance Measurement: Direct deflection methods.

Measurement of Inductance: Maxwell Bridge, Hay's Bridge and Anderson Bridge.

Measurement of capacitance: De Sauty's Bridge and Schering bridge, Q-meter.

Total Periods : 45

TEXT BOOK:

1. A.K.Sawhney, *A Course in Electrical and Electronics Measure ments and Instrumentation*,Dhanpat Rai and Sons, New Delhi, 19th Revised Edition, 2013.

REFERENCE BOOKS:

1. E.W. Golding & F.C. Widdis, *Electrical Measurements and Measuring Instruments*, 5th Edition, Wheeler Publishing.
2. Doeblin, E.O., *Measurement Systems: Applications and Design*, 4th Edition, TMH, 2003.
3. H.S. Kalsi, *Electronic Instrumentation*, TMH, 2002.

II B. Tech. - I Semester
14BT31002: SENSORS AND TRANSDUCERS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITE: Engineering Physics, Engineering Mathematics

COURSE DESCRIPTION: Performance characteristics of transducers; Working principle of resistive, inductive, capacitive, self-generating and other sensors; Applications of sensors.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate the principles of sensors and transducers with their technical characteristics.
CO2. Apply analytical skills to determine the response of sensors for change in physical parameters.
CO3. Identify and choose sensor for the specific problem.

Detailed Syllabus:

UNIT – I: CHARACTERISTICS OF TRANSDUCERS (9 Periods)

Principle of transducer, Classification of transducer, Static Characteristics: Calibration, accuracy, precision, sensitivity, linearity, threshold, resolution, hysteresis, dead space, reproducibility, span. Dynamic characteristics: Dynamic error, Fidelity, Measuring lag, Speed of response, Mathematical model of measuring system, Transfer function of Zero order system, First order system and Second order system. Step response, impulse response and frequency response of first order system and second order system. Factors influencing the choice of transducers.

UNIT – II: RESISTIVE SENSORS (9 Periods)

Potentiometers, Metal and semiconductor strain gauges, Resistance temperature detectors, Thermistors, Magnetoresistors, Light dependent resistors, Hot-wire resistive transducer, Resistive hygrometer.

UNIT–III: CAPACITIVE AND INDUCTIVE SENSORS (9 Periods)

Capacitive sensors: Change in overlapping area, dielectric constant and distance between the plates of variable and differential capacitor. Frequency response of capacitive sensors.

Inductive sensors: Variable reluctance sensors, Eddy current sensors, Linear variable differential transformers, Synchros, Resolvers, Electromagnetic sensors based tachogenerator, Hall Effect sensors.

UNIT – IV: SELF-GENERATING SENSORS (9 Periods)

Thermoelectric sensors: Thermoelectric effects, Thermocouple laws, common thermocouples. Piezoelectric sensors: Piezoelectric effect, deformation modes, equivalent circuit, materials. Pyroelectric Sensors: Pyroelectric effect, materials. Photoelectric sensors: photovoltaic effect, materials. Magnetostrictive transducers, Electrochemical Sensors: Ion selective electrodes, Solid state electrodes.

UNIT – V: DIGITAL AND OTHER SENSORS (9 Periods)

Digital transducers: Tachometer encoder, incremental encoder, absolute encoder. Semiconductor sensors: Basics, techniques. Film sensors: Thin film sensors, Thick film sensors. Fiber optic sensors: Basics, sensor technology. Ultrasonic sensors: Basics, sensing methods. Micromachining concept of MEMS, Basics of SMART sensors.

Total Periods: 45

TEXT BOOKS:

1. Ramon Pallas-Areny and John G. Webster, Sensors and Signal Coditioning, John Wiley & Sons, Inc., 2nd edition, 2001.
2. A.K.Sawhney, A Course in Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai & Co., 19th Revised Edition, 2013.

REFERENCE BOOKS:

1. D. V. S Murty, Transducers and Instrumentation, PHI Learning Private Limited, 2nd edition, 2011.
2. D. Patranabis, Sensors and Transducers, PHI Learning Private Limited, 2nd edition, 2003.
3. John P. Bentley, Principles of Measurement Systems, Pearson Education, 4th edition, 2005.
4. Doebelin E.0, Measurement Systems - Application and Design, Tata McGraw-Hill, 4th Edition, 2003.

II B. Tech. – I Semester

14BT30232: **NETWORK ANALYSIS**

(Common to ECE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Physics and Engineering Mathematics

COURSE DESCRIPTION: Basic concepts of electric circuits; voltage – current relationship of basic circuit elements; mesh and nodal analysis; AC circuits; transient analysis; two port network parameters; filters; network theorems.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on
- Voltage and current relationships for various electric elements.
- Network reduction techniques.
- Concepts of 1-phase and 3-phase electric circuits.
- Concepts of two port networks and filters.
- Various network theorems.

CO2. Analyze
- A circuit using mesh and nodal concepts.
- A two port network for various network parameters.
- Various types of filter networks.
- The transient behavior of the circuits.

CO3. Design single phase circuits and filters to meet the required specifications.

CO4. Solve
- Electrical circuits for voltage, current and power using Conventional circuit analysis methods and network theorems.
- Transient responses.
- Two port networks and filters.

Detailed Syllabus:

UNIT–I: INTRODUCTON TO ELECTRICAL CIRCUITS (10 periods)

Concepts of charge, current, voltage, power, circuit elements, Ohm's law, Kirchoff's Laws, network reduction techniques, voltage and current division rules, series-parallel circuits, star-delta and delta-star transformations, source transformation, nodal analysis, mesh analysis – problems.

UNIT–II: SINGLE PHASE AC CIRCUITS (8 periods)

Introduction to AC quantities, basic definitions: cycle, time period, frequency, amplitude, determination of average value, rms value, form factor and peak factor for different alternating waveforms, phase and phase difference, phase relation in R, L, C circuits, series and parallel circuits, impedance and power triangle, power factor. Series and parallel resonance – quality factor and bandwidth. Current locus diagram –problems.

UNIT–III: TRANSIENT ANALYSIS (8 periods)

Transient response of R-L, R-C and R-L-C for DC excitation – transient response of R-L, R-C and R-L-C for sinusoidal excitation, solution by using differential equation and Laplace Transforms method – problems.

UNIT–IV: TWO PORT NETWORKS AND FILTERS (10 periods)

Impedance parameters, admittance parameters, transmission (ABCD) parameters, hybrid parameters, conversion of one parameter to another, conditions for reciprocity and symmetry, interconnection of two port networks in series, parallel and cascaded configurations – problems.

FILTERS: Classification of filters, filter networks and equations of filter networks, classification of pass band and stop band, characteristic impedance in the pass band & stop bands, constant - k Low pass filter, high pass filter, m-derived high pass and low pass filter, band pass filter and band elimination filter-problems.

UNIT–V: NETWORK THEOREMS (9 periods)

Superposition theorems, Thevenin's, Norton's, maximum power transfer, Tellegen's, Millman's, reciprocity, compensation theorem for D.C. and sinusoidal excitation- applications and problems.

Total Periods: 45

TEXT BOOKS:

1. A. Sudhakar, S.P.Shyam Mohan, *Circuits and Networks analysis and synthesis*, 4th edition, Tata McGraw Hill publishing company Ltd., New Delhi, 2007.
2. A.Chakrabarthi, *Circuit Theory (analysis and synthesis)*, 6thedition, Dhanpat Rai & Co, New Delhi, 2014.

REFERENCE BOOKS:

1. M.E. Van Valkenberg, *Network Analysis,* Pearson Publications, 3rd edition, New Delhi 2006.
2. W H Hayt, J E Kemmerly, S M Durbin, *Engineering Circuit Analysis*, Tata McGrawHill publishing company Ltd., New Delhi, 6th Edition, 2008.

II B. Tech. - I Semester

14BT30402: **SEMICONDUCTOR DEVICES AND CIRCUITS**

(Common to ECE, EEE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Physics.

COURSE DESCRIPTION: Characteristics of general and special purpose electronic devices; Rectifiers, filters and regulators; Biasing and small signal analysis of BJT and FET.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate fundamental knowledge in
- p-n junction diode and its characteristics
- Zener diode and its characteristics
- Rectifiers, Filters and Regulators
- Characteristics of BJT, FET, MOSFET and special purpose electronic devices

CO2. Analyze numerical and analytical problems in
- Rectifiers using Filters
- Regulated Power Supplies
- Transistor biasing circuits and stabilization
- Transistor amplifiers
- FET biasing circuits and amplifiers

CO3. Design electronic circuits like
- BJT and FET biasing circuits
- BJT and FET amplifiers

CO4. Solve engineering problems and arrive at solutions pertaining to electronic circuits.

Detailed Syllabus:

UNIT-I:PN JUNCTION DIODE, RECTIFIERS AND REGULATORS (12 Periods)

PN-Junction Diode:

p-n Junction as a diode, *p-n* Junction diode equation, Volt-Ampere (V-I) characteristics, temperature dependence of *p-n* characteristics, diode resistance-static and dynamic resistances, transition and diffusion capacitances, break down mechanisms in semiconductor diodes, Zener diode characteristics.

Rectifiers and Regulators:

Half-Wave rectifier and Full-Wave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter, **-** P section filter, comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT-II: BIPOLAR JUNCTION TRANSISTOR, BIASING AND STABILIZATION (9 Periods)

Transistor construction, BJT Operation, Transistor currents and their relations, Input and Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications, Transistor Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Base Feedback Bias, Voltage Divider Bias, Bias Stability, Transistor as an amplifier, Thermal Runaway, Problems on biasing circuits.

UNIT-III: SMALL SIGNAL ANALYSIS OF BJT AMPLIFIERS (10 Periods)

BJT Modeling, Hybrid Modeling, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Millers Theorem, Analysis of CE, CB and CC configurations using simplified Hybrid Model, Comparison of CB, CE and CC configurations.

UNIT-IV: FIELD EFFECT TRANSISTOR (9 Periods)

Construction, Principle of operation and characteristics of JFET and MOSFET (Enhancement & Depletion), Biasing of FET, Small Signal Model of JFET, Common Source and Common Drain Amplifiers using JFET, Generalized FET Amplifier, FET as Voltage Variable Resistor, Comparison of BJT and FET.

UNIT-V: SPECIAL PURPOSE ELECTRONIC DEVICES (5 Periods)

Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Controlled Rectifier (SCR). Principle of operation of Schottky Barrier Diode.

Total Periods: 45

TEXT BOOK:

1. J. Millman, Christos C. Halkias and Satyabrata Jit, *Electronic Devices and Circuits,* TMH, 3rd Edition, 2010.

REFERENCE BOOKS:

1. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits,* PHI, 10th Edition, 2009.
2. David A. Bell, *Electronic Devices and Circuits,* Oxford University press, 5th Edition, 2014.
3. S. Salivahanan, N. Suresh Kumar, *Electronic Devices and Circuits*, Mc-Graw Hill, 3rd Edition 2013.

II B. Tech. – I Semester
14BT31021: MEASUREMENTS AND TRANSDUCERS LAB

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITE: Sensors and Transducers, Electrical Measurements

COURSE DESCRIPTION: Measurement of parameters like voltage, resistance, inductance, capacitance, displacement, pressure, force, temperature and shaft speed.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Carry out analysis of instrument in terms of accuracy, Linearity and Calibration.

CO2. Design and develop measuring circuits for voltage, current and resistance .

LIST OF EXPERIMENTS:

Minimum of 11 Experiments to be conducted

1. Measurement of AC parameters (Voltage & Current) using D'Arsonval Galvanometers
2. Conversion of D'Arsonval Galvanometer into ohmmeter (Series & Shunt)
3. Measurement of unknown resistance, inductance and capacitance using bridge circuits
4. Measurement of resistance, inductance, capacitance and quality factor of the coil using Q meter
5. Calibration and testing of single phase energy meter
6. Linear displacement measurement using LVDT
7. Temperature measurement using RTD
8. Strain measurement using Strain Gauges
9. Angular displacement using capacitive transducer
10. Transfer characteristics of thermocouple and Determination of Time Constant
11. Determination of Capacitance of a RC Circuit
12. Study of Piezoelectric Transducer
13. Measurement of shaft speed using stroboscope
14. Pressure measurement using Bourdon tube

II B. Tech. – I Semester

14BT30421: **SEMICONDUCTOR DEVICES AND CIRCUITS LAB**

(Common to ECE, EEE & EIE)

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: Semiconductor Devices and Circuits.

COURSE DESCRIPTION: Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; Transistor and FET characteristics; UJT and SCR characteristics; BJT and FET amplifiers.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Analyze the characteristics of different electronic devices, like

- Diode
- Zener Diode
- Transistor
- FET and UJT

CO2. Design and analyze the electronic circuits like transistor and FET amplifiers

CO3. Solve engineering problems and arrive at solutions pertaining to electronics.

LIST OF EXPERIMENTS:

PART A: (Only for viva voce Examination)

Electronic Workshop Practice (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs.
2. Identification, Specifications and Testing of Active Devices, Diodes: BJTs, Low-power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.
3. Study and operation of
   - Multimeters (Analog and Digital).
   - Function Generator.
   - Regulated Power Supplies.
   - CRO.

PART B: (Minimum of 10 experiments to be conducted)

1. Forward and Reverse bias characteristics of PN Junction diode.
2. Zener diode characteristics and Zener as Voltage Regulator.
3. Input and Output characteristics of Transistor in CB Configuration.
4. Input and Output characteristics of Transistor in CE Configuration.
5. Half wave Rectifier with and without filters.
6. Full wave Rectifier with and without filters.
7. FET characteristics .
8. Measurement of h - parameters of transistor in CE configuration.
9. Frequency response of CE Amplifier.
10. Frequency response of CC Amplifier.
11. Frequency response of Common Source FET Amplifier.
12. SCR Characteristics.
13. UJT Characteristics.

II B. Tech. - II Semester

14BT4HS02: **PROFESSIONAL ETHICS**

(Common to ECE, EEE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

COURSE DESCRPTION: Engineering Ethics, Moral autonomy and Moral dilemmas – Professional and Ideal Virtues, Professional Responsibility and Moral Leadership – Engineering as Social Experimentation, Conscientiousness and Law of Engineering - Responsibilities and Rights, Whistle Blowing – Global Issues, Managerial Ethics.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Apply the principles of ethics to solve engineering problems.
CO2. Analyze the problems in the implementation of moral autonomy and resolve through Consensus.
CO3. Responsible to follow the codes of ethics.
CO4. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas.
CO5. Function as a member, consultant, Manager, Advisor and Leader in multi–disciplinary teams.
CO6. Write reports without bias and give instructions to follow ethics.

Detailed syllabus:

UNIT I: ENGINEERING ETHICS (8 Periods)

Scope and Aim of Engineering Ethics–Senses of Engineering Ethics– Variety of Moral Issues–Types of Inquiry– Moral Dilemmas– Moral Autonomy– Kohlberg's Theory, Gilligan's theory, Consensus and Controversy.

UNIT II: PROFESSIONAL IDEALS AND VIRTUES (10 Periods)

Theories about Virtues, Professions, Professionalism – characteristics, expectations, Professional Responsibility, Integrity, Self–respect, Sense of "Responsibility". Self–interest, Customs and Religion– Self–interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories– resolving moral dilemmas and moral leadership.

UNIT III: ENGINEERING AS SOCIAL EXPERIMENTATION (9 Periods)

Engineering as experimentation– Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters–Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT IV: RESPONSIBILITIES AND RIGHTS (9 Periods)

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers– Professional rights, whistle–blowing, the bart case, employee rights and discrimination.

UNIT V: GLOBAL ISSUES (9 Periods)

Multinational corporations–Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers – Managerial ethics applied to Engineering Profession, moral leadership.

Total Periods: 45

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, *Ethics in Engineering*, 3rd Edition, Tata McGraw–Hill, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, *Engineering Ethics*, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, *Fundamental of Ethics for Scientists and Engineers*, 1st Edition, Oxford University Press, 2001.
3. Charles F. Fledderman, *Engineering Ethics*, Pearson Education, 2004.
4. R. Subramanaian, *Professional Ethics*, Oxford Higher Education, 2013.

II B. Tech. II Semester

14BT50201: **CONTROL SYSTEMS**

(Common to ECE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Electrical Circuits / Network Analysis

COURSE DESCRIPTION: Concepts of control system; transfer function of various physical systems; time response analysis; frequency response analysis; compensators; stability analysis; state space analysis.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on
- Modelling of physical systems.
- Time and frequency domain specifications used for stability analysis.
- Various methods of determining the stability of the system.
- Realization of various compensators.
- Concept of controllability and observability.

CO2. Analyze the stability of the system in time and frequency domains.

CO3. Demonstrate problem solving skills in
- Deriving the transfer function using block diagram reduction technique.y state error and static error constants.
- Evaluating the system stability in time and frequency domains.
- Solving the state equations of a system.
- Evaluating controllability and observability of a system.*Detailed Syllabus:*

Detailed Syllabus:

UNIT – I: CONTROL SYSTEMS CONCEPTS (9 periods)

Classification of control systems, effects of feedback. Mathematical models –mechanical and electrical systems, analogous systems. Block diagram reduction methods, signal flow graph, Mason's gain formula, transfer function of DC servo motor, AC servo motor, synchros.

UNIT - II: TIME RESPONSE ANALYSIS (8 periods)

Test signals, time response of first and second order systems, transient response of second order systems, time domain specifications, steady state response, steady state error, error constants and generalized error coefficients, response with proportional, integral and derivative controllers.

UNIT – III: STABILITY ANALYSIS IN TIME DOMAIN (9 periods)

The concept of stability, Routh's stability criterion, difficulties in the formation of Routh table, application of R-H criterion. Root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root loci, relative stability analysis.

UNIT – IV: FREQUENCY RESPONSE ANALYSIS (9 periods)

Frequency domain specifications, Bode plots, determination of frequency domain specifications and transfer function from the Bode plot, stability analysis from Bode plots, Polar plots, phase margin and gain margin. Nyquist stability criterion, stability analysis. Compensation techniques – realization of Lag, Lead and Lag-Lead compensators.

UNIT – V: STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS (10 periods)

Concepts of state, state variables and state model, derivation of state models from physical systems, diagonalization, solution of state equations- state transition matrix and it's properties. Concept of controllability and observability, Kalman's test only.

Total Periods: 45

TEXT BOOKS:

1. A. Anand kumar, *Control Systems*, PHI learning Pvt Ltd., 2nd Edition, 2014.
2. I. J. Nagrath and M. Gopal, *Control Systems Engineering*, New Age International (P) Limited, 5th Edition, 2007.

REFERENCE BOOKS:

1. K. Ogata, *Modern Control Engineering*, Prentice Hall of India, 4th Edition, 2006.
2. A. NagoorKani, *Control Systems,* RBA Publications, 2nd Edition, 2006.

II B. Tech. – II Semester
14BT30231: **ELECTRICAL TECHNOLOGY**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Network Analysis, Engineering Physics

COURSE DESCRIPTION: DC Machines; Three phase systems; operation and performance of a transformer, Three phase induction motor, Alternators and special machines.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Gain knowledge on
- Construction & operation of various types of electrical machines.
- Necessity of starter.
- Three phase circuits.

CO2. Analyze the characteristics of various electrical machines.

CO3. Evaluate the performance of electrical machines.

CO4. Select suitable machines for real time applications.

Detailed Syllabus:

UNIT - I: DC MACHINES (10 periods)

DC Generator: construction and working principle, types, EMF equation, losses, open circuit and load characteristics, applications – problems.

DC Motor: working principle, torque equation, characteristics, applications, speed control of shunt motor, Swinburne's test, three point starter–problems.

UNIT - II: SINGLE PHASE TRANSFORMER (10 periods)

Working principle of single phase transformer, constructional features, EMF equation, equivalent circuit, losses, efficiency and regulation of transformer, OC and SC test, predetermination of efficiency and regulation - problems.

UNIT - III: THREE PHASE CIRCUITS (8 periods)

Introduction to polyphase systems, advantages of polyphase system, generation of three phase voltages, phase sequence, star and delta connections, relationship between phase and line quantities in three phase balanced circuits, power measurement in three phase systems using two wattmeter method - problems.

UNIT - IV: THREE PHASE INDUCTION MOTOR AND ALTERNATOR (8 periods)

Induction motor: principle of operation, construction and types, slip, rotor frequency, torque, torque - slip characteristics – problems.

Alternators: principle of operation, constructional features, types, EMF equation.

UNIT - V: SPECIAL MACHINES (9 periods)

Single phase induction motors – construction, principle of operation (double field revolving theory) and applications of split phase induction motor, capacitor motor, shaded-pole motor. Construction, principle of operation and applications of universal motors and stepper motors.

Total Periods: 45

TEXT BOOKS:

1. B.L. Theraja and A.K. Theraja, A Text Book of Electrical Technology in S.I.Units, Vol.2, S.Chand Company Ltd, New Delhi, 2012.
2. V.K. Mehta, Rohit Mehta, Principles of Electrical Engineering and Electonics, S.Chand Company Ltd, New Delhi, 2010.

REFERENCE BOOKS:

1. H. Cotton, Electrical Technology, CBS Publishers & Distributors, 2004.
2. M.S. Naidu and S. Kamakshaiah, Electrical Technology, Tata McGraw-Hill Publishing company Ltd, New Delhi, 2007.
3. A.Sudhakar and Shyammohan, Principles of Electrical Engineering, Tata McGraw Hill Education Private Limited, New Delhi. 2012.

II B. Tech. – II Semester

14BT40402: **ELECTRONIC CIRCUIT ANALYSIS AND DESIGN**

(Common to ECE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISTES: Semiconductor Devices and Circuits

COURSE DESCRIPTION: BJT - Multi Stage amplifiers; Frequency Response; Feedback Amplifiers; Oscillators; Large Signal Amplifiers; Tuned Amplifiers; FET amplifiers.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in
- § Multi Stage Amplifiers.
- § BJT Frequency Response.
- § FET Amplifiers.
- § Feedback Amplifiers.
- § Oscillators.
- § Power Amplifiers.
- § Tuned Amplifiers.

CO2. Perform analysis of electronic circuits.

CO3. Design and develop electronic sub-systems such as Feedback Amplifiers, oscillators and Power amplifiers with given specifications.

CO4. Solve problems arising due to poor circuit design by choosing the appropriate design.

Detailed Syllabus:

UNIT - I: MULTI STAGE AMPLIFIERS (8 periods)

Introduction, Distortion in amplifiers, n-stage cascaded amplifier, Methods of inter-stage coupling, Analysis of RC Coupled Amplifier, Direct and Transformer Coupled Amplifier, Darlington Pair, CE-CC amplifier, Cascode amplifier.

UNIT - II: BJT FREQUENCY RESPONSE (11 periods)

Frequency response of BJT amplifier, Analysis at low and high frequencies, Effect of coupling and bypass capacitors Hybrid -P Common Emitter transistor model, CE short circuit current gain, CE current gain with resistive load, Single - stage CE transistor amplifier response, Gain - Bandwidth Product, Multistage Frequency Effects.

FET AMPLIFIERS

FET Small signal Model, Low - frequency Common - Source and Common -Drain Amplifiers, High - frequency Common - Source and Common - Drain Amplifiers.

UNIT - III: BJT FEEDBACK AMPLIFIERS AND OSCILLATORS (10 periods)

Concept of feedback, Classification of feedback amplifiers, general characteristics of negative feedback amplifiers, Effect of feedback on amplifier characteristics, voltage series, voltage shunt, current series and current shunt feedback configurations. Conditions for oscillations, Classification of oscillators, RC phase shift oscillator, Wien bridge oscillator, Generalized analysis of LC oscillators – Hartley and Colpitts oscillators, Piezoelectric crystal oscillator, Frequency and Stability of oscillators.

UNIT - IV: POWER AMPLIFIERS (8 periods)

Classification of power amplifiers, Class A large - signal amplifiers, Series -fed and transformer - coupled Class A audio power amplifier, Efficiency of Class A amplifier, Class B amplifier, Transformer - coupled Class B push - pull amplifier, Complementary symmetry Class B push - pull amplifier, Efficiency of Class B amplifier, Distortion in power amplifiers, Transistor power Dissipation, Thermal stability and Heat sinks.

UNIT - V: TUNED AMPLIFIERS (8 periods)

Introduction, Q - factor, Small signal single tuned amplifiers, Double tuned amplifiers, Effect of cascading single and double tuned amplifiers on band width, Stagger tuned amplifiers, Class - C tuned amplifiers.

Total Periods: 45

TEXT BOOKS:

1. Jacob Millman and Christos C. Halkias, *Integrated Electronics,* Tata McGraw-Hill, 2nd Edition, 2010.
2. Robert L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits Theory*, Pearson Education, 10th Edition, 2009.
3. K. Lal Kishore, *Electronic Circuit Analysis*, BS Publications, 2nd Edition, 2003.

REFERENCE BOOK:

1. Donald A. Neamen, *Electronic Circuit Analysis and Design*, Tata McGraw-Hill, 3nd Edition, 2007.

II B. Tech. – II Semester

14BT40404: **SIGNALS AND SYSTEMS**

(Common to ECE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Mathematics, Mathematical Methods

COURSE DESCRIPTION: Analysis of signals and systems; Representation of signals using Fourier series and Fourier transform and their properties; Time - Domain and Frequency - Domain aspects of signals and systems; concept of convolution and correlation; Sampling and types of sampling; Laplace transform of signals; Z-Transform of sequences and their properties.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate fundamental knowledge in
- Trigonometric and exponential Fourier series representation of periodic signals.
- Fourier transform of signals.
- Convolution and correlation of functions.
- Sampling Process.
- Laplace transforms, ROC for Laplace Transform.
- Z-Transform of discrete sequences and ROC for Z-Transform.

CO2. Perform time and frequency domain analysis of various continuous and discrete time signals and systems

CO3. Develop solutions to stable and causal systems

CO4. Solve engineering problems critically in the area of signalprocessing

Detailed Syllabus:

UNIT - I: SIGNALS AND SYSTEMS (10 periods)

Elementary signals - Unit Impulse and Unit Step Functions, Exponential and Sinusoidal Signals. Classification of Continuous - Time and Discrete - Time Signals, Basic operations on signals, Classification of Continuous -Time and Discrete - Time Systems, Basic System Properties, Linear Time Invariant Systems, Discrete - Time LTI Systems - The Convolution Sum, Continuous - Time LTI Systems - The Convolution Integral, Properties of Linear Time - Invariant Systems.

UNIT - II: FOURIER SERIES & FOURIER TRANSFORM OF CONTINUOUS - TIME SIGNALS (10 periods)

The Response of LTI Systems to Complex Exponentials. Fourier Series Representation of Continuous - Time Periodic Signals, Convergence of the Fourier Series, Properties of Continuous - Time Fourier Series Representation of aperiodic Signals, the Continuous - Time Fourier Transform. The Fourier Transform for Periodic Signals, Properties of the Continuous -Time Fourier Transform, The Convolution Property, Fourier Properties and Basic Fourier Transform Pairs, Systems characterized by Linear constant coefficient differential equations. The Magnitude - Phase Representation of the Fourier Transform, The Magnitude - Phase Representation of the Frequency Response of LTI Systems

UNIT - III: CORRELATION OF SIGNALS & SAMPLING (11 periods)

Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy /power spectral density function. Relation between convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

Spectral Characteristics of System Response: Power density spectrum of response, Cross-power spectral density of input and output of a linear system.

Sampling: Representation of a Continuous - Time Signal by its Samples - Sampling Theorem, Reconstruction of a Signal from its Samples using Interpolation. Effect of under sampling: Aliasing, Discrete - Time Processing of Continuous - Time Signals.

UNIT - IV: LAPLACE TRANSFORMS (7 periods)

The Laplace Transform, The Region of Convergence for Laplace Transforms, The Inverse Laplace Transform, Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot, Properties of the Laplace Transform, Some Laplace Transform Pairs, Analysis and Characterization of LTI Systems Using the Laplace Transform, System Function Algebra and Block Diagram Representations, Unilateral Laplace Transform.

UNIT - V: Z - TRANSFORMS (7 periods)

The Z - Transform -Region of Convergence for the z - Transform, The Inverse z - Transform, Geometric Evaluation of the Fourier Transform from the Pole - Zero Plot, Properties of the z - Transform, Some Common z -Transform Pairs, Analysis and Characterization of LTI Systems Using z -Transforms, System Function Algebra and Block Diagram Representations, Unilateral z - Transforms.

Total Periods: 45

TEXT BOOKS:

1. Alan V. Oppenheim, Alan S. Willsky, & S. Hamid, *Signals and Systems*, Pearson Higher Education, 2nd Edition , 2008.
2. B.P. Lathi, *Principles of Linear Systems and Signals*, Oxford University Press, 2nd Edition, 2013.

REFERENCE BOOKS:

1. Simon Haykin and B. Van Veen, *Signals & Systems*, John Wiley, 2nd Edition, 2010.
2. A. Anand Kumar, *Signals & Systems*, PHI, 2011.

II B.Tech – II Semester

14BT40405: **SWITCHING THEORY AND LOGIC DESIGN**

(Common to ECE, EEE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Basic algebra.

COURSE DESCRIPTION: Number system and Boolean algebra; Minimization; Analysis and synthesis of digital circuits; Asynchronous Sequential Logic & Programmable Memories.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in:

- · Conversion of number systems, Binary Codes.
- · Basic theorems, properties and postulates of Boolean algebra.
- · Minimization of switching functions using Map method and Tabular method.
- · Design of combinational and sequential circuits.
- · Realization of Boolean functions using PLDs.

CO2. Perform the analysis of reduction of Boolean function and implementation using PLDs.

CO3. Design and develop various combinational and sequential circuits.

CO4. Solve engineering problems and arrive at solutions pertaining to Digital Electronics.

Detailed Syllabus:

UNIT - I: NUMBER SYSTEM & BOOLEAN ALGEBRA (8 periods)

Digital systems, Binary Numbers, Number base conversions, Complements of numbers, Signed binary numbers, Binary codes, Error detection and correction codes. Boolean Algebra - Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, logical operations & Logic gates.

UNIT - II: GATE LEVEL MINIMIZATION (8 periods)

The map method, four variable, Five variable K - map, POS & SOP Simplification, Don't care conditions, NAND & NOR Implementation, Other two level Implementation, Exclusive - OR Function, Tabular Method - Simplification of Boolean function using tabulation Method.

UNIT - III: ANALYSIS AND SYNTHESIS OF COMBINATIONAL CIRCUITS (9 periods)

Combinational circuits, Analysis & Design procedure, Binary Adder-subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers.

UNIT - IV: ANALYSIS AND SYNTHESIS OF SEQUENTIAL CIRCUITS (11 periods)

Sequential Circuits, Latches, Flip - Flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers & Counters – Registers, Shift Registers, Synchronous counters and Asynchronous counters.

UNIT V: ASYNCHRONOUS SEQUENTIAL LOGIC & PROGRAMMABLE MEMORIES (9 periods)

Introduction, Analysis procedure, Circuits with Latches, Design Procedure, Reduction of State and flow tables, Race - free State Assignment, Hazards, ROM, PLA, PAL.

Total Periods: 45

TEXT BOOK:

1. M.Morris Mano, Digital Design, Pearson, 3rd Edition, 2001.

REFERENCE BOOKS:

1. Zvi Kohavi and Niraj K.Jha, Switching theory and Finite Automata Theory, Tata McGraw-Hill, 2nd Edition, 1978.
2. Charles H. Roth, Fundamentals of Logic Design, Thomson Publications, 5th Edition, 2004.
3. A Anand Kumar, Switching Theory and Logic Design, PHI, 2008.

II B.Tech. - II Semester

14BT50405: PULSE AND DIGITAL CIRCUITS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Semiconductor Devices and Circuits, Network Analysis.

COURSE DESCRIPTION: Analysis of Linear and non-linear Wave shaping circuits; switching characteristics of Diode and Transistor; multivibrators; sweep circuits; Pulse synchronization; sampling and logic gates.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in
- · Responses of High-pass and low-pass RC circuits for different inputs.
- · Clipping and clamping operations.
- · Methods of generating the Time-base waveforms.
- · Operating Principles of Sampling gates.
- · Realization of logic gates using Diodes and Transistors.

CO2. Perform the analysis of Linear and non - linear Wave shaping circuits.

CO3. Design and develop Multivibrator Circuits.

CO4. Solve engineering problems pertaining to pulse and Digital circuits.

Detailed Syllabus :

UNIT - I: LINEAR WAVE SHAPING (9 Periods)

High-pass, low-pass RC circuits, their response for step, pulse, square and ramp inputs. High pass RC network as a Differentiator and Low pass RC network as an Integrator, Parallel RLC circuit and its response for step input, Ringing circuit, attenuators and its application as a CRO probe.

UNIT - II: NON - LINEAR WAVE SHAPING (8 Periods)

Diode Switching times, Diode clippers, Transistor clipper, Clipping at two independent levels, Comparators, Clamping operation, Clamping circuit taking source and Diode resistances into account, Clamping circuit theorem, Practical clamping circuits, effect of Diode characteristics on Clamping voltage, Synchronized Clamping.

UNIT - III: MULTIVIBRATOR CIRCUITS (9 Periods)

Transistor as a switch, Transistor switching times, Analysis and Design of Fixed-Bias Bistable, Monostable, Astable Multivibrators (Collector-Coupled), Symmetrical and Asymmetrical triggering, Schmitt trigger Circuit.

UNIT - IV: TIME - BASE GENERATORS (10 Periods)

General features of a Time - Base signal, methods of generating Time-Base waveform, Miller and Bootstrap Time - Base generators - basic principles, Transistor Miller Time - Base generator, Transistor Bootstrap Time - Base generator. Transistor Current Time - Base generators, Methods of linearity improvements.

SYNCHRONIZATION AND FREQUENCY DIVISION: Pulse Synchronization of Relaxation Devices, Frequency Division in the sweep circuit, Stability of Relaxation Devices, Astable Relaxation circuits, Synchronization of a sweep circuit with symmetrical signals.

UNIT - V: SAMPLING GATES AND DIGITAL LOGIC CIRCUITS (9 Periods)

SAMPLING GATES: Basic operating principles of sampling gates, Unidirectional and Bidirectional sampling gates, Reduction of pedestal in gate circuits, Four Diode Sampling gate, Six diode gate, Applications of sampling gates.

DIGITAL LOGIC CIRCUITS: Realization of Logic gates (OR, AND & NOT) using diodes & transistors**,** Analysis of RTL, DTL, TTL and CMOS Logic families and Comparison between the logic families.

Total Periods: 45

TEXT BOOKS:

1. Jacob Millman, Herbert Taub and Suryaprakash Rao Mothiki, *Pulse, Digital and Switching Waveforms*, TMH, 3rd Edition, 2014.
2. David A. Bell, *Pulse, Switching and Digital Circuits*, Oxford University Press, 5th Edition, 2015.

REFERENCE BOOKS:

1. A. Anand Kumar, *Pulse and Digital Circuits*, PHI, 2nd Edition, 2012.
2. R.Venkataraman, *Pulse, Digital Circuits and Computer Fundamentals*, Dhanapat Rai Publications, 3rd Edition, 2009.

II B.Tech. - II Semester
14BT41021: ANALOG AND DIGITAL CIRCUITS LAB

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE - REQUISITES: Switching theory and logic design, Pulse and digital circuits, Electronic circuit analysis.

COURSE DESCRIPTION: Design of BJT - Small signal single stage & Multistage amplifiers Frequency Response; Design of Oscillator; Linear and Non linear wave shaping circuits; sampling gates; Multivibrator; Verification of logic gates and flip-flops.

COURSEOUTCOMES: After completion of the course the student will be able to

CO1. Analyse simple electronic circuits in terms of theoretical and practical performance.
CO2. Design and develop circuits using discrete components and ICs.
CO3. Apply any simulation tool to analyze the electronic circuits.

LIST OF EXPERIMENTS:

Minimum of 11 experiments to be conducted (At least three experiments from each part).

Part-A

I) **Design and Simulation in Simulation Laboratory using Any Simulation Software:**

1. Common Emitter amplifier.
2. Common Source amplifier.
3. A Two Stage RC Coupled Amplifier.
4. RC Phase Shift Oscillator using BJT.
5. Complementary Symmetry Push - Pull Amplifier.

Part - B

I) Pulse and Digital Circuits:

1. Linear wave shaping – Differentiator & Integrator.
2. Non - Linear wave shaping – Clippers & Clampers.
3. Astable Multivibrator.
4. Sampling Gates.
5. Bootstrap sweep circuit.

Part - C

II) Digital Design

1. Verification of logic gates.
2. Verification of combinational circuits.
3. Verification of Flip-flops.
4. Design of counters.
5. Verification of Multiplexer / Demultiplexer.

II B.Tech. - II Semester
14BT30222: ELECTRICAL TECHNOLOGY LAB

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: Network analysis and Electrical Technology

COURSE DESCRIPTION: Determination of Two port network parameters, verification of network theorems; Response of RLC circuits; Performance characteristics of AC and DC Machines.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Analyze the performance of electrical machines.
CO2. Design various types of passive filters and resonant circuits. CO3. Solve complex problems in electrical circuits and machines.

LIST OF EXPERIMENTS:

Any SIX experiments from each part to be conducted

PART-A

1. Series and parallel resonant circuits.
2. Time response of first order RL / RC network for periodic non Sinusoidal inputs.
3. Determination of Z and Y parameters for a given Two - port network.
4. Determination of ABCD and h - parameters for a given Two - port Network.
5. Verification of Superposition and Reciprocity theorems.
6. Verification of maximum power transfer theorem for both DC and AC excitation.
7. Verification of Thevenin's and Norton's theorems.
8. Design of low pass and high pass filters.

Part - B

1. Magnetization characteristics of a DC generator.
2. Swinburne's test on a DC shunt machine.
3. Brake test on a DC shunt motor.
4. Speed control of DC shunt motor by
    a. Field flux control method.
    b. Armature voltage control method.
5. OC and SC tests on a single - phase transformer.
6. Load test on a single phase transformer.
7. Brake test on a three - phase induction motor.
8. External characteristics of DC shunt generator.

III B. Tech. - I Semester

14BT4HS01: **BUSINESS COMMUNICATION AND PRESENTATION SKILLS**

(Common to ECE, EEE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Basic grammar and fundamentals of Listening, Speaking, Reading and writing skills.

COURSE DESCRIPTION: Nature and Scope of Communication; Non -Verbal Communication; Writing Business Documents; Business Presentations and Public Speaking; Careers and Resume.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Acquire knowledge in
- · Managerial Communication.
- · Corporate Communication.
- · Business Writing.
- · Presentation Skills.
- · Career Building.

CO2. Analyze and judge the situation through non - verbal communication for effective organizational communication.

CO3. Achieve personal excellence and ability to work in groups.

CO4. Develop effective communication to meet professional needs.

Detailed Syllabus:

UNIT – I : NATURE AND SCOPE OF COMMUNICATION (9 periods)

Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks - Informal Communication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication.

UNIT – II : NON - VERBAL COMMUNICATION (9 periods)

Introduction - Significance of Non - verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non - verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross - cultural Communication Strategies - Corporate Communication: Introduction- Crisis Management / Communication - Case Study.

UNIT – III : WRITING BUSINESS DOCUMENTS (10 periods)

Business Writing: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters - Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT – IV : BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 periods)

Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non - functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT – V : CAREERS AND RESUME (7 periods)

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - Resume Writing: Resume Formats; Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non - verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

Total Periods: 45

TEXT BOOK:

1. Meenakshi Raman and Prakash Singh, *Business Communication*, Oxford University Press, New Delhi, Second Edition, 2012.

REFERENCE BOOKS:

1. M K Sehgal and Vandana Khetarpal*, Business Communication*, Excel Books, New Delhi, 2011.
2. M Ashraf Rizvi, *Effective Technical Communication***,** Tata McGraw – Hill, 2009.

III- B. Tech. - I semester

14BT5HS01: **MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY**

(Common to ECE, EEE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Nil

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Acquire Knowledge in
- Tools and concepts of Micro Economics.
- Basic Principles and concepts of Accountancy.
- Provides life skills for effective utilization of scarce resources.
- Financial Accounting.
- Using advanced tools like tally and SAP.
- Significance of Economics and Accountancy.

CO2. Develop skills in analyzing problems for
- Managerial decisions of an organization.
- Demand & Supply, Production & Cost and Markets & Price through Economic theories.

CO3. Develop effective communication in Business and Accounting transactions.

Detailed syllabus:

UNIT – I: INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS (9 Periods)

Definition, Nature and Scope of Managerial Economics. Demand**:** Determinants of demand – Demand function - Law of demand, assumptions and exceptions - Elasticity of demand – Types of elasticity of demand -Demand forecasting and methods of demand forecasting, supply**-** Determinants of Supply and Supply function.

UNIT – II: THEORY OF PRODUCTION AND COST ANALYSIS (9 Periods)

Production Function: Isoquants and Isocosts – Input-output relationship - Law of returns.

Cost Concepts: Total, Average and Marginal Cost **-** Fixed vs. Variable costs – Opportunity Costs Vs Outlay Costs – Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs - Avoidable Costs vs Unavoidable Costs.

Break Even Analysis (BEA)–Assumptions, Merits and demerits - Determination of Break Even Point (Simple problems).

UNIT – III: INTRODUCTION TO MARKETS AND PRICING (9 Periods)

Market Structure: Types of Markets - Features of perfect competition - Monopoly and monopolistic competition - Price and Output determination in perfect competition and monopoly.

Pricing: Objectives and policies of pricing – Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - Market penetration – Market skimming - Block pricing – Peak load pricing - Cross subsidization. **Capital:** Significance - Types of capital – Sources of Capital.

UNIT – IV: INTRODUCTION AND PRINCIPLES OF ACCOUNTING (9 Periods)

Accountancy**:** Introduction – Concepts – Conventions – Accounting Principles - Double Entry Book Keeping – Journal – Ledger - Trial Balance (Simple problems).

UNIT – V: FINAL ACCOUNTS (9 Periods)

Introduction to Final Accounts - Trading account - Profit and Loss account and Balance Sheet with simple adjustments (Simple problems).

Computerization of Accounting System : Manual Accounting *Vs* Computerized Accounting – Advantages and Disadvantages of Computerized Accounting.

Total Periods: 45

TEXT BOOKS:

1. A.R. Aryasri, *Managerial Economics and Financial Analysis***,** Tata Mc Graw Hill, New Delhi, 3rd Edition, 2007.
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, *Managerial Economics*, S. Chand and Company, New Delhi, 2nd Edition, 2010.

REFERENCE BOOKS:

1. Vershaney and Maheswari, *Managerial Economics,* Sultan Chand and Sons, New Delhi, 19th Edition, 2005.
2. H. Craig Petersen and W. Cris Levis, *Managerial Economics,* Pearson Education, 4th Edition, 2009.
3. Lipsy and Chrystel, *Economics,* Oxford University Press, New Delhi, 12th Edition, 2011.
4. S.P. Jain and K.L. Narang, *Financial Accounting*, Kalyani Publishers, Ludhiana, 6th Edition, 2002.

III B. Tech. - I Semester
14BT51001: **ELECTRONIC INSTRUMENTATION**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Physics.

COURSE DESCRIPTION: Voltage and Current Measurement; Frequency and Time Measurement; Oscilloscope; Analyzers and Recorders; Display systems; Microprocessor based Instruments; Protection circuits for various instruments and Hazards free environment.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in
- Working Principle and operation of different instruments. used for Measurement of Analog & Digital values.
- The measurement of Frequency & Time.
- Usage and function of Oscilloscope, Analyzers and Recorders.
- Instrument using Microprocessor & Protection circuits.

CO2. Analyze and Identify Instruments and their suitability for different application.

CO3. Design and Implement of measurement setups.

Detailed Syllabus:

UNIT-I: ELECTRONIC INSTRUMENTS (9 Periods)

Analog voltmeter - AC voltmeter using rectifiers, true RMS Voltmeter, Considerations in choosing an analog voltmeter; Multimeter; Digital voltmeters: Ramp type, Dual Slope Integrating type DVM, Integrating type DVM, Staircase ramp DVM and successive approximation DVM; $3\ ^1/_2$ Digit; Resolution and Sensitivity of Digital Meters.

UNIT-II: FREQUENCY AND TIME MEASUREMENTS (9 Periods)

Digital Frequency Meter - Basic Circuit, Time Base Selector, Start and Stop gate; Circuit for Measurement of Frequency; Simplified Composite Circuit for a Digital Frequency Meter; High Frequency Measurement, Frequency synthesizer; Period Measurement; Ratio and Multiple Ratio Measurements; Time Interval Measurements; Universal Counter Timer.

UNIT - III: OSCILLOSCOPES (10 Periods)

Introduction, Block diagram of CRO, Cathode Ray Tube – Electron Gun, Electrostatic Focusing, Electrostatic Deflection, Screen for CRTs; Time base Generator, Amplifiers – Horizontal and Vertical, Attenuators; Dual Trace Oscilloscopes; Dual Beam Oscilloscopes; Sampling Oscilloscope; Storage Oscilloscopes – Analog, Digital; CRO probes; Lissajous figures.

UNIT - IV: ANALYZERS AND RECORDERS (9 Periods)

Introduction, Wave analyzers - Frequency selective wave analyzer, Heterodyne wave analyzer; Harmonic Distortion Analyzers, Total Harmonic Distortion; Spectrum analyzers; Recorders - Strip Chart recorders, x-y recorders, Magnetic tape recorders, CD/DVD Recorders; Display devices: LED, LCD, Seven segment, Dotmatrix displays and display systems.

UNIT - V: PROTECTION CIRCUITS (8 Periods)

Grounding and Shielding: Introduction - concept of earth ground, examples of current return path symbols, shock hazard protection using Earth Ground, grounding considerations, basic grounding practices and examples. Practical guide lines for shielding and examples.

Total Periods: 45

TEXT BOOKS:

1. A.K.Sawhney, *A Course in Electrical and Electronics Measurements and Instrumentation*, Dhanpat Rai and Sons, New Delhi, 1995.
2. M.M.S.Anand., Electronic Instruments and Instrumentation Technology, PHI, 2005.

REFERENCE BOOKS:

1. Cooper W.D & Hlefrick A.D., *Electronic Instrumentation & Measurement Technique*, 3rd Edition, PHI, 1991.
2. H.S. Kalsi, *Electronic Instrumentation*, TMH, 2002.

III B. Tech. - I Semester

14BT51002: **INDUSTRIAL INSTRUMENTATION – I**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Sensors and Transducers, Electrical Measurement, Electronic Instruments.

COURSE DESCRIPTION: Metrology; Measurement of physical quantities like Force, Weight, Torque, Power, Pressure, Velocity, Acceleration, Moisture, Viscosity, Density and Sound.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on science of measurement and measurement techniques.
CO2. Identify and formulate instruments to measure Physical parameters, like Torque, Pressure etc.
CO3. Design and implement suitable setup using instruments to measure force, torque, pressure, speed, density and viscosity.

Detailed Syllabus:

UNIT - I: METROLOGY (8 Periods)

Measurement of Length - Calipers, Micrometer, Diameter - Keilpart Gage, Ball on wire, Telescopic Internal Gage, Angle - Bevel Protractor, sine Bar, Area – Graphical, Numerical methods, Planimeter (Mechanical), Comparators, Fundamental requirements of a Comparators, Comparator types – Mechanical comparators, Pneumatic comparators, Electrical comparators, Optical comparators.

UNIT - II: FORCE, TORQUE AND POWER MEASUREMENT (9 Periods)

Force Measurement: Analytical balance, Weighing systems and weighers balance, Spring Balance, Load cell types – Hydrostatic, Pneumatic, Magnetoelastic, Piezoelectric, Elastic. Torque Measurement: Load Cell method, Strain gauge method, Wiedmann Magentostrictive, Relative angular twist. Shaft Power Measurement: Electrical Type Dynamometer – Eddy current, Motor generator Dynamometer.

UNIT - III: PRESSURE MEASUREMENT (10 Periods)

Dead weight gauges, Manometer and its Type, Elastic transducers - Bourdon tube, Diaphragm, Bellows, Electrical Types – Resistive, Inductive and Capacitive, Force balance & Vibrating Cylinder, High pressure Measurement – Very high pressure transducer (Bulk modulus Gage), Low Pressure (Vacuum) measurement – McLeod Gage, Knudsen Gage, Momentum transfer gage, Thermal conductivity gage, Ionization gage. Sound level meter, Microphone.

UNIT - IV: VELOCITY & ACCELERATION MEASUREMENT (8 Periods)

Electromagnetic Type, Revolution counter, Tachometers–Capacitive type, Drag cup type, Tachogenerators - AC, DC, Stroboscope. Acceleration Measurement: Reluctance type, Potentiometric type, Photo cell type, piezoelectric type, Null Balance, Gyroscopes & its types.

UNIT - V: HUMIDITY, DENSITY AND VISCOSITY MEASUREMENT (10 Periods)

Humidity: Psychrometer, hygrometer & Types, Dew point device.

Density: Introduction, Pressure head type, Displace type, Float type, Buoyancy effect densitometer method, Hot wire gas bridge type, Vibration type, Radioactive method.

Viscosity: Introduction, Friction tube viscometer, Saybolt's viscometer, Rotameter viscometer, Searle's rotating cylinder, Cone and Plate viscometer. Consistency meter – Rotating vane type and Oscillating type.

Total Periods: 45

TEXT BOOKS:

1. Patranabis.D, Principles of Industrial Instrumentation, TMH, 1997.
2. Doeblin E.O., Measurement Systems – Applications & Design, McGraw - Hill International, 4th Edition, 1990.

REFERENCE BOOKS:

1. *Bela G Liptak, Instrument Engineers Hand Book – Process Measurement and Analysis, 3rd Edition, Butterworth Heinemann.*
2. RK Jain, *Mechanical & Industrial Measurements*, Khanna Publishers, 1986.
3. A. K. Sawhney, *A Course in Electrical and Electronics Measurements and Instrumentation,* Dhanpat Rai and Sons, New Delhi, 1995.
4. Jon Wilson, *Sensor Technology Handbook,* 2004.

III B. Tech. - I Semester

14BT51003**: LINEAR & DIGITAL IC APPLICATIONS**

(Common to EEE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Semiconductor Devices & Circuits, Switching Theory & Logic Design

COURSE DESCRIPTION: Op - Amp characteristics, Applications of Op-Amp, 555 timer, PLL; Digital logic families and interfacing, Digital IC Applications, Programming of digital IC's in Verilog.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate Knowledge on Op-Amp and its Characteristics, Digital logic families, programming in VERILOG.

CO2. Apply analytical skills to determine the op-amp parameters, logic of digital circuits.

CO3. Design Linear and nonlinear systems using op-amp, Digital circuits using logic families.

CO4. Develop skills for programming of digital circuits using VERILOG.

Detailed Syllabus:

UNIT – I: OPERATION AMPLIFIER (9 Periods)

Op-amp block diagram, Differential Amplifier, Level Translator, Output stage. Transfer Characteristics, IC 741 Op-Amp, Basic information of Op-Amp. Ideal & Practical Operational Amplifier - Inverting, non - Inverting & Difference Amplifier, Voltage follower. DC Characteristics - Input Bias Current, Input Offset Current, Input Offset Voltage, Total Output Offset Voltage. AC Characteristics - Frequency Response, Frequency Compensation, Slew Rate. CMRR, PSRR& Thermal Drift.

UNIT – II: LINEAR & NON LINEAR APPLICATIONS, FILTERS (9 Periods)

Linear Applications - Integrator and differentiator, Instrumentation amplifier, AC amplifier, V to I, I to V converters.

Non - Linear Applications - Comparators & its applications, Log and Antilog amplifiers.

Filters: First - Order LPF, HPF, Butterworth Filters, Second Order LPF, HPF.

UNIT – III: IC 555 TIMER, PLL & CONVERTERS (9 Periods)

Introduction to 555 timer, functional diagram, monostable and astable operations and applications. PLL - introduction, block schematic, principles and description of individual blocks. Voltage Controlled Oscillator (IC 566). Applications of PLL – frequency multiplication, frequency translation.

D-A Converters: R-2R ladder & Inverted R-2R ladder. A-D converters: Flash type, Successive Approximation type and Dual slope ADC.

UNIT – IV: CMOS & BIPOLAR LOGIC (8 Periods)

Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior. Bipolar Logic – TTL & ECL, Low voltage CMOS Logic & CMOS/TTL interfacing, Comparison of logic families.

UNIT – V: MODELING & DESIGN OF DIGITAL CIRCUITS USING VERILOG (10 Periods)

Introduction to Verilog: HDL based design flow, program structure, language elements, operators, User defined primitives, data flow modeling, behavioral modeling, structural modeling.

Design & Programming using Verilog: 74x283 adder, 74x151 multiplexer, 74x138 decoder, 74x148 encoder, Flip-flops- SR & JK, 74x163 Counter

Total Periods: 45

TEXTBOOKS:

1. D. Roy Chowdhury, *Linear Integrated Circuits*, 4th Edition, New Age International Pvt. Ltd., 2010.
2. John F. Wakerly, *Digital Design Principles & Practices*, 4th Edition, Pearson Education, Asia 2009.
3. T.R. Padmanabhan, B. Bala Tripura Sundari, Design through Verilog HDL, Wiley India, 2004.

REFERENCE BOOKS:

1. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs*, 3rd Edition, PHI, 1987.
2. J. Bhasker, *VERILOG Primer*, 2nd Edition, BS Publications, 2001.
3. Stephen Brown, Zvonko Vranesic, *Fundamentals of Digital Logic with VERILOG Design*, 2nd Edition, TMH, 2007.

III B. Tech. – I Semester

14BT50202: **COMPUTER ORGANIZATION AND ARCHITECTURE**

(Common to EEE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Switching theory and logic design

COURSE DESCRIPTION: Basic structure of computers; register transfer language and micro operations; micro programmed control; memory system; architecture, programming and interfacing of 8085 microprocessor.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on
- Internal details of a computer.
- Various memories, their hierarchy and significance in a computer.
- Architecture, instruction set, addressing modes and in terfacing of 8085 microprocessor.

CO2. Critically analyze the requirements to meet the specifications.

CO3. Design and develop hardware to meet the requirements.

CO4. Exhibit programming skills to solve engineering problems.

Detailed Syllabus:

UNIT - I: BASIC STRUCTURE OF COMPUTERS AND COMPUTER ARTHMETIC (9 periods)

Basic structure of computers: Computer types, functional units, basic operational concept, bus structures, software, performance, multiprocessors and multicomputers.

Computer arithmetic: Addition, subtraction, multiplication and division algorithms.

UNIT - II: REGISTER TRANSFER AND MICROOPERATIONS (9 periods)

Register transfer language, register transfer, bus and memory transfers, arithmetic microoperations, logic microoperations, shift microoperations, arithmetic logic shift unit, instruction codes, computer registers, computer instructions, instruction cycle, Reduced Instruction Set computer.

UNIT - III: MICROPROGRAMMED CONTROL AND MEMORY SYSTEM (10 periods)

Microprogrammed Control: Control memory,address sequencing, design of control unit, hard wired control, microprogrammed control.

Memory System: Semiconductor RAM memories: Internal organization of memory chips, SRAM, DRAM. Read-only memories, cache memory: mapping functions, replacement algorithms.Performance considerations, virtual memory.

UNIT - IV: 8085 ARCHITECTURE (9 periods)

Microprocessor evolution and types, introduction to 8085 architecture, pin description, register organization, timing diagram – T-state, Machine cycle, instruction cycle, instruction set – data transfer, arithmetic and logic, branch control, I/O and machine control instructions, addressing modes.

UNIT - V: PROGRAMMING, INTERRUPTS AND INTERFACING (8 periods)

Simple programs, interrupts of 8085 – types, response, enabling and disabling, interfacing – memory, I/O devices - memory mapped I/O and I/O mapped I/O.

Total Periods: 45

TEXT BOOKS:

1. M.Moris Mano, *Computer System Architecture*, Pearson Education, 3rd edition, 2006.
2. Ramesh S Goankar, *Microprocessor – Architecture, Programming and Applications with the 8085*, 5th edition, Penram International Publishing Private Limited.

REFERENCE BOOK:

1. V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, *Computer Organization*, 6th edition, McGraw - Hill.

III B. Tech. – I Semester
14BT60401: DIGITAL SIGNAL PROCESSING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Signals and Systems.
COURSE DESCRIPTION: Continuous and discrete signals and sequences; systems**;** DFT and FFT algorithms for the analysis of discrete sequences; design and realization of Digital IIR and FIR filters; Multirate systems and some of the Signal processing applications.
COURSE OUTCOMES: After completion of the course the student will be able to
CO1.Demonstrate knowledge in
- · Digital signals, sequences and systems.
- · DFT and FFT transforms.
- · Analog & Digital Filters Design.
- · Digital Filters Realization.
- · DSP Processors.

CO2. Perform Frequency analysis of discrete time signals in suppressing unnecessary frequency components.
CO3. Design and develop digital filters to optimize system performance and their realization.
CO4. Solve problems in processing of signals through digital systems and applying them in signal processing.

Detailed Syllabus:
UNIT - I: INTRODUCTION TO DIGITAL SIGNAL PROCESSING 10 periods)
Review of Discrete - time signals, systems and their classification. Discrete - Time systems described by difference equations.
Frequency analysis of Discrete - Time signals:
Fourier series for DT periodic signal and power density spectrum, the Fourier transform of DT aperiodic signals and energy density spectrum, convergence of Fourier transforms. Review of Z - transform, Applications, solution for difference equations of digital filters.
UNIT - II: DISCRETE AND FAST FOURIER TRANSFORMS (9 periods)
DFS representation of periodic sequences, properties of Discrete Fourier Series.
Discrete Fourier Transforms (DFT): Properties of DFT, linear filtering methods based on DFT, Relationship of FT to Z - Transform, frequency analysis of signals using DFT.
Fast Fourier transforms (FFT): Radix-2 Decimation in time (DIT) and Decimation in frequency (DIF) FFT algorithms, Inverse FFT.
UNIT - III: IIR DIGITAL FILTERS (8 periods)
Design of IIR digital filters from analog filters - IIR filter design by approximation of derivatives, impulse invariance and bilinear transformation. Characteristics of commonly used analog filters, Frequency transformations. Structural realization of IIR systems - direct, cascade and parallel form structures, Transposed form.
UNIT - IV: FIR DIGITAL FILTERS (8 periods)
Symmetric and anti-symmetric FIR filters, Design of linear phase FIR digital filters using windowing techniques, Frequency sampling technique, Comparison of IIR and FIR filters. Structural realization of FIR filters - direct form, cascade form structures and linear phase structures.
UNIT - V: INTRODUCTION TO DSP PROCESSORS (10 periods)
Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in P - DSPs, Multiple access memory, multiported memory, VLIW Architecture, Pipelining, Special addressing modes, On-Chip Peripherals.
Architecture of TMS 320C6X: Introduction, Features of C6X Processors, Internal Architecture, CPU, General-Purpose Register Files, Functional Units and Operation, Data Paths , Control Register File.

Total Periods: 45

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital Signal Processing, Principles, Algorithms and Applications*, Pearson Education/PHI, 4th edition, 2007.
2. Alan.V. Oppenheim, Ronald.W. Schafer, John R Buck, *Discrete Time Signal Processing*, Prentice Hall, 2nd edition, 2006.
3. B.Venkataramani, M. Bhaskar, *Digital Signal Processors –Architecture, Programming and Applications,*, TATA McGraw - Hill, 2nd edition, 2010.

REFERENCE BOOK:

1. Tarun Kumar Rawat, *Digital Signal Processing*, Oxford University Press, 2015.

III B. Tech. - I Semester

14BT51021: **LINEAR & DIGITAL IC APPLICATIONS LAB**

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITE: Linear & Digital IC Applications

COURSE DESCRIPTION: Op-Amp characteristics, Applications of Op-Amp, 555 timer, PLL; Digital logic families and interfacing, Digital IC Applications, Programming of digital IC's in VHDL.

COURSE OUTCOMES: After completion of course the students will be able to:

CO1. Apply analytical skills to determine the op-amp parameters.
CO2. Design Linear & Nonlinear applications of op-amps, Digital circuits using logic families.
CO3. Develop skills for programming and simulation of digital circuits using VHDL.

LIST OF EXPERIMENTS:
(Minimum of eleven experiments to be conducted)

PART – A: Linear IC's (Minimum of 5 experiments to be done)

1. Op-Amp based comparator & Schmitt Trigger.
2. Op-Amp applications – (integrator / differentiator).
3. Applications of 555 timer (Monostable / Astable Multivibrator).
4. Design of I to V and V to I converter.
5. IC 566 – VCO.
6. Design of active filter (LPF / HPF).
7. D-A converter(R-2R ladder).

PART: B (Minimum of 5 experiments to be done)

Simulate the internal structure of the following Digital IC's using Verilog

1. Adder and Subtractor – Structural, Data flow and behavioral.
2. Decoder & encoder.
3. Multiplexer.
4. J-K, T, D Flip-flops
5. 4-Bit shift register – Right / Left.
6. Mod Counter.

III B. Tech. - I Semester
14BT51022: **SIGNAL PROCESSING LAB**

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITE: Signals and Systems

COURSE DESCRIPTION: Basics of MATLAB programming; Operations on Signals & sequences; Convolution and correlation; Pole-zero mapping; Power Spectral Density; Filter designing; Real-time signal processing using DSP processor kits.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate fundamental Knowledge in simulation of basic concepts and algorithms such as convolution, Correlation, DFT,FFT and Sampling rate conversion in signal processing.

CO2. Design and simulation of filters such as IIR and FIR.

CO3. Use

· MATLAB Toolboxes to solve the complex engineering problems in the domain of Signal processing.

· DSP Processor kit to implement algorithms like FFT.

LIST OF EXPERIMENTS:
(Minimum of eleven experiments to be conducted)

1. Generation of Various signals and Sequences (Periodic and Aperiodic), Such as Unit Impulse, Unit Step, Square, Sawtooth, Sinusoidal, Ramp, Sinc function.
2. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding.
3. Convolution and correlation of signals and sequences.
4. Verification of Sampling Theorem.
5. Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function.
6. Generation of Gaussian Noise (real and complex), computation of its mean, M.S.Value and its skew, kurtosis, and PSD, Probability Distribution Function.
7. Implement N-point DFT & IDFT.
8. Design of FIR filter (LPF, HPF & BPF) using windowing method.
9. Design of Butterworth filter (LPF, HPF & BPF).
10. Design of Chebyshev filter (LPF, HPF & BPF).
11. Design of IIR filter (LPF, HPF & BPF / Bilinear Transformation and Impulse Invariant Transformation).
12. Sampling rate conversion of any given arbitrary sequence.
13. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions.
14. To verify N-point FFT algorithm on DSP Processors.

III B. Tech. – II Semester

14BT5HS02: **MANAGEMENT SCIENCE**

(Common to EEE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: -NIL-

COURSE DESCRIPTION: Concepts of Management, Evolution of thought of Management, Functions of Management, Environmental Scanning, SWOT analysis, Social Responsibility of Management, Operations Management, Forecasting Methods, Work study, Method Study, Work measurement, Statistical Quality Control, Inventory Management, Marketing, Marketing functions, Human Resource Management, Job evaluation, merit rating, Theories of motivation, Project Management, CPM, PERT, Project cost analysis, Project crashing, Entrepreneurship, Entrepreneur vs Manager, Contemporary Management practices, Just-in-time, Enterprise Resource Planning, Business Process Outsourcing, Intellectual property rights and Supply chain management.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Employ fundamental knowledge on 'Management Thought' and Management of a business organization'.

CO2. Apply various Managerial concepts & contexts to attain 'Optimum Utilization of available organizational resources'.

CO3. Contribute to the group, as an individual, in accomplishing the stated objective of the business organization.

CO4. Apply gained knowledge on Management to establish and run his/her own organization, if he/she deserve to be an 'Entrepreneur'.

CO5. Imbibe contemporary practices in applying Management and exercise discernment in implementing managerial decisions for ethical, safe, and sustainable operations of the business

Detailed Syllabus:

UNIT – I: INTRODUCTION TO MANAGEMENT AND ORGANIZATION (9 Periods)

Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills -- Elements of corporate planning process - Environmental scanning – SWOT

Analysis - Social responsibilities of management. Basic concepts related to organization- Objectives, Procedure and Principles; Types of organizations – Merits, demerits and adoptability to modern firms.

UNIT – II: OPERATIONS MANAGEMENT (12 Periods)

Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling. Materials management objectives; Inventory - Types of inventory – Classical EOQ model - - ABC analysis - Purchase procedure - Stores management.

Marketing: Functions of marketing - Marketing mix - Channels of distribution.

UNIT – III: HUMAN RESOURCES MANAGEMENT(HRM) (6 Periods)

Nature and scope of HRM - Functions of HRM - Role of HR Manager in an organization, Job evaluation and merit rating - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT – IV: PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (9 Periods)

Network analysis - Program evaluation and review technique (PERT) - Critical path method (CPM) - Probability of completing the project within given time - Project cost analysis - Project crashing.

Introduction to entrepreneurship - Entrepreneurial traits - Entrepreneur vs. manager - Role of entrepreneurship in economic development - Women as an entrepreneur.

UNIT – V: CONTEMPORARY MANAGEMENT PRACTICES (9 Periods)

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) – Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making. **Total Periods: 45**

TEXT BOOKS:

1. O.P. Khanna, *Industrial Engineering and Management,*Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, *Management,* 6th Edition,Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, *Marketing Mangement,* 12th Edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, *Essentials of Management,* 6th Edition, TMH, New Delhi, 2007.
3. N.D. Vohra, *Quantitative Techniques in Management,* 2nd Edition, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz*, Management- A Global Perspective,*10th Edition, McGraw-Hill International.

III B. Tech. - II Semester

14BT61001: **INDUSTRIAL INSTRUMENTATION - II**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Sensors and Transducers, Principles of Electrical Measurements, Electronic Instruments and Industrial Instrumentation - I

COURSE DESCRIPTION: Instruments used to measure Temperature, Flow, Level and Environmental pollution. Designing of signal conditioning circuits; Electrical and intrinsic safety.

COURSE OUTCOME: After completion of the course the student will be able to

CO1. Demonstrate knowledge on measurement techniques for measurement of Temperature, Flow, Level and environmental pollution.

CO2. Identify and analyse suitable instrument for measurement of Temperature, Flow and Level.

CO3. Design suitable signal conditioning circuits for measuring instruments.

Detailed Syllabus:

UNIT - I: TEMPERATURE MEASUREMENT (9 periods)

Definition, Temperature measurement using change in physical properties – Solid expansion type, Fluid expansion type (Filled-in system), Electrical types – RTD, Thermistors, Thermo-emf thermometry – Laws, Thermoelectric characteristics of thermocouple, Processing and preparation, Cold junction Compensation, thermopiles, Radiation thermometry – Total radiation type, Optical Pyrometers. IC Temperature Sensor.

UNIT – II: FLOW MEASUREMENT (10 periods)

Introduction, Head types – Orifice, Venturi, Flow Nozzle, Dahl Tube, Pitot tube, Area Flow meter - Rotameter & types, Mass flow meters - Turbine Mass flow meter, Coriolis flow meter, Gyroscopic flow meter, Liquid bridge mass flow meter, Calorimetric flow meter. Positive Displacement type flow meters - Nutating Disc, Rotary Vane, Lobed Impeller, Reciprocating Piston type, Fluted Rotor.Electrical type flow meter – Turbo magnetic flow meter Electromagnetic flow meter, Ultrasonic flow meter, Hotwire anemometer type, Vertex Shedding type.

UNIT – III: LEVEL MEASUREMENT (8 periods)

Introduction, Gauge Glass technique, Float Types – Float–and– tape method, Float–and–shaft method, Magnetic float types. Displacer types, Hydrostatic types – Air-Purge type, Bubbler type. Thermal effect types, Electrical types – Resistance switch type, Inductive level gauge and Capacitance type level gauge. Ultrasonic Methods, bellow element type level transmitters, Fibre - optic type.

UNIT – IV: SIGNAL CONDITIONING (9 periods)

Measurement of Resistance, Voltage Dividers, Wheatstone Bridge: Balance and Deflection Measurements, Measurement of capacitance – Problems and Alternatives, AC Bridge – Sensitivity and Linearity, capacitive bridge analog linearization, electrostatic and driven shields, Chopper amplifier, auto zero amplifier, composite amplifier, charge amplifier.

UNIT – V: ENVIRONMENTAL POLLUTION INSTRUMENTS & SAFETY (9 periods)

Proximity sensors & limit switches: Proximity Sensors - Capacitive, Inductive, Magnetic, Hall-Effect, LVDT. Limit switches – Mechanical, Optical, Pneumatic, Ultrasonic, Digital outputs & Encoders.

Leak Detectors: Pressurization or Hydrostatic Tests, Bubble emissions paints & Dies, Combustible or toxic leaks, Ultrasonic Leak detectors, Thermal conductivity leak detectors, Halogen Leak detectors, Underground leakage detection.

Electrical & Intrinsic Safety: NEMA types, Fuses & Circuit breakers, Explosion hazards & intrinsic safety – Protection methods, Purging, pressurization, ventilation. **Total Periods: 45**

TEXT BOOKS:

1. Patranabis.D, Principles of *Industrial Instrumentation*, TMH, 1997.
2. Ramon Pallás, Areny, John G. Webster, *Sensors and Signal Conditioning,* John Wiley and Sons, 2nd Edition 2000.

REFERENCE BOOKS:

1. Bela G Liptak, *Instrument Engineers Hand Book - Process Measurement and Analysis,* Butterworth Heinemann, 3rd Edition, .
2. RK Jain, *Mechanical & Industrial Measurements*, Khanna Publishers, 1986.
3. Doeblin E.O, *Measurement Systems – Applications & Design*, McGraw Hill International, 4th Edition, 1990.

III B. Tech. - II Semester

14BT61002: **PROCESS CONTROL INSTRUMENTATION**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Control Systems, Sensors and Transducers

COURSE DESCRIPTION: Mathematical modeling of processes; Different types of controllers; characteristics of controllers; design of controllers; Tuning of controllers; characteristics of control valves; multi loop controllers and case studies.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge about
- Mathematical modeling of different processes.
- Tuning of controllers for different processes.
- Selection of control valves for different processes.
- Different unit operations.
- Multi loop control.

CO2. Design and analyze the response of controllers for different processes.

Detailed Syllabus:

UNIT - I: PROCESS DYNAMICS AND P&ID SYMBOLS (9 periods)

Elements of process control, Process variables, Degree of freedom, Characteristics of electric system, liquid system, gas system and thermal system, Elements of process dynamics, Mathematical model of liquid process, gas process and thermal processes, Batch process and continuous process, Self regulation; Piping and Instrumentation Diagram symbols: Connecting lines, General instruments or functions, Actuator and process elements.

UNIT - II: CONTROL SCHEMES AND CONTROLLERS (9 periods)

Discontinuous controller modes: Two position, Multiposition, Floating control modes; Continuous controller modes: Proportional, Integral, Derivative; Composite controller modes:P - I, P - D, P - I - D; Electronic controllers: Design of discontinuous, continuous and composite controller modes. Pneumatic PID controller (displacement and force type), Hydraulic PI controller.

UNIT – III: CONTROLLER TUNING (9 periods)

One - Quarter decay ratio criteria, Time integral performance criteria, Process loop tuning: open-loop transient response method, Ziegler - Nichol's method, Cohen - Coon method, Direct synthesis method, Frequency response method.

UNIT - IV: FINAL CONTROL ELEMENTS (9 periods)

Pneumatic actuators, Hydraulic actuators, Electro pneumatic actuators, Electric motor actuators, Control valves: Types of control valves and its characteristics, Sliding - stem control valves, Rotating - shaft control valves, Selection of control valves, Control - valve sizing, Pneumatic valve positioner.

UNIT - V: COMPLEX CONTROL SCHEMES (9 periods)

Cascade control, Ratio control, Feed forward control, Over-ride, split range and selective control; Selected unit operations: Mixing, evaporation, drying, heat exchanger; Case study of control schemes of distillation column: constant top product, constant bottom product and reflux rate, constant reflux rate and steam rate. **Total Periods: 45**

TEXT BOOKS:

1. Donald P. Eckman, *Automatic Process Control*, Wiley Eastern Ltd., 1993.
2. Curtis D. Johnson, *Process Control Instrumentation Technology*, Pearson Education, NewDelhi, 7th Edition, 2002.

REFERENCE BOOKS:

1. Jens G.Balchen & Kenneth I.Mumme, *Process Control,* VanNostrand Reinhold Company, New York.
2. Patranabis, *Principles of Process Control*,TMH., 1981.
3. Peter Harriot, *Process Control*, TMH.
4. G.Stephanopoulis, *Chemical Process Control,* Prentice Hall.,1990.

III B. Tech. – II Semester

14BT60201: **MICROPROCESSORS AND MICROCONTROLLERS**

(Common to EEE, ECE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Computer Organization and Architecture.

COURSE DESCRIPTION: Architecture, Instruction set and programming of 8086; Programmable interfacing devices: 8255, 8251, 8259, 8257 – their architecture and programming; Interfacing Memory and I/O devices with 8086; Architecture, programming, interrupts, and applications of 8051 Microcontroller.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate potential knowledge in
- · Internal hardware details of Intel 8086, 8051 and programmable devices like 8255, 8251, 8259, 8257.
- · Interfacing various peripherals to build stand alone systems.

CO2. Critically analyze the requirements to meet the specifications.

CO3. Design suitable interfaces for real time applications.

CO4. Exhibit programming skills, choose suitable hardware and program the devices to solve engineering problems.

Detailed Syllabus:

UNIT - I: 8086 ARCHITECTURE AND PROGRAMMING (10 periods)

Microprocessor Evolution and types, 8086 internal Architecture - register organization, memory segmentation, memory organization. Introduction to programming the 8086 - Assembler directives, addressing modes, instruction set, simple programs, procedures and macros.

UNIT - II: 8086 INTERFACING AND INTERRUPTS (8 periods)

Pin description, minimum & maximum mode operation of 8086, timing diagram. Interfacing memory (RAM and EPROM) to 8086. 8086 Interrupts - types and interrupt responses, Interrupt vector table, priority of interrupts. 8259 priority interrupt controller - architecture, system connections and cascading, initialization of 8259.

UNIT - III: PROGRAMMABLE DATA COMMUNICATION DEVICES (11 periods)

Introduction to serial and parallel communication, methods of parallel data transfer. 8255 PPI - internal architecture and system connections, operational modes and initialization, interfacing stepper motor, ADC, DAC. Methods of serial data transfer, 8251 USART - architecture and its initialization, sending and receiving characters. Serial communication standard RS 232C, USB. Architecture and operation of 8257 DMA controller.

UNIT - IV: 8051 MICROCONTROLLER AND PROGRAMMING (8 periods)

Microcontroller Vs general purpose microprocessor. 8051 / 8052 Microcontroller – architecture, features, register organization, pin diagram, internal and external memories & their interfacing, instruction set, addressing modes, simple programs.

UNIT - V: 8051 INTERFACING (8 periods)

Timer / Counters – Registers, modes and programming. Serial communication – registers, programming 8051 for serial communication. Interrupts – registers, programming. 8051 applications – Interfacing key board, LEDs and LCD. **Total Periods: 45**

TEXT BOOKS:

1. Douglas V. Hall, *Microprocessors and Interfacing: Programming and Hardware*, Tata McGraw-Hill, Revised 2nd edition, 2006.
2. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, Prentice Hall of India, 2000.

REFERENCE BOOKS:

1. A.K. Ray and K.M. Bhurchandi, *Advanced Microprocessors and Peripherals- Architecture, Programming and Interfacing*, Tata McGraw Hill, 2002 reprint.
2. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design*, Prentice Hall of India, 2006.

III B. Tech. – II Semester

14BT60431: **PRINCIPLES OF COMMUNICATION**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Signals and Systems

COURSE DESCRIPTION: Fundamentals of Communications; Analog and digital communications - modulation and Demodulation Techniques; Information theory and coding.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate fundamental knowledge in
- Elements of communication systems.
- Amplitude, Frequency, and Phase Modulators and De-Modulators.
- Data transmission and detection of digital signals.
- Information theory and coding techniques.

CO2. Perform analysis of different modulations and calculate total power & bandwidth in the modulated wave.

CO3. Design and develop modulators and demodulators for communication systems.

CO4. Solve engineering problems for feasible and optimal solutions in the core area of Analog and Digital Communication Systems .

Detailed Syllabus:

UNIT - I: INTRODUCTION (8 periods)

Block diagram of Electrical Communication System, Types of Communications, Analog, Pulse and Digital types of Signals, Fourier Transform for various Signals, Fourier Spectrum, Power Spectral Density, Autocorrelation, Cross Correlation, and Convolution.

UNIT - II: ANALOG MODULATION TECHNIQUES (11 periods)

Need for Modulation, Types of Amplitude Modulation, AM, DSBSC, SSBSC, Power and BW requirements, generation of AM, DSBSC, SSBSC, Demodulation of AM: Diode detector, Product demodulation for DSBSC & SSBSC. Frequency & Phase Modulations, Advantages of FM over AM, Bandwidth consideration, Narrowband and Wideband FM, generation and demodulation of FM, Comparison of FM & PM.

UNIT - III: PULSE MODULATIONS (8 periods)

Sampling, Nyquist Rate of Sampling, Sampling theorem for Band limited Signals, PAM, Regeneration of Base band Signal, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

UNIT - IV: DIGITAL TRANSMISSION (10 periods)

Pulse Code Modulation: Advantages, Block diagram of PCM, Quantization, effect of Quantization, Quantization error, DM, ADM and Comparison.

Digital Modulation: ASK, FSK, PSK, QPSK, DPSK, Modulation and Demodulation, Coherent and Incoherent, Modems.

UNIT - V: INFORMATION THEORY AND CODING (8 periods)

Concept of Information, Entropy and Rate of Information, Coding efficiency, Shannon-Fano and Huffman Coding, Error Control Coding, Error Detection and Correction Codes, Block Codes, Convolutional Codes.

Total Periods: 45

TEXT BOOKS:

1. R.P. Singh and S D Sapre, *Communication Systems - Analog and Digital,* TMH, 2nd Edition 2007.
2. Simon Haykin, *Communication Systems,* John Wiley, 2nd Edition 2007.

REFERENCE BOOKS:

1. H. Taub and D. Schilling, *Principles of Communication Systems,* TMH, 2nd Edition, 1991.
2. Sam Shanmugam, *Digital and Analog Communication Systems*, John Wiley, 2006.

III B.Tech. - II Semester
14BT61003: **ELECTROMAGNETIC THEORY**
(PROFESSIONAL ELECTIVE - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Engineering Mathematics and Engineering Physics.

COURSE DESCRIPTION: Vector - calculus; Static electric and Magnetic fields; time varying electromagnetic Fields; Maxwell's equations; Wave equations and wave propagation; electromagnetic interference and compatibility.

COURSE OUTCOMES: After completion of the course the students will be able to

CO1. Demonstrate Knowledge on static and time varying: electric and magnetic fields, Maxwell's equations, wave propagation, Interference and Compatibility in the field of Electromagnetics.

CO2. Formulate and analyse problems related to electromagnetics in different mediums.

CO3. Apply Coulombs law, Gauss's law, Biot - Savarts law and Amperes law to measure the existence of electric and magnetic fields.

Review of Coordinate Systems, Vector Calculus **(2 periods)**

Detailed Syllabus:

UNIT - I: ELECTROSTATICS **(9 periods)**

Coulomb's Law and Electric Field Intensity, Electric Fields due to continuous Charge Distributions, Electric Flux Density, Gauss Law - Maxwell's equation, Applications of Gauss's Law, Electric Potential, Relationship between E and V, Energy Density in Electrostatic Fields, Convection and Conduction Currents, Conductors, Continuity equation and relaxation time, Poisson's and Laplace's Equations, Capacitance**:**Parallel Plate, Coaxial, Spherical Capacitors, illustrative Problems.

UNIT - II: MAGNETOSTATICS **(9 periods)**

Biot - Savart's Law, Ampere's Circuital Law -Maxwell's equation and Applications of Ampere's Law, Magnetic Flux Density - Maxwell's equation, Maxwell's equation in static EM fields, Magnetic Scalar and Vector Potentials, Force due to Magnetic fields**:** force on a charged particle, force on a current element and force between two current elements, Inductors and Inductances, Magnetic Energy, illustrative Problems.

UNIT - III: MAXWELL'S EQUATIONS **(7 periods)**

Faraday's Law, Transformer and Motional emf, Inconsistency of Ampere's Law and Displacement Current, Maxwell's Equations in Different Final Forms and Word Statements. Boundary conditions in Electrostatics**:** Dielectric -Dielectric, Dielectric - Conductor and Conductor - Free space Interfaces, Magnetic boundary conditions, illustrative Problems.

UNIT - IV: ELECTROMAGNETIC WAVES **(9 periods)**

Solution for free space conditions, Uniform Plane Waves**:** Definition, Relation between E & H in a uniform plane wave, wave equation for a conducting medium, wave propagation in conductors and dielectrics, Polarization of wave, Reflection and Refraction of Plane Waves - Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Poynting vector and Poynting Theorem, illustrative Problems.

UNIT - V: INTRODUCTION TO EMI AND EMC **(9 periods)**

Concepts of EMI and EMC and Definitions, Practical experiences and concerns, Classification, Natural and man - made EMI sources, EMC Standards, Switching transients, Electrostatic Discharge.

Grounding - Principles and practice of Earthing, precautions in Earthing, cable shielding, Electrical bonding.

Total Periods: 45

TEXT BOOKS:

1. Matthew N.O. Sadiku, *Elements of Electromagnetics*, 3rd Edition, Oxford Univ. Press, 2001.
2. Kodali Prasad V, *Engineering Electromagnetic Compatibility*, S Chand, 2000.

REFERENCE BOOKS:

1. E.C. Jordan and K.G. Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd Edition, PHI, 2000.
2. William H Hayt Jr, John A. Buck, *Engineering Electromagnetics*, 7th Edition, Tata McGraw - Hill, 2006.
3. Clayton R. Paul, *Introduction to Electromagnetic Compatibility*, 2nd Edition, John Wiley & Sons, 1992.

III B. Tech. - II Semester
14BT61004: **INDUSTRIAL ELECTRONICS**
(PROFESSIONAL ELECTIVE - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Semiconductor Devices and Circuits, Principles of Electrical Engineering.

COURSE DESCRIPTION: Silicon controlled rectifier (SCR) and its applications in power control, Electronic timers, Welding, High frequency heating, Ultrasonic generation and applications, Computer Numeric Control.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Use SCR in power control and design of power supplies.

CO2. Demonstrate knowledge on electronic timers, electric welding, dielectric heating and ultrasonic generation and applications in industries.

CO3. Handle and program CNC machines for automation.

Detailed Syllabus:

UNIT - I: SILICON CONTROLLED RECTIFIER (9 Periods)

Principle of operation, static characteristics of SCR, turn - on methods, Switching characteristics, Two transistor model of SCR, SCR commutation techniques, protection of SCR – di/dt protection, dv/dt protection.

UNIT -II: **APPLICATIONS OF SCR IN POWER CONTROL (9 Periods)**

Static circuit breaker, converters: single phase half wave and full wave, Chopper circuits: principle, methods and configurations, inverters: classification, single phase half bridge and full bridge inverters, Cyclo converters: Introduction, principle of operation of single phase cyclo converters.

UNIT - III: INDUSTRIAL APPLICATIONS (9 Periods)

Electronic timers: classification – function, technique, RC and digital timers, time base generators, electric welding: classification - Electric resistance welding and electric arc welding. High frequency heating: principle, merits, applications, high frequency source for induction heating, dielectric heating: principle, material properties, electrodes and their coupling to RF generator, thermal losses and applications. Ultrasonics: generation, applications – ultrasonics as a means of communication, flaw detection.

UNIT - IV: REGULATED POWER SUPPLIES (9 Periods)

Design of series and shunt voltage regulators, IC Voltage regulators – Fixed voltage regulator, adjustable regulator, 723 general purpose regulator- current limit protection, current foldback, current boosting, switching regulator, uninterruptable power supplies, illustrative problems.

UNIT - V: NUMERIC CONTROL (9 Periods)

Basic concept of numerical control, driving devices, hydraulic systems, DC motors, stepping motors, data processing unit characteristics of N/C system, CNC / DNC - CNC typical system, block diagram, interfacing of CNC Machines, adaptive control systems.

Total Periods : 45

TEXT BOOKS:

1. G K Mithal and Dr Maneesha Gupta, *Industrial and Power Electronics,* 19th Edition, 4th Reprint, Khanna Publications, 2007.
2. Yoram Korean and Joseph Ben, *Numerical Control of Machine tools*, Khanna Publishers, New Delhi, 1998**.**

REFERENCE BOOKS:

1. D Roy Chowduary, *Linear* Integrated *Circuits*, 2nd Edition, New age International (P) Ltd, 2003.
2. P. S. Bimbhra, *Power Electronics*, 3rd edition, Khanna publishers, 2001.

III B. Tech. – II Semester

14BT70304: **INDUSTRIAL AUTOMATION AND ROBOTICS**

(PROFESSIONAL ELECTIVE - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Matrices and Numerical Methods, Engineering Mechanics, Kinematics of Machinery, Dynamics of Machinery.

COURSE DESCRIPTION: Integration of robots and CNC machines into manufacturing cells; motion control devices, such as actuators and sensors, conveyors and part feeder mechanisms; use of automation equipment in manufacturing. Integration of automation equipment such as PLCs, motion control devices.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Select suitable sensors and actuators for automating the operations in a given industry using simple automation schemes.

CO2. Calculate the forward kinematics, inverse kinematics, for a 3R manipulator and path planning of serial and parallel robot.

CO3. Propose preliminary designs for automating simple machining operations, pick and place operations, conveyor operations etc.

CO4. Use appropriate software for implementing automation schemes using robot programming languages.

Detailed syllabus:

UNIT – I: INTRODUCTION TO AUTOMATION (8 Periods)

Automation, need, types, Basic elements of an automated system, levels of automation, Part transfer methods and mechanisms, Types of flow lines, Flow line with / without buffer storage. Assembly process and systems assembly line, Line balancing methods, Flexible assembly lines.

UNIT – II: INTRODUCTION TO INDUSTRIAL ROBOTS (9 Periods)

Robots, Brief History, Types of Robots, classification , robot configurations, joint notation schemes, work volume, Degrees of freedom, Components, Common types of arms , joints, Grippers, Drives, pneumatic, hydraulic, Electric, comparison.

UNIT – III: MANIPULATOR KINEMATICS & DYNAMICS (11 Periods)

Mathematical Preliminaries on Vectors & Matrices. Homogeneous transformations as applicable to rotation and translation, (D-H) notation. Forward kinematics, inverse kinematics, Manipulators with two, three degrees of freedom.

Manipulator dynamics; Introduction, Inertia of a Link, Lagrangian formulation for a planar 2R manipulator.

UNIT – IV: TRAJECTORY PLANNING (9 Periods)

Trajectory planning and avoidance of obstacles, path planning, skew motion, joint integrated motion, and straight line motion.

Sensors: position sensors, potentiometers, resolvers encoders, velocity sensors, tactile sensors, proximity sensors, machine vision sensors, fail safe hazard sensor systems, and compliance mechanism.

UNIT – V: ROBOT PROGRAMMING & ROBOT APPLICATION (8 Periods)

Robot programming, types, features of languages and software packages, Robot application in industry, Task programming, Goals of AI Research, AI techniques, Robot intelligence and task planning, modern robots, future Application and challenges and case studies.

Total Periods : 45

TEXT BOOKS:

1. M.P. Groover, *Industrial Robotics*, McGraw - Hill Education (India) Private Limited, 2nd Edition, 2008.
2. S.R.Deb / S.Deb, *Robotics Technology & Flexible Automation*, McGraw Hill Education (India) Private Limited, 2nd Edition, 2009.

REFERENCE BOOKS:

1. Mikell P. Groover, *Automation, Production Systems and CIM*, Prentice-Hall of India Pvt. Ltd, 3rd Edition, 2008.
2. Mittal R.K & Nagrath IJ, *Robotics and Control*, TMH, 2003.
3. K. S. Fu., R. C. Gonzalez, C. S. G. Lee, *Robotics: Control Sensing, Vision and Intelligence* International Edition, McGraw - Hill Book Co, 2008.
4. Ashitave Ghosal, *Robotics, Fundamental Concepts and analysis*, Oxford Press, 2006.
5. John. J. Craig, *Introduction to Robotics*, Pearson India, 3rd Edition, 2008.

III B. Tech. – II Semester
14BT41201**: OBJECT ORIENTED PROGRAMMING**
(PROFESSIONAL ELECTIVE - I)
(Common to ECE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Problem Solving and Computer Programming.

COURSE DESCRIPTION: Object Oriented Concepts; Basics of Java; Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling, Applets, AWT, Database Connectivity and Servlets.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate Knowledge on:
- Object Oriented Programming concepts - classes, objects, inheritance, polymorphism, encapsulation and abstraction.
- Packages, interfaces, multithreading, exception handling, event handling.

CO2. Apply AWT and Applets to design and develop interactive Graphical User Interfaces.

CO3. Gain problem solving skills to provide effective solutions for real world problems.

Detailed Syllabus:

UNIT - I: OBJECT ORIENTED THINKING (9 Periods)

Need for OOP paradigm, OOP concepts: History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting.
classes and objects: concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT - II: INHERITANCE, PACKAGES AND INTERFACES (9 Periods)

Understanding Inheritance: Base class object, subclass, subtype, substitutability, forms of inheritance - specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, using super, Creating multi-level hierarchy, method overriding, abstract classes, using final with inheritance.
Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.
Interfaces: Defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT - III: EXCEPTION HANDLING AND MULTITHREADING (9 Periods)

Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
Java thread model, thread life cycle, creating threads, thread priority, synchronizing threads, inter thread communication.

UNIT - IV: APPLETS, EVENT HANDLING AND AWT (9 Periods)

Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class.
Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes.
The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scrollpane, dialogs, menubar, graphics, layout manager - boarder, grid, flow, card and grid bag.

UNIT - V: JDBC and SERVLETS (9 Periods)

Database Connectivity: Loading the driver, Establishing connection, Create statement, Execute query, Iterate result set, Scrollable Results, and Transactions.
Servlets: The Life Cycle of a Servlet, Using Tomcat for Servlet Development, Create and Compile the Servlet Source Code, Start Tomcat, Start a Web Browser and Request the Servlet, The Servlet API, The Javax.Servlet Package, The javax.Servlet.http Package.

Total Periods: 45

TEXT BOOKS:

1. Herbert Schildt, *Java the complete reference,* TMH, 7th edition, 2007.
2. Timothy Budd, *Understanding Object-oriented Programming with Java,* Addison-Wesley, updated edition, 2002.

REFERENCE BOOK:

1. Sachin Malhotra, Saurab Choudhary, *Programming in java,* Oxforduniversity press, 2nd edition, 2014.

III - B.Tech. - II Semester

14BT61021: **PROCESS CONTROL LAB**

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: Process Control Instrumentation.

COURSE DESCRIPTION: Tuning methods, Characteristics of control valve, Response of controllers for different processes like flow, temperature, level etc.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Analyze the characteristics of control valve and evaluate the performance of controllers for different process like flow, temperature, level etc.
CO2. Tune the controller parameters using various tuning methods

LIST OF EXPERIMENTS:

PART A : Only for viva-voce examination

LabVIEW practice (2 lab sessions)

1. Study of Functional blocks in LabVIEW.
2. Creation of Arrays and Loops in LabVIEW.

PART B : Minimum 10 experiments to be conducted

1. Response of Interacting Systems using LabVIEW.
2. Response of Non-interacting Systems using LabVIEW.
3. Response of Level Process using LabVIEW.
4. Response of Pressure Process using LabVIEW.
5. Response of flow process using LabVIEW.
6. Multi loop control systems – Ratio Control using LabVIEW.
7. Multi loop control systems – Cascade Control using LabVIEW.
8. Response of Temperature Process.
9. Current to pressure converter.
10. Realization of control actions: Electronic controllers.
11. Control valve characteristics.
12. Process tuning – Process reaction curve method.
13. Process tuning – continuous oscillation method.

III B. Tech. - II Semester

14BT60222: **MICROPROCESSORS AND MICROCONTROLLERS LAB**

(Common to EEE, ECE & EIE)

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: Microprocessors and Microcontrollers.

COURSE DESCRIPTION: Assembly language Programming for Intel 8086 & 8051; Interfacing standard peripherals & Programming - DAC, Stepper Motor, ADC, Logic Controller, Keyboard, Seven Segment Display.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Analyze various programming alternatives & interfacing methods to build a typical microcomputer based system.

CO2. Design and develop microcomputer based system to solve various problems.

LIST OF EXPERIMENTS:

Any **TWELVE** experiments to be conducted.

I Programs using 8086

1. Introduction to MASM/TASM.
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

II Interfacing with 8086

1. Stepper motor
2. Logic controller
3. A/D converter
4. Seven segment display
5. Keyboard interfacing

III Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory.
3. Programs using special instructions like SWAP, bit/byte, set/reset etc.

IV Interfacing with 8051

1. Stepper Motor
2. Digital to Analog Converter
3. Square wave generation using Timers in Mode 0 and Mode 1.

IV B. Tech. - I Semester
14BT71001:**ANALYTICAL INSTRUMENTATION**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Electronic Instrumentation, Engineering chemistry.

COURSE DESCRIPTION: Different type of Gas analyzers; dissolved component analyzers; spectrophotometers and nuclear radiation detectors.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in analysing the characteristics of pH meters, dissolved Component analysers, gas analysers, radiation detectors, different chromatography Techniques and different Spectrometers with different excitations.

CO2. Identify and apply suitable analytical instrument for analysis of a sample.

CO3. Compound Analysis of different chemical solutions using Spectrophotometer and Chromotography.

Detailed Syllabus:

UNIT - I: pH , CONDUCTIVITY & DISSOLVED COMPONENT ANALYZER (10 Periods)

Classification of Analyzers; Conductivity meters: measurement of conductance, conductivity cell, temperature compensation and high frequency method; pH meters: Hydrogen electrodes, glass electrodes, reference electrodes, and combinational electrodes, null detector type pH meters, Direct type pH meters, Industrial pH meters; Dissolved oxygen analyzer; sodium analyzer; silica analyzer and sampling systems.

UNIT - II: GAS ANALYZERS (8 Periods)

Thermal conductivity type; paramagnetic oxygen analyser; hydrogen analyser; CO monitor; NO_X analyser; H_2S analyser system; pollution monitoring instruments: sulphur dioxide, hydrocarbons estimation and sampling systems.

UNIT - III: CHROMATOGRAPHY **(8 Periods)**

Introduction, Gas chromatography: Principle, detection systems: Flame ionization detector, Argon ionization detector, Electron capture detector, Photo ionization detector; applications. Liquid chromatography: Principle, detection system: Fluorescence detector, Refractive index detector, thermal detector, mass detector; applications.

UNIT - IV: SPECTROPHOTOMETERS (11 Periods)

Special methods of analysis, Beer - Lambert law, colorimeters, UV - VIS spectrophotometers: single and double beam instruments, sources and detectors. FTIR spectrophotometer, atomic absorption spectrophotometer, atomic emission spectrophotometer, flame photometers.

UNIT - V : RADIATION DETECTORS AND NMR SPECTROSCOPY (8 Periods)

Generation and characteristics of nuclear radiations, Detectors: ionization chamber, proportional counter, GM counters, scintillation counter; Principle associated with NMR spectrometer, types. Mass spectrometer: Magnetic deflection, Time of Flight, Radio frequency, Quadruple.

Total Periods: 45

TEXT BOOKS:

1. R.S. Khandpur, Handbook of Analytical Instruments, TMH, 2nd Edition, 2006.
2. Jain R.K., Mechanical and Industrial Measurements, Khanna Publishing, New Delhi, 10th Edition, 1992.

REFERENCE BOOKS:

1. WillardH.H., MerritL.L., DeanJ.A.. and SeattleF.L., Instrumental Methods of Analysis, CBS Publishing and Distributors, 7th Edition 1995.
2. Skoog D.A. and Holler.F.J, Principles of Instrumental Analysis, Holt Sounder Publication, Philadelphia, 1985.

IV B. Tech. - I Semester
14BT71002: **BIOMEDICAL INSTRUMENTATION**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Sensors and Transducers, Electronic Instrumentation.

COURSE DESCRIPTION: Human Anatomy & Physiology; Bio - signals; Cardiovascular and Neuro - muscular Instrumentation; Therapeutic Equipment; Advanced Imaging techniques.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on human anotomy and physiology, ECG, EMG and EEG measuring systems, Medical imaging and therapeutic equipment.
CO2. Identify the suitable electrode for specific application.
CO3. Apply skills to analyze the performance of Bio - signals and also the internal structure of the instruments.

Detailed Syllabus:

UNIT – I: BIO ELECTRIC POTENTIALS AND ELECTRODES (10 periods)

Structure of cell, Resting and Action Potentials, Propagation of Action Potentials, Propagation of action potentials nerve to neuro - muscular junction, sources of Bioelectric Potentials, Electrode theory: Bio potential electrodes, Bio chemical transducers; Problems encountered in measuring a living system.

UNIT – II: CARDIOVASCULAR INSTRUMENTATION (10 periods)

Physiology of cardiovascular system, electrical conduction system of the heart, interpretation of ECG waveform, standard 12 - lead configurations, Einthoven triangle, specifications of ECG Machine; Blood pressure, blood flow and heart sound measurements; Relation between electrical and mechanical activities of the heart.

UNIT – III: NEURO-MUSCULAR AND RESPIRATORY INSTRUMENTATION (8 periods)

Physiology of nervous system, electrode placement for EEG and EMG recording, Specification of EEG and EMG machines, Interpretation of EEG and EMG.

Respiratory Instrumentation: Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

UNIT – IV: THERAPEUTIC EQUIPMENT (8 periods)

Pacemakers: Need for Cardiac pacemakers, pacing modes, Ventricular asynchronous Pacemaker (Fixed rate Pacemaker), Ventricular inhibited Pacemaker (demand Pacemaker), Atrial Synchronous pacemaker, Comparison between internal & external Pacemakers; Defibrillators: AC Defibrillator, DC Defibrillator, Synchronised DC Defibrillator; Diathermy: Shortwave and microwave, Dialysis: Hemo Dialysis, Peritonal Dialysis.

UNIT – V: MEDICAL IMAGING SYSTEM (9 periods)

Ultrasonic Imaging: Doppler principle, Modes of Display: A-Mode, B-Mode and Echocardiography. Computed Tomography: Block diagram of CT scanner, Applications of Computed Tomography. MRI Imaging System, Cine angiogram, Endoscope.

Total Periods: 45

TEXTBOOKS:

1. Leslie Cromwell, Fred. J. Weibell and Erich. A. Pfeiffer, *Biomedical Instrumentation and Measurements*, 2nd Edition, PHI, 2003.
2. R.S. Khandpur, *Hand Book of Biomedical Instrumentation*, Tata McGraw - Hill, 2nd Edition, 2002.

REFERENCE BOOKS:

1. John G.Webster, *Medical Instrumentation Application and Design*, WileyIndia Pvt. Ltd., 3rd Edition,2004.
2. M. Arumugam, *Biomedical Instrumentation*, Anuradha Publications, 1992.

IV B. Tech. - I Semester
14BT71003: LOGIC AND DISTRIBUTED CONTROL SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Switching Theory and Logical Design

COURSE DESCRIPTION: Basics of Programmable Logic Controller (PLC); PLC Programming Languages; I/O Processing; Concepts of DCS; Communication networks for DCS; Industrial Data Networks.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on Programmable Logic Controller (PLC) and their Programming Languages, DCS and their communication networks, Communication Standards.

CO2. Design and developsolutions to automate the given process.

CO3. Analyze the information to provide effective solution for real time problems in Automation Industries.

Detailed Syllabus:

UNIT – I: PROGRAMMABLE LOGIC CONTROLLER (PLC) BASICS (7 Periods)

Controllers, Programmable Logical Controller, Hardware, Architecture of PLC system, Power supplies and Isolators, Selection of PLC Systems - Allen Bradley, Omron, Mitsubishi. IEC Standard, Programming PLC's, Networking of PLC's, Advantages and Disadvantages of PLC.

UNIT – II: I/O PROCESSING (9 Periods)

Input/output Units: Input units, Output units. Signal Conditioning: Changing Voltage levels, Op-amp Comparator, Output Protection. Remote Connections: Serial and parallel Communication, Serial Standards, Parallel Standards. Examples of Commercial Systems. Processing inputs. I/O addresses.

UNIT – III: PLC INTERMEDIATE FUNCTIONS (11 Periods)

Ladder and functional block programming, Logic functions, Functional blocks, Jump and call, timer functions, counter functions, Register basics. Design of interlocks and alarms using a PLC, Arithmetic functions, Number Comparison Functions, Skip and MCR functions, Data Move Systems. Sequencer functions, PID functions.

UNIT – IV: DISTRIBUTED CONTROL SYSTEM (7 Periods)

Overview of Distributed Control System (DCS), DCS Software configuration, DCS Communication, DCS Supervisory Computer tasks, DCS Integration with PLCs and Computers. Communications in Distributed Control Systems – CSMA / CD Protocol, Token ring, Token Bus Communication Topology.

UNIT – V: INDUSTRIAL DATA NETWORKS (11 Periods)

HART protocol: Introduction, Method of operation, structure, operating conditions. Foundation Fieldbus: Introduction, OSI model of Foundation Field bus, troubleshooting. MODBUS: Overview, protocol structure. ProfiBus: Introduction, protocol stack, communication model, Relationship between application process and communication, Operation. Interface and backplane bus standards for instrumentation systems – VXI, VME, IEEE 1451 protocol, IEEE – 488 GPIB – Talkers, Listeners and Controllers.

Total Periods: 45

TEXT BOOKS:

1. Bolton. W, *Programmable Logic Controllers*", 5th Edition, 2009.
2. S.K. Singh, *Computer Aided Process Control*, PHI, 2009.

REFERENCE BOOKS:

1. Steve Mackay, Edwin Wrijut, Deon Reynders, John Park, *Practical Industrial Data Networks Design, Installation and Trouble shooting*' Newnes Publication, Elsevier First Edition, 2004.
2. M. Chidambaram, *Computer Control of Processes*, 2nd Edition, Narosa Publications, 2003.
3. John W. Webb and Ronald A. Reis, *Programmable Logic Controllers-Principles and Applications*, Pearson Education 5th Edition.
4. Frank D. Petruzella, *Programmable Logic Controllers*, 2nd Edition, McGraw - Hill, New york, 1997.

IV B. Tech. - I Semester
14BT60206: **ADVANCED CONTROL SYSTEMS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Control Systems.

COURSE DESCRIPTION: Linear control system design; design of compensators and controllers; non-linear systems; describing function; phase plane and stability analysis; design of controllers and observers; formulation of various optimal control problems; minimization of functional.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Gain knowledge on
- Need for control system design, tuning of PID controller and Two-Degrees-of-Freedom control.
- Non-linear system stability.
- Modal and optimal control.

CO2. Analyze
- Stability of a non-linear system using describing functions and phase plane analysis.
- Non-linear system stability using Lyapunov's stability criterion.
- Minimization of functional with different cases.

CO3. Demonstrate design skills in
- Compensators and controllers using Root locus and Bode plot.
- Controllers, observer and regulators using state space.

CO4. Demonstrate problem solving skills in
- Evaluating stability of systems using describing functions and lyapunov stability.
- Application of calculus of variations.

Detailed Syllabus:

UNIT – I: LINEAR CONTROL SYSTEM DESIGN (10 periods)

Introduction to control system design, types of compensators, design of compensators using bode plot and root locus technique. Types of controllers, design of PI, PD and PID controllers using bode plot and root locus technique. Tuning rules for PID controllers, two-degrees-of-freedom control.

UNIT – II: ANALYSIS OF NONLINEAR SYSTEMS (10 periods)

Introduction to nonlinear systems, different types of physical nonlinearities, describing functions, derivation of describing functions for dead zone, saturation, backlash, relay and hysteresis. Stability analysis of nonlinear systems through describing functions, Phase-Plane analysis, singular points, methods for constructing trajectories - Isoclines' method, delta method.

UNIT - III: STABILITY ANALYSIS (9 periods)

Stability in the sense of Lyapunov. Lyapunov's stability theorems. Stability analysis of linear time invariant systems by Lyapunov second method. Generation of Lyapunov functions, variable gradient method, Krasovskii's method.

UNIT – IV:DESIGN OF CONTROL SYSTEMS IN STATE SPACE (9 periods)

Necessity of pole placement, design by pole placement, necessary and sufficient conditions for arbitrary pole placement. Determination of feedback gain matrix using direct substitution method and Ackermann's formula. Full order observer and reduced order observer, quadratic optimal regulator systems.

UNIT – V: OPTIMAL CONTROL (7 periods)

Introduction to optimal control, formulation of optimal control problems, calculus of variations, minimization of functional of single function, functional involving *n* independent functions, constrained minimization.

Total Periods: 45

TEXT BOOKS:

1. M. Gopal, *Modern Control System Theory*, New Age International (P) Ltd., 2nd edition, 2000.
2. K. Ogata, *Modern Control Engineering*, Prentice Hall of India, 4th edition, 2006.

REFERENCE BOOKS:

1. A.Nagoorkani, *Advanced control theory*, RBA publications, 2nd edition, 1999.
2. I. J. Nagrath and M. Gopal, *Control Systems Engineering,* New Age International (P) Ltd., 2007.

IV B.Tech. - I Semester

14BT6HS01: **BANKING AND INSURANCE**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Managerial Economics and Principles of Accountancy.

COURSE DESCRIPTION: Origin and growth of Banking, functions and importance, RBI; Debtor and Creditor relationship, Types of Accounts, Loans and Advances; e - payment, e-cash, NEFT, RTGS, Credit and Debit cards; Insurance elements and risk; LIC, GIC, IRDA.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Acquire Knowledge in

- Tools and concepts of Banking and Insurance.
- Basic Principles and concepts of Insurance and Banking.
- Provides life skills for effective utilization of Banking and Insurance facilities.
- e-fund transfers, e-payments and e-business models.

CO2. Develop analytical skills in understanding problems pertaining to

- Online banking and e – payments..
- Risk Management through insurance benefits the society at large.
- Money management by leveraging on technology, banking and insurance services.

Detailed Syllabus:

UNIT I: INTRODUCTION TO BANKING (9 periods)

Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT - II: BANK-CUSTOMER RELATIONSHIP (9 periods)

Debtor-creditor relationship, anti money laundering, products or services, payment and collection of cheques and other negotiable instruments. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances- principles of lending, types of loans,

UNIT - III: BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM (9 periods)

Features, types of e-payment system, e-cash, NEFT, RTGS, Electronic purses, Credit and Debit cards. Business models- B2B, B2C, C2C, and B2G.

UNIT - IV: INTRODUCTION TO INSURANCE (9 periods)

Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT - V: INSURANCE OVERVIEW (9 periods)

Principles of insurance, insurance types, LIC & GIC insurance contract- nature, elements, functions, IRDA, Insurance Players in India.

Total Periods: 45

TEXT BOOKS:

1. A.V. Ranganadha Chary and R.R. Paul, *Banking and Financial system*, Kalyani Publisher, 2nd Edition, New Delhi.
2. P.K.Gupta, *Insurance and Risk Management*, Himalaya Publishing House, New Delhi, 2002.

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma, *Electronic Commerce- A Manager's Guide to E-Business*, Vanity Books International, Delhi, 2002.
2. Kalakota Ravi and Whinston Andrew B, *Frontiers of Electronic Commerce*, Pearson Education India, New Delhi, 1996 .
3. Schneider and Grey P, *Electronic Commerce, Course Technology*, Cengage Learning, 8th Edition, New Delhi, 2008.

IV B.Tech. - I Semester

14BT6HS02: COST ACCOUNTING AND FINANCIAL MANAGEMENT

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES : Nil

COURSE DESCRIPTION: Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Returns on Investment.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Acquire Knowledge in
- Elements of Costing.
- Basic concepts of Financial Management.
- Risk and Return.
- Financial Accounting.
- Using advanced tools like tally and SAP.
- Significance of Economics and Accountancy.

CO2. Do cost, risk and return of investment analysis.

CO3. Develop skills in providing solutions for
- Material, Labor, Overheads control.
- Excellence and ability to minimize the cost of the organization.
- Effective investment decisions.

CO4. Prepare cost sheets pertaining to manufacturing of products.

Detailed Syllabus:

UNIT-I: INTRODUCTION TO COST ACCOUNTING (9 Periods)

Cost and Cost Accounting, Scope, Objectives, Advantages and disadvantages –Cost Accounting Vs Management Accounting – Elements of Costing –Installation of costing system – Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

UNIT - II: COST ANALYSIS (9 Periods)

Analysis of Cost – Preparation of cost sheet, estimate, tender and quotation (Simple problems) – Importance of Costing while pricing the products.

UNIT - III: STANDARD COSTING (9 Periods)

Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labor variances (Simple Problems).

UNIT - IV: FINANCIAL MANAGEMENT (9 Periods)

Financial Management - Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

UNIT - V: RISK AND RETURNS ON INVESTMENT (9 Periods)

Investment - Meaning and Definition - concept of risk and returns -Investment Alternatives - Introduction to Behavioral Finance – Anomalies – Key Concepts – Anchoring – Mental Anchoring - Confirmation and Hindsight Bias - Gambler's Fallacy - Herd Behavior - Over Confidence -Overreaction and Availability Bias - Prospect Theory.

Total Periods : 45

TEXT BOOKS:

1. S.P. Jain and K.L. Narang, *Cost Accounting,* Kalyani Publishers, Ludhiana, 6th Edition, 2002.
2. James C Van Horne, *Financial Management and Policy*, Prentice-Hall of India/Pearson, 12th Edition, 2001.

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, *Cost and Management Study Material,* New Delhi.
2. I.M. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd., 10th Edition, 2010.

IV B. Tech. - I Semester

14BT6HS03: **ENTREPRENEURSHIP FOR MICRO, SMALL AND MEDIUM ENTERPRISES**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Acquire Knowledge in
- · Schemes and institutions encouraging entrepreneurship.
- · Basic Principles and concepts of Accountancy.
- · Significance of entrepreneurship.

CO2. (i) Develop analytical skills in understanding problems pertaining to
- · Personal excellence through financial and professional freedom.
- · Women entrepreneurship acts as contrivance in the societal development.

(ii) Develop Critical thinking and evaluation ability.

CO3. Generate ideas for formulating business plans.

Detailed Syllabus:

UNIT – I: INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT (9 periods)

Concept of Entrepreneurship – Growth of Entrepreneurship in India **-** Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur – Functions of Entrepreneur – Need for an Entrepreneur – Entrepreneurial Decision Process – Types of Entrepreneurs – Distinction between an Entrepreneur and a manager – Intrapreneur - Entrepreneur Vs Intrapreneur.

UNIT – II: IDEA GENERATION AND FORMULATION OF BUSINESS PLANS (9 periods)

Sources of Ideas – Methods of idea generation – Product Identification – Opportunity Selection – Steps in Setting up of a Small Business Enterprise - Contents Of Business Plans – Significance Significance – Formulation of Business Plan – Business Opportunities in Various Sectors – Common Errors in Business Plan Formulation – Project Report Preparation.

UNIT – III: MICRO AND SMALL ENTERPRISES (9 periods)

Meaning and Definition – Micro and Macro units – Essentials – Features – Characteristics – relationship between Micro and Macro Enterprises – Rationale behind Micro and Small Enterprises – Scope of Micro and Small Enterprises – Objectives of Micro Enterprises - Problems of Micro and Small Enterprises

UNIT – IV: INSTITUTIONAL FINANCE AND SUPPORT TO ENTREPRENEUR (9 periods)

Need for Institutional Finance **-** Commercial Banks - Industrial Development Bank of India (IDBI) – Industrial Finance Corporation of India Ltd. (IFCI) – Industrial Credit Investment Corporation of India Ltd. (ICICI) – State Financial Corporations (SFCs) - State Industrial Development Corporations (SIDCs) – Small Industries Development of Bank of India (SIDBI) – Need For Institutional Support – National Small Industries Corporation Ltd (NSIC) – Small Industries Development Organisation (SIDO) – Small Industries Service Institutes (SISIs) – District Industries Centres (DICs) – National Institute of Entrepreneurship and Small Business Development (NIESBUD) – Technical Consultancy Organizations (TCOS) (Origin, Mission, and credit facility /support).

UNIT –V: WOMEN ENTREPRENEURSHIP (9 periods)

Concept of Women entrepreneur - Functions of Women entrepreneurs - Growth of women entrepreneurship in India - Challenges of Women entrepreneurs- Programmes supporting women entrepreneurship – Rural Entrepreneurship – Meaning, Need for Rural entrepreneurship, Problems of rural entrepreneurship, Role of NGOs. **Total Periods: 45**

TEXT BOOKS:

1. Dr. S. S. Khanka*, Entrepreneurial Development*, S. Chand and Company Ltd, Revised Edition, 2012.
2. Madhurima Lall & Shikha Sahai, *Entrepreneurship***,** Excel Books India, 2nd Edition 2008.

REFERENCE BOOKS:

1. Nandan, H., *Fundamentals of Entrepreneurship*, PHI Learning Pvt. Ltd., 2013, New Delhi, 3rd edition 2013.
2. Vasanth Desai, *The Dynamics of Entrepreneurial Development and Management,* Himalaya Publishing House, 4th edition 2009.
3. Bholanath Dutta, *Entrepreneurship Management – Text and Cases*, Excel Books, 2009.

IV B.Tech. - I Semester

14BT70105: **DISASTER MITIGATION AND MANAGEMENT**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Environmental Sciences.

COURSE DESCRIPTION: Natural disasters and hazards – Earthquakes – Floods and cyclones, droughts – Landslides – Disaster management.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Explain various types of disasters and mitigation strategies

CO2. Analyze and interpret the Guidelines for hazard assessment and vulnerability analysis.

CO3. Use historical data of disaster losses and inform the people over preparedness.

CO4. Address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society.

CO5. Function in multidisciplinary teams for the effective displacement of people during disasters.

Detailed Syllabus:

UNIT - I: INTRODUCTION (8 periods)

Types of disasters – Natural disasters – Impact of disasters on environment – Infrastructure and development – Concepts of hazards and vulnerability analysis– Hazard Assessment **–** Guidelines for hazard assessment and vulnerability analysis – Basic principles and elements of disaster mitigation.

UNIT - II: EARTHQUAKES (11 periods)

Introduction to earthquakes – Intensity scale (MSK–64) – Seismic activity in India – Seismic zones of India – Earthquakes in A.P. – Action plan for earthquake disaster preparedness – Elements at risk, recovery and rehabilitation after earthquake – Earthquake resistant design and construction of buildings. Tsunami – Onset, types and causes – Warning – Element at risk – Typical effects – Specific preparedness and mitigation strategies.

UNIT - III: FLOODS AND CYCLONES (11 periods)

Onset, types, warnings – Elements at risk – Typical effects – Indian floods and cyclones – Hazard zones – Potential for reducing hazards – Mitigation strategies and community based mitigation.

DROUGHTS: Onset, types and warning – Kinds of droughts – Causes of droughts – Impact of droughts – Early warning and response mechanisms – Mitigation strategies – Droughts in India.

UNIT - IV: LANDSLIDES (7 periods)

Onset, types and warning – Causes of landslides – Elements at risk – Indian land slides – Hazards zones – Typical effects – Mitigation strategies and community based mitigation.

UNIT - V: DISASTER MANAGEMENT (8 periods)

Disaster management organization and methodology – Disaster management cycle – Disaster management in India – Typical cases – Cost–benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Total Periods: 45

TEXT BOOKS:

1. V. K. Sharma, *Disaster Management,* National Centre for Disaster Management, IIPE, 1999.
2. A. S. Arya, Anup Karanth, and Ankush Agarwal, *Hazards, Disasters and Your Community: A Primer for Parliamentarians,* GOI–UNDP Disaster Risk Management Programme, 2005.

REFERENCE BOOKS:

1. *Disaster Management in India*, A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. R. B. Singh, *Natural Hazards And Disaster Management*, Rawat Publications, 2009.
3. Pardeep sahni, Alka Dhameja and Uma Medury, *Disaster Mitigation*, PHI Learning Pvt. Ltd., 4th Edition, 2011.
4. Sanjay K. Sharma, *Environment Engineering and Disaster Management,* USP Publishers, 2011.

IV B. Tech. - I Semester

14BT70106: **ENVIRONMENTAL POLLUTION AND CONTROL**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Environmental Sciences.

COURSE DESCRIPTION: Introduction, Sources and Effects of Air Pollution – Dispersion of Pollutants and their control – Surface and Ground Water Pollution and control–Soil Pollution and remediation– Management of Municipal Solid Wastes.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Explain various pollutants, characteristics and their dispersion

CO2. Analyze the major pollutants that causes environmental pollution.

CO3. Conduct research and select suitable techniques to control pollution.

CO4. Understand the effects of environmental pollutions on human beings and vegetation.

CO5. Communicate the methods of management and control of environmental pollution.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS (8 periods)

Scope – Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, Point and Non – Point, Line and Area Sources of Air Pollution – Stationary and Mobile Sources – Dispersion of Pollutants – Dispersion Models – Applications.

UNIT - II: EFFECTS AND CONTROL OF PARTICULATES (9 periods)

Effects of Air Pollutants on Man, Material and Vegetation – Global Effects of Air Pollution – Green House Effect, Heat Island, Acid Rains, Ozone Holes – Control of Particulates – Control at Sources – Process Changes – Equipment Modifications – Design and Operation of Control Equipment – Settling Chambers – Centrifugal Separators – Bag Filters, Dry and Wet Scrubbers – Electrostatic Precipitators.

UNIT - III: WATER POLLUTION (10 periods)

Introduction–Water Quality in Surface Waters – Nutrients – Controlling Factors in Eutrophication–Effects of Eutrophication – Ground Water Pollution – Thermal Pollution – Marine Pollution – Sewage Disposal in Ocean – Types of Marine Oil Pollution – Cleanup of Marine Oil Pollution – Control of Water Pollution – Case Study on Tanneries – Drinking Water Quality Standards.

UNIT - IV: SOIL POLLUTION (9 periods)

Soil Pollutants – Sources of Soil Pollution – Causes of Soil Pollution and their Control – Effects of Soil Pollution – Diseases Caused by Soil Pollution – Methods to Minimize Soil Pollution – Effective Measures to Control Soil Pollution – Case Study on Fertilizer.

UNIT - V: MUNICIPAL SOLID WASTE MANAGEMENT (9 periods)

Introduction – Types of Solid Wastes – Principles of Excreta Disposal – Domestic Solid Waste Production – Collection of Solid Wastes – Transport of Solid Wastes – Management of Solid Wastes – Methods of Land Disposal – Sanitary Landfill – Composting – Incineration.

Total Periods: 45

TEXT BOOKS:

1. C.S.Rao, *Environmental Pollution Control Engineering*, New Age International Pvt Ltd., 2nd Edition, 2007.
2. Y.Anjaneyulu, *Introduction to Environmental Science,* BS Publications*.,* 2009.

REFERENCE BOOKS:

1. M.N. Rao and H.V.N. Rao, *Air Pollution,* Tata Mc Graw - Hill Education Pvt. Ltd., 19th Edition, 2010.
2. Daniel Vallero, *Fundamentals of Air Pollution,* Academic Press (Elsevier)*,* 5th Edition, 2014.
3. S.M.Khopkar, *Environmental Pollution Monitoring and Control,* New Age International Pvt Ltd., 2nd Edition, 2007.
4. S.Deswal and K.Deswal, *Environmental Science,* Dhanpat Rai & Co, 2nd Edition, 2011.

IV B.Tech. - I Semester

14BT70107: **CONTRACT LAWS AND REGULATIONS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Construction Contracts – Tenders – Arbitration – Legal Requirements – Labour Regulations.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Explain contract documents and tendering processes.
CO2. Analyze the legal issues in arbitration and in contracts documents.
CO3. Address the legal issues in collecting taxes.
CO4. Follow ethics while bidding, sale and purchase of property.
CO5. Develop and Prepare tender documents as per the standards.

Detailed Syllabus:

UNIT - I: CONSTRUCTION CONTRACTS (9 periods)

Indian Contracts Act – Elements of Contracts – Types of Contracts – Features – Suitability – Design of Contract Documents – International Contract Document and laws – Standard Contract Document – Law of Torts.

UNIT - II: TENDERS (9 periods)

Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Financial Points of View – Two Cover System – Preparation of the Documentation – Contract Formation and Interpretation – Potential Contractual Problems – Price Variation Clause – Comparison of Actions and Laws – Subject Matter – Violations.

UNIT - III: ARBITRATION (9 periods)

Arbitration – Comparison of Actions and Laws – Agreements – Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Arbitration Disputes – Dispute Review Board.

UNIT - IV: LEGAL REQUIREMENTS (9 periods)

Legal Requirements for Planning – Property Law – Agency Law – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties – Local Government Approval – Statutory Regulations – Insurance and Bonding – Laws Governing Purchase and Sale – Use of Urban and Rural Land – Land Revenue Codes – EMD – Security Deposits – Liquidated Damages.

UNIT - V: LABOUR REGULATIONS (9 periods)

Social Security – Welfare Legislation – Laws Relating to Wages, Bonus and Industrial Disputes – Labour Administration – Insurance and Safety Regulations – Workmen's Compensation Act – Maternity Benefit Act – Child Labour Act – Other Labour Laws.

Total Periods: 45

TEXT BOOKS:

1. G. C. V. Subba Rao, *Law of Contracts I & II*, S. Gogia & Co., 11th Edition, 2011.
2. Jimmie Hinze, *Construction Contracts,* Mc Graw - Hill, 2nd Edition, 2001.

R**EFERENCE BOOKS:**

1. Gajaria G.T, Kishore Gajaria, *Laws Relating to Building and Engineering Contracts in India*, Lexis Nexis Butterworths India, 4th Edition, 2000.
2. B. S. Patil, Civil Engineering Contracts and Estimates, University Press (India) Private Ltd., 3rd Edition, 2013.
3. Joseph T. Bockrath, Contracts and the Legal Environment for Engineers and Architects, McGraw Hill Education, 7th Edition, 2010.
4. Akhileshwar Pathak, Contract Law, Oxford University Press, 2011.

IV B. Tech. - I Semester

14BT70108: **PLANNING FOR SUSTAINABLE DEVELOPMENT**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Introduction to Sustainable Development – Environment, Sciences and Sustainability – Sustainable Development Politics and Governance – Tools, Systems and Innovations for Sustainability – Communication and Learning for Sustainability.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate the knowledge of planning, environment, tools and systems for sustainable development .
CO2. Analyze the current challenges to sustainability.
CO3. Use theoretical frameworks and provide solutions to the real world sustainability issues.
CO4. Conduct awareness of contemporary issues on globalization in terms of sustainability.
CO5. Give recommendations for the sustainability issues and solutions using a holistic approach.
CO6. Explain a sense of civic responsibility, including reflection on the student's own role in developing and nurturing sustainable communities.
CO7. Participate in decision making as individual and responsible for collective decision.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO SUSTAINABLE DEVELOPMENT (8 periods)

Definition and Concepts of Sustainable Development – Capitalization of Sustainability – National and Global Context – The Millennium Development Goals – Emergence and Evolution of Sustainability and Sustainable Development – Theories of Sustainability – Case Studies.

UNIT - II: ENVIRONMENT, SCIENCES AND SUSTAINABILITY (8 periods)

Climate Change – Science, Knowledge and Sustainability – Unforeseen Environmental Impacts on Development – Challenges of Sustainable Development – Centrality of Resources in Sustainable Development – Case Studies.

UNIT - III: SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE (10 periods)

Governance and Democracy and Eco–Welfare – Global Civil Society and World Civil Politics – Civic Environmentalism – Policy Responses to Sustainable Development – Economics of Sustainability – Social Responsibility in Sustainability – National Action.

UNIT-IV: TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY (11 periods)

Need for System Innovation – Transition and Co–Evolution – Theories and Methods for Sustainable Development – Strategies for Eco – Innovation – Ecological Foot Print Analysis – Socio Ecological Indicators – Eco Labels– Policy Programmes for System Innovation – Case Studies.

UNIT - V: COMMUNICATION AND LEARNING FOR SUSTAINABILITY (8 periods)

Role of Emerging Media – Remarkable Design and Communication Art, Activism and the Public Interest – Education for Sustainability – Participation in Decision Making – Critical Thinking and Reflection – Case Studies. **Total Periods: 45**

TEXT BOOKS:

1. John Blewitt, *Understanding Sustainable Development,* Earth Scan Publications Ltd., 2nd Edition, 2008.
2. Jennifer A. Elliot, *An introduction to sustainable development,* Earth Scan Publications Ltd., 4th Edition, 2006.

REFERENCE BOOKS:

1. Peter Rogers, Kazi F Jalal , John A Boyd, *An introduction to sustainable development,* Earth Scan Publications Ltd., 2006.
2. Simon Dresner, *The Principles of Sustainability,* Earth Scan Publications Ltd., 2nd Edition, 2008.
3. Peter Bartelmus, *Environment growth and development: The concepts and strategies of sustainability,* Routledge, 3rd Edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, Mirilia Bonnes, Jose Antonio Corraliza and Maria Vittoria Giuliani, *People places and sustainability,* Hogrefe & Huber Publishers, 2nd Edition, 2003.

IV B.Tech. - I Semester

14BT70109: **RURAL TECHNOLOGY**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: -

COURSE DESCRIPTION: Research & Development – Non Conventional Energy – Community Development – IT Management.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Acquire the knowledge of various nonconventional energy systems and technologies for rural development.
CO2. Apply the principles of IT for the rural development.
CO3. Responsible for the development of technologies in rural areas.
CO4. Understand the impact of technologies in societal and environmental aspects.

Detailed Syllabus:

UNIT - I: RESEARCH & DEVELOPMENT (9 periods)

India – Ancient Indian Technologies – Rural India Life – Indian Farmer – Role of Science and Technology in Rural Development – Rural Technology and Poverty Eradication – Rural Business Hubs – Technology in improving rural infrastructure – Various organizations related to innovation – Issues of technology transfer: CAPART, NABARD, CSIR, NIF.

UNIT - II: NON CONVENTIONAL ENERGY (9 periods)

Definition of Energy, Types of alternative sources of energy, Sources of non conventional energy – Solar energy – Solar Cooker – Solar Heater – Biogas – Recycling and Management and Wastes Conservation – Assessment & Production of biomass products & their utilization.

UNIT - III: TECHNOLOGIES FOR RURAL DEVELOPMENT (9 periods)

Food & Agro based technologies – Tissue culture – Building and Construction technologies – Cultivation and processing of economic plants – Cottage and social Industries.

UNIT - IV: COMMUNITY DEVELOPMENT (9 periods)

Water conservation – Rain water Harvesting – Drinking water – Environment and Sanitation – Bio fertilizers – Medical and Aromatic plants – Employment generating technologies – Apiculture – Piciculture – Aquaculture.

UNIT - V: IT IN RURAL DEVELOPMENT (9 periods)

The Role of Information Technology in Rural Areas – Impact of Information Technology in Rural development – Need and Necessity of Technology – Corporate Social Responsibilities – Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and Saansad Adarsh Gram Yojana (SAGY) – village adoptions schemes.

Total Periods: 45

TEXT BOOKS:

1. M.S Virdi, *Sustainable Rural Technologies*, Daya Publishing House, New Delhi, 2009.
2. S.V. Prabhath & P. Ch. Sita Devi, *Technology and Rural India*, Serials Publications, New Delhi, 2012.

REFERENCE BOOKS:

1. P. R. S. Murthy, R.C. Chackravarthy, *Information Technology & Rural Development*, Pacific Books International, 2011.
2. Shivakanth Singh, *Rural Development Policies and Programmes,* Northern book centre, New Delhi, 2002.
3. L.M.Prasad, *Principles and Practice of Management*, Sultan Chand & Sons, New Delhi, 8th Edition, 2014.
4. Venkata Reddy. K, *Agriculture and Rural Development Gandhian Perspective*, Himalaya Publishing House, 2001.

IV B.Tech. – I Semester

14BT60305: **ARTIFICIAL INTELLIGENCE AND ROBOTICS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: -

COURSE DESCRIPTION: Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning;

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.

CO2. Employ effective methods to analyze a robot motion control while executing a specific task.

CO3. Design and Implement appropriate solutions for search Problems such as playing two person games and for planning problems which involve defining a sequence of actions of a robot.

CO4. Apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance.

Detailed Syllabus:

UNIT - I: ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING (10 periods)

The Underlying assumption of AI; AI Technique: simple Tic - Tac - Toe program; Problem solving: State space search; Production systems: control strategies, search space control: depth-first, breadth - first search; Heuristic search: Hill climbing, best - first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means - End Analysis.

UNIT - II: KNOWLEDGE REPRESENTATION & LEARNING (9 periods)

Knowledge Representation; Predicate Logic: Simple facts in logic, resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; slots; conceptual dependency; scripts; Non - Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.

UNIT - III: ROBOTICS – VISION & SENSING (8 periods)

Robotics: Robot Classification, Robot Specification, notation; Sensing: Range sensing: Triangulation; proximity sensing: Inductive, Capacitive and Ultrasonic sensing; touch sensing: tactile sensing, artificial skins; Force and torque sensing: Wrist force sensors; Vision: low - level vision, high -level vision.

UNIT - IV: ROBOT PROGRAMMING & CONTROL (10 periods)

Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: characteristics, specifications; Task level languages; Language structure: VAL II.

UNIT - V: ROBOT INTELLIGENCE & TASK PLANNING (8 periods)

Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; graph search technique; Problem solving and problem reduction; robot learning; Task planning: Modelling, task specification, obstacle avoidance, grasp planning; Expert system.

Total Periods: 45

TEXT BOOKS:

1. E. Rich and K. Knight, *Artificial intelligence,* Tata Mc Graw - Hill, 2nd edition, 1992.
2. K.S. Fu, R.C. Gonzalez, C.S.G. Lee, *Robotics: Control, Sensing, Vision, and Intelligence,* Mc Graw Hill, International Edition, 1987.

REFERENCE BOOKS:

1. Mikell P. Groover, *Industrial Robotics, Technology, Programming and Applications*, Tata Mc Graw Hill, 2011.
2. D.W. Patterson, *Introduction to AI and Expert Systems*, PHI, 1992.
3. N.J. Nilsson, *Principles of AI*, Narosa Publishing House, 2000.
4. George Luger, *Al-Structures and Strategies for and Strategies for Complex Problem solving,* Pearson Educations, 4th Edition, 2002.

IV B.Tech. – I Semester

14BT60306: **GLOBAL STRATEGY AND TECHNOLOGY**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: -Nil-

COURSE DESCRIPTION: Introduction to strategic management, strategic management process, principles of good strategy, globalisation, globalisation strategies, research & development strategies, technology management and transfer, significance, elements of transfer process, corporate governance: the Indian scenario.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Decide upon a macroscopic management strategy to optimize the impact of decisions with limited resources.

CO2. Identify the impact of globalization in a given engineering scenario. Participate in elementary discussions on corporate governance.

CO3. Analyse an industrial Engineering problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO STRATEGIC MANAGEMENT (9 periods)

Definitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT - II: GLOBALISATION (9 periods)

Meaning and dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouring Globalisation; Globalisation strategies.

UNIT - III: RESEARCH & DEVELOPMENT STRATEGIES (9 periods)

Introduction, Concept, Evolution of R & D Management, R & D as a business, R & D and competitive advantage, Integration of R & D, Elements of R & D strategies, Selection of R & D strategies, Implementation strategies, R & D trends, Responses to changes.

UNIT - IV: TECHNOLOGY MANAGEMENT AND TRANSFER (9 periods)

Technology Management: Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.

Technology Transfer: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT – V: CORPORATE GOVERNANCE: THE INDIAN SCENARIO (9 periods)

Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance – Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family – owned business in India, Corporate Governance and the Indian ethos.

Total Periods: 45

TEXT BOOKS:

1. Francis Cherunilam, *Stategic Management,* Himalaya Publishing House, 3rd Edition, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan, *Management of Technology, Stategic Management,* Himalaya Publishing House, 2nd Edition, 2012.

REFERENCE BOOKS:

1. White and Bruton, *The management of Technology and innovation; a strategic approach,* Cengage Learning, 2007.
2. S.K.Mandak, *Ethics in business and Corporate Governance,* TMH, 2nd Edition, 2012.

IV B.Tech. – I Semester

14BT60307: **INTELLECTUAL PROPERTY RIGHTS & MANAGEMENT**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:-Nil

COURSE DESCRIPTION: Protection of ideas, innovation and artistic endeavors ; Acts and procedure related to patents, trademarks, passing off, copy right, design registration, trade secrets and cyber laws, case studies in each.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Prepare documents and fill applications needed for filing a patent, design, copy right and trade mark.

CO2. Ensure smooth transition from concept to final product.

CO3. Exercise discretion in following ethical aspects in dealing with intellectual property rights.

Detailed Syllabus:

UNIT – I: OVERVIEW OF INTELLECTUALPROPERTY RIGHTS (9 periods)

Introduction and importance of intellectual property rights (IPRs), types of intellectual property, International scenario in IPR: WIPO, WTO, TRIPS, international and national patent acts: United States of America patent act, United Kingdom patent act, India patent act, recent amendments in India patent act 1972.

UNIT – II: PATENTS (9 periods)

Introduction, Basic concepts, object and value of patent law, advantages of patent to inventor, patentable inventions, Not patentable inventions, overview of patent procedure, Bio technology patents, patents on computer program, patent rights on micro organism, plant breeding and breeders right, protection of bio diversity, protection of traditional knowledge, infringement of patents and remedy for infringement.

UNIT – III: TRADEMARKS (9 periods)

Trade Marks: Basic concepts, definition, functions, kinds of trademarks: service trademarks, collective trademarks, certification trademarks, textile trade marks, registrable and non registrable trademarks, registration of trademarks, examination process, establishing trade mark right, good will, infringement and action for trademarks, passing off, trade mark and eco label, comparison with patents industrial design and copy right.

UNIT - IV: INDUSTRIAL DESIGN, TRADE SECRETS, CYBER LAWS (9 periods)

Industrial Design: Basic concepts, scope and nature of rights, process of registration rights, rights after registration, transfer of interest or rights, reliefs and remedies and action for infringement of rights, appeals.

Trade Secrets: Definition, significance, tools to protect trade secrets in India.

Cyber laws: Corelation to intellectual property.

UNIT - V: COPY RIGHTS (9 periods)

Copy Rights: Introduction, nature and scope, subject matter, related or allied rights, works in which copy rights subsists, registration of copy rights, conferred by copy right, copy right protection in India, transfer of copy rights, right of broad casing organizations and of performer, computer software.

Total Periods: 45

TEXT BOOKS:

1. P.Narayan, *Intellectual Property Law,* Eastern Law House, New Delhi and Kolkata, 2005,
2. Deborah E. Bouchoux, *Intellectual Property Rights,* Cengage Learning, India edition, 2011.

REFERENCE BOOKS:

1. Bainbridge David, *Intellectual Property Rights: Key to New Wealth, National Research Development Corporation,* Pearson Education, New Delhi.
2. W.R.Cornesh, *Intellectual Property Rights: Patent, Copy Right, Trade Mark, Allied Rights,* Universal law publishing private limited, Delhi, 2001.
3. S.R. Myneni, *Law of Intellectual Property,* Asia law house, Hyderabad 2001.
4. Prabuddha Ganguly, *Intellectual Property Rights: Unleasing Knowledge Economy,* TMH New Delhi, 2001.

IV B. Tech. – I Semester

14BT60308: **MANAGING INNOVATION AND ENTREPRENEURSHIP**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: *Nil*

COURSE DESCRIPTION: Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts Shifting Composition of the Economy Purposeful Innovation & 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Define, explain and illustrate theories of business innovation and entrepreneurship, the evolution of industries and economies, and the roles of Entrepreneurs.

CO2. Develop a comprehensive and well structured business plan for a new venture.

CO3. Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan.

CO4. Work effectively in multidisciplinary, cross - cultural teams, towards the development of a Team Project.

Detailed Syllabus:

UNIT - I: ENTREPRENEURSHIP (7 periods)

Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, entrepreneurial growth and development.

UNIT - II: CREATIVITY AND INNOVATION (11periods)

Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies: Strategies that aim at introducing an innovation, innovation & entrepreneurship, planning - incompatible with Innovation & entrepreneurship.

UNIT - III: THE INDIVIDUAL ENTREPRENEUR (7 periods)

Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation Entrepreneurial motivation (nAch story); Achievement Motivation in Real life - Case Study. Entrepreneurs versus inventors.

UNIT - IV: INTERNATIONAL ENTREPRENEURSHIP OPPORTUNITIES (11 periods)

International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Entrepreneurial entry into international business, strategic Issues in International Entrepreneurship.

UNIT - V: CREATIVE PROBLEM SOLVING (9 periods)

Problem Identification and Problem Solving: Problem Identification. Problem solving Innovation and Diversification.

Total Periods: 45

TEXT BOOKS:

1. Martin, M.J*. Managing Innovation and Entrepreneurship in Technology based Firm*, John Wiley Interscience, 1994.
2. Ettlie, J.E. *Managing Technology Innovation*, John Wiley & Sons, 2000.
3. Robert D Hisrich., Michael P Peters., Dean A Shepherd, *Entrepreneurship,* The McGraw-Hill Companies, 6th Edition, 2011.

REFERENCE BOOKS:

1. Christensen, C. M. and Raynor, M. E. *The Innovators Solution: Creating and Sustaining Successful Growth*, Boston, MA: Harvard Business School Press, 2003.
2. Drucker, P. F., *Innovation and Entrepreneurship*, New York: Harper, 1985.
3. *Harvard Business Review on Innovation (Collection of articles)*, Harvard Business School Press, 2001.
4. *Harvard Business Review on Entrepreneurship (Collection of articles)*, Harvard Business School Press, 1999.
5. Rogers, E.M., *Diffusion of Innovations*, New York: Simon and Schuster, 5th Edition, 2003.
6. Drucker, P. F. *The Discipline of Innovation,* Harvard Business Review, 2000.

IV B.Tech. – I Semester

14BT60309: **MATERIAL SCIENCE**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Chemistry, Engineering Physics.

COURSE DESCRIPTION: Structure and Bonding in metals; Steels ,Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semi conductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics engineering, Material Selection and manufacturing of Optical fibers.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Understand how materials are formed and their classification based on atomic arrangement.

CO2. Illustrate how the design of the various types of steels, cast Irons and Non ferrous alloys influence various engineering applications.

CO3. Understand the basic difference in properties of various conductors, Insulators and Semiconductors and application of various advanced materials for different branches of Engineering.

Detailed Syllabus:

UNIT – I: INTRODUCTION TO MATERIAL SCIENCE (7 periods)

Structure of metals: Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size.

Constitution of alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT – II: CAST IRON, STEEL & NON - FERROUS METALS (12 periods)

Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast iron. Classification of steels, structure and properties of plain carbon steels. Structure and properties of Copper and its alloys, Aluminum and its alloys.

UNIT – III: ELECTRIC CONDUCTORS & INSULATORS (12 periods)

Type of materials selected for conductors, Insulators and semi conductors. Introduction to ceramics-Bonding and microstructure-DC properties of ceramic materials–AC properties– mechanical properties - Ceramics as Conductors, Insulators and capacitors, introduction to Plastics-DC properties-AC properties-mechanical properties.

UNIT – IV: SEMICONDUCTORS AND MAGNETIC MATERIALS (9 periods)

Fabrication of Semiconductors-Producing a silicon wafer-Lithography and Deposition-Packaging of semiconductors materials-Types of magnetic materials- Measuring magnetic properties-Application of soft magnetic materials in Electromagnets and relays, AC transformers, Generators and motors.

UNIT – V: ADVANCED MATERIALS AND APPLICATIONS (5 periods)

Composites – Fiber reinforced, Metal Matrix, Ceramic Matrix – properties and applications; Ceramics – Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Glasses– properties and applications, manufacturing of Optical fibers.

Total Periods: 45

TEXT BOOKS:

1. Kodigre V D, *Material Science and Metallurgy,* Everest Publishing House, Pune, 31st edition, 2011.
2. Ian.P.Jones, *Material Science for Electrical and Electronic Engineers*, Oxford University Press, New Delhi,2000

REFERENCE BOOKS:

1. V. Raghavan, *Physical Metallurgy: Principles and Practices,* PHI, New Delhi, 2nd edition,2006.
2. William. D. Callister, *Materials Science & Engineering - An Introduction,* John Wiley and sons, New Delhi, 6th edition, 2002.
3. A.J. Dekkar, *Electrical Engineering Materials*, PHI, New Delhi, 1970.

IV B. Tech. – I Semester

14BT60502: **ENGINEERING SYSTEMS ANALYSIS AND DESIGN**

(Open-Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: NIL

COURSE DESCRIPTION: Overview of the Systems Process, Technologies for systems, System Development Life Cycle, system Analysis and Modeling, levels of management, Project Management, Systems Implementation and importance of UML Prototyping, Maintaining and Managing the Systems output Process.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Gain knowledge on

- ☐ Systems Process and System Design.
- ☐ Systems Analysis and Modeling.
- ☐ System Development Life Cycle.
- ☐ Design Management and Maintenance Tools.

CO2. Apply the CASE Tools for System Processand estimation the given models.

CO3. Design, Develop and implement new Techniques for modeling the systems.

CO4. Work effectively as team member on projects.

CO5. Manage and Maintain the System Process.

Detailed Syllabus:

UNIT - I: INTRODUCTION (9 periods)

Introduction - Systems, Types of systems, integrating technologies for systems, Need for system analysis and design, Role of the systems analyst, the system development life cycle, CASE tools for analysis and design.

UNIT - II: ANALYSIS AND MODELING ORGANIZATIONAL SYSTEMS (9 periods)

Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, levels of management, organizational culture.

UNIT - III: PROJECT MANAGEMENT (9 periods)

Project initiation, Problem in organization, Determining feasibilities, ascertaining hardware and software needs, identifying, forecasting, comparing costs and benefits, activity planning and control, managing the project.

UNIT - IV: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (9 periods)

Object oriented analysis and design - Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT - V: DESIGNING EFFECTIVE OUTPUT (9 periods)

Output design objectives, relating output content to output method, realizing how output bias affects users, designing output for display, Case studies- Designing a web site management, online exam management.

Total Periods: 45

TEXT BOOK:

1. Kenneth E. Kendall and Julie E.Kendall, *System analysis and Design,* Pearson Education , India, 8th Edition, 2011.

REFERENCE BOOKS:

1. Dennis, Wixom, and Roth, *Systems Analysis and Design,* John Wiley, 5th Edition, 2012.
2. Shelly and Rosenblatt, *Systems Analysis and Design,* Cengage Learning, 9th Edition, 2012.

IV B. Tech. – I Semester

14BT71005: **MICROELECTROMECHANICAL SYSTEMS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Basic knowledge in Physics.

COURSE DESCRIPTION: Overview of Micro Electro Mechanical Systems (MEMS), scaling laws, working principles of microsensors and microactuators, materials, microfabrication processes, packaging of Microsystems.

COURSE OUTCOMES: After completion of the course the student is able to

CO1. Demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators.

CO2. Identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.

Detailed Syllabus:

UNIT - I: OVERVIEW OF MEMS AND SCALING LAWS (9 periods)

Introduction, MEMS and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.

Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid- body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT - II: **WORKING PRINCIPLES OF MICROSYSTEMS (9 periods)**

Microsensors, acoustic wave sensors, biomedical and biosensors, chemical sensors, pressure sensors, thermal sensors. Microactuation: actuation using thermal forces, shape-memory alloys, piezoelectric crystals, electrostatic forces. MEMS with microactuators, microgrippers, micromotors, microvalves, micropumps. Microaccelerometers, microfludics.

UNIT - III: MATERIALS FOR MEMS AND MICROSYSTEMS (9 periods)

Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

UNIT - IV: MEMS FABRICATION PROCESS AND MICROMANUFACTURING (9 periods)

Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.

UNIT - V: MEMS PACKAGING (9 periods)

Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging.

Total Periods: 45

TEXT BOOK:

1. Tai-Ran Hsu, *MEMS & Microsystems, Design and Manufacture*, McGraw - Hill Education (India) Pvt. Ltd., 2002.

REFERENCES BOOKS:

1. G.K.Ananthasuresh, K.J.Vinoy, *Micro and Smart Systems*, Wiley India, 2010.
2. Nitaigour Premchand Mahalik, *MEMS*, McGraw - Hill Education (India) Pvt. Ltd., 2013.

IV B.Tech. – I Semester
14BT61205: **BIO INFORMATICS**
(Open Elective)
(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION: Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.
CO2. Analyze biological database management system.

CO3. Create, select and apply appropriate techniques and tools to manage the biological data.

Detailed Syllabus:

UNIT-I: INTRODUCTION TO BIOINFORMATICS (8 periods)

Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

UNIT-II: BIOLOGY AND INFORMATION (7 periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT-III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 periods)

Heuristic alignment algorithms, global sequence alignments- Needleman-Wunsch algorithm, local sequence alignments- smith-waterman algorithm, amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.

UNIT - IV: PRIMARY DATABASES AND THEIR USE (11 periods)

Introduction to biological databases- organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT - V: SECONDARY DATABASES (9 periods)

Introduction to secondary databases- organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-organization and Management of databases, KEGG, ExPASy, BRENDA.

Total Periods: 45

TEXT BOOK:

1. David W. Mount, *Bioinformatics: Sequence and Genome Analysis,* CSHL Press, 2nd Edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, *Bioinformatics Basics, Applications in Biological Science and Medicine,* CRC Press, Taylor & Francis Group, 2nd Edition, 2005.
2. Rastogi S. C., Namita Mendiratta, Parag Rastogi, *Bioinformatics: Methods and Applications: Genomics, Proteomics and Drug Discovery,* PHI Learning Pvt. Ltd., 3rd Edition, 2011.

IV B.Tech. – I Semester

14BT61206: **CYBER SECURITY AND LAWS (Open Elective)**

(Common to ECE, EEE, EIE & CE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION: Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in Cyber security, Cyber crimes and its related laws in Indian and Global Act.

CO2. Analyze the legal perspectives and laws related to cyber crimes in Indian context.

CO3. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO CYBER CRIMES (9 periods)

Introduction, Definition, Origin, Cyber Crime and Information Security, Cyber Criminals, Classifications of Cyber Crimes, The Legal Perspectives and Indian Perspective, Cyber Crime and Indian ITA 2000, Global Perspective on Cyber Crimes.

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Café and Crimes, Botnets.

UNIT - II: TOOLS AND METHODS USED IN CYBER CRIME (9 periods)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT - III: CYBER CRIMES AND CYBER SECURITY-LEGAL PERSPECTIVES (8 periods)

Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT - IV: CYBER SECURITY - ORGANIZATIONAL IMPLICATIONS (10 periods)

Introduction, Cost of Cyber Crimes and IPR issues, Web Threats for Organizations – Evils and Perils, Security and Privacy Implications from Cloud Computing, Social Media Marketing-Security Risks and Perils for Organizations, Social Computing and Associated Challenges for Organizations, Protecting People's Privacy in Organization, Organizational Guidelines for Internet Usage, Safe Computing and Usage Policy, Incident Handling and Best Practices, Media and Asset Protection.

UNIT - V: CYBER TERRORISM AND INFORMATION WARFARE (9 Periods)

Introduction, Intellectual Property in the Cyber Space, the Ethical Dimension of Cyber Crimes, the Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.

Cyber Crime Illustrations: Indian Banks lose Millions of Rupees, Justice vs. Justice, Parliament Attack, The Indian case of online Gambling, Bank and Credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam.

Total Periods: 45

TEXT BOOK:

1. Nina Gobole, Sunit Belapure, *Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives***,** Wiley India, 2011.

REFERENCE BOOKS:

1. Ferrara et al., *Cyber Law: Text and Cases,* Cengage Learning, 3rd edition, 2012.
2. Vivek Sood, *Cyber Law Simplified***,** Tata McGraw-Hill, 2012.
3. Prashant Mali, *Cyber Law and Cyber Crimes,*Snow White Publications Pvt. Ltd., 2013.

IV B Tech. - I Semester
14BT71004: **COMPUTER CONTROL OF PROCESSES**
(PROFESSIONAL ELECTIVE - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Control Systems, Signals and systems, Process Control Instrumentation.

COURSE DESCRIPTION: Analysis of discrete state variable system identification techniques; direct discrete design techniques; advanced control strategies used in industries; Adaptive Control.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on the basics of Z - Transform and modified Z - Transform of Sampled Data system, System identification, advanced control strategies used in Industries;Adaptive Control.

CO2. Develop skills in Design of Digital Control systems, Design of controller using various algorithms.

Detailed Syllabus:

UNIT - I: DISCRETE STATE-VARIABLE TECHNIQUE (9 Periods)

State equation of discrete data system with sample and hold, State transition equation, Methods Of computing the state transition matrix, Decomposition of discrete data transfer functions, State Diagrams of discrete data systems, System with zero-order hold, Controllability and observability of linear time invariant discrete data system, Stability tests of discrete-data system, State Observer - State Feedback Control.

UNIT - II: SYSTEM IDENTIFICATION (9 Periods)

System Theory, Mathematical models, Model properties, Structural model representation, System identification procedure. System response methods: Impulse Response, Step response, Sine wave Response.

UNIT - III: DESIGN OF CONTROLLERS (9 Periods)

Computer control loop, Modified Z – Transform, First order system with time delay, Converting continuous time controller to discrete time domain, Design of controllers based on discrete time model – Deadbeat and Dahlin's algorithms. Design of Feed Forward Controller: Block Diagram, Feed Forward control algorithms –dynamic, static, Deadbeat.

UNIT - IV: ADVANCED PROCESS CONTROL STRATEGIES (9 Periods)

Cascade Control- Dynamic response, Types, Implementation, Predictive Control – Model based and Multivariable System, Statistical Process Control. Algorithms for Processes with Dead Time – Smith Predictor (SP), Analytical Predictor (AP).

UNIT - V: ADAPTIVE CONTROL (9 Periods)

Self-Tuning Regulators, Adaptive Control Adjustment, Indirect Adaptive Control, Direct Adaptive Control, Model Reference Adaptive Control, Relationship between MRAC and STR, Inertial Control with examples.

Total Periods: 45

TEXT BOOKS:

1. Gopal, M., *Digital Control and State Variable Methods*, Tata McGraw Hill, 2003.
2. S.K.Singh, *Computer Aided Process Control*, PHI, 2009.

REFERENCE BOOKS:

1. M.Chidambaram, *Computer Control of Processes*, Narosa Publications, 2nd Edition, 2003.
2. Karel J. Keesman, *System Identification: An Introduction*, Springer, 2011.

IV B. Tech. - I Semester

14BT70205: **SOFT COMPUTING TECHNIQUES**

(PROFESSIONAL ELECTIVE - II)

(Common to EEE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

COURSE DESCRIPTION: Architectures of artificial neural networks: feed forward and feedback networks, Learning strategies: Supervised; Un-supervised and reinforced; Fuzzy set theory; Fuzzy systems design; applications of neural networks and fuzzy systems, Terminologies and Operators of Genetic Algorithm; Encoding; Selection; Crossover; Mutation; Replacement.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate the knowledge on learning strategies of an artificial neural network, components of fuzzy logic system and operators of genetic algorithm.

CO2. Design fuzzy systems, neural networks and genetic algorithm for real time problems.

CO3. Exhibit problem solving skills in fuzzy set theory and learning methods of neural networks.

CO4. Apply various configurations of neural networks, fuzzy systems and genetic algorithm to different engineering applications.

Detailed Syllabus:

UNIT – I: FUNDAMENTALS OF ARTIFICIAL NEURAL NETWORKS (10 periods)

Neural networks-introduction, artificial neural network, advantages, biological neural network, architectures of artificial neural networks- activation functions, important terminologies of ANN, Mcculloch-pitts neuron model, learning strategies-supervised, un supervised, reinforced, learning rules- Hebbian learning rule, perceptron learning rule, delta learning rule, widrow-hoff learning rule, correlation learning rule, winner–take-all learning rule, out star learning rule, concept of linear separability with AND & XOR examples.

UNIT – II: SUPERVISED, UN SUPERVISED NETWORKS & ASSOCIATIVE MEMORIES (10 periods)

Supervised networks: back propagation neural network-architecture, training algorithm, learning factors-initial weights, steepness of the activation function, leaning constant, momentum method and necessary number of hidden neurons.Un-supervised networks: Kohonen self-organizing map- competitive process, cooperation process, adaptive process, training algorithm. Counter propagation Networks- full counter propagation network-architecture, training algorithm.

Associative memories: concepts, Bidirectional Associative Memory (BAM)-architecture, discrete BAM-testing algorithm, analysis of hamming distance, energy function and storage capacity. Discrete Hopfield network - architecture and training algorithm. Applications of artificial neural networks - short term electrical load forecasting, process identification.

UNIT – III: CLASSICAL AND FUZZY SETS (10 periods)

Introduction- classical sets - operations, properties. Fuzzy sets - operations, properties. Crisp relations - cardinality, operations, properties, cartesian product, composition. Fuzzy relations - cardinality, operations, properties, fuzzy cartesian product, composition. Linguistic hedges, membership functions - features, methods of membership value assignments – intuition, inference, rank ordering, neural networks, inductive reasoning.

UNIT – IV: FUZZY LOGIC SYSTEMS (9 periods)

Defuzzification: lamda - cuts for fuzzy sets and fuzzy relations, defuzzification methods-max membership principle, weighted average, centroid, center of sums. Fuzzy rule base - formation of rules, decomposition of rules, aggregation of rules, design procedure. Applications of fuzzy logic - speed control of a dc motor, air conditioner control.

UNIT – V: GENETIC ALGORITHM (7 periods)

Introduction to evolutionary computing – GA, biological back ground of GA, terminologies and operators of GA – search space, individuals, genes, fitness function, population, encoding – binary encoding, breading, selection – roulette wheel, rank selection, tournament, crossover – single point and two point crossovers, mutation – flipping, interchanging, reversing. Probabilities of cross over & mutation. Replacement – random, weak parent replacement. Termination criteria, flow chart, advantages, limitations and applications. **Total Periods: 45**

TEXT BOOKS:

1. S.N. Sivanandam, S.N. Deepa, *Principles of Soft computing*, Wiley India private Ltd., 2nd edition, 2013.
2. Timothy J Ross, *Fuzzy Logic with Engineering Application*, McGraw Hill Inc.1997.

REFERENCE BOOKS:

1. Jacek M. Zurada, *Introduction to Artificial Neural Networks*, Jaico Publishing House.
2. Simon Haykin, *Neural Networks – A Comprehensive Foundation*, Prentice-Hall Inc, 1999.

IV B. Tech. - I Semester
14BT60403: **VLSI DESIGN**
(PROFESSIONAL ELECTIVE - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Switching Theory and Logic Design, Digital ICs and their Applications.

COURSE DESCRIPTION: Introduction to the design and implementation of VLSI circuits for complex digital systems; CMOS technology; submicron design; clocking; subsystem design; CAD tools and algorithms; simulation; verification; testing and design methodology.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in
- Understanding the Fabrication of MOS Transistors.
- Electrical properties of CMOS and BiCMOS Circuits
- Designing Static Combinational and Sequential logic at transistor level, including mask layout.
- Estimating and optimizing combinational RC Circuit delay using RC delay models and logical effort.
- Design methodology and tools.
- Testing the chip at various abstraction levels.

CO2. Perform analysis of Circuit Characterization and Performance Estimation of CMOS device and Create models of moderately sized CMOS circuits that realize specified digital functions.

CO3. Formulate and solve technology specific problems in developing an IC circuit using EDA tools.

CO4. Use modern design tools to IC devices to create system on - chip (SOC) designs in FPGAs.

Detailed Syllabus:

UNIT –I: REVIEW OF MICROELECTRONICS AND INTRODUCTION TO MOS TECHNOLOGIES (9 Periods)

Basic MOS Transistor, CMOS, BiCMOS Technology, Fabrication of NMOS & CMOS. Basic Electrical Properties of MOS & BiCMOS Circuits: Ids – Vds relationships, Threshold Voltage VT, gm, and ω0, Pass Transistor, nMOS inverter, Determination of pull up to pull down ratio for an NMOS inverter, CMOS & BiCMOS Inverters, Latch-up in CMOS circuits.

UNIT – II: MOS AND BICMOS CIRCUIT DESIGN PROCESS (12 Periods)

VLSI design flow, Transmission gate & alternate CMOS logic structures, MOS layers, stick diagrams: n-MOS design style, CMOS design style, design rules and layouts, General observations on Design rules, Symbolic Diagrams, Layout diagrams for inverters, NAND & NOR. Sheet resistance applied to MOS, capacitances of layers, Delay unit, Inverter delays, Driving Large capacitive loads, Wiring capacitances, Scaling models and scaling factors, limitation of scaling.

UNIT - III: SUBSYSTEM DESIGN (9 Periods)

Adders – Transmission based Adder, Carry look ahead, Manchester Carry Chain, Carry Skip Adder, Carry Select Adder, Shifters - Barrel Shifter, Logarithmic Shifter, Multipliers – Array Multiplier, Carry Save multiplier, Booth Multiplier, ALUs, Parity generators, Comparators, Linear feedback shift register.

UNIT - IV: SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN (8 Periods)

Memory Elements – General memory array architecture, 6-transistor SRAM cell, Memory Read/Write, DRAM cell, Content Addressable memory. Design Strategies, Programming of PALs, Programmable Interconnect, CPLD, FPGA, Cell Based Design methodology

UNIT - V: VERIFICATION & TESTING (8 Periods)

HDL Synthesis, Layout Synthesis, Design capture tools, Design Verification Tools. Introduction, Testers Test Fixtures & Test programs, Logic verification principles, Manufacturing Test Principles, Design for Testability, Boundary Scan. **Total Periods: 45**

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, *Essentials of VLSI Circuits and Systems,* PHI, 2005.
2. Neil H. E. Weste, David Harris, Ayan Banerjee, CMOS VLSI Design, Pearson Education, 3rd Edition, 2006.

REFERENCE BOOKS:

1. John M. Rabaey, *Digital Integrated Circuits: A Design Perspective*, PHI, 2nd Edition, 1997.
2. John. P. Uyemura*, Introduction to VLSI Circuits and Systems,* John Wiley, 2003.
3. Eugene D. Fabricius, *Introduction to Very Large Scale Integration Design,* Paperback, McGraw - Hill Education (ISE Editions), August 1990.
4. Stephen Brown, Zvonko Vranesic, *Fundamentals of Digital Logic with Verilog Design*, TMH 2007.
5. Weste and EShraghian, *Principles of CMOS VLSI Design,* Pearson Education, 2nd Edition, 1998.

IV B. Tech. – I Semester
14BT51201: **COMPUTER NETWORKS**
(PROFESSIONAL ELECTIVE - II)
(Common to ECE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil.

COURSE DESCRIPTION: Introduction to Computer Networks; The Physical Layer; The Data Link Layer; The Medium Access Sub layer; The Network Layer; The Transport Layer; The Application Layer; Network Security.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on
- Concepts of computer networks.
- Functionality of reference models layers.
- 3G Mobile Phone Networks, 802.11.

CO2. Analyze the issues in data link layer by using error detection and correction techniques, medium access sub layer by channel allocation schemes and transport layer by connection management schemes.

CO3. Acquire problem solving skills to assess the routing of the packet by selecting the appropriate routing algorithms.

Detailed Syllabus:

UNIT - I: INTRODUCTION AND PHYSICAL LAYER (9 periods)

Uses of Computer Networks, Network Hardware, Network Software, Reference Models: OSI, TCP/IP, Example Networks: Internet, 3G Mobile Phone Networks, 802.11. Guided Transmission Media, Wireless Transmission.

UNIT - II: DATA LINK LAYER AND MEDIUM ACCESS SUBLAYER (10 periods)

Data Link Layer Design Issues, Error detection and correction-CRC, Hamming codes, Elementary Data Link Protocols, Sliding Window Protocols. Channel Allocation problem, Multiple Access protocols: ALOHA, CSMA, CSMA / CD protocols, Collision free protocol, Limited contention protocol, Ethernet, DLL Switching.

UNIT - III: NETWORK LAYER (10 periods)

Network Layer Design Issues, Routing Algorithms: Shortest path, Flooding, Distance vector, Hierarchical, Broadcast, Multicast and Any cast, Congestion Control Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet.

UNIT - IV: TRANSPORT LAYER (8 periods)

Transport Service, Elements of transport protocol, Internet Transport layer protocols: UDP, TCP; UDP – Introduction, Remote Procedure Call, Real-Time Transport Protocol TCP - Introduction, Service Model, Protocol, Segment Header, Connection Establishment, Connection Release, Connection Management Modeling, Sliding Window, Timer Management, Congestion Control, The Future of TCP.

UNIT - V: APPLICATION LAYER AND NETWORK SECURITY (8 periods)

Domain name system (DNS), Electronic Mail, World Wide Web: Architectural Overview, Dynamic Web Document, HTTP. Introduction to Network Security: Cryptography - Substitution Techniques, Transposition Techniques, One-Time Pads.

Total Periods: 45

TEXT BOOK:

1. Andrew S. Tanenbaum and David J. Wetherall, *Computer Net works,* Pearson Education, 5th Edition, 2012.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *Data communication and Networking***,** Tata McGraw-Hill, 4th Edition, 2006.
2. James F. Kurose and Keith W. Ross, *Computer Networking A Top Down Approach Featuring the Internet***,** Pearson Education, 2nd Edition, 2003.

IV - B.Tech. - I Semester

14BT71021: **ANALYTICAL & BIOMEDICAL INSTRUMENTATION LAB**

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: Analytical Instrumentation, Biomedical Instrumentation.

COURSE DESCRIPTION: Measurements of parameters: calorific value, blood pressure, respiration rate and heart sounds;characteristics of spectrometer; gas chromatography, and flame photometer.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. To measurements of heart sounds, respiration rate, pH Value and calorific value.

CO2. Analyze the performance spectrometers, flame photometer, gas chromatography and Geiger Muller counter.

LIST OF EXPERIMENTS:

Minimum 11 experiments to be conducted.

1. Measurement of pH value of a given sample using pH meter.
2. Measure the absorbance, transmittance and concentration of the sample using UV-VIS Spectrometer.
3. Measure the concentration of a sample using Flame Photometer.
4. Characteristics of Geiger Muller Counter.
5. Compound analysis of a sample using Gas/Liquid chromatography.
6. Measurement of dissolved oxygen.
7. Blood pressure measurement using sphygmomanometer.
8. Analysis of ECG for different lead configuration.
9. Analysis of EEG Signals.
10. Design of an Instrumentation Amplifier for bioelectrical Signals.
11. Measurement of Respiration rate.
12. Measurement of heart sound.
13. Measure the conduction velocity in muscle fiber.

IV - B. Tech. - I Semester
14BT71022: **INDUSTRIAL AUTOMATION LAB**

Int.Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: Process Control Instrumentation, Logical and Distributed Control Systems.

COURSE DESCRIPTION: Automatic control of motors; liquid level; temperature; pressure; processes using PLC based control systems and SCADA systems. P&I diagram of Feedback Control system and Cascade control system; Ratio control system; Drum type Boiler with only measurement points.

COURSE OUTCOMES: After successful completion of the course the student will be able to

CO1. Identify and analyze the problems of various real time processes in Automation Industries.

CO2. Design and develop solutions for various real time processes in Automation Industries.

CO3. Use modern technologies to Analyze and synthesize the information to provide effective solutions for real time problems.

LIST OF EXPERIMENTS: Minimum 11 experiments to be conducted

P&I DRAWINGS USING CAD

1. Study of various symbols and abbreviations used in P&ID diagram
2. Draw the P&I diagram of Feedback Control System and Cascade Control System.
3. Draw the P&I diagram of Feed forward Control system and Ratio Control System.
4. Draw the P&I diagram of Feedback and Cascade Control System for Evaporators.
5. Draw the P&I diagram of a Drum type Boiler with only measurement points.

PLC

1. Implementation of Ladder Diagrams for Logic gates, timer and counters.
2. Programming a PLC to demonstrate control of a level Process.
3. Programming a PLC to demonstrate control of Pressure.
4. Programming a PLC to demonstrate DC Motor speed control.
5. Programming a PLC to demonstrate Bottle filling system.
6. Programming a PLC to demonstrate Temperature control.
7. Implementation of PLC programming through SCADA.
8. Programming a PLC to demonstrate control of flow process trough SCADA.

IV B. Tech. - I Semester
14BT71023: **SEMINAR**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	50	50	-	-	-	2

PRE-REQUISITES: All the courses of the program up to IV B. Tech. – I Semester.

COURSE DESCRIPTION: Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of thesis and presentation.

COURSE OUTCOMES: After completion of the seminar work the student will be able to

CO1. Demonstrate in-depth knowledge on the seminar topic.

CO2. Analyze critically, chosen seminar topic for substantiated conclusions.

CO3. Undertake investigation of issues related to seminar topic providing valid conclusions.

CO4. Function effectively as individual on the chosen seminar topic.

CO5. Develop communication skills, both oral and written for preparing and presenting seminar report.

CO6. Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

IV - B. Tech. - II Semester
14BT81001: **FIBER OPTICS & LASER INSTRUMENTATION**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Physics, Industrial Instrumentation – I & II.

COURSE DESCRIPTION: Optical fiber, components of optical fiber, fiber optic Sensors, Industrial and medical applications of laser.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate about
- · Types of optical fiber, components of optical fiber.
- · Measurement of temperature, pressure, strain using fiber optic sensors.
- · Operation of laser, Industrial and biomedical applications of laser.
- · Holography and optoelectronic modulators.

CO2. Analyse the optical parameters and characteristics.

Detailed Syllabus:

UNIT - I: FIBER OPTICS (9 periods)

Introduction to optical fibers, Laws of reflection, critical angle, Light guidance, Numerical aperture, Dispersion, Losses, Different types of fibers, Modes of operation and their transmission characteristics.

Components of Optical Fiber: Light Sources for fiber optics, Photo detectors, source coupling, Fiber termination, Splicing and connectors.

UNIT - II: FIBER OPTIC INSTRUMENTATION (9 periods)

Fiber optic instrumentation system, Interferometer method of measurement of length, Measurement of pressure, Temperature, Current, Voltage, Liquid level and strain, fiber optic Gyroscope, Polarization maintaining fibers, Applications.

UNIT - III: FUNDAMENTALS OF LASER (9 periods)

Fundamental characteristics of lasers, Three level and four level lasers, Properties of laser, Laser modes, Resonator configuration, Q-switching and mode locking, Types of lasers: Gas lasers, solid lasers, liquid lasers, semiconductor lasers.

UNIT - IV: INDUSTRIAL AND MEDICAL APPLICATIONS OF LASER (9 periods)

Industrial Applications: Industrial applications of lasers, Laser heating Material processing, laser welding, melting and trimming of material, Laser Doppler velocity meter.

Medical applications: LASER's in medicine, Interaction with tissues, Interaction with bio molecules, laser endoscope.

UNIT - V: HOLOGRAPHY AND OPTOELECTRONIC MODULATORS (9 periods)

Holography: Principle, Methods, Holographic Interferometers, Different types of holographic techniques, Acoustical holography, Character recognition by holography, 3 - D Cinematography with holographic screen.

Optoelectronic Modulators: Electro-optic, Magneto-optic and Acousto-optic Modulators.

Total Periods: 45

TEXT BOOKS:

1. Ghatak A.K. and Thyagarajan K., O*ptical Electronics*, Foundation Books, 1991.
2. Arumugam.M**,** *Optical Fibre Communication and Sensors***,** Anuradha agencies,2008**.**

REFERENCE BOOKS:

1. Das P., *Lasers and Optical Engineering*, Springers International Students Edition, 1991.
2. Thyagarajan K. and Ghatak A.K., *Lasers: Theory and Applications*, Plenum Press, 1981.
3. Gerd Keiser, *Optical Fiber Communication*, TMH, 3rd Edition, 2000.

IV B. Tech. - II Semester

14BT70402: **EMBEDDED SYSTEMS**

(Common to EEE and EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Microprocessors and Microcontrollers.

COURSE DESCRIPTION: Introduction to Embedded System; State Machines and Concurrent Process Models; Various Communication interfacing Models; RTOS Concepts; Target Architectures.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on Communication Interfacing Models, Processor Technology, State Machines, Kernel Objects, ARM and SHARC Controllers.
CO2. Analyze Various problems in Optimization of Single Purpose Processor, Synchronization among the Processes, Clock Driven and Event Driven Scheduling and Debugging Techniques.
CO3. Design and develop embedded system to suit a particular Application.
CO4. Choose suitable Hardware and software components of a system that Work together to solve engineering problems to exhibit a specific behavior.

Detailed Syllabus:

UNIT - I: INTRODUCTION (12 periods)

Embedded systems overview, classification, applications, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors, Basic architecture, operation, Pipelining, Programmer's view, development environment.

UNIT - II: STATE MACHINE AND CONCURRENT PROCESS MODELS (8 periods)

Introduction, models versus languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model.

UNIT - III: COMMUNICATION INTERFACE (7 periods)

Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Fire wire, Ethernet, I^2C bus and CAN.

UNIT - IV: RTOS CONCEPTS (10 periods)

Concepts 1: Architecture of the Kernel, Tasks and Task scheduler, Types of real - time tasks, Task periodicity, Task scheduling, Classification of scheduling algorithms, Clock driven Scheduling, Event driven Scheduling, resource sharing, Commercial RTOs.

Concepts 2: Interrupt service routines, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem.

UNIT - V :TARGET ARCHITECUTERS (8 periods)

Host and target machines, linkers, loading software into target machine, debugging techniques,ARM microcontroller, ARM pipeline, Instruction set architecture, THUMB instructions, Exceptions in ARM, salient features of SHARC microcontroller and comparison with ARM microcontroller.

Total Periods: 45

TEXT BOOKS:

1. Frank Vahid, Tony D. Givargis, *Embedded System Design – A Unified Hardware/Software Introduction,* John Wiley, 2002.
2. KVKK Prasad, *Embedded/Real Time Systems,* Dramatic Press, 2005.

REFERENCE BOOKS:

1. Raj Kamal, *Embedded System Architectures Programming & Design*, Tata MC Graw-Hill Publishing, 2003.
2. David E.Simons, *An Embedded Software Premier*, Pearson Education, 2004.

IV B. Tech. – II Semester
14BT81002: **POWER PLANT INSTRUMENTATION**
(PROFESSIONAL ELECTIVE - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Industrial Instrumentation-I & II.

COURSE DESCRIPTION: Different methods of power generation; Instrumentation and control in water and air - fuel circuit; Turbine monitoring and control; power plant management.

COURSE OUTCOMES: After completion of the course the student will be able to
CO1. Demonstrate knowledge about
· Different methods of power generation.
· Instrumentation and control in water and air - fuel circuit.
· Turbine monitoring and Control.
· Power plant management.
CO2. Identify and formulate suitable control scheme for different control loops in power generation.

Detailed Syllabus:

UNIT - I: AN OVERVIEW OF POWER GENERATION (9 periods)
Methods of power generation: Hydro, Nuclear, Solar, Wind, Thermal, Tidal, Geothermal, classification of instruments in a power plant, objectives of instrumentation and control; Cogeneration.

UNIT - II: INSTRUMENTATION IN WATER CIRCUIT AND AIR-FUEL CIRCUIT (9 periods)
Measurements in water circuit: water circuit, water flow measurement, differential pressure transmitter, steam flow measurement, water and steam pressure measurements, water and steam temperature measurements, Drum water level measurement.
Measurements in Air-fuel circuit: Air-fuel circuit: fuels, combustion air, flue gases, waste gases, measurement of flow/Quantity, measurements of pressure, measurement of temperature, measurement of level.
UNIT – III: CONTROLS IN WATER CIRCUIT AND AIR-FUEL CIRCUIT (9 periods)
Controls in water circuit: Boiler drum level: single element drum level control, two element drum level control, three element drum level control; superheated steam temperature control: waterside steam temperature control, cascade steam temperature control, feed forward-plus-feedback steam temperature control, fire side steam temperature control, steam pressure control.
Controls in Air-fuel circuit: Combustion control, furnace draft control.
UNIT - IV: TURBINE MONITORING AND CONTROL (9 periods)
Principal parts of steam turbine, turbine measurements: process parameters, mechanical parameters, electrical parameters; turbine control system: safety control systems, process control systems, Lubrication system, controls in lubrication system, turbo alternator cooling system
UNIT - V: POWER PLANT MANAGEMENT (9 periods)
Maintenance of measuring instruments: types of maintenance, maintenance costs, life cycle costs; Intrinsic and electrical safety: Intrinsic safety of instruments, electrical safety, explosion hazards and intrinsic safety; Interlocks for boiler operation: safety interlocks, start- up and shut down interlocks.
Total Periods: 45

TEXT BOOK:

1. Krishnaswamy & Ponni Bala, *Power Plant Instrumentation*, PHI, 2010.

REFERENCE BOOKS:

1. Patranabis, *Principles of Industrial Instrumentation*, Mcgraw - Hill, 2nd Edition.
2. A.R.Mallick, *Practical boiler operation engineering and power plant,* Denett & Co., 2nd Edition, 2010.

IV B.Tech. - II Semester
14BT81003: **TELEMETRY AND TELECONTROL**
(PROFESSIONAL ELECTIVE - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Principles of communication.

COURSE DESCRIPTION: Different Telemetry Principles; Frequency and Time-division Multiplexed Systems; Satellite Telemetry; Optical Telemetry and Telecontrol Methods.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on different Telemetry Principles, Satellite Telemetry and Optical Telemetry.
CO2. Analyze and solve errors during transmission.
CO3. Design transmitter and receiver circuits for data transmission.
CO4. Apply appropriate telemetry principles for data transmission in real time.

Detailed Syllabus:

UNIT – I: TELEMETRY FUNDAMENTALS AND CLASSIFICATION (10 periods)

Fundamental concepts, Significance, Principle, functional blocks of Telemetry and Telecontrol system; Methods of telemetry: Electrical, Pneumatic, Hydraulic and Optical Telemetry; State of the art; Telemetry standards.

UNIT – II: LANDLINE TELEMETRY (7 periods)

Electrical Telemetry: Current Systems, Voltage Systems; Synchro Systems; Frequency systems, Position and Pulse systems; Example of a landline telemetry system.

UNIT – III: BIO TELEMETRY (9 periods)

Introduction to Biotelemetry: Physiological parameters adaptable to Biotelemetry, Components of Biotelemetry Systems, Implantable Units, Applications of Telemetry in Patient Care.

UNIT – IV: OPTICAL TELEMETRY (9 periods)

Optical fibers for signal transmission: Sources for fiber optic transmission, optical detectors, trends in fiber optic device development, Example of an optical telemetry system.

UNIT – V: TELECONTROL METHODS (10 periods)

Analog and Digital techniques in telecontrol: telecontrol apparatus, Remote adjustment, Guidance and regulation; Telecontrol using information theory, Example of a telecontrol system.

Total Periods: 45

TEXTBOOKS:

1. D. Patranabis, *Telemetry Principles,* TMH.
2. Swoboda G., *Telecontrol Methods and Applications of Telemetry and Remote Control*, Reinhold Publishing Corp., London, 1991.

REFERENCE BOOK:

1. Leslie Cromwell, Fred. J. Weibell and Erich. A. Pfeiffer, *Biomedical Instrumentation and Measurements*, PHI, 2nd Edition, 2003.

IV B. Tech. – II Semester

14BT80431: **DSP PROCESSORS AND ARCHITECTURES**

(PROFESSIONAL ELECTIVE - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Digital Signal Processing.

COURSE DESCRIPTION: Programmable DSPs; Architectures for Programmable DSP Devices; Computational Accuracy in DSP Implementations; Implementations of basic DSP algorithms; Interfacing memory and I/O peripherals to programmable DSP devices; advancements in DSP System Design.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in
- · The programmable DSPs.
- · The Architectural features of programmable DSP devices.
- · The Computational Accuracy in DSP Implementations.
- · The concepts of Execution Control and Pipelining.

CO2. Analyze the architectures of the special purpose DSP Processors such TMS320C54xx,C5x,C6x, etc.

CO3. Design a system component or process as per needs & Specifications.

CO4. Identify, formulate & solve engineering problem.

Detailed Syllabus:

UNIT – I: INTRODUCTION TO DIGITAL SIGNAL PROCESSING (9 periods)

Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation, Analysis and Design tool for DSP Systems MATLAB, Digital signal-processing using MATLAB.

COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT – II: ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES (10 periods)

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

EXECUTION CONTROL AND PIPELINING: Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models.

UNIT – III: PROGRAMMABLE DIGITAL SIGNAL PROCESSORS (9 periods)

Commercial Digital signal - processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On - Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT – IV: IMPLEMENTATIONS OF BASIC DSP ALGORITHMS (9 periods)

The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

IMPLEMENTATION OF FFT ALGORITHMS: An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and Scaling, Bit-Reversed Index Generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the Signal Spectrum.

UNIT - V: INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES (8 periods)

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example. **Total Periods: 45**

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan, *Digital Signal Processing*, Thomson Publications, 2004.
2. Lapsley et al., *DSP Processor Fundamentals, Architectures & Features*, S. Chand & Co, 2000.

REFERENCE BOOKS:

1. B. Venkata Ramani and M.Bhaskar, *Digital Signal Processors, Architecture, Programming and Applications*, TMH, 2004.
2. Jonatham Stein, *Digital Signal Processing*, John Wiley, 2005.

IV B.Tech. - II Semester
14BT60405: **IMAGE PROCESSING**
(PROFESSIONAL ELECTIVE - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Digital Signal Processing.

COURSE DESCRIPTION: Fundamentals of image processing; Image transforms; Image enhancement techniques in spatial and frequency domains; Restoration techniques; Image segmentation techniques; Image compression techniques.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Gain knowledge in

- Image Fundamentals
- Image Enhancement & Restoration Techniques
- Image Segmentation & Compression Techniques
- Color image processing

CO2. Analyze different images using various processing techniques.

CO3. Develop various image processing algorithms to process the images in Real Time Applications.

CO4. Solve problems related to images for feasible and optimal solutions in the area of Image Processing.

Detailed Syllabus:

UNIT-I: IMAGE FUNDAMENTALS (10 periods)

Fundamental steps in Image Processing, Image sampling & quantization, some basic relationships between pixels, Arithmetic operations, Logical operations, Spatial operations.

IMAGE TRANSFORMS: 2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar-Transform, Slant Transform, Hotelling Transform.

UNIT - II: IMAGE ENHANCEMENT (11 periods)

Basic Intensity transformation functions, Histogram processing, Fundamentals of Spatial Filtering, Smoothing spatial filters, Sharpening spatial filters, Combining spatial Enhancement methods. Basics of filtering in frequency domain, Correspondence between filtering in the spatial and frequency domains, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters, Homomorphic filtering.

UNIT - III: IMAGE RESTORATION (7 periods)

Image degradation/Restoration model, Noise models, Restoration in the presence of Noise only-spatial filtering - mean, order- statistic and adaptive filters. Estimating the degradation function, Inverse filtering, Weiner filtering, Constrained least squares filtering.

UNIT - IV: IMAGE COMPRESSION (8 periods)

Classification of redundancy in Images, Image Compression models, Run length coding, Arithmetic coding, Dictionary based compression, bitplane coding, Transform based coding, Image compression standards.

UNIT - V: IMAGE SEGMENTATION AND COLOR IMAGE PROCESSING (9 periods)

Detection of discontinuities- Point, line and edge Detection. Thresholding- global thresholding, adaptive thresholding. Region based Segmentation. Color image fundamentals - RGB, HSI models, conversions, Pseudo Color Image Processing, Color transformations.

Total Periods: 45

TEXT BOOKS:

1. Rafael C. Gonzalez & Richard E. Woods, *Digital Image Processing*, Pearson Education, 3rd Edition, 2008.
2. Anil K. Jain, *Fundamentals of Digital Image processing*, Prentice Hall, 2007.

REFERENCE BOOKS:

1. William K. Pratt, *Digital Image Processing*, John Wiley and Sons, 3rd Edition, 2002.

IV B. Tech. - II Semester
14BT81004: **AIRCRAFT INSTRUMENTATION**
(PROFESSIONAL ELECTIVE - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Industrial Instrumentation - I & II.

COURSE DESCRIPTION: Aircraft instruments; air data instruments; gyroscopic instruments; engine instruments and electronic flight instrumentation system.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate Knowledge on aircraft instruments, air data instruments, gyroscope, engine instruments and electronic flight instrument system.

Detailled Syllabus:

UNIT - I: BASICS OF AIRCRAFT (9 Periods)

Control surfaces, forces, moments and angle of attack, engines, modern aircraft system, aircraft Instruments and their layout - aircraft display types: quantitative displays, display colour and markings, instrument grouping - glass cockpits of modern aircraft: attitude director indicator, electronic attitude director indicator, horizontal situation indicator.

UNIT - II: AIR DATA INSTRUMENTS (9 Periods)

Introduction to air data instruments, types of air data instruments: Pneumatic air data instruments, air data computer, international standard atmosphere - introduction to ISA, atmospheric variations with altitude, earth's atmosphere, air data instruments - combined pitot and static probe, separate static ports, location of combined probe and static ports,pneumatic - type air data instruments: pneumatic air speed indicator, temperature compensation, altimeter.

UNIT - III: GYROSCOPIC AND ADVANCED FLIGHT INSTRUMENTS (9 Periods)

Types of Gyro: conventional mechanical gyroscopes, vibrating gyros, ring laser gyroscope, fibre optic gyros, basic mechanical gyros and its properties,directional gyro, gyro horizon, turn and bank indicator: turn indicator, bank indicator, turn coordinator, standby attitude director indicator, gyro stabilized direction indicating system.

UNIT - IV: ENGINE INSTRUMENTS (9 Periods)

Engine speed measurement: Electricaltachogenerator indicator, Servo - type RPM indicators, non contact type tacho probe, optical tachometer, hall effect sensor, torque measurement: hydromechanical transducer, electronic torque meter, pressure measurement, engine fuel quantity indicator, fuel flow rate indicator: rotating – vane flow meter.

UNIT – V: ELECTRONIC FLIGHT INSTRUMENTATION SYSTEM (9 Periods)

Flight director system, attitude director indicator, horizontal situation indicator, mode selector panel/mode controller, annunciator display panel, active matrix liquid crystal display units.

Total Periods: 45

TEXT BOOK:

1. S.Nagabhushana and L.K.Sudha, *Aircraft Instrumentation and Systems,* I K International Pvt. Ltd., 2010.

REFERENCE BOOK:

1. Pallett, E.H.J, *Aircraft Instruments and Integrated Systems,* Pearson higher Education, 1992.

IV B.Tech. - II Semester
14BT81005: **AUTOMOTIVE INSTRUMENTATION**
(PROFESSIONAL ELECTIVE - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Sensors and Transducers, Industrial Instrumentation I & II.

COURSE DESCRIPTION: Basic automotive system: Power train control functions and applications, Chassis systems control functions and applications, Body systems control functions and applications; Combustion Engines: Internal combustion engines, external combustion engines; Sensors used in Power-train, Chassis, Body systems; Sensors for Vehicle convenience and Security Systems.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in varioussensors used for measurement of different physical quantities in automotive systems and Control functions.
CO2. Identify the suitable sensors for measurement of various parameters in automobile system.
CO3. Apply appropriate techniques for Power-train, Chassis and Body control system.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO AUTOMOTIVE SYSTEMS (6 periods)

Introduction to modern automotive systems and need for electronics in automobiles; Application areas of electronics in automobiles; Sensors classification (Major areas of systems application for automotive sensors): Power - train systems control functions and applications, Chassis systems control functions and applications, Body systems control functions and applications; List of sensors used in power - train systems, Chassis and Body systems of an automobile; Possibilities and challenges in the automotive industry.

UNIT - II: ENGINE CONTROL SYSTEM AND SENSORS (8 periods)

Combustion Engines: Types of combustion engines: internal combustion engines: 2-stroke and four stroke engines, external combustion engines; Speed and RPM sensors for crank and cam shaft position measurement: Inductive engine-speed sensors, incremental angle-of-rotation sensor, Hall Effect phase sensors; Vibration sensor: Piezoelectric knock sensor; Differential Gears mechanism.

UNIT - III: BRAKING, ELECTRONIC STABILITY AND STEERING CONTROL (9 periods)

Car braking system: Classification of car braking system, brake circuit configuration, braking system components, wheel brakes and drum brakes; basics of antilock braking systems; Pressure sensor: High pressure sensor for fuels and brake fluids; Steering system basics: Active steering; Steering wheel angle sensor (multi-turn).

UNIT - IV: SENSORS FOR POWER-TRAIN, CHASSIS AND BODY SYSTEMS APPLICATIONS (13 periods)

Pressure sensors: Thick film pressure sensor, Micro-mechanical pressure sensor; Flow (fuel) sensors: Hot wire air mass meter: HLM, HFM2, HFM5; Torque sensors: Strain measuring sensors, Angle-measuring sensors, Eddy current sensors; Exhaust temperature sensors; Gas sensors (Concentration probes): Air quality sensors (CO and NOx gases) Two-step lambda O2 sensor, LSF4 planar Lambda oxygen sensor; Acceleration sensors: Hall effect acceleration sensors, Micromechanical bulk silicon acceleration sensors, surface micromechanical acceleration sensors, piezoelectric acceleration sensor; Yaw sensors: Tuning-fork piezo yaw-rate sensors, piezo-electric oscillating drum type yaw-rate sensors, Micro -mechanical yaw - rate sensors; Position sensors: Magnetically inductive sensors: Eddy current, short circuit ring sensor, Hall effect sensors: Differential, digital and analog, Magneto-resistive angle sensor.

UNIT-V: PASSENGER SAFETY, COMFORT AND CONVENIENCE SYSTEMS (9 periods)

Air bag sensor; Power window; Seat belt pre - tensioner systems; Central locking system, Parking assistance system; Tire pressure monitoring systems; Remote keyless system; Engine immobilize system.

Total Periods: 45

TEXT BOOK:

1. Robert Bosch, *Safety, Comfort and Convenience Systems*, Bosch, 2005.

REFERENCE BOOKS:

1. Ernest O.Doebelin, *Measurement systems – Application and Design*, McGraw - Hill, 4th Edition, 2000.
2. Tai-Ran Hsu, *MEMS & Microsystems, Design and Manufacture*, McGraw - Hill, 2002.

IV B.Tech. - II Semester

14BT81006: **INSTRUMENTATION IN PROCESS INDUSTRIES**

(PROFESSIONAL ELECTIVE - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Control Systems, Process Control Instrumentation.

COURSE DESCRIPTION: Description of the Process in Instrumentation in the Food Industry, Paper Industry, Pharmaceutical Industry, Iron and Steel Industry, Petrochemical Industry**.**

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge on the basics of measurement systems, Analyzers, Valves Feeders, Controllers, Displays and P& ID.

Detailed Syllabus:

UNIT-I: INSTRUMENTATION IN THE FOOD INDUSTRY (9 Periods)

Description of the Process, Measurement Hardware in the Food Industry, Analyzers in the Food Industry, Valves and Feeders in the Food Industry, Controllers and Displays in the Food Industry, Computer Applications in the Food Industry, Typical Control Systems in the Food Industry.

UNIT-II: INSTRUMENTATION IN THE PAPER INDUSTRY (9 Periods)

Description of the Process, Measurement Hardware in the Paper Industry, Analyzers in the Paper Industry, Valves and Feeders in the Paper Industry, Controllers and Displays in the Paper Industry, Computer Applications in the Paper Industry, Typical Control Systems in the Paper Industry.

UNIT-III: INSTRUMENTATION IN THE PHARMACEUTICAL INDUSTRY (9 Periods)

Description of the Process, Measurement Hardware in the Pharmaceutical Industry, Analyzers in the Pharmaceutical Industry, Valves in the Pharmaceutical Industry, Controllers in the Pharmaceutical Industry, Computer Applications in the Pharmaceutical Industry, and Typical Control Applications in the Pharmaceutical Industry.

UNIT - IV: INSTRUMENTATION IN THE IRON AND STEEL INDUSTRY (9 Periods)

Description of the Process, Measurement Hardware in the Iron and Steel Industry, Analyzers in the Iron and Steel Industry, Valves in the Iron and Steel Industry, Controllers in the Iron and Steel Industry, Computer Applications in the Iron and Steel Industry, Typical Control Applications in the Iron and Steel Industry.

UNIT-V: INSTRUMENTATION IN THE PETROCHEMICAL INDUSTRY (9 Periods)

Control of Chemical Reactors, Computer Control of Batch Reactors, Control of Distillation Towers, Optimizing Control of Distillation Columns, Control of Furnaces, Control of Dryers, Control of Compressors.

Total Periods: 45

TEXT BOOK:

1. Bela G. Liptak, *Instrumentation in Processing Industries*, Chilton Book Company, Canada, 1973.

REFERENCE BOOK:

1. Bela G.Liptak, *Instrument Engineers Handbook on Process Control*, Chilton Book Company, Canada, 3rd Edition, 1999.

IV B. Tech. – II Semester
14BT80302: **MECHATRONICS**
(PROFESSIONAL ELECTIVE - IV)
(Common to EIE and ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES*:* Engineering mathematics, Basics of Electrical and Electronic Engineering, Kinematics of Machines, Design of Machine Elements.

COURSE DESCRIPTION: Mechatronic system; Signal Conditioning; Actuating systems; sensors; Transducers; Linear Motion Guides; Electronic interface systems; Solenoids; PWM; DC Motor; Microcontroller; AD converter; DA converter; PLC; PMC.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Employ the knowledge of Mathematics, Electronics and Mechanical engineering to design a system or component with respect to Mechatronic specifications.
CO2. Analyze and interpret the performance of a Mechatronic component, a system, or a process with relevance to simulation techniques.
CO3. Provide system level design involving interfacing and actuation used in industries.
CO4. Independently plan and design and define a Mechatronic problem by utilizing relevant engineering principles and techniques.

Detailed Syllabus:

UNIT-I: SCOPE OF MECHATRONICS (8 Periods)

Definitions of Traditional and Mechatronics design; Mechatronics in manufacturing and production; Examples of Mechatronics systems; Fundamentals of electronics; and Data conversion devices.

UNIT-II: PRECISION MECHANICAL SYSTEMS (9 Periods)

Pneumatic and Hydraulic actuation system: Electro-pneumatic actuator; Electro-hydraulic actuator; timing belts; control valves; LVDT; linear motion guides; piezoelectric actuators.

Electro-mechanical drives: Electric motor; LVDT; DC motor; AC motor; DC brushless motor; DC servo motor; 4-Quadrant servo drives, and Pulse Width Modulation-Variable frequency drive.

UNIT - III: SIGNAL PROCESSING AND CONDITIONING (9 Periods)

Discrete Time signals: sequences; representation of signals on orthogonal basis; discrete systems; Z-transformation; frequency analysis; inverse systems; discrete Fourier transformations (DFT); frequency selective filters; ideal filter characteristics; low pass; high pass-bandpass and bandstop filters, and notch filters.

Electronic interface systems: sensors; transducers; solenoids; transistors; MOSFET isolation scheme; opto coupling; buffer ICs; protection schemes; circuit breakers; over current sensing; resettable fuses; thermal dissipation, and power supply.

UNIT - IV: MICROCONTROLLERS (9 Periods)

8051 Microcontroller; Microprocessor structures; DA interfacing; DA convertors; AD convertors, and applications.

UNIT - V: LOGIC AND MOTION CONTROLLERS (10 Periods)

Programmable Logic Controllers: Basic structure; ladder diagram; timers; internal relays and counters; shift registers; PLC selection, and applications.

Programmable Motion Controller: Introduction, system transfer function, Control system performance and tuning, Digital Controllers, proportional P, proportional PI, proportional integral derivative PID control modes, position, velocity, torque, velocity profiles, controlled velocity profiles and applications.

Total Periods: 45

TEXT BOOKS:

1. K.P.Ramachandran, *Mechatronics Integrated Mechanical Electronic Systems*, Wiley, 2008.
2. Devdas Shetty, Richard, *Mechatronic System Design*, Cengage learning, 2012.

REFERENCE BOOKS:

1. W. Bolton, *Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering*, Pearson, 3rd Edition, 2005.
2. N.P. Mahalik, *Mechatronics Principles Concepts and Applications*, McGraw Hill Education (India) Private Limited, 2012.
3. Dr. J.S. Chitode, *Digital Signal Processing*, Technical Publication, 2008.

IV B.Tech. - II Semester

14BT81021: **COMPREHENSIVE VIVA-VOCE**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	100	100	-	-	-	2

PRE-REQUISITES: All courses of the program.

COURSE DESCRIPTION: Assessment of all the courses of the program from view point of knowledge, skills, applications and attitude.

COURSE OUTCOMES: After completion of the course the student will be able to

CO1. Demonstrate knowledge in the program domain.

CO2. Exhibit professional etiquette suitable for career progression.

CO3. Present views cogently and precisely.

IV B. Tech. - II Semester
14BT81022: **PROJECT WORK**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
60	140	200	-	-	20	10

PRE-REQUISITES: All the courses of the program up to IV B. Tech. – I Semester.

COURSE DESCRIPTION: Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES: After completion of the project work the student will be able to

CO1. Demonstrate in-depth knowledge on the project topic.

CO2. Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.

CO3. Design solutions to the chosen project problem.

CO4. Undertake investigation of project problem to provide valid conclusions.

CO5. Use the appropriate techniques, resources and modern engineering tools necessary for project work.

CO6. Understand professional and ethical responsibilities while executing the project work.

CO7. Function effectively as individual and a member in the project team.

CO8. Develop communication skills, both oral and written for preparing and presenting project report.

CO9. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.

CO10. Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

CIVIL ENGINEERING
I Year B.Tech. (Yearly Pattern)

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT1HS01	Technical English	2	-	-	4	30	70	100
14BT1BS01	Engineering Physics	2	1	-	4	30	70	100
14BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
14BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
14BT10301	Engineering Mechanics	3	1	-	6	30	70	100
14BT1ES01	Programming in C and Data Structures	3	1	-	6	30	70	100
14BT1ES03	Computer-Aided Engineering Drawing	-	1	3	3	25	50	75
14BT1BS05	Engineering Physics and Engineering Chemistry Lab.	-	-	3	3	25	50	75
14BT1ES04	Programming in C and Data Structures Lab.	-	-	3	3	25	50	75
14BT1ES06	Engineering and IT Workshop	-	-	3	3	25	50	75
14BT1HS02	English Language Communication Skills Lab.	-	-	3	3	25	50	75
	TOTAL	15	6	15	45	305	670	975

II B.Tech I Semester

Course code	Course Name	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS01	Matrices & Numerical Methods	3	1	–	3	30	70	100
14BT30101	Engineering Geology	3	1	–	3	30	70	100
14BT30233	Basics of Electrical and Mechanical Technology	3	1	–	3	30	70	100
14BT30102	Mechanics of Solids	3	1	–	3	30	70	100
14BT30103	Building Materials and Concrete Technology	3	1	–	3	30	70	100
14BT30104	Fluid Mechanics–I	3	1	–	3	30	70	100
14BT30121	Engineering Geology Lab	–	–	3	2	25	50	75
14BT30122	Strength of Materials Lab	–	–	3	2	25	50	75
	Total:	**18**	**6**	**6**	**22**	**230**	**520**	**750**

II B.Tech II Semester

Course code	Course Name	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS03	Probability & Statistics	3	1	–	3	30	70	100
14BT4HS01	Environmental Sciences	3	1	–	3	30	70	100
14BT5HS01	Business Communication and Presentation Skills	3	1	–	3	30	70	100
14BT40101	Structural Analysis – I	3	1	–	3	30	70	100
14BT40102	Construction, Planning & Project Management	3	1	–	3	30	70	100
14BT40103	Surveying	3	1	–	3	30	70	100
14BT40104	Fluid Mechanics–II	3	1	–	3	30	70	100
14BT40121	Surveying Lab	–	–	3	2	25	50	75
14BT40122	Fluid Mechanics & Hydraulic Machinery Lab	–	–	3	2	25	50	75
	Total	**21**	**7**	**6**	**25**	**260**	**590**	**850**

III B.Tech I Semester

Course code	Course Name	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS02	Management Science	3	1	–	3	30	70	100
14BT4HS02	Professional Ethics	3	1	–	3	30	70	100
14BT50101	Structural Analysis – II	3	1	–	3	30	70	100
14BT50102	Reinforced Cement Concrete Structures – I	3	1	–	3	30	70	100
14BT50103	Water Supply Engineering	3	1	–	3	30	70	100
14BT50104	Soil Mechanics	3	1	–	3	30	70	100
14BT50105	Engineering Hydrology	3	1	–	3	30	70	100
14BT50121	Computer Aided Building Planning &Drawing Lab	–	–	3	2	25	50	75
14BT50122	Geotechnical Engineering Laboratory	–	–	3	2	25	50	75
	TOTAL	**21**	**7**	**6**	**25**	**260**	**590**	**850**

III B.Tech II Semester

Course code	Course Name	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS01	Managerial Economics and Principles of Accountancy	3	1	–	3	30	70	100
14BT60101	Reinforced Cement Concrete Structures – II	3	1	–	3	30	70	100
14BT60102	Foundation Engineering	3	1	–	3	30	70	100
14BT60103	Transportation Engineering –I	3	1	–	3	30	70	100
14BT60104	Wastewater Technology	3	1	–	3	30	70	100
Professional Elective– I								
14BT60105	1. Advanced Structural Analysis	3	1	–	3	30	70	100
14BT60106	2. Geo-environmental Engineering							
14BT60107	3. Ground Water Development and Management							
14BT60108	4. Solid Waste Management							
14BT60121	Concrete and Highway Materials Lab	–	–	3	2	25	50	75
14BT60122	Environmental Engineering Lab	–	–	3	2	25	50	75
	Total:	**18**	**6**	**6**	**22**	**230**	**520**	**750**

IV B.Tech I Semester

Courses code	Course Name	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT70101	Steel Structures	3	1	–	3	30	70	100
14BT70102	Water Resources Engineering	3	1	–	3	30	70	100
14BT70103	Geospatial Technologies	3	1	–	3	30	70	100
14BT70104	Transportation Engineering– II	3	1	–	3	30	70	100
Open Elective								
OPEN ELECTIVES		3	1	–	3	30	70	100
Professional Elective II								
14BT70110	Structural Dynamics	3	1	–	3	30	70	100
14BT70111	Advanced Foundation Engineering							
14BT70112	Water Resources Systems Planning and Management							
14BT70113	Transportation Management							
14BT70114	Environmental Impact Assessment and Management							
14BT70121	Remote Sensing and Geographical Information Systems Lab	–	–	3	2	25	50	75
14BT70122	Computer Aided Design and Detailing Lab	–	–	3	2	25	50	75
14BT70123	Seminar	–	–	–	2	–	50	50
Total		**18**	**6**	**6**	**24**	**230**	**570**	**800**

OPEN ELECTIVES

Offering Dept	Course Code	Course Title
BS&H	14BT6HS01	Banking and Insurance
BS&H	14BT6HS02	Cost Accounting and Financial Management
BS&H	14BT6HS03	Entrepreneurship for Micro, Small and Medium Enterprises
CE	14BT70105	Disaster Mitigation and Management
CE	14BT70106	Environmental Pollution and Control
CE	14BT70107	Contract Laws and Regulations
CE	14BT70108	Planning for Sustainable Development
CE	14BT70109	Rural Technology
ME	14BT60305	Artificial Intelligence and Robotics
ME	14BT60306	Global Strategy and Technology
ME	14BT60307	Intellectual Property Rights and Management
ME	14BT60308	Managing Innovation and Entrepreneurship
ME	14BT60309	Material Science
CSE	14BT60502	Engineering Systems Analysis and Design
EIE	14BT71005	Microelectromechanical Systems
IT	14BT61203	Bio-Informatics
IT	14BT61204	Cyber Security and Laws

IV B.Tech II Semester

Courses Code	Course Name	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT80101	Prestressed Concrete	3	1	–	3	30	70	100
14BT80102	Estimation, Costing & Valuation	3	1	–	3	30	70	100
Professional Elective– III								
14BT80103	Advanced Steel Structures	3	1	–	3	30	70	100
14BT80104	Soil Dynamics and Machine Foundations							
14BT80105	Watershed Management							
14BT80106	Industrial Waste Water Treatment							
14BT80107	Infrastructure Development and Management							
14BT80108	Earthquake Resistant Design of Structures							
Professional Elective– IV								
14BT80109	Bridge Engineering	3	1	–	3	30	70	100
14BT80110	Ground Improvement Techniques							
14BT80111	Rehabilitation and Retrofitting of Structures							
14BT80112	Design and Drawing of Irrigation Structures							
14BT80113	Architecture and Town Planning							
14BT80114	Railway, Harbour and Airport Engineering							
14BT80121	Comprehensive Viva–Voce	–	–	–	2	–	100	100
14BT80122	Project Work	–	–	20	10	60	140	200
	Total:	**12**	**4**	**20**	**24**	**180**	**520**	**700**

B.Tech I Year

14BT1HS01: **TECHNICAL ENGLISH**

(Common to All Branches of Engineering)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

Detailed Syllabus:

UNIT – I: (10 periods)

My Early Days by **A. P. J. Abdul Kalam** from **All About English** by Cambridge University Press India Pvt Ltd. 2014.

Communication: Importance of Communication – Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-Verbal Communication.

UNIT – II: (10 periods)

A Speech by N. R. Narayana Murthy from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: (10 periods)

The Town by the Sea by Amitav Ghosh from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: (10 periods)

Sir. C. V. Raman: The Celebrated Genius from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Reading: Reading and Interpretation – Intensive and Extensive Reading–Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: (10 periods)

The Model Millionaire by **Oscar Wilde** from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Writing: Characteristics – Language – Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism - Referencing and Styling.

Total Periods: 50

TEXT BOOKS:

1. **All About English***,* Cambridge University Press India Pvt. Ltd., First Edition, 2014.
2. Meenakshi Raman and Sangeetha Sharma, **Technical Communication**, Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, **Effective Technical Communication**, Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.
2. Martin Hewings, **Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,** Cambridge University press, First South Asian Edition, New Delhi, 1999.

B.Tech. I Year

14BT1BS01**: ENGINEERING PHYSICS**

(Common to All Branches of Engineering)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

COURSE OUTCOMES :

After completion of the course a successful student will be able to

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context.

Detailed syllabus:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, Ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY (16 periods)

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III :PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

(17 periods)

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative treatment), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS

(17 periods)

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V :MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS (17 periods)

Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total :85 periods

TEXTBOOKS :

1. S. Mani Naidu, **Engineering Physics**, Pearson Education, 2013.
2. P. K. Palaniswamy, **Engineering Physics**, Scitech Publications India Private Limited, 2009

REFERENCE BOOKS:

1. R. K. Gaur and S. L. Gupta, **Engineering Physics,** DhanpatRai Publications (P) Ltd., 8th Edition, 2001.
2. M. R. Srinivasan, **Engineering Physics,** New Age International (P) Limited, Publishers, 1st Edition,2010.

B.Tech. I Year

14BT1BS02 **: ENGINEERING CHEMISTRY**

(Common to All Branches of Engineering)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
2	1	-	4

PRE REQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.

COURSE OUTCOMES:

After successful completion of the course the student is able to:

1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.
2. Develop analytical skills in:
   a. Determination of hardness of water.
   b. Determination of viscosity, flame and fire points, cloud and pour points.
   c. Determination of calorific value of fuels.
3. Develop skills in design of:
   a. Methods for control of corrosion
   b. Chemical methods for the synthesis of Nanomaterials.
4. Develop skills for providing solutions through:
   a. Mitigation of hardness of water.
   b. Control of corrosion
   c. Newer Nanomaterials for specific applications
5. Acquire awareness to societal issues on:
   a. Chemical materials utility and their impact.
   b. Quality of water.
   c. Phenomenon of corrosion.
6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:
   a. Green computing
   b. Green construction

c. Green manufacturing systems

Detailed syllabus:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.

Conducting Polymers – Definition, types of conducting polymers and their engineering applications. **Composites** – Introduction, advantages of composites, constituents of composites, types of composites, applications of composites. **Sensors** - Introduction, types of sensors, electrochemical sensors, applications. **Insulators** – Definition, characteristic properties of insulators and classification of insulators.

UNIT–II: WATER TECHNOLOGY (15 periods)

Introduction, types of water, impurities in water and their consequences. Hardness of water, units of hardness, measurement of hardness by EDTA method, disadvantages of hardness. Softening methods – Ion exchange process, Zeolite process-Municipal water treatment. Boiler Troubles. Desalination of brackish water by Electro dialysis and Reverse osmosis. Numerical problems on measurement of hardness of water.

UNIT–III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst's equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, H_2 – O_2 fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT–IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY (17 periods)

Nano Chemistry: Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

Green Chemistry: Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems. **Total Periods : 85**

TEXT BOOKS:

1. P.C.Jain & Monika Jain, **Engineering Chemistry**, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah **Engineering Chemistry**, Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2013.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, **Hand book of Nanostructured materials and Nanotechnology**, New Age international publishers, 2nd edition, 2010.
2. Paul T. Anastas, John C Warner, **Green Chemistry: Theory and practice,** Oxford University Press, 2000.

B.Tech. I Year

14BT1BS03 **: ENGINEERING MATHEMATICS**

(Common to All Branches of Engineering)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	6

PRE REQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas , surfaces and volumes of revolutions.
3. Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton's Law of cooling and heat transfer.
4. Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

Detailed syllabus:

UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS (20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton's Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for $Q(x) = e^{ax}$, *sin ax*, *cos ax*, x^n, $e^{ax}\,V(x)$, $x\,V(x)$. Method of variation of parameters . Applications to L-R-C circuits.

UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES (22 periods)

Functions of two or more variables – Homogeneous functions – total derivatives – derivatives of implicit function – Jacobian – maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers. Radius ,centre and circle of curvature, tracing of curves in cartesian, parametric and polar forms.

UNIT-III: APPLICATIONS OF INTEGRATION (18 Periods)

Applications of integration to – length of curves, area of surfaces of revolution and volume of solids of revolution – Double integrals – change of variables and change of order of integration. Evaluation of Triple integrals -volume as double integral.

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS (20 periods)

Laplace transforms of standard functions – Properties of Laplace transforms–First and second shifting Theorems. Laplace transforms of derivatives and integrals–Laplace transforms of periodic functions – Unit step function – Dirac delta function – Inverse transforms–Convolution theorem. Applications of Laplace transforms to linear differential equations with constant coefficients.

UNIT-V : VECTOR CALCULUS (20 periods)

Vector differentiation – gradient, divergence, curl and vector identities. Laplacian Operator. **Vector integration**: Line integrals independent of path – work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals. Verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

Total periods : 100

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, **Engineering Mathematics, Vol. 1**, S. Chand & Company, 12/e ,2013.

REFERENCE BOOKS:

1. Grewal, B.S., **Higher Engineering Mathematics**, Khanna Publishers, 42/e,2012.
2. Kreyszig, E., **Advanced Engineering Mathematics**, John Wiley and Sons, 8/e.2006

B.Tech. I Year

14BT10301**: Engineering Mechanics**

(Common to CE and ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	—	6

PREREQUISITE : Intermediate/Senior Secondary Mathematics and Physics

COURSE DESCRIPTION: Engineering Mechanics is a foundation course for all other courses belonging to the broad knowledge area Design Engineering as applied to Civil Engineering and Mechanical Engineering. Basic concepts of statics and dynamics are presented in this course. Several aspects such as resultant of a system of forces, couple, support reactions, moment of inertia, member forces in trusses and preliminaries of friction, virtual work are included in the "statics" part of the course. Similarly characteristics of motion, cylindrical / Cartesian coordinates, centripetal acceleration and Newton's second law are included in the "dynamics" part of the course.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Apply the knowledge of Mathematics, Science, Engineering fundamentals to the solutions of complex engineering problems.
2. Analyse :
   (a) multi-body systems under equilibrium and under dynamic conditions.
   (b) systems involving dry friction and computing the efficiency of the system forces in trusses under suitable assumptions.
3. Design solutions to complex engineering problems using first principles of engineering mechanics.
4. Exercise awareness to assess the safety of system and other ethical issues related to engineering mechanics.
5. Communicate effectively engineering and allied information through free body diagram.
6. Sustain interest in Engineering Mechanics to upgrade knowledge and skills through self learning concepts in mechanics.

Detailed Syllabus:

UNIT I-BASIC CONCEPTS (24 periods)

Axioms of Mechanics – basic quantities of mechanics and their units, System of forces– Lami's theorem, Moment of forces and its Application, Couples and Resultant of Force System, concurrent force systems, parallel force systems, non-concurrent force systems. Free body diagrams, Friction as a force – Laws of dry friction – Wedge, screw-jack, and differential screw-jack, Introduction to Virtual work principle – Very simple and elementary problems using virtual work.

UNIT II-STRUCTURAL ANALYSIS (16 periods)

Types of Supports – Support reactions for beams with different types of loading, concentrated, uniformly distributed and uniformly varying loading

Types of frames –perfect frames, Analysis of frames using method of joints and method of sections.

UNIT III-CENTROID, CENTER OF GRAVITY, MOMENTS OF INERTIA (18 periods)

Centroids of simple figures, Centroids of Composite figures, Centre of Gravity of bodies, Centre of Gravity of Composite figures. Parallel axis and perpendicular axis theorems, Theorems of Pappus and Guldinus, Moments of Inertia of Composite Figures, Mass Moment of Inertia of Simple solids, Moment of Inertia of composite masses.

UNIT IV-KINEMATICS (14 periods)

Rectilinear and Curvilinear motion – Velocity and Acceleration, motion of a projectile, Normal and tangential accelerations.

UNIT V-KINETICS (18 periods)

Analysis as particle and Analysis as a Rigid Body in Translation – Newton's laws, Work Energy Method – Equation for Translation, Work – Energy application to Particle Motion, Impulse-Momentum Equation, Fixed axis Rotation.

Total Periods: 90

TEXT BOOKS:

1. S.S. Bhavikatti and K.G. Rajashekarappa, **Engineering Mechanics**, New Age International (P) Ltd., 3rd edition, 2008
2. Basudeb Bhattacharya, **Engineering Mechanics**, Second Edition, Oxford University Press, 2nd Edition, 2014.

REFERENCE BOOKS:

1. S. Timoshenko, D.H. Young, and J.V. Rao, **Engineering Mechanics**, Tata McGraw-Hill Publishing Company Limited, Revised 4th Edition, 2007.
2. R.C. Hibbeler, **Engineering Mechanics - Statics and Dynamics**, Prentice Hall, 8th Edition, 1998
3. K. Vijaya Kumar Reddy and J. Suresh Kumar, **Singer's Engineering Mechanics – Statics and Dynamics**, BS Publications, 3rd Edition.

B.Tech. I Year

14BT1ES01**: PROGRAMMING IN C & DATA STRUCTURES**

(Common to ECE, EEE, EIE, ME and CE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	—	6

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with fundamentals of programming in C language such as syntax of C, mechanisms of input and output processing, derived data types like arrays, strings and pointers. Also file in C and data structures are discussed.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Gain knowledge on developing algorithms and programming techniques.
2. Gain analytical skills on
    a. Searching and sorting
    b. File management functions.
    c. Various Data Structures
3. Design various applications using basic data structures like linked list, stacks and queues
4. Gain competence to represent and solve real time problems using tree data structures.

DETAILED SYLLABUS

Unit-I **(15 periods)**

Programming Languages- Compiler, Interpreter, Loader, and Linker- Program execution- Classification of programming-Algorithms and flowcharts .

Basics of C: Introduction, Standardizations of C language, Developing Programs in C, Structure of C program, Variables, Data Types, Declaration, Token, Operators and expressions, L values and R values, Type Conversion in C.

Unit-II **(20 periods)**

Input and Output: Basic screen and key board I/O in C , Non formatted input and output , Formatted Input and output. Control Statements: Specifying Test Condition for Selection and Iteration, Writing Test Expressions, Conditional Execution and Selection, Iterative and Repetitive Execution, GOTO Statement, Special Control statements, Nested loops.

Unit-III **(20 periods)**

Arrays and Strings: One dimensional Array, Strings: One-Dimensional Character Arrays, Multidimensional Arrays, Arrays of Strings. Functions: Concept of function, Call by Value Mechanism, passing arrays to Functions, Scope and extent, Storage classes, Inline function, Recursion, Searching and sorting.

Unit-IV **(25 periods)**

Pointers: Introduction, Understanding Memory Address, Address Operators, pointer, Void pointer, Null pointer, use of pointers, arrays and pointers, Pointer and strings, pointer arithmetic, pointers to pointers, pointer to arrays, Pointers to functions, Dynamic memory allocation, Pointer and const Qualifier. User-defined data types and variables: Structures, union, Enumerations types, Bitfields.

Files in C: Working with text files, Binary files, Random Access files, other file management functions, Command line arguments, C preprocessor, Type qualifier.

Unit-V **(20 periods)**

Linked Lists: Singly Linked Lists, Circular Linked lists, Doubly Linked list Applications of Linked Lists. Stacks and Applications, Queues, Other Variations of Queues, Applications, Tree-Binary tree, Traversals, Kinds of binary tress, Binary Search tree, Application of tree.

Total periods: 100

TEXT BOOK:

1. PradipDey and Manas Ghosh, "**Programming in C**,"Second Edition, Oxford University Press, New Delhi, 2007

REFERENCE BOOKS:

1. D. Samanta, "**Classic Data Structures**", Second Edition, PHI Learning, New Delhi, 2004
2. Behrouz A. Forouzan and Richard F. Gilberg, "**A Structured Programming Approach using C**,"Third Edition, Cengage Learning, New Delhi, 2007.

B.Tech. I Year

14BT1ES03**: COMPUTER AIDED ENGINEERING DRAWING**

(Common to All Branches of Engineering)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	1	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with the concepts of computer-aided sketching, and orthographic and isometric projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES: After completion of the course, a successful student is able to :

1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general audience.

Detailed Syllabus:

UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING (20 periods)

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, Different types of lines, Material conventions and free hand practicing, Definitions of Principle planes and other planes. Computer screen, layout of the software, Creation of 2D/3D environment, Selection of drawing size and scale, Standard tool bar/menus, Coordinate system, and description of most commonly used toolbars, Navigational tools, Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS (20 periods)

Introduction, Definitions- Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), Projection of lines inclined to one plane, inclined to both the planes, finding true lengths and true inclinations (No application problems).

UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES (20 periods)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS (20 periods)

Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS (20 periods)

Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.

Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts. **Total Periods: 100**

TEXT BOOKS:

1. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, **Engineering Graphics with Auto CAD**, PHI Learning Private Limited, Revised Edition, August 2010.
2. N D Bhat & V M Panchal, **Engineering Drawing**, Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, **AutoCAD 2013 For Engineers And Designers**, Dreamtech Press, 2013
2. T Jeyapoovan, **Engineering Drawing and Graphics Using Autocad**, Vikas Publishing House, 3rd Edition, 2010.
3. Jolhe, **Engineering Drawing**, Tata McGraw Hill Education Private Limited, 1st Edition, 2007.
4. Basant Aggarwal, **Engineering Drawing**, Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

B.Tech I Year

14BT1BS05**: ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LABORATORY**

(Common to All Branches of Engineering)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wave length of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:

After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.

Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of P^H of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments :

Engineering Physics:

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
4. Characteristics of LED source.
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee's method
9. Melde's experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
12. Characteristics of laser source.
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum

Engineering Chemistry:

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Conductometric titration of strong acid Vs strong base
6. Determination of P^H of a given solution by P^H metry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
10. Synthesis of Nano metal-oxide using sol– gel process.
11. Determination of the capacity of the given cation-exchange Resin.
12. Measurement of viscosity by Redwood viscometer.

Duration: 3 Periods for each experiment **Total periods: 30**

TEXT BOOKS:

1. **Physics Laboratory Manual**
2. K. Mukkanti, **Practical Engineering Chemistry**, BS Publications, 2013.
3. K.N. Jayaveera, K.B. Chandra Sekhar, **Chemistry laboratory manual**, S.M. Enterprises Limited, 2013.

B.Tech I Year

14BT1ES04**: PROGRAMMING IN C & DATA STRUCTURES LAB**

(Common to ECE, EEE, EIE, ME and CE)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION: This course provides programming practice in C language specifically syntax of C, input-output processing, derived data types, file processing, and data structures.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Design, code, test, debug and execute programs in C.
2. Implement and use common features found in C programs – arrays, pointers, strings, stacks and queues.
3. Select the appropriate data structure and algorithm design method for a specified problem.

Week 1:

a) Write a C program to print the string "SVEC" at four corners and center of the screen using single printf statement.

b) Mr. Gupta deposits Rs.1000 in a bank. The bank gives simple interest of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I=PTR/100)

c) Write a program to exchange the values of two variables without using the third variable.

Week 2:

a) A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

b) In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.

c) Assume that any month is of 30 days. Input total days through keyboard. Find out the exact number of Years, Months & Days.

Week-3

a. Write a program that reads in a number, then reads in a single digit and determines whether the first number contains the digit. If it does, the program should display how many times the digit occurs in the number.

b. Write a program to print Pythagoras triplets a = m* n , b=(n^2 + m^2)/2, c=(n^2-m^2)/2 where m = 1,3, 5 ……; n = m + 2, m + 4 ……

c. Write a program to produce the following pattern:

a.
```
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7
1 2 3 4 5 6
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

b.
```
1 2 3 4 5 6 7 8 9 10
  2 3 4 5 6 7 8 9 10
    3 4 5 6 7 8 9 10
      4 5 6 7 8 9 10
        5 6 7 8 9 10
          6 7 8 9 10
            7 8 9 10
              8 9 10
                9 10
                  10
```

Week-4

a. Write a C program to generate Pascal's triangle.

b. Write a C program to construct a pyramid of numbers.

Week-5

a. The formula used to calculate the amount of interest on a bank account that compounds interest daily is

$$i = p\ (1 + r)^d - p$$

where:

i is the total interest earned,

p is the principal (the amount originally deposited in the account),

r is the rate of interest as a decimal less than 1 (for example, 15 percent is expressed as 0.15), and

d is the number of days the money is earning interest.

Write a program that accepts values for p, r and d and calculates the interest earned.

b. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127

c. Write a C program to convert a given decimal number into its equivalent
   i. Binary Number
   ii. Octal Number
   iii. Hexadecimal Number
   iv. Quinary Number(base 5)

Week-6

a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %, use switch statement)
b. Write a program to find the sum of individual digits of a positive integer.
c. A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.
d. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to find the largest and smallest number in a list of integers.
b. Write a program to perform the following:
   i) Addition of two matrices.
   ii) Multiplication of two matrices.

Week-8

a. Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
b. Write a C program to determine if the given string is a palindrome or not
c. Write a C Program to implement all string operations.
   1. Find the length of string 2. Reverse the string.
   3. Comparing the two strings. 4. Copy the string .

Week -9:

a. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 10:

a. Write a C program to count the lines, words and characters in a given text.
b. Write a program that simulates a password entry.
c. Write a program to read a five letter word and generate all possible combinations of two-letter words using those five letters.

Week 11:

Write a program to perform the following:
i) Linear search ii) Binary search

Week 12:

Write a program to perform the following:
i) Selection sort ii) Insertion sort
iii) merge Sort iv) Quick sort

Week 13:

Write programs to perform the following using recursion
i) To find the factorial of a given integer.
ii)To solve Towers of Hanoi problem

Week-14

a. Write a C Program to return a substring from a main string using pointers.
b. Write a C program to return character frequency count in a text using pointers

Week-15

a. Write a C program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers
   (Note: represent complex number using a structure.)

b. Write a Program to enter records of students display in sorted order according to ID number.

c. Define a structure to store employee's data with the following specifications:
   Employee-Number, Employee-Name, Basic pay, Date of Joining
   i) Write a function to store 10 employee details.
   ii) Write a function to implement the following rules while revising the basic pay.
   If Basic pay <= Rs.5000 then increase it by 15%.
   If Basic pay > Rs.5000 and <= Rs.25000 then it increase by 10%.
   If Basic pay > Rs.25000 then there is no change in basic pay.
   iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

Week-16

a. Write a program which copies one text file to another.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

c. Consider the following text file:

Input File:

S.No.	Customer_ID	Item No.	Qty.	Price Per Item (Rs.)
1.	C01	I1	2	10
2.	C02	I2	5	50
3.	C03	I2	5	50
4.	C04	I4	10	10

Write a program to print the output in following format by giving the Customer_ID as an input.

Output:

S.V. PROVISION STORES
TIRUPATI
Customer_ID: C01 Date: 12-08-2010

Item	Qty	Price
I1	2	20
	Total	20

Week - 17:

Write a program to implement the following operations on Singly Linked List
a. List Creation b. Insertion c. Deletion d. Display

Week -18:

Write a program to implement the following operations on Circular Linked List
a. List Creation b. Insertion c. Deletion d. Display

Week -19 :

Write a program to implement the following operations on Doubly Linked List
a. List Creation b. Insertion c. Deletion d. Display

Week- 20:

Write a program to implement stack operations using:
i) Arrays ii) Pointers

Week -21 :

Write a program to implement linear queue operations using:
i) Arrays ii) Pointers

Week -22:

a) Write a program to implement circular queue operations using arrays
b) Write a program to implement traversals of a Binary tree
   i. Preorder ii. Post order iii. Inorder

Week- 23

Write a program to implement insertion and deletion in a binary search tree.

REFERENCE BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "**A Structured Programming Approach using C**," Third Edition, Cengage Learning, New Delhi, 2007.
2. PradipDey and Manas Ghosh, "**Programming in C**", Second Edition, Oxford University Press, New Delhi, 2007
3. D. Samanta, "**Classic Data Structures**", Second Edition, PHI Learning, New Delhi, 2004.

B.Tech. I Year

14BT1ES06**: ENGINEERING & IT WORKSHOP**

(Common to All Branches of Engineering)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

After completion of the course, a successful student is able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a)	**Carpentry Shop**	:	Cross lap joint, mortise and tenon, T-joint, dove tail joint.
b)	**Fitting Shop**	:	Square fit and V-fit, semi circular fit, dove tail fit.
c)	**Sheet Metal Shop**	:	Trapezoidal tray, square tin, funnel, cylinder.
d)	**House wiring**	:	Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.
(e)	**Foundry**	:	Preparation of casting using single piece pattern, Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) Welding
b) Metal Cutting
c) Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

IT WORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources.

Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.

Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.

Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.

Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

Total Periods: *48*

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, **Engineering Work shop practice**, VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, **Work shop Manual**, SciTech Publishers, 2009.
3. K. Venkata Reddy, **Workshop Practice Manual**, BS Publications, 2008

IT WORKSHOP:

1. Vikas Gupta, "**Comdex Information Technology Course Tool Kit**," 2nd Edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, "**Introduction to Information Technology**," 2nd Edition, Pearson Education, New Delhi, 2005.
3. **IT Workshop Laboratory Manual**, Department of IT, SVEC, 2014.

B.Tech I Year

14BT1HS02: **ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY**

(Common to All Branches of Engineering)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which are classified into software based learning, grammar and activities. English Speech Sounds and Phonemic Transcription, Word Stress and Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features, Vocabulary Building, are aided by software. Grammar sessions include Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays, Telephonic Etiquette, Listening Skills, Describing People, Places and Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to

1. Gain practical knowledge in
   - English Speech Sounds
   - Stress Patterns in word and sentence
   - Intonation Patterns
   - Paralinguistic Features
   - Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts.
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.
6. Demonstrate various language functions by participating in
   - Just A Minute
   - Impromptu Speech
   - Elocution
   - Role Plays
   - Presentations
7. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling
   b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes
   c. Idioms and Phrases–Homophones–Homonyms–Homographs.
6. Functional Grammar
   a. Parts of Speech b. Tenses c. Change of Speech d. Change of Voice
   e. Word Order and Error Correction f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India.

II B.Tech I Semester

14BT3BS01: **MATRICES AND NUMERICAL METHODS**

(Common to CE and ME)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Intermediate/Senior secondary Mathematics

COURSE DESCRIPTION: Matrices, Systems of Equations; Eigen Values, Eigen Vectors; Solutions of Algebraic and Transcendental Equations, Curve Fitting, Interpolation, Numerical Differentiation and Integration, Numerical Solutions of Ordinary Differential Equations ,Fourier Series and Integrals, Partial Differential Equations.

COURSE OUTCOMES:

After the completion of this course, a successful student will be able to

1: Acquire knowledge in
- (a) Estimating ranks and solutions of linear equations through matrices.
- (b) Solutions of algebraic and transcendental equations
- (c) Fitting of different curves to discrete data.
- (d) Estimating the unknown values of different parameters through interpolation.
- (e) Estimating values of derivatives from the given data
- (f) Numerical differentiation and integration
- (g) Numerical solutions of differential equations
- (h) Fourier series, Fourier transforms and partial differential equations.

2: Develop analytical skills in providing solutions to the problems involving
- (a) Differential equations through numerical methods
- (b) Partial differential equations

3: Develop skills in analyzing
- (a) Properties of functions through Fourier series.
- (b) numerical techniques in differentiation and integration of higher complexity

4: Develop skills in the design of mathematical equations and arrive at numerical solutions involving
- (a) Curves that best fits the given data
- (b) Integrations of higher complexity
- (c) Ordinary differential equations
- (d) Oscillatory motion and heat transformations.

DETAILED SYLLABUS:

UNIT I **(10 periods)**

MATRIX THEORY & APPLICATIONS: Matrices– rank of a matrix, echelon form, Normal form – Inverse of a matrix by row operations. Homogenous and non–homogenous linear systems, consistency and solutions of linear system of equations. Solutions of equations by Gauss elimination method. Eigen values , Eigen vectors – properties. Cayley – Hamilton theorem (without proof). Inverse and powers of a matrix using Cayley– Hamilton theorem.

UNIT II **(09 periods)**

NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION: Solutions of algebraic and transcendental equations by bisection method, Regula–falsi method, Newton–Raphson method. Curve fitting by the principle of least squares – fitting of a straight line, parabola, exponential curves. Interpolation –Newton's forward formula, Newton's backward formula, Lagrange's interpolation formula.

UNIT III **(08 periods)**

NUMERICAL DIFFERENTIATION, INTEGRATION AND SOLUTIONS OF O D E: Numerical differentiation using Newton's forward formula, Newton's backward formula. Numerical integration using trapezoidal rule, Simpsons $1/3^{rd}$ Rule, Simpsons $3/8^{th}$ Rule. Numerical solutions of first order ordinary differential equations by Euler's method, Euler's modified method, Runge – Kutta method (4^{th} order only).

UNIT IV **(09 periods)**

FOURIER SERIES AND FOURIER INTEGRALS: Fourier series of functions in (0, 2n), (-n, n), (0, 2*l*), (-*l*, *l*) . Determination of Fourier coefficients by Euler's formulae. Even and odd functions, Fourier series for periodic functions. Half – range Fourier sine and cosine expansions. Fourier integral theorem (statement only). Fourier sine and cosine integrals – Fourier sine and cosine transforms.

UNIT V **(09periods)**

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equations. Method of separation of variables for second order partial differential equations. Solutions of one dimensional wave equation– heat equation.

TEXTBOOKS **Total Periods: 45**

1. T.K.V. Iyenger, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N.Prasad, *Mathematical Methods,* 8^{th} Edition, S.Chand and Company, 2013.

REFERENCE BOOKS

1. B.S. Grewal, *Higher Engineering Mathematics*, 42^{nd} Edition, Khanna publishers, 2012.
2. S.S.Sastry, *Introductory methods of Numerical Analysis*, 4^{th} Edition, Prentice Hall of India, 2005.

II B.Tech I Semester

14BT30101 **: ENGINEERING GEOLOGY**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

EREQUISITES:

COURSE DESCRIPTION: Importance of Geology in the Civil Engineering– Weathering – Mineralogy, Petrology – Structural Geology, Geophysical Studies – Ground Water, Earthquakes and Landslides – Geological Considerations for Dams, Reservoirs and Tunnels.

COURSE OUTCOMES:

After the completion of this course, a successful student will be able to:

1. Apply the knowledge of geological features, the properties of rocks and their suitability as building stones for various civil engineering constructions .
2. Analyze the failure of structures using geological studies .
3. Conduct investigations and give recommendations for the effective use of rocks, minerals for construction .
4. Use modern methods and apply suitable techniques for carrying out geophysical studies .
5. Explain causes of earthquakes and give remedial measures to the society for the safety .

DETAILED SYLLABUS:

UNIT I

GENERAL GEOLOGY: Importance of geology from civil engineering point of view – Brief study of case histories of failure of some civil engineering constructions due to geological draw backs – Importance of physical geology, petrology and structural geology, Weathering: Agents of weathering, Effects of weathering of rocks – Importance of weathering with reference to dams, reservoirs and tunnels.

UNIT II

MINERALOGY AND PETROLOGY: Definition of mineral – Importance of study of minerals – Different methods of study of minerals– Advantages of study of minerals by physical properties – Identification of minerals – Physical properties of common rock forming minerals: Feldspar, Quartz, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite – Study of other common economic minerals: Pyrite, Hematite, Magnetite, Galena, Pyrolusite, Graphite, Magnesite and Bauxite – Origin, Geological classification into Igneous, Sedimentary and Metamorphic rocks – Common structures, textures of Igneous, Sedimentary and Metamorphic rocks – Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sandstone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT III **(10 Periods)**

STRUCTURAL GEOLOGY AND GEOPHYSICAL STUDIES: Out crop – Strike and dip – Classification and recognition of folds, faults, unconformities, and joints – Importance of geophysical studies – Principles of geophysical studies – Gravity methods –Magnetic methods – Electrical resistivity methods – Seismic refraction methods – Radiometric methods and geothermal method – Special importance of electrical resistivity methods and seismic refraction methods.

UNIT IV **(8 Periods)**

GROUNDWATER, EARTHQUAKE AND LANDSLIDES

Groundwater : Hydrological cycle, Water table, Common types of groundwater, Cone of depression, Geological controls of groundwater movement – Hydrological properties of rocks: porosity, permeability, storativity, specific yield and specific retention – Earthquakes: causes and effects – shield areas and seismic zones – Seismic waves – Richter scale – Precautions to be taken for building construction in seismic areas – Landslides: their causes and effect – Measures to be taken to prevent their occurrence.

UNIT V **(8 Periods)**

GEOLOGY OF DAMS, RESERVOIRS AND TUNNELS : Types of dams – Geological considerations in the selection of a dam site – Analysis of dam failures of the past – Factors contributing to the success of a reservoir – Purposes of tunneling – Effects of tunneling on the ground – Geological considerations (i.e., Lithological, structural and groundwater) in tunneling, over break and lining in tunnels.

Total Periods: 45

TEXT BOOKS

1. N. Chenna kesavulu, *Engineering Geology,* 2nd Edition, Mc–Millan India Ltd., 2014.
2. Parbin Singh, *A Text Book of Engineering and General Geology,* 8th Edition, S.K. Kataria and Sons, 2012.

REFERENCE BOOKS

1. D. Venkata Reddy, *Engineering Geology*, 1st Edition, Vikas Publications, 2014.
2. K.V.G.K. Gokhale, *Principles of Engineering Geology*, 1st Edition, B.S. Publications, 2013.
3. F.G. Bell, *Fundamental of Engineering Geology*, 2nd Edition, B.S. Publications, 2007.
4. S.K. Garg, *Physical and Engineering Geology*, 4th Edition, Khanna Publishers, 2013.

II B.Tech I Semester

14BT30233: **BASICS OF ELECTRICAL AND MECHANICAL TECHNOLOGY**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	--	3

ELECTRICAL TECHNOLOGY (PART-A)

PRE-REQUISITES: Engineering Physics

COURSE DESCRIPTION:

Basics concepts of electrical circuits; layout for electrical wiring; construction and operating principle of single phase transformer, three phase induction motor, single phase induction motor and alternator; earthing & illumination.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Understand various circuit elements, the working of various electrical machines, filament & fluorescent lamps and types of earthing
2. Analyze the electrical circuits to know their response
3. Design layout for wiring circuit depending upon the requirement
4. Evaluate the electrical parameters
5. Apply IE rules while designing electrical wiring

DETAILED SYLLABUS:

UNIT I **(11 Periods)**

ELECTRICAL CIRCUITS AND WIRING : Concepts of network - active and passive elements, Ohm's law, Kirchhoff's laws, resistive networks, inductive networks, capacitive networks - series and parallel configuration, star-delta transformation problems, conductors and insulators.

AC fundamentals - introduction to alternating quantities, RMS values, phasor representation, active, reactive and apparent power, power factor – problems. Wiring - systems of wiring- cleat wiring, conduit winding. General rules related to wiring - IE rules for internal wiring estimation. Wiring layout of electrical installations for residential buildings, commercial buildings and small industries.

UNIT II **(9 Periods)**

EARTHING, ILLUMINATION AND BASICS OF AC MACHINES : Earthing - rod earthing, pipe earthing and plate earthing. Illumination - incandescent lamp, fluorescent lamp. Construction and operating principle of single phase transformer, three phase induction motor, single phase capacitor start induction motor and alternator.

Total Periods : 20

TEXT BOOKS:

1. D.P. Kothari, *Basic Electrical Engineering, 3rd edition,* Tata McGraw Hill, 2012.
2. K. B. Raina, *Electrical Design Estimating and Costing*, New Age International, 2007.

REFERENCE BOOKS:

1. V.K. Mehta and Rohit Mehta, *Principles of Electrical Engineering*, S. Chand and Company Ltd., New Delhi, 2006.
2. M.S Naidu and S. Kamakshaiah, *Introduction to Electrical Engineering*, Tata McGraw-Hill Publications Ltd., New Delhi, 2009.
3. J.B. Gupta, *Electrical Installation Estimating & Costing*, S. K. Kataria & Sons, 2009.
4. H.Parthab, *Art and science of utilization of electrical energy,* Dhanpat rai & Co., 2010.

MECHANICAL TECHNOLOGY (PART-B)

PRE-REQUISITES: Engineering physics, Engineering chemistry, Engineering workshop.

COURSE DESCRIPTION:

Welding; Types of Welding techniques; IC engines and its classifications; Types of Lubrication Systems; Refrigeration Systems and its classifications; Types of Refrigerants; Types of Air conditioning system; Types of Air compressors; Earth Moving Machines and its Applications.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Employ the suitable welding technique in the joining of metals, working of IC engines, refrigeration, air conditioning systems, and air compressors.
2. Identify the manageable areas in welding processes, I.C engines for their effective utilization.
3. Analyze and apply the various types of earth moving machines for the operation of various projects in Civil Engineering.

DETAILED SYLLABUS:

UNIT III **(10 periods)**

WELDING PROCESSES & INTERNAL COMBUSTION ENGINES: Introduction, Classification of Welding processes: Arc Welding processes, Gas Welding processes, and Equipments, Submerged arc welding, TIG processes, MIG processes; Soldering and Brazing processes, applications; I.C engines: Introduction, Classification , components of IC Engines; Working principle of S.I and C.I engines; Four stroke and Two stroke I.C engines ;Comparison of Four stroke and Two stroke engines ; Comparison of S.I and C.I engines – Lubrication, and cooling systems of S.I and C.I Engines.

UNIT IV **(8 periods)**

REFRIGERATION & AIR–CONDITIONING SYSTEMS : Refrigerants and their Desirable properties; Vapor Compression and Vapor Absorption refrigeration Systems, comparison of Vapor Compression and Vapor Absorption refrigeration Systems; air conditioning: Need of Air conditioning , window air conditioning systems,summer, and winter air conditioning systems, and year round air conditioning system.

UNIT V **(7 periods)**

AIR COMPRESSORS & EARTH MOVING MACHINERY: Introduction, classification, Working principle of reciprocating air compressor; Working principle of Single & Multi stage compressors, applications; Need of Earth Moving Machines: Mechanical handling equipment; Bull dozers; Power shovels; Excavators; Concrete mixer; Belt and bucket conveyors; applications.

Total Periods: 25

TEXT BOOKS:

1. R. K. Rajput, *Thermal Engineering* , 8th Edition, Laxmi Publications, 2010.
2. P. C. Sharma, *Production technology*, 7th edition, S. Chand, 2006.

REFERENCE BOOKS:

1. R. S Khurmi & J.K Gupta, *Refrigeration & Air conditioning*, S. Chand & company ltd, Fifth Revised Edition, 2011.
2. S.K.Hajra Choudhary & S.K.Bose, *Elements of Workshop Technology*, Vol. I, Asia Publishing House, Bombay, 2nd Edition. V. Ganesan, I.C Engines, TMH, 3rd edition , 2007.

II B.Tech I Semester

14BT30102: **MECHANICS OF SOLIDS**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Engineering Mechanics

COURSE DESCRIPTION: Simple Stresses and Strains; Strain Energy – Shear Force and Bending Moment – Stresses in Beams – Combined Direct and Bending Stresses; Torsion – Springs and Shafts – Thin Cylinders and Thick Cylinders.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Understand the concepts on stresses, strains, and displacements in structures due to different types of loading conditions .
2. Analyze the stress distribution of simple structural elements such as bars, beams under specific external load .
3. Design simple bars, beams and circular shafts for various loading conditions .

DETAILED SYLLABUS:

UNIT I (09Periods)

SIMPLE STRESSES AND STRAINS: Elasticity and plasticity – Types of stresses and strains – Hooke's law – Stress–strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – Composite bars – Temperature stresses – Strain energy – Resilience – Gradual, sudden and impact loadings – Simple applications.

UNIT II (10 Periods)

SHEAR FORCE AND BENDING MOMENT: Types of beams, supports and loads – Concept of shear force and bending moment – SF and BM diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying load and combination of these loads – Point of contra–flexure – Relation between SF, BM and rate of loading at a section of beam.

UNIT III (10 Periods)

STRESSES IN BEAMS: Theory of simple bending – Basic bending equation– Neutral axis – Bending stresses – Section modulus of rectangular, circular section, I, T, Angle and Channel sections – Design of simple beam sections – Strain energy due to bending. Basic shear stress
equation – Shear stress distribution; Rectangular, circular, triangular, I, T, Angle sections – Strain energy due to shear.

COMBINED DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and bending moment – Core of a section – Stresses in chimneys, retaining walls and dams – Conditions for stability – Stresses due to direct loading and bending moment about both axes.

UNIT IV (09 Periods)

TORSION: Theory of pure torsion – Torsional equation – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending, torsion and end thrust – Design of shafts.

SPRINGS: Deflection of close and open coiled helical springs under axial load and axial twist – Springs in series and in parallel.

UNIT V (07 Periods)

THIN CYLINDERS: Thin cylindrical shells – Longitudinal and circumferential stresses – Hoop, longitudinal and volumetric strains – Changes in diameter and volume of thin cylinders

THICK CYLINDERS: Lame's theory – Distribution of hoop and radial stresses across thickness – Design of thick cylinders – Compound cylinders – Difference of radii for shrinkage.

Total Periods: 45

TEXT BOOKS

1. Punmia, B. C., Ashok Kumar Jain and Arun Kumar Jain, *Mechanics of Materials*, 1st Edition, Laxmi Publications Pvt. Ltd., 2001.
2. Basavarajaiah, B.S. and Mahadevappa. P, *Strength of Materials*, 3rd Edition, Universities Press (India) Pvt. Ltd., 2010.

REFERENCE BOOKS

1. Rajput, R.K., *Strength of Materials (Mechanics of Solids)*, 5th Edition, S. Chand & company LTD, New Delhi, 2006.
2. Junnarkar, S. B. and Shah, H. J., *Mechanics of Structures– Vol. I* (Strength of Materials), 27th Revised and Enlarged Edition, Charotar Publishing House Pvt. Ltd., 2008.
3. Bhavikatti, S. S., *Strength of Materials*, 3rd Edition, Vikas Publishing House, 2010
4. Khurmi, R. S., *Strength of Materials,* 23rd Edition, S. Chand & Company Ltd., 2005.

II B. Tech I Semester

14BT30103 : **BUILDING MATERIALS AND CONCRETE TECHNOLOGY**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Engineering Chemistry

COURSE DESCRIPTION: Bricks and Tiles – Timber – Lime and Other Materials for Construction – Cement and Concrete – Hardened Concrete and Tests on Hardened Concrete – Elasticity, Creep and Shrinkage, Mix Design.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Understand various types and properties of building materials and procedure for making mix design .
2. Carryout the mix design and also carryout all tests for cement and concrete **.**
3. Design a concrete mix for the given construction materials
4. Assess the properties of concrete mixes for various construction activities and suggest proper building materials for construction purposes .

DETAILED SYLLABUS:

UNIT I **(07 Periods)**

STONES, BRICKS AND TILES: Properties of Building Stones and Structural Requirements – Classification of Stones – Stone Quarrying **–** Blasting and Dressing of Stones Composition of good brick earth- – Various methods of manufacture of bricks – Qualities of a good brick – Efflorescence in bricks – Classification of bricks – Characteristics of good tile – Manufacturing methods – Types of tiles.

TIMBER: Structure – Properties – Seasoning of timber – Classification of various types of woods used in buildings – Defects in timber – Decay of timber – Mechanical treatment – Paints – Varnishes – Distempers – Bituminous wooden products in construction.

UNIT II **(07 Periods)**

LIME AND MISCELENIOUS MATERIALS FOR CONSTRUCTION: Various ingredients of lime – Constituents of lime stone – Classification of lime – Various methods of manufacture of lime – Use of Materials like galvanized iron, steel, aluminum, gypsum, copper, glass, bituminous materials, rubber, fiber–reinforced plastics, ceramic products, asbestos and their quality.

UNIT III **(12 Periods)**

CEMENT AND CEMENT CONCRETE: Ingredients of cement – Manufacture of OPC –Types of cement and their properties – Various field and laboratory tests on cement.

Various ingredients of cement concrete and their importance – Proportioning of concrete – Water–cement ratio – Workability of concrete – Factors influencing workability – Measurement of workability – Effect of time and temperature on workability – Segregation and bleeding – Mixing and vibration of concrete – Quality of mixing water.

UNIT IV **(10 Periods)**

HARDENED CONCRETE AND TESTS ON HARDENED CONCRETE: Nature of strength of concrete – Maturity concept – Strength in tension and compression– Factors affecting strength –– Relation between compression and tensile strength – Curing – Numerical Problems – Compression test – Tension test – Factors affecting strength – Flexure test – Non–destructive testing methods.

UNIT V **(09 Periods)**

ELASTICITY, CREEP AND SHRINKAGE: Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep and time – Effects of creep – Shrinkage – Types of shrinkage.

MIX DESIGN: Factors in the choice of mix proportions – BIS method of mix design.–Numerical Problems on Mix Design. **Total Periods: 45**

TEXT BOOKS

1. S. K. Duggal, *Building Materials*, 4th Edition, New Age International Publishers, 2010.
2. M.S. Shetty, *Concrete Technology*, 7th Edition, S. Chand and Company Ltd., 2011.

REFERENCES

1. Rajput R.K., *Engineering Materials*, 3rd Edition, S. Chand and Company Ltd., 2006.
2. A.R. Santha Kumar, *Concrete Technology*, 7th Edition, Oxford University Press, New Delhi, 2011.
3. A.M. Neville, *Properties of Concrete*, 5th Edition, Pearson Education, 2012.
4. M.L. Gambhir, *Concrete Technology*, 5th Edition, Mc.Graw Hill Education (India) Private Limited, 2013.

NOTE. Booklet containing relevant extracts from Standards and Codes, should be made available to Students during examinations

II B. Tech I Semester

14BT30104: **FLUID MECHANICS – I**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Engineering Physics and Engineering Mathematics

COURSE DESCRIPTION: Properties of Fluids and Pressure Measurement – Hydrostatic Forces – Fluid Kinematics – Fluid Dynamics – Closed Conduit Flow – Measurement of Flow – Laminar and Turbulent Flow – Hydraulic Similitude and Model Testing.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Demonstrate the knowledge of Fluid properties, buoyancy, hydrostatic pressure, fluid flow and solve problems using fundamentals of Physics and mathematics .
2. Analyze various types of flows and interpret the data .
3. Evaluate losses in pipes and design a piping system as per requirement .
4. Address the fault in the prototype preparation using the model analysis and provide suitable solutions .

DETAILED SYLLABUS:

UNIT I **(10 Periods)**

PROPERTIES OF FLUIDS AND PRESSURE MEASUREMENTS: Dimensions and units – Physical properties of fluids – Pressure at a point – Pascal's law – Hydrostatic law – Atmospheric, gauge and absolute pressures – Measurement of pressure – Manometers – Differential and micro manometers – Hydrostatic forces on submerged plane surfaces – Total pressure and centre of pressure on plane and curved surfaces – Buoyancy – Centre of Buoyancy.

UNTI II **(10 Periods)**

FLUID KINEMATICS AND DYNAMICS: Description of fluid flow – Stream line – Path line and streak line – Stream tube – Classification of flows – Equation of continuity – Stream and Velocity potential functions – Flow net and its uses – Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line – Momentum equation and its application – Momentum and kinetic Energy correction factors – Forces on pipe bend.

UNIT III **(09 Periods)**

CLOSED CONDUIT AND MEASUREMENT OF FLOW: Laws of fluid friction – Darcy–Weisbach equation – Minor losses – Pipes in series – Pipes in parallel – Total energy line and hydraulic gradient line – Moody's chart – Pitot tube – Venturimeter and orifice meter – Orifices and mouthpieces – Rectangular, triangular and trapezoidal notches – Broad crested weir.

UNIT IV **(08 Periods)**

LAMINAR AND TURBULENT FLOW: Reynolds's experiment – Hagen Posieullie equation – Characteristics of laminar and turbulent flows – Laminar flow through circular pipes – Flow between parallel plates – Hydro dynamically smooth and rough boundaries.

UNIT V **(08 Periods)**

HYDRAULIC SIMILITUDE : Dimensional analysis – Rayleigh's method and Buckingham's ð theorem – Model studies – Geometric, kinematic and dynamic similarities – Dimensionless numbers – Model laws – Scale effects.

Total Periods: 45

TEXT BOOKS

1. R.K. Rajput, *A Textbook of Fluid Mechanics*, 5th Edition, S. Chand Publishers, 2013.
2. R.K. Bansal, *Fluid Mechanics a*nd *Hydraulic Machines*, 9th Edition, Laxmi Publishers, 2011.

REFERENCE BOOKS

1. P.N. Modi and S.M. Seth, *Hydraulics and Fluid Mechanics Including Hydraulic Machines,* 20th Edition, Standard Book House, 2011.
2. J.F. Douglas, J.M. Gaserek and J.A. Swaffirld*, Fluid Mechanics,* 5th Edition, Longman, 2010.
3. S.K. Som and G. Biswas*, Introduction to Fluid Machines*, 2nd Edition, Tata McGraw–Hill Publishers Pvt. Ltd, 2010.
4. Domkundwar and Domkundwar, A *Textbook of Fluid Mechanics a*nd *Hydraulic Machines*, 6th Edition, Dhanpat Rai and Co, 2014.

II B.Tech I Semester

14BT30121: **ENGINEERING GEOLOGY LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: –

COURSE DESCRIPTION: Study of Physicl Properties of Rocks and Minerals – Geological Maps – Problems on Structural Geology – Norm Form Calculations.

COURSE OUTCOMES:

After the completion of this course, a successful student will be able to:

1. Apply the knowledge of physical properties of minerals and rocks to the suitability of the construction materials .
2. Analyze the geological map for a given area
3. Conduct investigations on the availability ground water using resistivity meter

LIST OF EXPERIMENTS:

1. Study of physical properties and identification of rock forming minerals
2. Study of physical properties and identification of ore forming minerals
3. Study of physical properties and identification of common igneous rocks
4. Study of physical properties and identification of common sedimentary rocks
5. Study of physical properties and identification of common metamorphic rocks
6. Study of geological maps, drawing and interpretation of geological sections
7. Simple structural geology problems
8. Norm form calculations

II B.Tech I Semester

14BT30122: **STRENGTH OF MATERIALS LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: Engineering Mechanics

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Determine the strength of structural elements under different loading conditions
2. Present report on the structural properties of the materials in written and oral form

LIST OF EXPERIMENTS:

1. Tension test on mild steel / HYSD bar
2. Compression test on wood
3. Compression test on coiled spring
4. Tension test on coiled spring
5. Bending test on carriage spring
6. Brinell and Rockwell hardness tests
7. Charpy and Izod impact tests
8. Shear test on mild steel
9. Bending test on simply supported beam
10. Bending test on cantilever beam
11. Bending test on fixed beam
12. Bending test on continuous beam
13. Verification of Maxwell's reciprocal theorem
14. Torsion test on mild steel

II B.Tech II Semester

14BT3BS03: **PROBABILITY AND STATISTICS**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITE: Engineering Mathematics

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO 1 Acquire basic knowledge in
- (a) probability distributions, correlation and regressions,
- (b) statistical quality control and testing of hypotheses.
- (c) finding regression coefficients ,elucidating relationships in bivariate data
- (d) tests of significance for small and large samples

CO 2 (i) Develop analytical skills for the problems involving
- (a) means, probability distributions and standard deviations
- (b) sampling techniques for decision making in uncertain environments

(ii) Develop skills for analyzing the data with
- (a) suitable tests of significance for practical situations.
- (b) through probability distributions for practical situations.

CO 3 Develop skills in applying
- (a) statistical techniques employed for quality control and maintenance of uniform quality in the manufacturing processes.

DETAILED SYLLABUS:

UNIT – I **(9 periods)**

PROBABILITY & MATHEMATICAL EXPECTATIONS: Probability- Conditional probability. Bayes theorem. **Random Variables:** Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density function, Mathematical expectation, Properties of Mathematical expectations, Mean and Variance.

UNIT - II **(9 periods)**

PROBABILITY DISTRIBUTIONS:

Discrete Distributions: Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and Standard Deviations of Poisson Distribution.

Continuous Distributions: Normal Distribution, Mean, Variance and area properties.

UNIT-III **(9 periods)**

STATISTICAL QUALITY CONTROL AND CORRELATION- REGRESSION: Introduction, Advantages and limitations of statistical quality control, Control charts, specification limits, $\bar{X}$, R, p, np and c charts. Definition of correlation, correlation coefficient, Rank correlation. Simple linear regression, regression lines and properties.

UNIT-IV **(9 periods)**

SAMPLING DISTRIBUTIONS AND TESTS OF SIGNIFICANCE FOR LARGE SAMPLES: Population and Sample, Parameter and Statistic, Sampling Distribution of Statistic, Standard Error of Statistic, Null and Alternative Hypothesis, Type I and II errors, Level of Significance, Critical region, Degrees of freedom. Test of Significance for Single Proportion, Difference of Proportions, Single Mean, Difference of Means.

UNIT-V **(9 periods)**

TESTS OF SIGNIFICANCE FOR SMALL SAMPLES

Student's t-test: single mean, difference of means, F-test for equality of population variance, Chi-Square Test for Goodness of fit, contingency table, Chi-Square Test for Independence of Attributes.

Total Periods : 45

TEXT BOOKS:

1. T.K.V. Iyengar, B. Krishna Gandhi ..etal., *Probability and Statistics*, 3/e., S. Chand & Company, (2011).
2. S.P.Gupta, *Statistical Methods,* 34th edition, Sultan and Chand, New Delhi, (2005).

REFERENCE BOOKS:

1. Shahnaz Bathul, *A text book of Probability and Statistics,* 2 ed, Ridge Publications.
2. S.C.Gupta and V.K.Kapoor , *Fundamentals of Applied Statistics,* Sultan and Chand, New Delhi.(1998).

II B.Tech II semester:

14BT3HS01: **ENVIRONMENTAL SCIENCES**

(Common to CE, ME, CSSE, IT & CSE)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Physics and Engineering Chemistry

COURSE DESCRIPTION:

Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Acquire knowledge in

a) diverse components of environment and natural resources

b) ecosystem and biodiversity & its conservation methods

c) population growth and human health

d) green technology

2. Identify and resolve the issues related to sources of different types of pollutions.
3. Provide solutions to individuals, industries and government for sustainable development of natural resources.
4. Create awareness on environmental degradation and to bring best management practices to protect environment.
5. Develop skills in analyzing reports on environment for sustainable development.
6. Apply environmental ethics in protection of diversified ecosystems.

DETAILED SYLLABUS: (11 periods)

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES

Multidisciplinary nature of environment: Definition, scope and importance of multidisciplinary nature of environment, segments of environment-lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness.

Natural Resources: Renewable and Non-renewable resources and associated problems- (a) forest resources: use and over exploitation, deforestation-causes, effects and remedies, case studies, (b) water resources-use and over utilization of surface & ground water, conflicts over water-benefits and problems of large dams, case studies, (c) mineral resources- mining, adverse effects, case studies,

(d) food resources-world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging and salinity, case studies, (e) energy resources-growing needs, renewable energy resources–solar, wind, hydropower, hydrogen fuel and non-renewable energy resources-coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT-II: ECOSYSTEMS AND BIODIVERSITY (10 periods)

Ecosystems: Definition and concept of an ecosystem, structure and function of an ecosystem-producers, consumers and decomposers, food chains, food webs and ecological pyramids-introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem-ponds, lakes & oceans, energy flow in the ecosystem, ecological succession. Biodiversity: Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity–habitat loss, poaching of wildlife, man-wild life conflicts, endemic, endangered and extinct species of India, conservation of biodiversity–in-situ and ex-situ.

UNIT-III: ENVIRONMETAL POLLUTION AND CONTROL (8 periods)

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management–causes, effects and control measures of urban and industrial wastes, hazards and disaster management–floods, earthquakes, tsunamis, case studies.

UNIT-IV: SOCIAL ISSUES AND THE ENVIRONMENT (8 periods)

From unsustainable to sustainable development, urban problems related to energy, environmental ethics-issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

UNIT-V: HUMAN POPULATION AND THE ENVIRONMENT (8 periods)

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies. Field work: visit to a local area to document environmental assets-pond/forest/grassland/hill/mountain/Environment Impact Assessment procedures for local environmental issues or assignment/seminar.

Total periods: 45

TEXT BOOKS:

1. **A.Kaushik and C.P. Kaushik**, "Environmental Studies", 4th Edition, New Age International (P) Ltd Publications, 2014.
2. Erach Barucha, "Environmental Studies", 2nd Edition, Orient Blackswan, 2013.

REFERENCE BOOKS:

1. **R. Rajagopalan**, "Environmental Studies", 2nd Edition, Oxford University Press, 2011.
2. **Benny Joseph**, "Environmental Studies", Tata Mc.Graw Hill, 2009.
3. **Dr. B S Chauhan,** "Environmental Studies", 1st Edition, University Science Press, 2008.
4. **M. Anji Reddy**, "Textbook of Environmental Sciences and Technology", BS Publications, 2007.
5. **Larry W Canter, "**Environmental Impact Assessment",2nd edition, Mc.Graw Hill Education, 1996.

II B. Tech. II Semester

14BT4HS01: **BUSINESS COMMUNICATION AND PRESENTATION SKILLS**

(Common to CSE, IT, CSSE, CE and ME)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITES: Basic grammar and fundamentals of Listening, Speaking, Reading and Writing skills.

COURSE DESCRIPTION:

Nature and Scope of Communication; Non-Verbal Communication; Writing Business Documents; Business Presentations and Public Speaking; Careers and Resume.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to

1: Acquire knowledge in
   a) Managerial Communication
   b) Corporate Communication
   c) Business Writing
   d) Presentation Skills
   e) Career Building

2: Analyze and judge the situation through non-verbal communication for effective organizational communication.

3: Achieve personal excellence and ability to work in groups.

4: Develop effective communication to meet professional needs.

DETAILED SYLLABUS:

UNIT – I: NATURE AND SCOPE OF COMMUNICATION (09 periods)

Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks - Informal Communication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication.

UNIT – II: NON-VERBAL COMMUNICATION (09 periods)

Introduction - Significance of Non-verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non-verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross-cultural Communication Strategies - Corporate Communication: Introduction - Crisis Management / Communication - Case Study.

UNIT – III: WRITING BUSINESS DOCUMENTS (10 periods)

Business Writing: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters - Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT – IV: BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 periods)

Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non-functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT – V: CAREERS AND RESUME (07 periods)

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - Résumé Writing: Résumé Formats; Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non-verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

Total periods: 45

TEXT BOOK:

1. Meenakshi Raman and Prakash Singh, *Business Communication,* Second Edition, Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M K Sehgal and Vandana Khetarpal*, Business Communication,* Excel Books, New Delhi, 2011.
2. M Ashraf Rizvi, *Effective Technical Communication,* Tata Mc.Graw Hill, 2009.

II B.Tech II Semester

14BT40101: **STRUCTURAL ANALYSIS – I**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Mechanics of solids

COURSE DESCRIPTION: Principal Stresses and Strains – Deflection of Beams; Macaulay's Method and Double Integration Method – Columns and Struts – Intermediate Beams – Theories of Failure; Unsymmetrical Bending and Shear Centre.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain stresses and strains due to axial loading and fundamentals of columns and struts
2. Calculate stresses, moments and deflection of beams and columns using different methods

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

PRINCIPAL STRESSES AND STRAINS: Stresses on an inclined plane under axial loading – Compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Triaxial state of stresses– Principal stresses and strains.

UNIT II **(11 Periods)**

DEFLECTION OF BEAMS: Bending into a circular arc – Slope, deflection and radius of curvature – Differential equation for the elastic curve of a beam – Double integration and Macaulay's methods – Mohr's theorems. Moment area method– Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L. and uniformly varying loads.

UNIT III **(09 Periods)**

COLUMNS AND STRUTS : Types of columns – Short, medium and long columns – Axially loaded compression members – Euler's theorem for long columns – Euler's critical load – Equivalent length of a column – Slenderness ratio – Limitations of Euler's theory – Rankine–Gordon formula – Long columns subjected to eccentric loading – Secant formula.

UNIT IV **(09 Periods)**

INDETERMINATE BEAMS: Introduction to statically indeterminate beams – Fixed end moment due to uniformly distributed load, point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams – Deflection of fixed beams – Effect of sinking of support – Effect of rotation of a support – Shear force and Bending moment diagrams of propped cantilever. Continuous beams **–** Clapeyron's theorem of three moments – Analysis of continuous beams with one or both ends fixed – Continuous beams with overhang.

UNIT V **(08 Periods)**

THEORIES OF FAILURE: Maximum principal stress theory – Maximum principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory.

UNSYMMETRICAL BENDING AND SHEAR CENTRE: Centroidal principal axes of section– Stress in beams due to unsymmetrical bending– Principal axes– Location of neutral axis– Shear centre of channel section and unequal section.

Total Periods: 45

TEXT BOOKS

1. V.N. Vazirani, M.M.Ratwani and S.K.Duggal, *Analysis of Structures–Vol. I,* and *Vol. II*, 17th Edition, Khanna Publications, 2013.
2. Ramamrutham, S. and Narayanan, R., *Theory of Structures*, 9th Edition, Dhanpat Rai Publishing Co. Ltd., 2014.

REFERENCE BOOKS

1. R.S.Khurmi, *Theory of Structures*, 22nd Edition, S. Chand & Company Ltd., 2013.
2. S.S. Bhavikatti, *Structural Analysis– Vol–I*, 3rd Edition, I.K. International Publishing House Pvt. Limited, 2008.
3. H.J. Shah and S.B. Junnarkar, *Mechanics of Structures – Vol. II*, 21st Edition, Charotar Publishing House, 2010.
4. Pandit, G., Gupta, S. and Gupta, R., *Theory of Structures – Vol. I*, 2nd Edition, Tata Mc–Graw Hill Publishing Co. Ltd., 1999.

II B. Tech II Semester

14BT40102: **CONSTRUCTION, PLANNING AND PROJECT MANAGEMENT**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Building Materials and Concrete Technology

COURSE DESCRIPTION: Masonry and Foundations, Building Components – Finishing's – Shoring Scaffolding and Formwork – Organization – Resource Management (Manpower, Materials, Machinery) – Project Management, Bar Charts and Milestone Charts, Network – PERT and CPM.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Demonstrate the knowledge of building components, resource and project management in the construction
2. Identify Critical Activities and Critical Paths in a Construction Project and prepare network for analysis.
3. Monitor and Control the activities in the Civil Engineering Projects in the view of Safety and Cost of the Project
4. Use engineering and project management skills for better construction management

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

MASONRY AND FOUNDATIONS: Types of masonry – English and Flemish bonds – Rubble and Ashlar masonry – Cavity walls – Partition walls – Foundations – Shallow foundations – Spread, combined, strap and mat footings.

BUILDING COMPONENTS: Lintels, arches, vaults, stair cases – Different types of floors – Concrete, mosaic, terrazzo floors – Pitched, flat and curved roofs – Lean–to–Roof, coupled roofs, trussed roofs – King and Queen post trusses – RCC Roofs – Madras Terrace/Shell Roofs.

UNIT II **(09 Periods)**

FINISHINGS: Damp Proofing , water proofing, Termite proofing, Fire proof materials used – Plastering – Pointing – White washing and distempering – Painting – Constituents of a paint – Types of paints – Painting of new/old Wood – Varnish.

SHORING, SCAFFOLDING AND FORM WORK: Types, Erection methodology, Latest equipment, Safety precautions.

UNIT III **(11 Periods)**

ORGANIZATION: Types of organization – Merits and demerits of different types of organization – Labour legislation in India – Workmen's Compensation Act of 1923 and Minimum Wages Act of 1948, and subsequent amendments– Safety in construction.

RESOURCE MANAGEMENT :Manpower: Resource smoothing – Resource leveling – Establishing workers productivity. **Materials:** Objectives of material management – Costs – Functions of material management departments – ABC classification of materials – Inventory of materials – Material procurement – Stores management. **Machinery: (**Basics only) Classification of construction equipment – Earth moving equipment – Excavation equipment – Hauling equipment – Earth compaction equipment – Hoisting equipment – Concreting plant and equipment – Selection of equipment –Task consideration – Cost consideration – Factors affecting the selection – Factors affecting cost owning and operating the equipment – Equipment maintenance.

UNIT IV **(07 Periods)**

PROJECT MANAGEMENT, BAR CHARTS AND MILESTONE CHARTS:

Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives – Operation research – Methods of planning and programming problems – Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT network problems.

ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK:

Introduction – Event – Activity – Dummy – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems – Planning for network construction – Modes of network construction – Steps in development of network– Work breakdown structure – Hierarchies – Illustrative examples.

UNIT V **(10 Periods)**

PERT AND CPM : Network analyses – PERT – Slack – Critical path – Illustrative examples – Probability of meeting scheduled date problems – CPM Process – CPM Networks – Activity time estimate – Earliest event time – Latest allowable occurrence time – Combined tabular computations for T_E and T_L – Start and finish times of activity – Float – Critical activities and critical path – Resource allocation – Leveling – Crashing Illustrative examples.

Total Periods: 45

TEXT BOOKS

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Building Construction,* 10th Edition, Laxmi Publications (P) Ltd., 2010**.**
2. B.C.Punmia, K.K. Khandelwal, *Project Planning and Control with PERT and CPM,* 4th Edition, Lakshmi Publications (P). Ltd., 2010.

REFERENCE BOOKS

1. Jha, *Construction Project Management,* 1st Edition, Pearson Pubilications, 2011.
2. KK Chitkara, *Construction Project Management: Planning, Scheduling and Controlling*, 3rdEdition,Tata McGraw Hill Education Pvt. Ltd., 2014
3. S. Seetharaman, *Construction Engineering and Management,* 3rd Edition, Umesh Publications, 2010.
4. R. Chudly, Roger Greno, Mike Hurst and Simon Topliss, *Construction Technology – Vol. I and Vol. II,* 5th Edition, Longman, 2011.

NOTE: Booklet containing relevant extracts from Standards and Codes, prepared by the Department, should be made available to Students during examinations

II B.Tech II Semester

14BT40103: **SURVEYING**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

COURSE DESCRIPTION: Linear Measurements and Chain Surveying – Computation of Areas and Volumes – Compass Surveying– Leveling and Contouring – Theodolite – Tacheometric Surveying & Curves – Electronic Distance Measurement – Total Station.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Apply the principles of mathematics, sciences in the field for evaluating heights, areas and volumes in surveying engineering
2. Analyze and interpret the survey techniques in calculating areas and volumes
3. Perform a survey and preparea a plot using appropriate methods

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

LINEAR MEASUREMENTS AND CHAIN SURVEYING: Principle – Classification – Accuracy and errors – Linear measurements – Direct measurements – Instruments for chaining – Ranging out survey lines – Errors in chaining – Field book – Instruments for setting right angles.

COMPUTATION OF AREAS AND VOLUMES: Areas: Areas dividing into number of triangles – By offsets to a base line – By latitudes and departures (D.M.D. and D.P.D) – By coordinates – Areas from maps – Determination of the capacity of reservoir.

UNIT II **(10 Periods)**

COMPASS SURVEYING: Types of compass – Bearings – Included angles– Errors and Adjustments.

LEVELLING AND CONTOURING: Types of levels – Auto Level – Temporary and permanent adjustments – Height of instrument and rise and fall methods – Effect of curvature and refraction – Characteristics of contours – Uses of contour maps.

UNIT III **(09 Periods)**

THEODOLITE : Description and uses of vernier micrometer – Micro–optic theodolites – Temporary and permanent adjustments of vernier transit – Measurement of horizontal and vertical angles – Heights and distances – Traversing – Closing error and distribution – Gale's traverse table – Omitted measurements.

UNIT IV **(10 Periods)**

TACHEOMETRIC SURVEYING: Principle of stadia method – Distance and elevation formulae for staff held vertical and normal –Instrumental constants – Anallactic lens – Tangential method.

CURVES: Basic definitions – Different types and their characteristics – Geometry – Setting out – Filed problem of Circular curve, Transition curve, Combined curve and Vertical curve by using Tacheometry.

UNIT V **(08 Periods)**

ELECTRONIC DISTANCE MEASUREMENT: Modern surveying electronic equipments: digital levels, digital theodolites, EDMs.

TOTAL STATION: Principles – Working and applications: Measurement of Distance, Area, Height, Angles, Gradients, Traversing, Contouring, Stake out – Data Analysis.

Total Periods: 45

TEXT BOOKS

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Surveying– Vol. I, II and III*, 15th Edition, Laxmi Publications (P) Ltd., 2010.
2. R. Subramanian, *Surveying and Leveling*, 1st Edition, Oxford University Press, 2010.

REFERENCE BOOKS

1. S. K. Duggal, *Surveying – Vol. I and II*, 3rd Edition, Tata McGraw–Hill Publishing Co. Ltd., 2010.
2. Arthur R. Benton and Philip J. Taety, *Elements of Plane Surveying*, 3rd Edition, McGraw Hill, 2010.
3. Arora, K. R., *Surveying – Vol. I and II,* 14th and 11th Edition, Standard Book House, 2011.
4. T P Kanetkar,S V Kulakarni , *Surveying and leveling by*, 24th Edition, Vidyathi grisha prakasham, 2013.

II B.Tech II Semester
14BT40104: FLUID MECHANICS – II

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Fluid Mechanics–I

COURSE DESCRIPTION: Boundary Layer Theory – Open Channel Flow – Impact of Jets – Hydraulic Turbines – Centrifugal Pumps – Hydropower Engineering.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Explain open channel flows, turbines and pumps and apply the fundamentals of mathematics in solving boundary layer problems
2. Analyze the forces on a body, formation of a jump in a channel and efficiency of pumps and turbines.
3. Design a channel for a given condition and a turbine for a specified site

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

BOUNDARY LAYER THEORY : Boundary layer concepts – Thickness of boundary layer – Characteristics of boundary layer along a thin flat plate – Vonkarmen momentum integral equation – Laminar and turbulent boundary layers (no derivation) – Laminar sub–layer– Separation of boundary layer – Control of boundary layer– Flow around submerged bodies – Drag and lift – Magnus effect.

UNIT II **(09 Periods)**

OPEN CHANNEL FLOW: Types of flows – Types of channels – Velocity distribution – Chezy's, Manning's and Bazin's formulae for uniform flow – Most Economical sections – Critical flow – Specific Energy – Critical depth – Computation of critical depth – Critical, subcritical and supercritical flows – Non uniform flow – Dynamic equation for gradually varied flow – Types of slopes – Surface profiles – Direct step method – Rapidly varied flow – Hydraulic jump and its applications – Energy dissipation.

UNIT III **(8 Periods)**

IMPACT OF JETS : Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes – Series of vanes – Jet striking centrally and at tip – Velocity triangles at inlet and outlet – Expressions for work done and efficiency – Applications to radial flow turbines.

UNIT IV **(10 Periods)**

HYDRAULIC TURBINES : Layout of a typical hydropower installation – Heads and efficiencies – classification of turbines – Pelton wheel – Francis turbine – Kaplan turbine – Working, working proportions – Velocity diagrams **–** Work done and efficiency – Hydraulic design – Runaway speed – Draft tube theory, function and efficiency – Governing of turbines – Surge tanks – Unit quantities and specific speed – Performance characteristics – Geometric similarity – Cavitation, causes, effects – Classification of hydropower plants – Load factor – Utilization factor – Capacity factor – Estimation of hydropower potential.

UNIT V **(09 Periods)**

PUMPS : Pump installation details – Classification of centrifugal pumps – Heads – Losses and efficiencies – Limitation of suction lift – Work done – Minimum starting speed – Specific speed – Multistage pumps –Pumps in parallel and series – Performance of pumps – Characteristic curves – Net positive suction head – Priming devices – Cavitation – Working procedure of Special pumps – Self priming pump – Gear pump – Jet pump – Airlift pump.

Total Periods: 45

TEXT BOOKS

1. P.N. Modi and S.M. Seth, *Hydraulics a*nd *Fluid Mechanics,* 18th Edition, Standard Book House, 2011.
2. K. Subramanya, *Flow in Open Channels*, 3rd Edition, Tata McGraw Hill Publishers, 2010.

REFERENCE BOOKS

1. R.K. Bansal, *Fluid Mechanics a*nd *Hydraulic Machines,* 9th Edition, Laxmi Publishers, 2011.
2. R.K. Rajput, *A Textbook of Fluid Mechanics*, 5th Edition, S. Chand Publishers, 2013.
3. V.T .Chow, *Open Channel Flow,* 3rd Edition, McGraw–Hill Publishers, 2009.
4. Domkundwar and Domkundwar, *A Textbook of Fluid Mechanics a*nd *Hydraulic Machines*, 6th Edition, Dhanpat Rai and Co, 2014.

II B.Tech II Semester

14BT40121: **SURVEYING LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: Engineering Mathematics and Engineering Physics

COURSE DESCRIPTION: Exercises on chain survey; compass survey; plane table survey; leveling, heights, distances and areas.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Implement the procedure for an accurate and through note taking in the field work to serve as a legal note
2. Identify the differences in elevation, draw and utilize contour plots and calculate volume for earth work using different instruments
3. Function effectively as a team member in multi–disciplinary teams
4. Effectively communicate information in written, oral and graphical formats

LIST OF EXPERIMENTS:

CYCLE –I

1. CHAIN SURVEY:

1. Cross staff survey and plotting
2. Chain traversing and plotting

2. COMPASS SURVEY:

3. Determination of area by radiation method and plotting
4. Compass traversing and plotting

3. PLANE TABLE SURVEY

5. Resection – Two point and three point problems

4. LEVELLING:

6. Longitudinal and cross–sectioning of a road profile and plotting.
7. Contouring exercise

CYCLE –II

5. THEODOLITE SURVEY:

8. Measurement of horizontal angles by method of repetition and reiteration.
9. Trigonometric leveling – Measurement of heights and distances
10. Setting out a simple curve by Rankine's method

6. TOTAL STATION SURVEY:

11. Determination of area using total station
12. Determination of remote height using total station.
13. Distance between two inaccessible points.
14. Traversing using total station

II B.Tech II Semester

14BT40122: **FLUID MECHANICS AND HYDRAULIC MACHINERY LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: Fluid Mechanics – I & II

COURSE DESCRIPTION: Calibration of Flow Meters – Bernoulli's Apparatus – Performance of Turbines and Pumps – Losses Through Pipes.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Understand the working procedure of various flow measuring devices and hydraulic machines
2. Perform the test on flow measuring devices and hydraulic machines
3. Perform individually and in groups to find the flow rate and efficiency of pumps and turbines
4. Check the efficiency of hydraulic machines and write reports on the suitability of the machine

LIST OF EXPERIMENTS:

1. Calibration of Venturimeter
2. Calibration of Orificemeter
3. Determination of coefficient of discharge for a small orifice by a constant head method.
4. Calibration of rectangular notch
5. Determination of loss of head due to sudden contraction
6. Determination of friction factor for pipes
7. Verification of Bernoulli's equation.
8. Impact of jet on vanes
9. Study of hydraulic jump.
10. Performance test on Pelton wheel turbine
11. Performance test on Francis turbine
12. Performance test on Kaplan turbine.
13. Performance test on single stage centrifugal pump
14. Performance test on multi stage centrifugal pump
15. Performance test on reciprocating pump

III B.Tech I Semester

14BT5HS02: **MANAGEMENT SCIENCE**

(Common to CSE, IT, CSSE, CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PRE-REQUISITES: -

COURSE DESCRIPTION:

Concepts of Management, Evolution of thought of Management, Functions of Management, Environmental Scanning, SWOT analysis, Social Responsibility of Management, Operations Management, Forecasting Methods, Work study, Method Study, Work measurement, Statistical Quality Control, Inventory Management, Marketing, Marketing functions, Human Resource Management, Job evaluation, merit rating, Theories of motivation, Project Management, CPM, PERT, Project cost analysis, Project crashing, Entrepreneurship, Entrepreneur vs Manager, Contemporary Management practices, Just-in-time, Enterprise Resource Planning, Business Process Outsourcing, Intellectual property rights and Supply chain management.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Employ fundamental knowledge on 'Management Thought' and 'Management of a business organization'.
2. Apply various Managerial concepts & contexts to attain 'Optimum Utilization of available organizational resources'.
3. Contribute to the group, as an individual, in accomplishing the stated objective of the business organization.
4. Apply gained knowledge on Management to establish and run his/her own organization, if he/she deserve to be an 'Entrepreneur'.
5. Imbibe contemporary practices in applying Management and exercise discernment in implementing managerial decisions for ethical, safe, and sustainable operations of the business

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION TO MANAGEMENT AND ORGANIZATION (9 Periods)

Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills - Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management. Basic concepts related to organization- Objectives, Procedure and Principles; Types of organizations – Merits, demerits and adoptability to modern firms.

UNIT – II: OPERATIONS MANAGEMENT (12 Periods)

Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling. Materials management objectives; Inventory - Types of inventory – Classical EOQ model - - ABC analysis - Purchase procedure - Stores management. **Marketing:** Functions of marketing - Marketing mix - Channels of distribution.

UNIT – III: HUMAN RESOURCES MANAGEMENT (HRM) (6 Periods)

Nature and scope of HRM - Functions of HRM - Role of HR Manager in an organization, Job evaluation and merit rating - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT–IV: PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (9 Periods)

Network analysis - Program evaluation and review technique (PERT) - Critical path method (CPM) - Probability of completing the project within given time - Project cost analysis - Project crashing.

Introduction to entrepreneurship - Entrepreneurial traits - Entrepreneur vs. manager - Role of entrepreneurship in economic development - Women as an entrepreneur.

UNIT – V: CONTEMPORARY MANAGEMENT PRACTICES (9 Periods)

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) – Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making. **Total Periods:45**

TEXT BOOKS:

1. O.P. Khanna, *Industrial Engineering and Management,* Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, *Management,* 6th Edition, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, *Marketing Management,* 12th Edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, *Essentials of Management,* 6th Edition, TMH, New Delhi, 2007.
3. N.D. Vohra, *Quantitative Techniques in Management,* 2nd Edition, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz*, Management- A Global Perspective,*10th Edition, Mc.Graw Hill International Ltd.

III B. Tech I Semester

14BT4HS02: **PROFESSIONAL ETHICS**

(Common to CSE, IT, CSSE, CE & ME)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PRE-REQUISITES: -

COURSE DESCRPTION: Engineering Ethics, Moral autonomy and Moral dilemmas – Professional and Ideal Virtues, Professional Responsibility and Moral Leadership – Engineering as Social Experimentation, Conscientiousness and Law of Engineering - Responsibilities and Rights, Whistle Blowing – Global Issues, Managerial Ethics.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Apply the principles of ethics to solve engineering problems
2. Analyze the problems in the implementation of moral autonomy and resolve through consensus
3. Responsible to follow the codes of ethics
4. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas
5. Function as a member, consultant, Manager, Advisor and Leader in multi–disciplinary teams
6. Write reports without bias and give instructions to follow ethics

DETAILED SYLLABUS:

UNIT I **(8 Periods)**

ENGINEERING ETHICS

Scope and Aim of Engineering Ethics–Senses of Engineering Ethics– Variety of Moral Issues–Types of Inquiry– Moral Dilemmas– Moral Autonomy– Kohlberg's Theory, Gilligan's theory, Consensus and Controversy,

UNIT II **(10 Periods)**

PROFESSIONAL IDEALS AND VIRTUES

Theories about Virtues, Professions, Professionalism – characteristics, expectations, Professional Responsibility, Integrity, Self–respect, Sense of "Responsibility". Self–interest, Customs and Religion– Self–interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories– resolving moral dilemmas and moral leadership.

UNIT III **(9 Periods)**

ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation– Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters–Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT IV **(9 Periods)**

RESPONSIBILITIES AND RIGHTS

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers– Professional rights, whistle–blowing, the bart case, employee rights and discrimination.

UNIT V **(9 Periods)**

GLOBAL ISSUES

Multinational corporations–Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers – Managerial ethics applied to Engineering Profession, moral leadership.

Total Periods: 45

TEXT BOOKS

1. Mike W. Martin, Roland Schinzinger, *Ethics in Engineering*, 3rd Edition, Tata McGraw–Hill, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, *Engineering Ethics*, Prentice Hall of India, 2004.

REFERENCE BOOKS

1. Dr. S. Kannan, K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, *Fundamental of Ethics for Scientists and Engineers*, 1st Edition, Oxford University Press, 2001.
3. Charles F. Fledderman, *Engineering Ethics*, Pearson Education, 2004.
4. R. Subramanaian, *Professional Ethics*, Oxford Higher Education, 2013

III B.Tech I Semester

14BT50101:**STRUCTURAL ANALYSIS – II**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Structural analysis – I

COURSE DESCRIPTION: Shear Force and Bending Moment**,** Concentrated Load and Moving Load, Influence Lines – Moment Distribution Method – Slope–Deflection Method – Kani's Method – Energy Method – Redundant Pin–Jointed Frames – Multi Storey Frames.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Understand the concepts of Moving loads, influence lines, slope deflection, moment distribution method, Kani's method, energy methods
2. Analyse the beams and frames using different methods

DETAILED SYLLABUS:

UNIT I **(10 Periods)**

MOVING LOADS : Maximum SF and BM at a given section and absolute maximum SF and BM due to single concentrated load, UDL longer than the span, UDL shorter than the span, two point loads and several point loads – Equivalent uniformly distributed load – Focal length.

INFLUENCE LINES: Influence line for support reaction, shear force and bending moment – Load position for maximum SF and for maximum BM at a section – Point loads, UDL longer than the span, UDL shorter than the span – Influence lines for forces in members of Pratt and Warren trusses.

UNIT II **(10 Periods)**

SLOPE–DEFLECTION METHOD: Basic concepts – Slope deflection equation – Application to continuous beams with and without settlement of supports.

MOMENT DISTRIBUTION METHOD: Basic concepts – Stiffness factor – Carry over factor – Application to continuous beams with and without settlement of supports.

UNIT III **(10 Periods)**

KANI'S METHOD: Analysis of continuous beams including settlement of supports – Single bay, single storey portal frames without side sway.

ENERGY METHOD: Strain in linear elastic system – Expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem – Deflections of simple beams and pin jointed plane trusses.

UNIT IV **(08 Periods)**

MULTI STOREY FRAMES (Approximate Methods): Substitute frame method (Two cycle method) for gravity loads – Portal method and cantilever method for lateral loads.

UNIT V **(07 Periods)**

REDUNDANT PIN–JOINTED FRAMES: Introduction to indeterminate frames – Static and kinematic indeterminacies – Castigliano's theorem – Analysis of pin–jointed frames with upto two degrees of internal and external indeterminacies. **Total Periods:45**

TEXT BOOKS

1. Ramamrutham, S. and Narayanan, R., *Theory of Structures*,9th Edition, DhanpatRai Publishing Co. Ltd., 2014.
2. V.N. Vazirani, M.M. Ratwani and S.K.Duggal, *Analysis of Structures – Vol.II*, 16th Edition, Khanna Publications, 2013.

REFERENCE BOOKS

1. H.J.Shah and S.B.Junnarkar, *Mechanics of Structures – Vol.II*, 21st Edition, Charotar Publishing House, 2010.
2. Pandit, G., Gupta.S. and Gupta.R., *Theory of Structures – Vol. II*, 1st Edition, Mc.Graw Hill Publishing Co. Ltd., 1999.
3. Punmia, B. C., Ashok Kumar Jain and Arun Kumar Jain, *SMTS–II –Theory of Structures*, 12th Edition, Laxmi Publications (P) Ltd**.,** 2004.
4. R.S.Khurmi, *Theory of Structures*, 22nd Edition, S. Chand & Company Ltd., 2010.

III B.Tech I Semester

14BT50102: **REINFORCED CEMENT CONCRETE STRUCTURES – I**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Building Materials and Concrete Technology, Structural Analysis

COURSE DESCRIPTION: Introduction to IS 456 recommendations, Working Stress Method, Limit State Method – Design of Beams – Design of Columns – Design of Footings – Design of Slabs.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Apply the working stress method and IS Codal provisions to design RCC elements .
2. Design beams, columns and footings using IS Code .

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

INTRODUCTION TO IS CODAL PROVISIONS: IS 456 recommendations– Reinforced cement concrete, Concrete (constituents, grades, setting time and its behavior under tension and compression), Steel (types, grades and its behavior under tension and compression), Characteristic loads – Characteristic strength – Partial safety factors, Bonding between concrete and steel, Design methods of various RCC elements of a structure(Working stress method and Limit state method).Design of beam using working stress method.

UNIT II **(09 Periods)**

BEAMS: Limit state design of singly reinforced and doubly reinforced beam in detail.

UNIT III **(08 Periods)**

COLUMNS: Short and long columns under axial loads – Slender columns.

UNIT IV **(10 Periods)**

FOOTINGS: Different types of footings – Design of isolated square, rectangular and circular footings– Design of combined footing.

UNIT V **(10 Periods)**

SLABS: Design of one way slab – Two–way slab – Continuous slab using IS Coefficients.

TEXT BOOKS

1. S. UnnikrishnaPillai and DevdasMenon, *Reinforced Concrete Design*, 3rd Edition, Tata Mc.Graw Hill, 2010.
2. S.K. Ray and N.C. Sinha, *Fundamentals of Reinforced Concrete*, 5thEdition, S. Chand & Company & Ltd., 2010.

REFERENCE BOOKS

1. P.C. Varghese, Limit State Designed of Reinforced Concrete, 2nd Edition, Prentice Hall of India, 2010.
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Reinforced Concrete Structures – Vol. I*, 19th Edition, Laxmi Publications Pvt. Ltd., 2010.
3. N. Krishna Raju and R.N. Pranesh,*Reinforced Concrete Design*, 3rdEdition, CBS Publishers Distributors, 2010.
4. M.L. Gambhir, *Fundamentals of Reinforced Concrete Design*, 1st Edition, Printice Hall of India Pvt. Ltd., 2010.

Codes: IS 456–2000 code book is to be permitted into the examination hall.

III B.Tech I Semester

14BT50103:**WATER SUPPLY ENGINEERING**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Environmental Sciences, Fluid Mechanics–I

COURSE DESCRIPTION: Water quality and introduction to water supply – water collection, conveyance and distribution – water treatment – advanced treatment methods – water supply arrangements in buildings.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Explain the concepts of water quality, water quantity and water distribution
2. Analyze the water samples for finding different impurities present in water .
3. Design a pipe network for supplying water from a main source .
4. Assess the reasons for ill health due to disinfected water consumption and provide necessary solutions to treatment for the benefit of the society .

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

WATER QUALITY AND INTRODUCTION TO WATER SUPPLY: Importance of water supply engineering – Need for protected water supply – Objective of water supply systems – Flow diagram of water supply systems. Different sources of water **–** Quantity and quality of different sources – Physical, chemical and biological impurities and their testing– Types and variation in water demand – Factors affecting water demand – Design period – Forecasting of population, different methods and their suitability, Water quality standards.

UNIT II **(10 Periods)**

WATER COLLECTION, CONVEYANCE AND DISTRIBUTION : Intake works for collection of surface water – Conveyance of water – Gravity and pumping methods – Different materials used for conveying conduits and their suitability – Systems of distribution – Distribution reservoirs – Distribution networks – Design of simple networks – Pipe accessories – Valves and their location and suitability.

UNIT III **(09 Periods)**

WATER TREATMENT: Conventional water treatment processes, units and their functions – Theory and design of aeration, coagulation, flocculation, and clarification – Determination of optimum dose of alum for coagulation of water. Theory of filtration – Different types of filters and their design – Disinfection – Disinfectants – Mechanism of disinfection – Different methods of disinfection – Break point chlorination – Types chlorination – Dose of disinfectant.

UNIT IV **(09 Periods)**

ADVANCED TREATMENT METHODS: Removal of fluorides, arsenic, hardness, iron and manganese, salinity, colour, organic chemical and biological residues – Adsorption with activated carbon, ion–exchange resins, membrane processes, chemical oxidation.

UNIT V **(09 Periods)**

WATER SUPPLY ARRANGEMENTS IN BUILDINGS: Definition of technical terms used in water supply arrangements – Identification of different water supply of pipes – General layout of water supply in single storey and multi– storied buildings – Principles and precautions in laying pipe lines in the premises of buildings – Connection from water main to building – Water supply fittings – Detection and prevention of leakage. **Total Periods:45**

TEXT BOOKS

1. G.S. Birdie and J. S. Birdie, *Water Supply and Sanitary Engineering*, 9th Edition , Dhanpat Rai and Sons Publishers, 2011.
2. S.K. Garg, *Environmental Engineering,Vol. I: Water Supply Engineering*, 20th Edition Khanna Publishers, 2011.

REFERENCE BOOKS

1. K.N. Duggal, *Elements of Environmental Engineering*, 1st Edition S.Chand Publishers, 2010.
2. H.S. Peavy and D.R.Rowe, *Environmental Engineering*, 2nd Edition, Mc.Graw Hill Publishing Company, , 1984.
3. P.N.Modi, *Water Supply Engineering*, 3rd edition, Standard book house, 2010.
4. S.K.Duggal, *Elements of water Supply Engineering,* 1st Edition, S. Chand & Co, 2010.

III B.Tech I Semester

14BT50104: **SOIL MECHANICS**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Engineering Mechanics, Engineering Geology

COURSE DESCRIPTION: Basic principles of soil mechanics and their application in engineering practice; Index properties; Engineering properties: Permeability; Seepage – Stress distribution; Compaction; Consolidation; Shear strength.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to

1. Understand the behaviour of soil as an engineering material
2. Provide the description and classification of soil and analyze stresses in soils under different loading conditions.
3. Address problems associated with flow through soils and suggest suitable methods.

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

INDEX PROPERTIES OF SOILS: Soil formation – Types of soils – Soil structure and clay mineralogy – Adsorbed water – Volume–weight relationships – Three–phase diagram – Moisture content – Specific gravity – In–situ density – Relative density– Grain size analysis – Sieve and hydrometer methods – Plasticity of soils – Consistency limits and indices – I.S. Classification of soils – Sensitivity – Thixotropy – Activity of soil.

UNIT II **(09 Periods)**

PERMEABILITY: Soil water – Capillary rise – Flow of water through soils – Darcy's law – Permeability – Factors affecting permeability – Laboratory determination of coefficient of permeability – Permeability of layered systems.

SEEPAGE THROUGH SOILS: Effective stress principle – Effective stress under different loading conditions – Seepage pressure **–** Quicksand condition – Seepage through soils – Flownets: Characteristics and uses – Seepage through earth dams with horizontal filter – Critical hydraulic gradient.

UNIT III **(09 Periods)**

STRESS DISTRIBUTION IN SOILS: Boussinesq's and Westergaard's theories for point loads, circular and rectangular loaded areas – Newmark's influence chart – Approximate methods – Contact pressure distribution.

COMPACTION: Mechanism of compaction – Optimum moisture content and maximum dry density – Factors affecting compaction – Effects of compaction on soil properties – Laboratory determination of OMC and MDD – Field compaction methods – Compaction control.

UNIT IV **(09Periods)**

CONSOLIDATION OF SOILS : Initial, primary and secondary consolidation – Spring analogy for primary consolidation – Consolidation test – e–p and e–log p curves – Terzaghi's theory of one dimensional consolidation – Coefficient of consolidation – Preconsolidation pressure – Secondary consolidation.

UNIT V **(09Periods)**

SHEAR STRENGTH OF SOILS: Mohr–Coulomb failure theories – Types of laboratory shear strength tests – Strength tests based on drainage conditions and their field applicability – Shear strength of cohesionless soils – Critical void ratio – Liquefaction – Shear strength of cohesive soils – Skempton's pore pressure coefficients.

Total Periods:45

TEXT BOOKS

1. Gopal Ranjan and A. S. R. Rao, *Basic and Applied Soil Mechanics,* 2nd Revised Edition, New age International Pvt. Ltd., 2014.
2. K. R. Arora, *Soil Mechanics and Foundation Engineering,* 7thEdition, Standard Publishers and Distributors, 2014.

REFERENCE BOOKS

1. Braja. M. Das, *Principles of Geotechnical Engineering,* 7th Edition, Cengage Learning India, 2009.
2. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Soil Mechanics and Foundation,* 16th Edition, Laxmi Publications Pvt. Ltd., 2014.
3. C. Venkatramaiah, *Geotechnical Engineering,* 3rd Edition, New Age International Publishers, 2010.
4. Lambe, T. W. and Whitman, R. V., *Soil Mechanics,* John Wiley and Sons, Singapore, 2000.

III B.Tech I Semester

14BT50105: **ENGINEERING HYDROLOGY**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Fluid Mechanics I and II

COURSE DESCRIPTION: Hydrologic cycle, applications and history – Weather and seasons in India – Precipitation – Evaporation and evapotranspiration – Runoff – Hydrograph analysis – Design flood – Erosion and reservoir sedimentation.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Explain hydrological cycle, characteristics of runoff and principles of sedimentation .
2. Analyze and interpret the rainfall data and measure precipitation & runoff .
3. Develop solutions in estimating runoff and the flood routing for the safety of public .

DETAILED SYLLABUS:

UNIT I **(09Periods)**

INTRODUCTION TO HYDROLOGY AND PRECIPITATION: Definition and scope of hydrology – Hydrologic cycle – Practical applications and historical development – Precipitation – Types and forms of precipitation – Weather and seasons in India – Measurement of rainfall – Recording and non–recording type of rain gauges – Errors in measurement – Analysis and interpretation of rain fall data – Methods of calculation of mean precipitation over an area

UNIT II **(09Periods)**

EVAPORATION AND INFILTRATION: Process – Factors affecting evaporation – Estimation – Methods of reduction – Infiltration **–** Definition – Factors affecting infiltration – Infiltration equation and indices – Interception – Evapotranspiration – Factors affecting – Measurement

UNIT III **(09Periods)**

RUNOFF : Components – Factors affecting runoff – Rainfall–Runoff relationships – Flow mass curve – Flow duration curves – Mass curve of rainfall – Hyetograph – Double mass curve – Measurement – Stream flow – Measurement of discharge – Area velocity method – Moving boat method – Current meter – Float methods.

UNIT IV **(09Periods)**

HYDROGRAPH ANALYSIS AND FLOOD: Components of Hydrograph – Unit Hydrograph – Derivation – Use and limitation of unit hydrograph – Flood – Methods – Envelope curves – Empirical formulae – Rational method – Unit hydrograph method – Frequency analysis – Flood routing.

UNIT V **(09Periods)**

EROSION AND RESERVOIR SEDIMENTATION

Introduction – Erosion process – Estimation of sheet erosion – Channel erosion – Movement of sediment from Watersheds – Sediment yield from Watersheds – Trap efficiency – Density of sediment deposits – Distribution of sediment in the reservoir – Life of a reservoir – Reservoir sedimentation control – Erosion and reservoir sedimentation problems in India.

Total Periods:45

TEXT BOOKS

1. K. Subramanya, *Engineering Hydrology*, 4th Edition, Tata McGraw– Hill Education Pvt. Ltd., 2013.
2. P. Jaya Rami Reddy, *A Text book of Hydrology,* 3rd Edition, University Press, Laxmi Publications, 2011.

REFERENCE BOOKS

1. H.M. Raghunath, *Grou*nd *Water,* 3rd Edition, Wiley Eastern Ltd., 2009.
2. David Keith Todd, *Grou*nd *Water Hydrology,* 2nd Edition, Wiley India Pvt. Ltd., 2010.
3. V.T. Chow., *Ha*nd *Book of Applied Hydrology,* 2nd Edition, Mc Graw– Hill Education Pvt. Ltd., 2000.
4. C.S.P. Ojah, R. Berndtsson, P. Bhunya, *Engineering Hydrology*, 5th Edition, Oxford Higher Education, 2008.

III B.Tech I Semester

14BT50121 : **COMPUTER AIDED BUILDING PLANNING & DRAWING LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: Building materials and Concrete Technology

COURSE DESCRIPTION: Loading bearing walls; RCC framed structures; Industrial buildings; views on one and two storey buildings.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Draw plan, elevation and cross sectional views of a structure .
2. Design the buildings using Auto CAD
3. Prepare drawings and provide report on the building plan, section and elevation .

SOFTWARE: AUTOCAD

LIST OF EXPERIMENTS:

1. Buildings with load bearing walls (Flat and pitched roof) – Including details of doors and windows
2. RCC framed structures
3. Industrial buildings – North light roof trusses
4. Perspective view of one and two storey buildings

TEXT BOOKS

1. Varma B.P., *Civil Engineering Drawing and House Planning,* 10th Edition, Khanna Publishers, 2008.
2. Balagopal and T.S. Prabhu, *Building Drawing and Detailing,* Spades Publishers, 1987.

REFERENCE BOOKS

1. Shah, M.G., *Building Drawing,* Mc.Graw Hill, New Delhi, 2007.
2. Kumaraswamy N. and KameswaraRao A., *Building Planning and Drawing,* 4th Edition, Charotar Publishing, 2010.
3. Kale and Patki, Shah, *Building Drawing with Integrated Approach To Built Environment,* Mc.Graw Hill, New Delhi, 2002.
4. K.V.Natarajan, *A Text Book of Engineering Graphics,* N.Dhanalakshmi Publishers, 2015.

III B.Tech I Semester
14BT50122: **GEOTECHNICAL ENGINEERING LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: Soil Mechanics

COURSE DESCRIPTION: Determination of water content and specific gravity, Grain size analysis, Tests for Atterberg's limits, Determination of field density, Relative density, Compaction test, CBR test, Permeability tests, Consolidation test, Direct shear test, Unconfined compression test, Triaxial test, Vane shear test.

COURSE OUTCOMES

After completion of the course, a successful student will be able to:

1. Classify the given soil and determine its properties
2. Analyze and interpret engineering behavior of soils.
3. Find suitability of soil for a civil engineering construction.
4. Recommend suitable ground improvement method based on soil type and application.
5. Give solutions to the problems of soil which are environmental friendly and economically viable.
6. Prepare a report on the properties of soil for a given site

LIST OF EXPERIMENTS:

1. Determination of water content
2. Determination of specific gravity
3. Grain size analysis
4. Tests for Atterberg's limits
5. Determination of field density – core cutter and sand replacement method
6. Relative density test
7. Standard Proctor's Compaction test
8. CBR test
9. Permeability of soil – constant head test and variable head test
10. Consolidation test
11. Direct shear test
12. Unconfined compression test
13. Tri–axial compression test
14. Vane shear test

III B. Tech II semester

14BT5HS01: **MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY**

(Common to CSE, IT, CSSE, CE & ME)

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Nil

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1 : Acquire Knowledge in
   a) Tools and concepts of Micro Economics.
   b) Basic Principles and concepts of Accountancy.
   c) Provides life skills for effective utilization of scarce resources.
   d) Financial Accounting.
   e) Using advanced tools like tally and SAP.
   f) Significance of Economics and Accountancy

2:Develop skills in analyzing problems for
   a) Managerial decisions of an organization.
   b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.

3: Develop effective communication in Business and Accounting transactions.

DETAILED SYLLABUS:

UNIT – I **(09 Periods)**

INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS:

Definition, Nature and Scope of Managerial Economics. **Demand:** Determinants of demand – Demand function - Law of demand, assumptions and exceptions - Elasticity of demand –Types of elasticity of demand -Demand forecasting and methods of demand forecasting, **Supply-** Determinants of Supply and Supply function.

UNIT – II **(09 Periods)**

THEORY OF PRODUCTION AND COST ANALYSIS:

Production Function: Isoquants and Isocosts – Input-output relationship - Law of returns. **Cost Concepts:** Total, Average and Marginal Cost **-** Fixed vs. Variable costs –Opportunity Costs Vs Outlay Costs– Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs- Avoidable Costs Vs Unavoidable Costs - **Break Even Analysis (BEA)**–Assumptions, Merits and demerits - Determination of Break Even Point (Simple problems).

UNIT – III **(09 Periods)**

INTRODUCTION TO MARKETS AND PRICING

Market Structure: Types of Markets - Features of perfect competition - Monopoly and monopolistic competition - Price and Output determination in perfect competition and monopoly.

Pricing : Objectives and policies of pricing – Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - Market penetration – Market skimming - Block pricing – Peak load pricing - Cross subsidization. **Capital: Significance** - Types of capital – Sources of Capital.

UNIT – IV **(09 Periods)**

INTRODUCTION AND PRINCIPLES OF ACCOUNTING:

Accountancy: Introduction – Concepts – Conventions – Accounting Principles - Double Entry Book Keeping – Journal – Ledger - Trial Balance (Simple problems).

UNIT – V **(09 Periods)**

FINAL ACCOUNTS:

Introduction to Final Accounts - Trading account - Profit and Loss account and Balance Sheet with simple adjustments (Simple problems).**Computerization of Accounting System :** Manual Accounting *Vs* Computerized Accounting – Advantages and Disadvantages of Computerized Accounting.

Total periods: 45

TEXT BOOKS:

1. A.R. Aryasri, *Managerial Economics and Financial Analysis,* 3rd Edition, Mc. Graw Hill, New Delhi, 2007.ISBN 13: 9780070078031
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, *Managerial Economics,* 2nd Edition, S. Chand and Company, New Delhi, 2010.ISBN13:

REFERENCE BOOKS:

1. Vershaney and Maheswari, *Managerial Economics,* 19th Edition, Sultan Chand and Sons, New Delhi, 2005.
2. H. Craig Petersen and W. Cris Levis, *Managerial Economics,* 4th Edition, Pearson Education, 2009 ISBN-13: 978-0139762833
3. Lipsy and Chrystel, *Economics,* 12th Edition, Oxford University Press, New Delhi, 2011.ISBN 978-0-19-956338-8
4. S.P. Jain and K.L. Narang, *Financial Accounting,* 6th Edition, Kalyani Publishers, Ludhiana, 2002. ISBN 8127204242, 9788127204242.

III B.Tech II Semester

14BT60101: **REINFORCED CEMENT CONCRETE STRUCTURES – II**

Internal Marks	External Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: RCCS I

COURSE DESCRIPTION: Structures– Foundations: strap, raft and piles– Retaining walls– Domes and water tanks– Silos and Chimneys.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain the types of stair cases, foundations and water tanks
2. Design stair case, foundation, retaining walls, water tanks, silos and chimney using IS code .
3. Suggest suitable type of foundation based on loading and soil conditions .

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

STAIRCASES: Types of staircases – Stairs spanning longitudinally and transversally

UNIT II **(10 Periods)**

FOUNDATIONS: Strap footing – Raft foundations–Design of piles and pile caps

UNIT III **(09 Periods)**

RETAINING WALLS: Lateral earth pressure – Design of cantilever and counter fort retaining walls.

UNIT IV **(10 Periods)**

DOMES AND WATER TANKS: Stresses in domes–membrane theory–design of dome–types of water tanks–IS Code provisions–Design of water tanks with flexible base and rigid base.

UNIT V **(08 Periods)**

MISELLANEOUS STRUCTURES: Design of Silos – design of chimneys

Total Periods:45

TEXT BOOKS

1. S. Unnikrishna Pillai and Devdas Menon, *Reinforced Concrete Design*, 3rd Edition, Tata Mc.Graw Hill, 2010.
2. P.C. Varghese, *Limit State Design of Reinforced Concrete*, 2nd Edition Prentice Hall of India, 2010.

REFERENCE BOOKS

1. N.C. Sinha and S.K. Roy, *Fundamentals of Reinforced Concrete*, 5th Edition, S. Chand & Company Ltd, 2010.
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Limit state design of Reinforced Concrete,* Laxmi Publications Pvt. Ltd., 2007.
3. N. Krishna Raju and R.N. Pranesh, *Reinforced Concrete Design*, 3rd Edition, CBS Publishers Distributors, 2010.
4. M.L. Gambhir, *Fundamentals of Reinforced Concrete Design*, Prentice Hall of India Pvt. Ltd., 2010.

III B.Tech II Semester

14BT60102: **FOUNDATION ENGINEERING**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Soil Mechanics

COURSE DESCRIPTION:

Subsurface sampling and characterization methods; Lateral earth pressure; Earth retaining structures; Stability of earth slopes; Bearing capacity of shallow foundations; Allowable bearing pressure; Pile foundations; Caissons and well foundations.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Explain the soil condition at a given location in order to suggea suitable foundation.
2. Estimate bearing capacity, settlement of footings and Analyze slopes using limit equilibrium methods
3. Design foundations and retaining walls

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

SOIL EXPLORATION : Need – Planning – Methods of soil exploration: Geophysical methods, open excavation methods, boring and sampling methods – Types of soil samples – Field tests: SPT, CPT, plate load test, in–situ vane shear test – Borehole logging – Soil investigation report.

UNIT II **(09 Periods)**

LATERAL EARTH PRESSURE: Types of earth pressures – Plastic equilibrium in soils – Rankine's theory: Earth pressures in cohesionless and cohesive soils - Coloumb's wedge theory – Earth pressure on retaining walls of simple configurations – Graphical methods (Rebhann and Culmann) - Types of earth retaining structures - Stability considerations of gravity and cantilever retaining walls.

UNIT III **(8 Periods)**

STABILITY OF EARTH SLOPES : Infinite and finite earth slopes – Types of failures – Factor of safety of infinite slopes – Stability analysis of finite slopes: Bishop's simplified method, Taylor's stability number – Stability of slopes of earth dams under different conditions – Improving stability of slopes.

UNIT IV **(10 Periods)**

BEARING CAPACITY OF SHALLOW FOUNDATIONS: Types and choice of foundation - Depth of foundation - Types of shear failure – Safe bearing capacity - Bearing capacity theories: Terzaghi, Meyerhof, Skempton and IS methods - Effect of groundwater table on bearing capacity - Bearing capacity from SPT and CPT - Allowable bearing pressure - Safe bearing capacity and settlement from plate load test – Allowable settlements of structures – Settlement analysis.

UNIT V **(09 Periods)**

PILE FOUNDATIONS: Types of pile foundation – Factors influencing the selection of pile – Load carrying capacity of piles in granular and cohesive soils – Static and dynamic pile formulae – Pile load test – Negative skin friction – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

CAISSONS AND WELL FOUNDATIONS : Types of caissons – Bearing capacity – Construction – Advantages and disadvantages – Well foundations – Shape – Components of wells – Sinking of wells – Tilts and shifts.

Total Periods:45

TEXT BOOKS

1. C. Venkatramaiah, *Geotechnical Engineering,* 3rd Edition, New Age International Publishers, 2010.
2. K. R. Arora, *Soil Mechanics and Foundation Engineering*, 7th Edition, Standard Publishers and Distributors, 2010.

REFERENCE BOOKS

1. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Soil Mechanics and Foundation*, 16th Edition, Laxmi Publications Pvt. Ltd., 2005.
2. Gopal Ranjan and A. S. R. Rao, *Basic and Applied Soil Mechanics,* 2nd Revised Edition, New Age International Pvt. Ltd., 2010.
3. Braja M. Das, *Principles of Foundation Engineering,* 6th Edition, Cengage Learning India, 2007.
4. Bowles J.E., *Foundation Analysis and Design,* 5th Edition, McGraw–Hill Publishing Company, 2001.

III B.Tech II Semester

14BT60103: **TRANSPORTATION ENGINEERING – I**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Surveying, Soil Mechanics

COURSE DESCRIPTION: Highway development and planning – Highway geometric design– Highway alignment and Highway drainage – Pavement types and Design – Highway construction and equipment – Railway Engineering, Tracks, Curves, Alignment – Airport Engineering, Runway & Lighting systems

COURSE OUTCOMES:

After the completion of this course, a successful student will be able to:

1. Understand the methodology of various tests on Highway materials and their significance
2. Assemble, analyze, and appropriately apply transportation engineering data from existing graphics, reports, and other documents
3. Conduct investigations for the suitability of a pavement to a given site and design of Highway Geometrics, Flexible and Rigid Pavements, Transportations systems and components

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

HIGHWAY DEVELOPMENT AND PLANNING : Highway development in India – Necessity for highway planning – Different road development plans – Classification of roads – Road network patterns – Highway alignment – Factors affecting alignment – Engineering surveys – Drawings and reports.

HIGHWAY GEOMETRIC DESIGN : Importance of geometric design – Design controls and criteria– Highway cross section elements– sight distance elements – Stopping sight distance, overtaking sight distance and intermediate sight distance – Design of horizontal alignment – Design of super elevation and extra widening – Design of transition curves – Design of vertical alignment – Gradients – Vertical curves.—Numerical problems on all the above topics

UNIT II **(07 Periods)**

HIGHWAY MATERIALS : Aggregates and bitumen – Desirable properties – Laboratory tests on aggregate and bitumen, CBR test – Specifications – Aggregate bitumen mixes – Desirable properties – Mix design by Marshal method – Cement and cement concrete —Numerical Problems on all these methods of Testing

HIGHWAY DRAINAGE : Importance of highway drainage – Requirements – Surface drainage – Subsurface drainage – Drainage of slopes and erosion control – Road construction in water logged areas and black cotton soils –Numerical problems

UNIT III **(12 Periods)**

PAVEMENT DESIGN : Types of pavements Difference between flexible and rigid pavements – Pavement components – Sub grade, sub base, base and wearing course – Functions of pavement components – Design factors – Flexible pavement design methods – G.I method, CBR method, Triaxial method – Numerical examples – Design of rigid pavements – Critical load positions – Westergaard's stress equations – Computing radius of relative stiffness and equivalent radius of resisting section – Stresses in rigid pavements – Design of expansion and contraction joints in CC pavements. Design of dowel bars and tie bars – Numerical Problems in all above methods using Formulae and Charts.

UNIT IV **(09 Periods)**

HIGHWAY CONSTRUCTION: Earth work – Construction of WBM Roads – Bituminous Pavements – Cement Concrete Pavements – Joints in Cement Concrete Pavements – RCC and PCC Pavements

HIGHWAY CONSTRUCTION AND CONSTRUCTION EQUIPMENT: Excavators – Drilling Rock and Earth – Aggregate Production – Trucks and Haulage Equipment – Dozers – Scrappers – Finishing Equipment – Asphalt Mix Production and Placement – Concrete and Concrete Equipment – Piles and Pile Driving Equipment – Air Compressors and Pumps – Numerical Problems on output calculations

UNIT V **(09 Periods)**

RAILWAY ENGINEERING: Permanent way components – Cross section of permanent way – Functions of various components like rails, sleepers and ballast –Rail fastenings – Creep of rails – Theories related to creep – Adzing of sleepers – Sleeper density.

GEOMETRIC DESIGN OF RAILWAY TRACK: Gradients – Grade compensation – Cant and negative super elevation – Cant deficiency – Degree of curve – Crossings and turn out.

AIRPORT ENGINEERING: Factors affecting selection of site for airport – Aircraft characteristics – Geometric design of runway – Computation of runway length – Correction for runway length – Orientation of runway – Wind rose diagram – Runway lighting system.

Total Periods:45

TEXT BOOKS

1. S.K. Khanna and C.E.G.Justo, *Highway Engineering,* 10th Edition, Nemchand and Brothers, 2014.
2. S.P. Saxena, S.P. Arora, *Railway Engineering – A Text Book of Transportation Engineering,* 7th Edition, S.Chand and Co. Ltd., 2010.

REFERENCE BOOKS

1. S.K. Khanna and Arora, *Airport Planning and Design,* 6th Edition, Nemchand and Brothers, 2012.
2. KK Chitkara, *Construction Project Management: Planning, Scheduling and Controlling*, Tata McGraw Hill Education Pvt. Ltd., 2010
3. L.R.Kadyali, *Traffic Engineering and Transportation Planning,* 7th Edition, Khanna Publications, 2012.
4. SP Chandola, *A Text book of Transportation Engineering*, S Chand & Co Ltd, 2011

III B.Tech II Semester

14BT60104:**WASTEWATER TECHNOLOGY**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Water Supply Engineering

COURSE DESCRIPTION: Introduction to sewerage systems – Quantity and characterization of sewage – Preliminary and primary sewage treatment – Secondary treatment of sewage – Sludge management and effluent disposal.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain the characteristics of wastewater and its treatment processes
2. Design waste water treatment plant
3. Understand the impact on the environment due to onsite disposal of waste
4. Responsible for the sludge conditioning, utilization and disposal

DETAILED SYLLABUS:

UNIT I **(06 Periods)**

INTRODUCTION TO SEWERAGE SYSTEMS Definition of terms – Sewage, sullage, refuse, garbage – Objectives of sewerage works systems– Sewage collection and disposal – Conservancy systems – Water carriage systems – Merits and demerits – Sewerage systems – Combined, separate, partially separate and combined systems – Merits and demerits**.**

UNIT II **(11 Periods)**

QUANTITY AND CHARACTERISTICS OF SEWAGE

Estimation of quantity of municipal wastewater – Estimation of quantity of storm water – Different types of sewers, design flows through sanitary sewers, storm sewers and combined sewers – Hydraulic design of sewers – Sewer appurtenances – House drainage and plumbing systems. Sampling of sewage – Characteristics and composition of sewage – Physical, chemical and biological properties – Total solids – C.O.D – B.O.D – Equation and factors affecting the BOD and rate of reaction.

UNIT III **(08 Periods)**

PRELIMINARY AND PRIMARY SEWAGE TREATMENT

Concept of waste water treatment, primary, secondary and tertiary treatment – Conventional treatment process flow diagrams of municipal wastewater treatment plants – Functions of each unit– Principles and design of screens, grit chamber, and primary settling tanks.

UNIT IV **(08 Periods)**

SECONDARY TREATMENT OF SEWAGE

Principles of biological treatment, nutritional requirement of biological treatment systems, factors affecting biological treatment systems – Design, construction, operation and maintenance of trickling filter– Activated sludge process – Oxidation ditch – Stabilization ponds.

UNIT **(12 Periods)**

SLUDGE MANAGEMENT AND EFFLUENT DISPOSAL

Quantity and characteristics and types of sludge – Sludge conditioning and dewatering – Handling, treatment, sludge utilization and disposal – Tertiary treatment – Removal of nitrogen, phosphorus, refractory organic, heavy metals, suspended solids and pathogenic bacteria. Standards for disposal – Disposal into surface water bodies – Self purification, zones of pollution – Dissolved oxygen sag curve – Streeter Phelps equation– marine disposal – On land disposal and treatment systems – Overflow, flooding and irrigation – Onsite disposal systems – Septic tank and effluent disposal system.

Total Periods:45

TEXT BOOKS

1. G.S. Birdie and J. S. Birdie, *Water Supply and Sanitary Engineering*, 8th Edition, Dhanpat Rai and Sons Publishers, 2010.
2. P.N. Modi, *Sewage Treatment Disposal and Wastewater Engineering*, 3rd Edition, Standard Publishers Distributors, 2011.

REFERENCE BOOKS

1. S.K. Garg., *Environmental Engineering (Vol. II): Sewage Disposal and Air Pollution Engineering*, 22nd Edition, Khanna Publishers, 2010.
2. Met Calf and Eddy, *Wastewater Engineering*, 4th Edition, TMH Education Pvt. Ltd., 2010.
3. K.N. Duggal, *Elements of Environmental Engineering*, 1st Edition, S. Chand Publishers, 2010.
4. B.C. Punmia and Ashok Jain, *Waste water Engineering*, 2nd Edition, Laxmi Publications, 2014.

III B.Tech II Semester
14BT60105: **ADVANCED STRUCTURAL ANALYSIS**
(PROFESSIONAL ELECTIVE - I)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Structural Analysis

COURSE DESCRIPTION: Arches: two and three hinged arches– Portal frames– Flexibility method– Stiffness method– Curved beams.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Analyze and interpret the data using different methods for arches, frames and curved beams .
2. Apply modern techniques in analyzing arches, frames and curved beams .

DETAILED SYLLABUS:

UNIT I **(10 Periods)**

ARCHES:
THREE HIGED ARCHES Types of arches–Elastic theory of arches – Eddy's theorem– Determination of horizontal thrust, bending moment, normal thrust and radial shear – Effect of temperature
TWO HINGED ARCHES: Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses – Tied arches – Fixed arches.

UNIT II **(09 Periods)**
PORTAL FRAMES: Analysis of single bay, single storey, portal frame including side sway – Shear force and bending moment diagrams by slope deflection and moment distribution methods.

UNIT III **(09 Periods)**
FLEXIBILITY METHOD: Flexibility coefficients – Flexibility matrices – Sign convention – Application to continuous beams – Temperature stresses – Lack of fit – Support settlements.

UNIT IV **(09 Periods)**
STIFFNESS METHOD: Stiffness coefficients – Stiffness matrices – Application to continuous beams – Effect of support displacements– Temperature stresses.

UNIT V **(08 Periods)**
CURVEDBEAMS: Circular beams loaded uniformly and supported on symmetrically placed columns – Semi–circular beams simply supported on three equally spaced supports.

Total Periods:45

TEXT BOOKS

1. V.N. Vazirani, M.M.Ratwani and S.K.Duggal, *Analysis of Structures – Vol. I*, 17th Edition and *Vol. II*, 16th Edition, Khanna Publications, 2013.
2. Ramamrutham, S. and Narayanan, R., *Theory of Structures*, 9th Edition, Dhanpat Rai Publishing Co. Ltd., 2014.

REFERENCE BOOKS

1. H.J.Shah and S.B. Junnarkar, *Mechanics of Structures – Vol. II*, 21st Edition, Charotar Publishing House, 2010.
2. Pandit, G., Gupta, S. and Gupta, R., *Theory of Structures – Vol. II*, 1st Edition, Tata Mc–Graw Hill Publishing Co. Ltd., 1999.
3. Punmia, B. C., Ashok Kumar Jain and Arun Kumar Jain, *SMTS–II – Theory of Structures*, 12thEdition, Laxmi Publications (P) Ltd**,** 2004.
4. R.S.Khurmi, *Theory of Structures*, 22nd Edition, S. Chand & Company Ltd., 2010.

III B.Tech II Semester

14BT60106: **GEOENVIRONMENTAL ENGINEERING**

(PROFESSIONAL ELECTIVE – I)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Soil Mechanics, Environmental Engineering

COURSE DESCRIPTION: Fundamentals of Geoenvironmental Engineering; Multiphase behavior of soil – Soil–Water–Contaminant Interaction – Waste Containment System; Contaminant Site Remediation; Advanced Soil Characterization.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain the fundamental principles of science in Geo-environmental engineering
2. Analyse and identify the mechanical and hydraulic properties of soil, solid waste, and geosynthetics.
3. Quantify the mechanical and hydraulic properties needed to satisfy design criteria of projects involving clay barriers, unsaturated soil barriers, and geosynthetics barriers.
4. Apply stability, water balance, and contaminant transport concepts needed in the design of waste containment facilities.

DETAILED SYLLABUS:

UNIT I **(9 Periods)**

Fundamentals of Geoenviromental Engineering: Scope of geoenvironmental engineering – multiphase behavior of soil – role of soil in geoenvironmental applications – importance of soil physics, soil chemistry, hydrogeology, biological process – sources and type of ground contamination – impact of ground contamination on geoenvironment – case histories on geoenvironmental problems..

UNIT II **(9 Periods)**

Soil–Water–Contaminant Interaction: Soil mineralogy characterization and its significance in determining soil behavior – soil–water interaction and concepts of double layer – forces of interaction between soil particles – concepts of unsaturated soil – importance of unsaturated soil in geoenvironmental problems – measurement of soil suction – water retention curves – water flow in saturated and unsaturated zone – soil–water–contaminant interactions and its implications – factors affecting retention and transport of contaminants.

UNIT III **(9 Periods)**

Waste Containment System: Evolution of waste containment facilities and disposal practices – site selection based on environmental impact assessment – different roles of soil in waste containment – different components of waste containment system and its stability issues – property evaluation for checking soil suitability for waste containment – design of waste containment facilities.

UNIT IV **(9 Periods)**

Contaminant Site Remediation: Site characterization – risk assessment of contaminated site – soil remediation technologies: soil vapor extraction, soil washing, stabilization/solidifcation, electrokinetic remediation, thermal desorption, vitrification, bioremediation, phytoremediation – groundwater remediation technologies: pump–and–treat; in–situ flushing; permeable reactive barriers, in–situ air sparging, monitored natural attenuation, bioremediation – selection and planning of remediation technologies – some examples of in–situ remediation.

UNIT V **(9 Periods)**

Advanced Soil Characterization: Contaminant analysis – water content and permeability measurements – electrical and thermal property evaluation – use of GPR for site evaluation – introduction to geotechnical centrifuge modeling.

Total Periods:45

TEXT BOOKS

1. Reddi, L. N. and Inyang, H. I. *Geoenvironmental Engineering Principles and Applications*, Marcel. Dekker, Inc., 2000.
2. Sharma H.D. and Reddy K.R., "Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies" John Wiley & Sons, Inc., USA, 2004.

REFERENCE BOOKS

1. Rowe, R. K. *Geotechnical & Geoenvironmental Engineering Handbook*, Kluwer Academic, 2001
2. Yong, R. N., "Geoenvironmental Engineering, Contaminated Soils, Pollutant Fate, and Mitigation" CRC Press, New York, 2001.
3. Phillip B. Bedient, Refai, H. S. & Newell, C. J. *Ground Water Contamination*, 4th Edition, Prentice Hall Publications, 2008
4. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. *Hazardous Waste Management*, McGraw–Hill, 2001.

III B.Tech II Semester

14BT60107: **GROUND WATER DEVELOPMENT AND MANAGEMENT**

(PROFESSIONAL ELECTIVE - I)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Engineering Hydrology, Engineering Geology, Water Resources Engineering

COURSE DESCRIPTION: Groundwater occurrence and movement – Analysis of pumping test data – Saline water intrusion into an aquifer – Artificial recharge of ground water – Surface and subsurface investigation – Groundwater basin management.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Describe about ground water occurrence, exploration, movement and pollution .
2. Analyze the capacity of a well using Theis, Jacob and Chow's solution .
3. Use modern methods for recharging groundwater and reducing the ground water pollution .

DETAILED SYLLABUS:

UNIT I **(10 Periods)**

GROUNDWATER OCCURRENCE AND MOVEMENT : Groundwater hydrologic cycle – Origin of groundwater – Vertical distribution of groundwater – Geologic formations – aquifers – Types of aquifers – Aquifer Parameters – Permeability – Darcy's law – Differential equation governing groundwater flow – Groundwater flow equation – Groundwater flow contours and their applications.

UNIT II **(09 Periods)**

ANALYSIS OF PUMPING TEST DATA : Steady groundwater flow towards a well in confined and unconfined aquifers – Unsteady radial flow towards a well – Non equilibrium equations – Thies solution – Jacob and Chow's solutions – Leaky aquifers – Yield of an open well.

UNIT III **(08 Periods)**

SALINE WATER INTRUSION IN AN AQUIFER: Saline water intrusion – Ghyben – Herzberg relation – Shape of interface – Control of seawater intrusion – Recognition of seawater in groundwater.

UNIT IV **(09 Periods)**

ARTIFICIAL RECHARGE OF GROUND WATER AND BASIN MANAGEMENT: Concept of artificial recharge – Recharge methods – Relative merits – Applications of GIS and Remote Sensing in artificial recharge of groundwater along with case studies – Concepts of conjunction use – Case studies.

UNIT V **(09 Periods)**

SURFACE AND SUBSURFACE INVESTIGATION: Surface methods of exploration – Electrical resistivity and seismic refraction methods – Radiometric logging – Subsurface methods – Geophysical logging and resistivity logging – Field Survey using Electrical resistivity method.

Total Periods:45

TEXT BOOKS

1. H.M. Raghunath, *Grou*nd *Water,* 3rd Edition, Wiley Eastern Ltd., 2009.
2. David Keith Todd, *Grou*nd *Water Hydrology,* 2nd Edition, Wiley India Pvt. Ltd., 2010.

REFERENCE BOOKS

1. K.R. Karanth, *Grou*nd *Water Assessment, Development a*nd *Management*, 1st Edition, TMH, 2003.
2. R.Willis and W.W.G. Yeh, *Grou*nd *Water System Planning a*nd *Management,* PHI, 1987.
3. C.W. Fetter, *Applied Hydrogeology,* 4th Edition, PHI, 2010.
   Bhagu R. Chahar, *Grou*nd *Water Hydrology,* Mc. Graw Hill Education Pvt. Ltd., 2014.

III B.TECH II SEMESTER
14BT60108: **SOLID WASTE MANAGEMENT**
(PROFESSIONAL ELECTIVE - I)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Waste Water Technology

COURSE DESCRIPTION: Sources and types of municipal solid wastes – Onsite handling, storage and processing – collection and transfer – Off sites processing – Disposal

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Demonstrate knowledge on the sources, types of solid wastes, storage and disposal .
2. Idenrify and develop onsite and offsite processing techniques of solid waste .
3. Use modern techniques for collection and land filling of solid waste .
4. Address the public health problems due to waste disposal and collection .

DETAILED SYLLABUS:

UNIT I **(11 Periods)**

SOURCES AND TYPES OF MUNICIPAL SOLID WASTES

Sources and types of solid wastes, quantity – Factors affecting generation of solid wastes– Characteristics – methods of sampling and characterization – Effects of improper disposal of solid wastes – public health effects. Principles of solid waste management – Social & economic aspects – Public awareness – Role of NGOs – Legislation.

UNIT II **(08 Periods)**

ON–SITE STORAGE & PROCESSING

On–site storage methods – materials used for containers – On–site segregation of solid wastes – Public health & economic aspects of storage – Options under Indian conditions – Critical Evaluation of Options.

UNIT III **(09 Periods)**

COLLECTION AND TRANSFER

Methods of Collection – types of vehicles – Manpower requirement – Collection routes; transfer Stations – Selection of location, operation & maintenance– Collection options under Indian conditions.

UNIT IV **(09 Periods)**

OFF–SITE PROCESSING

Processing techniques and Equipment; Resource recovery from solid wastes – Composting, Incineration, Pyrolysis.

UNIT V **(08 Periods)**

DISPOSAL

Dumping of solid waste– sanitary landfills – Site selection, design and operation of sanitary Landfills – Leachate collection & treatment

Total Periods:45

TEXT BOOKS

1. T.V.Rama Chandra, *Management of Municipal Solid Waste*, 2011.
2. B.Bilitewski, G.HardHe, K.Marek, A.Weissbach, and H.Boeddicker, *Waste Management*, Springer, 1994.

REFERENCE BOOKS

1. George Tchobanoglous et.al., *Integrated Solid Waste Management*, Mc.Graw Hill Publishers, 2002.
2. *Manual on Municipal Solid Waste Management*, CPHEEO, Ministry of Urban Development, Government of India, 2000.
3. Bhide A.D. and Sundaresan, B.B. *Solid Waste Management in Developing Countries*, INSDOC, 2010.
4. G. Burke, B. R. Singh and L. Theodore, *Handbook of Environmental Management and Technology*, 2nd Edition, John Wiley & Sons, 2000.

III B.Tech II Semester

14BT60121: **CONCRETE AND HIGHWAY MATERIALS LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: Transportation Engineering – I

COURSE DESCRIPTION: Testing of Aggregates, Cement and Bituminous material; Testing of Concrete and Bituminous mixes

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Perform standard tests on Aggregates and Cements used in Buildings and Highway construction
2. Evaluate the quality and performance of Aggregates, Cement and Bituminous material and select suitable materials used in Buildings and Highway construction
3. Test and design Concrete and Bituminous mixes
4. Communicate the properties of building and highway materials through a report after testing

LIST OF EXPERIMENTS:

I. AGGREGATES

1. Aggregate crushing value
2. Aggregate impact test
3. Specific gravity and water absorption
4. Attrition test
5. Abrasion test
6. Shape tests
7. Bulking of Sand

II. BITUMINOUS MATERIALS

1. Penetration test
2. Ductility test
3. Softening point test
4. Flash and fire point tests
5. Bituminous Mix Design and testing using Marshall Stability Testing Machine

III. CEMENT AND CONCRETE

1. Normal consistency and fineness of cement
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement
4. Compressive strength of cement
5. Workability test on concrete by Compaction factor, Slump and Vee–bee
6. Young's modulus and compressive strength of concrete
7. Concrete Mix Design and Testing

III B.Tech II Semester

14BT60122: **ENVIRONMENTAL ENGINEERING LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: Water Supply Engineering

COURSE DESCRIPTION: Physical and chemical analysis for water and waste water

COURSE OUTCOMES:

After completion of the course, a successful student will able to:

1. Test water quality and asses waste water characteristics using different treatment methods
2. Write a report after testing the water samples

LIST OF EXPERIMENTS:

1. Determination of pH and turbidity
2. Determination of conductivity and total dissolved solids.
3. Determination of alkalinity/acidity.
4. Determination of chlorides.
5. Determination and estimation of total solids, organic solids and inorganic solids.
6. Determination of optimum coagulant dose
7. Determination of chlorine demand
8. Determination of dissolved oxygen
9. Determination of B.O.D
10. Determination of C.O.D
11. Determination of iron
12. Determination of nitrogen.
13. Determination of total phosphorous
14. Determination of sulphates

IV B. Tech I Semester

14BT70101: **STEEL STRUCTURES**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: SA & RCCS

COURSE DESCRIPTION: Design concepts– connections: Bolts , rivets, welds– Tension and compression members – Beams and built–up compression members– Design of column foundations

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Attain the knowledge on various structural steel elements .
2. Design tension and compression members .

DETAILED SYLLABUS:

UNIT I **(06 Periods)**

DESIGN CONCEPTS: Types of rolled steel sections – Stress–strain relationship for mild steel – Loads – Design concepts of steel structures – Working stress design – Limit state design – Design requirements – Design strength – Serviceability limit state.

UNIT II **(11 Periods)**

RIVETED, BOLTED AND WELDED CONNECTIONS: Failure of a joint – Strength and efficiency of a joint – Lap Joint – Butt joint – Eccentric connections. Strength of welds – Butt and fillet welds – Design of fillet welds subjected to axial load – Design of fillet welds subjected to moment acting in the plane and at right angles to the plane of the joints – Beam to beam and beam to column connections.

UNIT III **(10 Periods)**

TENSION AND COMPRESSION MEMBERS: Net effective sectional area for angle and tee sections – Design of tension members – Lug angles. Effective length, radius of gyration and slenderness of compression members – Design strength – Design of axially loaded compression members.

UNIT IV **(11 Periods)**

BEAMS AND BUILT–UP COMPRESSION MEMBERS: bending, shear and bearing strength – Design of simple beams – Design of plated beams – Design of connection of cover plates with the flanges of beams. Design of built–up compression members – Design of lacings and battens – Design principles of eccentrically loaded columns – Splicing of columns.

UNIT V **(07 Periods)**

DESIGN OF COLUMN FOUNDATIONS: Design of slab base and gusseted bases – Column bases subjected moment

Total Periods:45

TEXT BOOKS

1. S.K. Duggal, *Limit State Design of Steel Structures*, 2nd Edition, Mc.Graw Hill, 2014.
2. N. Subramanian, *Design of Steel Structures*, 1st Edition, Oxford University Press, 2010

REFERENCE BOOKS

1. S.S. Bhavikatti, *Design of Steel Structures*, 2nd Edition, I.K. International Publishing House Pvt. Ltd., 2010.
2. N. Krishna Raju, *Structural Design and Drawing*, 3rd Edition, Universities Press, Hyderabad, 2009.
3. Ramachandra and VirendraGehlot, *Design of Steel Structures*, 11th Edition, Scientific Publishers, 2005.
4. B.C. Punmia, Ashok Kumar Jain and ArunKumar Jain, *Design of Steel Structures,* 2nd Edition, Laxmi Publications, 2013.

IS Codes:IS 800–2007, IS–875– Part III and Steel Tables are to be permitted into the examination hall.

IV B.Tech I Semester

14BT70102: WATER RESOURCES ENGINEERING

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Fluid Mechanics – I and II, Engineering Hydrology

COURSE DESCRIPTION: Irrigation and soil moisture – Diversion head works – Reservoirs – Gravity and earth dams – Canal structures – Cross drainage works.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Demonstrate the knowledge of irrigation systems, water resources and storage works and apply the principle of mathematics in finding the irrigation water requirement.
2. Analyze the forces acting on a hydraulic structure .
3. Design hydraulic structures and regulation works using different methods .
4. Estimate the reservoir capacity using modern tools .
5. Give reasons for the failure of a dam and reservoir for the safety of the society .
6. Demonstrate the importance of canals and canal lining for reducing the seepage losses for sustainable use of water .
7. Responsible as a civil engineer for the construction of canal outlets and canal escapes in reducingthe floods .

DETAILED SYLLABUS:

UNIT I **(10 Periods)**

IRRIGATION AND SOIL MOISTURE: Necessity and importance– Advantages and Disadvantages – Types of Irrigation – Application of irrigation water – Indian agricultural soils – Methods of increasing soil fertility – Standards for irrigation water – Soil–Water–Plant relationship – Vertical distribution of soil moisture – Soil moisture constants – Consumptive use – Duty–Delta relationship **–** Factors affecting duty – Irrigation efficiency.

UNIT II **(09 Periods)**

DIVERSION HEAD WORKS : Types of diversion head works – Weirs – Barrages – Layout of diversion works – Causes and failure of hydraulic structures on permeable foundations – Bligh's creep theory – Khosla's theory – Determination of uplift pressure – Impervious floors – Exit gradient – Functions of upstream and downstream sheet piles.

UNIT III **(10 Periods)**

DAMS : Types of dams – Merits and demerits – Factors affecting selection of site – Zones of storage of reservoir – Estimation of reservoir capacity – Mass curve– Gravity dams – Forces acting on gravity dam – Causes of failure of gravity dams – Elementary profile and practical profile of gravity dam – Limiting height of a low gravity dam – Stability analysis – Drainage galleries – Joints – Grouting – IS design of gravity dams.

UNIT IV **(10 Periods)**

EARTH DAMS AND CANAL STRUCTURES: Types – Causes of failure – Criteria for safe design – Seepage through earth dam – Measures of seepage control – Types of canals – Lining of Canals – Design of canals – Kennedy's and Lacey's theory – falls – Canal regulation works – Canal outlets

UNIT V **(6 Periods)**

CROSS DRAINAGE WORKS: Types – Selection of site for aqueducts – Super passages – Level crossing – River training works.

Total Periods:45

TEXT BOOKS

1. S.K.Garg, *Irrigation Engineering and Hydraulic Structures,* 24th Edition, Khanna Publishers, 2012.
2. P.N. MODI, *Irrigation Water Resources and Water Power Engineering,* 7th Edition, Standard Book House, 2008.

REFERENCE BOOKS

1. K.R. Arora, *Irrigation, Water Power a*nd *Water Resources Engineering*, 4th Edition, Standard Publishers Distributers, 2013.
2. G.L. Asawa*, Irrigation a*nd *Water Resources Engineering,* New Age International Limited, 2012
3. R.K. Sharma and T.K. Sharma, *Irrigation Engineering,* 3rd Edition, S. Chand Publishers, 2007.
4. B.C. Punmia and P.B.B. Lal*, Irrigation a*nd *Water Power Engineering,* 16th Edition, Laxmi Publications, 2011.

IV B.Tech I Semester

14BT70103: GEOSPATIAL TECHNOLOGIES

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Surveying

COURSE DESCRIPTION: Aerial Photogrammetry – Remote Sensing, Electromagnetic Spectrum, Sensors – Geographic Information System, Data Representation – GIS Spatial Analysis – Remote Sensing and GIS Applications.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Apply the knowledge of aerial photographs, satellite imagery to civil engineering Applications .
2. Analyze the availability of natural resources using RS and GIS .
3. Use modern tools to estimate the land use and land cover .
4. Demonstrate the knowledge of GIS and RS to predict and assess damages due to natural disasters for sustainable development .

DETAILED SYLLABUS:

UNIT I **(9 Periods)**

INTRODUCTION TO PHOTOGRAMMETRY : Fundamental concepts of photogrammetry – Principle and types of aerial photographs – Geometry of Aerial photographs – Scale of aerial photographs and its determination – Planning & Execution of Photographic Flights – Stereoscopy –Mosaics – Parallax measurements for height determinations

UNIT II **(10 Periods)**

REMOTE SENSING: Basic concepts and foundation of remote sensing – Elements of remote sensing, electromagnetic spectrum – Spectral reflectance and spectral regions – Energy resources – Energy interactions with earth surface features and atmosphere – Resolution – Spectral properties of water bodies, soil and vegetation – Sensors and platforms – Visual interpretation techniques – Converging evidence

UNIT III **(10 Periods)**

GEOGRAPHIC INFORMATION SYSTEM: GIS categories – Components of GIS, fundamental operations of GIS – Raster GIS – Vector GIS – File management, spatial and non spatial data – Layer based GIS – Feature based GIS, map projections.

UNIT IV **(7 Periods)**

GIS SPATIAL ANALYSIS: Data storage – Vector data storage – Attribute data storage – Overview of the data manipulation and analysis – Integrated analysis of the spatial and attribute data– Basics of Global positioning system.

UNIT V **(9 Periods)**

REMOTE SENSING AND GIS APPLICATIONS : Land use/Land cover classification – Rainfall – Runoff studies – Flood and drought impact assessment and monitoring – Drainage Morphometry – Watershed management for sustainable development – Inland water quality survey and management. Regional and Urban planning and management, GIS based Highway alignment, GIS based traffic congestion analysis, Soil Mapping.

Total Periods:45

TEXT BOOKS

1. B. Bhatta, *Remote Sensing and GIS*, 2nd Edition, Oxford University Press, 2011.
2. M. Anji Reddi, *A Text Book of Remote Sensing and Geographical Information Systems*, 2nd Edition, B. S. Publications, 2012.

REFERENCE BOOKS

1. Lillesand, T.M., Kiefer, R.W. and J.W.Chipman, *Remote Sensing and Image Interpretation*, 7th Edition, John Willey and Sons (Asia) Pvt. Ltd. 2014.
2. C.P. Lo Albert and K.W. Yong, *Concepts and Techniques of GIS*, 2nd Edition, Prentice Hall (India) Publications, 2010.
3. Narayana Panigrahi, *Geographical Information Science*, 2nd Edition, University Press, 2013.

   Peter A. Burragh and Rachael Mc Donnell, *Principles of Geographical Information Systems*, 2nd Edition, Oxford University Press, 2014.

IV B.Tech I Semester

14BT70104: **TRANSPORTATION ENGINEERING – II**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Surveying, Soil Mechanics

COURSE DESCRIPTION: Introduction to Traffic engineering, Traffic characteristics, Highway safety – Traffic measurement, Highway capacity – Traffic regulation and control, Parking studies, Traffic signs and Road markings – Statistical methods in Traffic Engineering – Road Safety Audit, Traffic and Environment, Environmental Impact Assessment, Traffic management.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Apply the principles of mathematics and science to analyze and solve technical problems related to transportation engineering projects .
2. Assemble, analyze, and appropriately apply transportation engineering data from existing graphics, reports, and other documents .
3. Conduct Traffic studies and arrive at the parameters for design of Highway and design of Traffic Control systems .
4. Use modern technology to support the planning, design, operation and management of transportation facilities and projects .

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

INTRODUCTION TO TRAFFIC ENGINEERING: Significance and scope – Characteristics of vehicles and road users – Skid resistance and braking efficiency (Problems) – Components of traffic engineering – Road, traffic and land use characteristics.

TRAFFIC CHARACTERISTICS: Basic characteristics of traffic – Volume, speed and density – Relationship among traffic parameters.

HIGHWAY SAFETY: Problem of highway safety – Types of road accidents – Causes – Numerical Problems – Engineering measures to reduce accidents – Enforcement measures – Educational measures.

UNIT II **(09 Periods)**

TRAFFIC MEASUREMENT : Traffic volume studies – Objectives – Types of volume studies – Concept of PCU– Data collection and presentation – Speed studies – Types of speeds – Objectives of speed studies – Methods

of conducting Pedestrian studies – Basic principles of traffic flow speed studies – Data collection and presentation – Origin and Destination studies, Numerical Problems

HIGHWAY CAPACITY: Definition of capacity – Importance of capacity – Factors affecting capacity – Concept of level of service – Different levels of service – Concept of service volume – Peak hour factor– Numerical Problems.

UNIT III **(09 Periods)**

TRAFFIC CONTROL AND REGULATION : Traffic problems in urban areas – Importance of traffic control and regulation – Traffic regulatory measures – Channelization – Principle and design of intersections, grade separations and interchanges – Traffic signals – Saturation flow – Design of traffic signals and signal co–ordination (Problems) – Signal phasing and timing diagrams – Traffic control aids and street furniture, street lighting, computer applications in signal design.

PARKING STUDIES: Types of Parking facilities – On street and off street parking facilities – Parking studies – Parking inventory study – Parking survey by patrolling method – Analysis of parking data and parking characteristics – Multi–storey car parking facility – Design standards. **–** Numerical Problems

TRAFFIC SIGNS AND ROAD MARKINGS : Types of traffic signs – Cautionary, regulatory and informative signs – Specifications – Pavement markings – Types of markings – Lane markings and object markings – Standards and specifications for road markings.

UNIT IV **(09 Periods)**

STATISTICAL METHODS IN TRAFFIC ENGINEERING: Numerical Problems using Poisson Distribution, Normal Distribution, Hypothesis Testing, Chi–Squared Test, Linear Regression and Correlation, Numerical Problems.

UNIT V **(09 Periods)**

ROAD SAFETY AUDIT:. Road safety audit – Principles, Elements and Methodology of Road Safety Audit.

TRAFFIC AND ENVIRONMENT: Detrimental effect of traffic on environment – Air pollution – Pollutants due to traffic – Measures to reduce air pollution due to traffic – Noise pollution – Measures to reduce Noise pollution.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA): Importance – Aspects to be considered – Preparation of EIA for a Highway Project before construction, during construction, after construction.

TRAFFIC MANAGEMENT: Traffic management – Transportation system management (TSM) – Travel demand management (TDM) – Traffic forecasting techniques, restrictions on turning movements – Oneway Streets – Traffic segregation – Traffic calming – Tidal flow operations – Exclusive bus lanes – Introduction to Intelligent transportation system (ITS).

Total Periods:45

TEXT BOOKS

1. Kadiyali L R, *Traffic Engineering and Transport Planning,* 7th Edition, Khanna Publishers, 2012.
2. Khanna K and Justo C E G, *Highway Engineering,* 10th Edition, Nem Chand & Bros, 2014.

REFERENCE BOOKS

1. *Indian Roads Congress (IRC) Specifications: Guidelines and Special Publications on Traffic Planning and Management.*
2. *Guidelines of Ministry of Road Transport and Highways,* Government of India.
3. C. Jotin Khisty and B.Kent Lall, *Transportation Engineering – An Introduction,* Prentice Hall of India Pvt. Ltd., 2006.
4. C.S. Papacostas and P.D. Prevedouros, *Transportation Engineering and Planning,* Prentice Hall of India Pvt. Ltd., 2006.

NOTE: Booklet containing relevant extracts from Standards and Codes, should be made available to students during examinations.

IV B.Tech I Sem

14BT6HS01: **BANKING AND INSURANCE**

(OPEN ELECTIVE)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

Pre Requisite: Managerial Economics and Principles of Accountancy

COURSE DESCRIPTION: Origin and growth of Banking, functions and importance, RBI; Debtor and Creditor relationship, Types of Accounts, Loans and Advances; e-payment, e-cash ,NEFT, RTGS, Credit and Debit cards; Insurance elements and risk; LIC, GIC, IRDA.

COURSE OUTCOMES: After completion of the course a successful student is able to

1 Acquire Knowledge in
   a) Tools and concepts of Banking and Insurance.
   b) Basic Principles and concepts of Insurance and Banking.
   c) Provides life skills for effective utilization of Banking and Insurance facilities.
   d) e-fund transfers, e-payments and e-business models.
2 Develop analytical skills in understanding problems pertaining to
   a) Online banking and e – payments.
   b) Risk Management through insurance benefits the society at large.
   c) money management by leveraging on technology, banking and insurance services.

DETAILED SYLLABUS:

UNIT – I **(09 Periods)**

INTRODUCTION TO BANKING: Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT – II **(09 Periods)**

BANK-CUSTOMER RELATIONSHIP: Debtor-creditor relationship, anti money laundering, products or services, payment and collection of cheques and other negotiable instruments. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances- principles of lending, types of loans, **UNIT – III** **(09 Periods)**

BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM: Features, types of e-payment system, e-cash ,NEFT,RTGS, Electronic purses, Credit and Debit cards. Business models- B2B, B2C, C2C, and B2G.

UNIT – IV **(09 Periods)**

INTRODUCTION TO INSURANCE: Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT – V **(09 Periods)**

INSURANCE OVERVIEW: Principles of insurance, insurance types, LIC & GIC insurance contract-nature, elements, functions, IRDA, Insurance Players in India.

Total periods : 45

TEXT BOOKS:

1. A.V. Ranganadha Chary, R.R. Paul- *Banking and Financialsystem,* 2nd Edition, Kalyani Publisher, New Delhi.
2. P.K.Gupta- *Insurance and Risk Management*, Himalaya Publishing House, New Delhi, ISBN: 9789350516676

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma: '*Electronic Commerce- A Manager's Guide to E-Business*', Vanity Books International, Delhi,2002. ISBN-13: 978- 8174462039
2. Kalakota Ravi and Whinston Andrew B: '*Frontiers of Electronic Commerce'*, Pearson Education India, 1996 New Delhi. ISBN: 978-81-7758-392-2
3. Schneider, Grey P: '*Electronic Commerce, Course Technology',* 8th Edition, Cengage Learning, 2008, New Delhi ISBN-13:978- 1-4239-0305-5.

IV. B.Tech I Semester

14BT6HS02: **COST ACCOUNTING AND FINANCIAL MANAGEMENT**

(OPEN ELETIVE)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

Pre-Requisites : Nil

COURSE DESCRIPTION: Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Returns on Investment..

COURSE OUTCOMES: After completion of the course a successful student is able to

1. Acquire Knowledge in
   a) Elements of Costing.
   b) Basic concepts of Financial Management.
   c) Risk and Return
   d) Financial Accounting.
   e) Using advanced tools like tally and SAP.
   f) Significance of Economics and Accountancy
2. Do cost, risk and return of investment analysis.
3. Develop skills in providing solutions for
   a) Material, Labor, Overheads control.
   b) Excellence and ability to minimize the cost of the organization
   c) Effective investment decisions
4. Prepare cost sheets pertaining to manufacturing of products.

DETAILED SYLLABUS:

UNIT I (09 Periods)

INTRODUCTION TO COST ACCOUNTING: Cost and Cost Accounting, Scope, Objectives, Advantages and disadvantages –Cost Accounting Vs Management Accounting – Elements of Costing –Installation of costing system – Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

UNIT II (09 Periods)

COST ANALYSIS: Analysis of Cost – Preparation of cost sheet, estimate, tender and quotation (Simple problems) –Importance of Costing while pricing the products.

UNIT III (09 Periods)

STANDARD COSTING: Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labor variances (Simple Problems).

UNIT IV (09 Periods)

FINANCIAL MANAGEMENT: Financial Management-Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

UNIT V (09 Periods)

RISK AND RETURNS ON INVESTMENT: Investment-Meaning and Definition- concept of risk and returns-Investment Alternatives- Introduction to Behavioral Finance – Anomalies –Key Concepts – Anchoring – Mental Anchoring-Confirmation and Hindsight Bias-Gambler's Fallacy-Herd Behavior-Over Confidence-Overreaction and Availability Bias-Prospect Theory.

Total periods: 45

TEXT BOOKS:

1. S.P. Jain and K.L. Narang: *Cost Accounting,* 6th Edition, Kalyani Publishers, Ludhiana, 2002
2. James C Van Horne, *Financial Management and Policy,* 12th Edition, Prentice-Hall of India/Pearson, 2001 ISBN-10: 0130326577

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, *Cost and Management Study Material*, New Delhi.
2. I.M. Pandey, *Financial Management,* 10th Edition, Vikas Publishing House Pvt. Ltd., 2010, ISBN- 13 9788125937142

IV B.Tech I Semester

14BT7HS03: **ENTREPRENEURSHIP FOR MICRO SMALL AND MEDIUM ENTERPRISES (OPEN ELECTIVE) (Common to ECE, EEE, EIE & CE)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

Pre requisites: Nil

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES: After completion of the course a successful student is able to

1. Acquire Knowledge in KNOWLEDGE
   a) Schemes and institutions encouraging entrepreneurship.
   b) Basic Principles and concepts of Accountancy.
   c) Significance of entrepreneurship.
2. i) Develop analytical skills in understanding problems pertaining to
   a) Personal excellence through financial and professional freedom.
   b) Women entrepreneurship acts as contrivance in the societal development
   ii) Develop Critical thinking and evaluation ability.
3. Generate ideas for formulating business plans.

DETAILED SYLLABUS

UNIT – I **(09 Periods)**

INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT: Concept of Entrepreneurship – Growth of Entrepreneurship in India **-** Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur – Functions of Entrepreneur – Need for an Entrepreneur – Entrepreneurial Decision Process – Types of Entrepreneurs – Distinction between an Entrepreneur and a manager – Intrapreneur - Entrepreneur Vs Intrapreneur.

UNIT – II **(09 Periods)**

IDEA GENERATION AND FORMULATION OF BUSINESS PLANS : Sources of Ideas – Methods of idea generation - – Product Identification – Opportunity Selection – Steps in Setting up of a Small Business Enterprise - Contents Of Business Plans – Significance – Formulation of Business Plan – Business Opportunities in Various Sectors – Common Errors in Business Plan Formulation – Project Report Preparation

UNIT – III **(09 Periods)**

MICRO AND SMALL ENTERPRISES: Meaning and Definition – Micro and Macro units – Essentials – Features – Characteristics – relationship between Micro and Macro Enterprises – Rationale behind Micro and Small Enterprises – Scope of Micro and Small Enterprises – Objectives of Micro Enterprises - Problems of Micro and Small Enterprises

UNIT – IV **(09 Periods)**

INSTITUTIONAL FINANCE AND SUPPORT TO ENTREPRENEUR: Need for Institutional Finance **-** Commercial Banks - Industrial Development Bank of India (IDBI) – Industrial Finance Corporation of India Ltd. (IFCI) – Industrial Credit Investment Corporation of India Ltd. (ICICI)– State Financial Corporations (SFCs) - State Industrial Development Corporations (SIDCs) – Small Industries Development of Bank of India (SIDBI) –– Need For Institutional Support – National Small Industries Corporation Ltd (NSIC) – Small Industries Development Organisation (SIDO) – Small Industries Service Institutes (SISIs) – District Industries Centres (DICs) – National Institute of Entrepreneurship and Small Business Development (NIESBUD) – Technical Consultancy Organizations (TCOS)(Origin, Mission, and credit facility/support).

UNIT – V **(09 Periods)**

WOMEN ENTREPRENEURSHIP: Concept of Women entrepreneur - Functions of Women entrepreneurs - Growth of women entrepreneurship in India - Challenges of Women entrepreneurs- Programmes supporting women entrepreneurship – Rural Entrepreneurship – Meaning, Need for Rural entrepreneurship, Problems of rural entrepreneurship, Role of NGOs.

Total periods : 45

TEXT BOOKS:

1. Dr.S.S.Khanka*, Entrepreneurial Development,* Revised Edition, S. Chand and Company Ltd, 2012. **ISBN**: 9788121918015
2. Madhurima Lall & Shikha Sahai, *Entrepreneurship,* 2nd Edition, Excel Books India, 2008. **ISBN**:9789350620953

REFERENCE BOOKS:

1. Nandan, H., *Fundamentals of Entrepreneurship,* PHI Learning Pvt. Ltd., 2013, New Delhi, 3rd edition 2013. **ISBN**: 9788120347502
2. Vasanth Desai, *"The Dynamics of Entrepreneurial Development and Management"*, Himalaya Publishing House, 4th edition 2009. **ISBN**: 9788183184113
3. Bholanath Dutta, *Entrepreneurship Management – Text and Cases,* 1st edition, Excel Books, 2009. **ISBN**: 9789350621257.

IV B.Tech I Semester
DISASTER MITIGATION AND MANAGEMENT
(OPEN ELECTIVE)
(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Environmental Sciences
COURSE DESCRIPTION: Natural disasters and hazards – Earthquakes – Floods and cyclones, droughts – Landslides – Disaster management
COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain various types of disasters and mitigation strategies
2. Analyze and interpret the Guidelines for hazard assessment and vulnerability analysis
3. Use historical data of disaster losses and inform the people over preparedness
4. Address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society
5. Function in multidisciplinary teams for the effective displacement of people during disasters

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

INTRODUCTION: Types of disasters – Natural disasters – Impact of disasters on environment – Infrastructure and development – Concepts of hazards and vulnerability analysis– Hazard Assessment **–** Guidelines for hazard assessment and vulnerability analysis – Basic principles and elements of disaster mitigation

UNIT II **(11 Periods)**

EARTHQUAKES : Introduction to earthquakes – Intensity scale (MSK–64) – Seismic activity in India – Seismic zones of India – Earthquakes in A.P. – Action plan for earthquake disaster preparedness – Elements at risk, recovery and rehabilitation after earthquake – Earthquake resistant design and construction of buildings. Tsunami – Onset, types and causes
– Warning – Element at risk – Typical effects – Specific preparedness and mitigation strategies

UNIT III **(11 Periods)**

FLOODS AND CYCLONES: Onset, types, warnings – Elements at risk – Typical effects – Indian floods and cyclones – Hazard zones – Potential for reducing hazards – Mitigation strategies and community based mitigation.

DROUGHTS: Onset, types and warning – Kinds of droughts – Causes of droughts – Impact of droughts – Early warning and response mechanisms – Mitigation strategies – Droughts in India

UNIT IV **(07 Periods)**

LANDSLIDES: Onset, types and warning – Causes of landslides – Elements at risk – Indian land slides – Hazards zones – Typical effects – Mitigation strategies and community based mitigation

UNIT V **(08 Periods)**

DISASTER MANAGEMENT: Disaster management organization and methodology – Disaster management cycle – Disaster management in India – Typical cases – Cost–benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Total Periods:45

TEXT BOOKS

1. V.K. Sharma, *Disaster Management,* National Centre for Disaster Management, IIPE, 1999.
2. A.S. Arya, Anup Karanth, and Ankush Agarwal, *Hazards, Disasters and Your Community: A Primer for Parliamentarians,* GOI–UNDP Disaster Risk Management Programme, 2005.

REFERENCE BOOKS

1. *Disaster Management in India*, A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. R. B. Singh *Natural Hazards And Disaster Management*, Rawat Publications, 2009.
3. Pardeep sahni, Alka Dhameja, Uma Medury *Disaster Mitigation*, 4th Edition, PHI Learning Pvt. Ltd., 2011.
4. Sanjay K. Sharma *Environment Engineering and Disaster Management,* 1st Edition, USP Publishers, 2011.

IV B.Tech I Semester
ENVIRONMENTAL POLLUTION AND CONTROL
(Open Elective)
(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Introduction, Sources and Effects of Air Pollution – Dispersion of Pollutants and their control – Surface and Ground Water Pollution and control–Soil Pollution and remediation– Management of Municipal Solid Wastes.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain various pollutants, characteristics and their dispersion
2. Analyze the major pollutants that causes environmental pollution.
3. Conduct research and select suitable techniques to control pollution.
4. Understand the effects of environmental pollutions on human beings and vegetation
5. Communicate the methods of management and control of environmental pollution

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS: Scope – Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, Point and Non– Point, Line and Area Sources of Air Pollution – Stationary and Mobile Sources – Dispersion of Pollutants – Dispersion Models – Applications.

UNIT II **(09 periods)**

EFFECTS AND CONTROL OF PARTICULATES: Effects of Air Pollutants on Man, Material and Vegetation – Global Effects of Air Pollution – Green House Effect, Heat Island, Acid Rains, Ozone Holes – Control of Particulates – Control at Sources – Process Changes – Equipment Modifications – Design and Operation of Control Equipment – Settling Chambers – Centrifugal Separators – Bag Filters, Dry and Wet Scrubbers – Electrostatic Precipitators.

UNIT III **(10 Periods)**

WATER POLLUTION: Introduction–Water Quality in Surface Waters – Nutrients – Controlling Factors in Eutrophication–Effects of Eutrophication – Ground Water Pollution – Thermal Pollution – Marine Pollution – Sewage Disposal in Ocean – Types of Marine Oil Pollution – Cleanup of Marine Oil Pollution – Control of Water Pollution – Case Study on Tanneries – Drinking Water Quality Standards.

UNIT IV **(09 Periods)**

SOIL POLLUTION: Soil Pollutants – Sources of Soil Pollution – Causes of Soil Pollution and their Control – Effects of Soil Pollution–Diseases Caused by Soil Pollution – Methods to Minimize Soil Pollution – Effective Measures to Control Soil Pollution – Case Study on Fertilizer.

UNIT V **(09 Periods)**

MUNICIPAL SOLID WASTE MANAGEMENT: Introduction – Types of Solid Wastes – Principles of Excreta Disposal – Domestic Solid Waste Production – Collection of Solid Wastes – Transport of Solid Wastes – Management of Solid Wastes – Methods of Land Disposal – Sanitary Landfill – Composting – Incineration.

Total Periods:45

TEXT BOOKS

1. C.S.Rao, *Environmental Pollution Control Engineering*, 2nd Edition, New Age International Pvt Ltd., 2007.
2. Y.Anjaneyulu, *Introduction to Environmental Science,* 1st Edition, BS Publications*.,* 2009.

REFERENCE BOOKS

1. M.N. Rao and H.V.N. Rao, *Air Pollution,* 19th Edition, Tata McGraw–Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, *Fundamentals of Air Pollution,* 5th Edition, Academic Press (Elsevier)*,* 2014.
3. S.M.Khopkar , *Environmental Pollution Monitoring and Control,* 2nd Edition, New Age International Pvt Ltd., 2007.
4. S.Deswal and K.Deswal, *Environmental Science,* 2nd Edition, Dhanpat Rai & Co, 2011.

IV B.Tech I Semester
CONTRACT LAWS AND REGULATIONS
(OPEN ELECTIVE)
(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: —

COURSE DESCRIPTION: Construction Contracts – Tenders – Arbitration – Legal Requirements – Labour Regulations.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain contract documents and tendering processes .
2. Analyze the legal issues in arbitration and in contracts documents .
3. Address the legal issues in collecting taxes .
4. Follow ethics while bidding, sale and purchase of property .
5. Develop and Prepare tender documents as per the standards.

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

CONSTRUCTION CONTRACTS: Indian Contracts Act – Elements of Contracts – Types of Contracts – Features – Suitability – Design of Contract Documents – International Contract Document and laws – Standard Contract Document – Law of Torts.

UNIT II **(09 Periods)**

TENDERS: Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Financial Points of View – Two Cover System – Preparation of the Documentation – Contract Formation and Interpretation – Potential Contractual Problems – Price Variation Clause – Comparison of Actions and Laws – Subject Matter – Violations.

UNIT III **(09 Periods)**

ARBITRATION: Arbitration – Comparison of Actions and Laws – Agreements – Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Arbitration Disputes – Dispute Review Board.

UNIT IV **(09 Periods)**

LEGAL REQUIREMENTS: Legal Requirements for Planning – Property Law – Agency Law – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties – Local Government Approval – Statutory Regulations – Insurance and Bonding – Laws Governing Purchase and Sale – Use of Urban and Rural Land – Land Revenue Codes – EMD – Security Deposits – Liquidated Damages.

UNIT V **(09 Periods)**

LABOUR REGULATIONS: Social Security – Welfare Legislation – Laws Relating to Wages, Bonus and Industrial Disputes – Labour Administration – Insurance and Safety Regulations – Workmen's Compensation Act – Maternity Benefit Act – Child Labour Act – Other Labour Laws.

Total Periods:45

TEXT BOOKS

1. G.C.V. Subba Rao *Law of Contracts I & II*, 11th Edition, S. Gogia & Co., 2011.
2. Jimmie Hinze, *Construction Contracts,* 2nd Edition, Mc Graw Hill, 2001.

REFERENCE BOOKS

1. Gajaria G.T, Kishore Gajaria, *Laws Relating to Building and Engineering Contracts in India*, 4th Edition, Lexis Nexis Butterworths India, 2000.
2. B. S. Patil, *Civil Engineering Contracts and Estimates*, 3rd Edition, University Press (India) Private Ltd., 2013.
3. Joseph T. Bockrath, *Contracts and the Legal Environment for Engineers and Architects*, 7th Edition, McGraw Hill Education, 2010.
4. Akhileshwar Pathak, *Contract Law*, 1st Edition, Oxford University Press, 2011.

IV B.Tech I Semester
PLANNING FOR SUSTAINABLE DEVELOPMENT
(OPEN ELECTIVE)
(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: —

COURSE DESCRIPTION: Introduction to Sustainable Development – Environment, Sciences and Sustainability – Sustainable Development Politics and Governance – Tools, Systems and Innovations for Sustainability – Communication and Learning for Sustainability.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Demonstrate the knowledge of planning, environment, tools and systems for sustainable development
2. Analyze the current challenges to sustainability
3. Use theoretical frameworks and provide solutions to the real world sustainability issues
4. Conduct awareness of contemporary issues on globalization in terms of sustainability
5. Give recommendations for the sustainability issues and solutions using a holistic approach
6. Explain a sense of civic responsibility, including reflection on the student's own role in developing and nurturing sustainable communities
7. Participate in decision making as individual and responsible for collective decision

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

INTRODUCTION TO SUSTAINABLE DEVELOPMENT: Definition and Concepts of Sustainable Development – Capitalization of Sustainability – National and Global Context – The Millennium Development Goals – Emergence and Evolution of Sustainability and Sustainable Development – Theories of Sustainability – Case Studies

UNIT II **(08 Periods)**

ENVIRONMENT, SCIENCES AND SUSTAINABILITY: Climate Change – Science, Knowledge and Sustainability – Unforeseen Environmental Impacts on Development – Challenges of Sustainable Development – Centrality of Resources in Sustainable Development – Case Studies

UNIT III **(10 Periods)**

SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE: Governance and Democracy and Eco–Welfare – Global Civil Society and World Civil Politics – Civic Environmentalism – Policy Responses to Sustainable Development – Economics of Sustainability – Social Responsibility in Sustainability – National Action

UNIT IV **(11 Periods)**

TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY: Need for System Innovation – Transition and Co–Evolution – Theories and Methods for Sustainable Development – Strategies for Eco–Innovation – Ecological Foot Print Analysis – Socio Ecological Indicators – Eco Labels– Policy Programmes for System Innovation – Case Studies

UNIT V **(08 Periods)**

COMMUNICATION AND LEARNING FOR SUSTAINABILITY: Role of Emerging Media – Remarkable Design and Communication Art, Activism and the Public Interest – Education for Sustainability – Participation in Decision Making – Critical Thinking and Reflection – Case Studies

Total Periods:45

TEXT BOOKS

1. John Blewitt, *Understanding Sustainable Development*, Earth Scan Publications Ltd., 2nd Edition, 2008.
2. Jennifer A. Elliot, *An introduction to sustainable development*, Earth Scan Publications Ltd., 4th Edition, 2006.

REFERENCE BOOKS

1. Peter Rogers, Kazi F Jalal , John A Boyd, *An introduction to sustainable development*, Earth Scan Publications Ltd., 1st Edition, 2006.
2. Simon Dresner, *The Principles of Sustainability*, Earth Scan Publications Ltd., 2nd Edition, 2008.
3. Peter Bartelmus, *Environment growth and development: The concepts and strategies of sustainability*, Routledge, 3rd Edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, Mirilia Bonnes, Jose Antonio Corraliza, Maria Vittoria Giuliani, *People places and sustainability*, Hogrefe & Huber Publishers, 2nd Edition, 2003.

IV B.Tech I Semester
RURAL TECHNOLOGY
(OPEN ELECTIVE)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES:

COURSE DESCRIPTION: Research & Development – Non Conventional Energy – Community Development – IT Management

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Acquire the knowledge of various nonconventional energy systems and technologies for rural development.
2. Apply the principles of IT for the rural development .
3. Responsible for the development of technologies in rural areas .
4. Understand the impact of technologies in societal and environmental aspects .

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

RESEARCH & DEVELOPMENT: India – Ancient Indian Technologies – Rural India Life – Indian Farmer – Role of Science and Technology in Rural Development – Rural Technology and Poverty Eradication – Rural Business Hubs – Technology in improving rural infrastructure – Various organizations related to innovation – Issues of technology transfer: CAPART, NABARD, CSIR, NIF.

UNIT II **(09 Periods)**

NON CONVENTIONAL ENERGY: Definition of Energy, Types of alternative sources of energy, Sources of non conventional energy – Solar energy – Solar Cooker – Solar Heater – Biogas – Recycling and Management and Wastes Conservation – Assessment & Production of biomass products & their utilization.

UNIT III **(09 Periods)**

TECHNOLOGIES FOR RURAL DEVELOPMENT: Food & Agro based technologies – Tissue culture – Building and Construction technologies – Cultivation and processing of economic plants – Cottage and social Industries.

UNIT V **(09 Periods)**

IT IN RURAL DEVELOPMENT: The Role of Information Technology in Rural Areas – Impact of Information Technology in Rural development – Need and Necessity of Technology – Corporate Social Responsibilities – Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and Saansad Adarsh Gram Yojana (SAGY) – village adoptions schemes.

Total Periods:45

TEXT BOOKS

1. M.S Virdi, *Sustainable Rural Technologies,* 1st Edition, Daya Publishing House, New Delhi, 2009.
2. S.V. Prabhath & P. Ch. Sita Devi, *Technology and Rural India*, 1st Edition, Serials Publications, New Delhi, 2012.

REFERENCE BOOKS

1. P. R. S. Murthy, R.C. Chackravarthy, *Information Technology & Rural Development,* 1st Edition, Pacific Books International, 2011.
2. Shivakanth Singh, *Rural Development Policies and Programmes,* 1st Edition, Northern book centre, New Delhi, 2002.
3. L.M.Prasad, *Principles and Practice of Management*, 8th Edition, Sultan Chand & Sons, New Delhi, 2014.
4. Venkata Reddy. K, *Agriculture and Rural Development Gandhian Perspective*, 1st Edition, Himalaya Publishing House, 2001.

IV B.Tech I Semester

14BT60305: **Artificial Intelligence and Robotics**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

COURSE DESCRIPTION:

Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning;

COURSE OUTCOMES:

On completion of the program, a successful student will be able to:

1. Impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.
2. Employ effective methods to analyze a robot motion control while executing a specific task.
3. Design and Implement appropriate solutions for search Problems such as playing two person games and for planning problems which involve defining a sequence of actions of a robot.
4. Apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance. **UNIT-I** **(10 periods)**

ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING: The Underlying assumption of AI; AI Technique: simple Tic-Tac-Toe program; Problem solving: State space search; Production systems: control strategies, search space control: depth-first, breadth-first search; Heuristic search: Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT-II **(09 periods)**

KNOWLEDGE REPRESENTATION & LEARNING: Knowledge Representation; Predicate Logic: Simple facts in logic, resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; slots; conceptual dependency; scripts; Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.

UNIT-III **(08 periods)**

ROBOTICS –VISION & SENSING: Robotics: Robot Classification, Robot Specification, notation; Sensing: Range sensing: Triangulation; proximity sensing: Inductive, Capacitive and Ultrasonic sensing; touch sensing: tactile sensing, artificial skins; Force and torque sensing: Wrist force sensors; Vision: low-level vision, high-level vision.

UNIT-IV **(10 periods)**

ROBOT PROGRAMMING & CONTROL: Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: characteristics, specifications; Task level languages; Language structure: VAL II.

UNIT-V **(08 periods)**

ROBOT INTELLIGENCE & TASK PLANNING: Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; graph search technique; Problem solving and problem reduction; robot learning; Task planning: Modelling, task specification, obstacle avoidance, grasp planning; Expert system.

Total Periods: 45

Text Books:

1. E. Rich and K. Knight,"*Artificial intelligence"*, 2nd ed., Tata Mc Graw Hill, 1992.
2. K.S. Fu, R.C. Gonzalez, C.S.G. Lee, *Robotics: Control, Sensing, Vision, and Intelligence,* International Edition, Mc Graw Hill, 1987.

Reference Books:

1. Mikell P. Groover, "*Industrial Robotics, Technology, Programming, and Applications"*, 9th reprint, Tata Mc Graw Hill, 2011.
2. D.W. Patterson, "*Introduction to AI and Expert Systems",* PHI, 1992.
3. N.J. Nilsson, "*Principles of AI"*, Narosa Publ. House, 2000.
4. George Luger, *.AI-Structures and Strategies for and Strategies for Complex Problem solving,* 4th edition, Pearson Educations, 2002.

IV B.Tech I Semester

14BT60306: **Global Strategy and Technology**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PRE-REQUISITES: -Nil-

COURSE DESCRIPTION:

Introduction to strategic management, strategic management process, principles of good strategy, globalisation, globalisation strategies, research & development strategies, technology management and transfer, significance, elements of transfer process, corporate governance: the Indian scenario.

COURSE OUTCOMES:

On completion of the program, a successful student will be able to:

1. Decide upon a macroscopic management strategy to optimize the impact of decisions with limited resources.
2. Identify the impact of globalization in a given engineering scenario. Participate in elementary discussions on corporate governance.
3. Analyse an industrial Engineering problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.

DETAILED SYLLABUS:

UNIT-I **(09 periods)**

INTRODUCTION TO STRATEGIC MANAGEMENT: Deefinitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT II **(09 periods)**

GLOBALISATION: Meaning and dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouring Globalisation; Globalisation strategies.

UNIT III **(09 periods)**

RESEARCH & DEVELOPMENT STRATEGIES: Introduction, Concept, Evolution of R & D Management, R & D as a business, R & D and competitive advantage, Integration of R & D, Elements of R & D strategies, Selection of R & D strategies, Implementation strategies, R & D trends, Responses to changes.

UNIT IV **(09 periods)**

Technology Management and Transfer

Technology Management: Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.

Technology Transfer: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT –V **(09 periods)**

Corporate Governance: The Indian Scenario: Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance – Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family – owned business in India, Corporate Governance and the Indian ethos,

Total Periods: 45

Text Books:

1. Francis Cherunilam, *Stategic Management*, 3rd Edition, Himalaya Publishing House, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan , *Management of Technology, Stategic Management*, 2nd Edition, Himalaya Publishing House, 2012.

Reference Books:

1. White and Bruton, *The management of Technology and innovation; a strategic approach*, 1st Edition, Cengage Learning, 2007.
2. S.K.Mandak, *Ethics in business and Corporate Governance,* 2nd Edition, TMH 2012.

IV B.Tech – I Semester

14BT60307: **Intellectual Property Rights & Management**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES:-Nil

COURSE DESCRIPTION:

Protection of ideas, innovation and artistic endeavors ; Acts and procedure related to patents, trademarks, passing off, copy right, design registration, trade secrets and cyber laws, case studies in each.

COURSE OUTCOMES:

After the completion of course, a successful student will be able to:

1. Prepare documents and fill applications needed for filing a patent, design, copy right and trade mark
2. Ensure smooth transition from concept to final product.
3. Exercise discretion in following ethical aspects in dealing with intellectual property rights.

UNIT I **(09 periods)**

OVERVIEW OF INTELLECTUALPROPERTY RIGHTS: Introduction and importance of intellectual property rights (IPRs), types of intellectual property, International scenario in IPR: WIPO, WTO, TRIPS, international and national patent acts: United States of America patent act, United Kingdom patent act, India patent act, recent amendments in India patent act 1972.

UNIT II **(09 periods)**

PATENTS: Introduction, Basic concepts, object and value of patent law, advantages of patent to inventor, patentable inventions, Not patentable inventions, overview of patent procedure, Bio technology patents, patents on computer program, patent rights on micro organism, plant breeding and breeders right, protection of bio diversity, protection of traditional knowledge, infringement of patents and remedy for infringement.

establishing trade mark right, good will, infringement and action for trademarks, passing off, trade mark and eco label, comparison with patents industrial design and copy right.

UNIT IV **(09 periods)**

INDUSTRIAL DESIGN, TRADE SECRETS, CYBER LAWS: Industrial Design: Basic concepts, scope and nature of rights, process of registration rights, rights after registration, transfer of interest or rights, reliefs and remedies and action for infringement of rights, appeals..

Trade Secrets: Definition, significance, tools to protect trade secrets in India

Cyber laws: Co relation to intellectual property

UNIT V **(09 periods)**

COPY RIGHTS:

Copy Rights: Introduction, nature and scope, subject matter, related or allied rights, works in which copy rights subsists, registration of copy rights, conferred by copy right, copy right protection in India, transfer of copy rights, right of broad casing organizations and of performer, computer software.

Total Periods: 45

TEXT BOOKS:

1. P.Narayan, "*Intellectual Property Law*", Eastern Law House, New Delhi and Kolkata, 2005,
2. Deborah E. Bouchoux, "*Intellectual Property Rights"*, India edition, Cengage Learning, 2011.

REFERENCE BOOKS:

1. Bainbridge David, "*Intellectual Property Rights: Key to New Wealth, National Research Development Corporation,* Pearson Education, New Delhi.
2. W.R.Cornesh, "*Intellectual Property Rights: Patent, Copy Right, Trade Mark, Allied Rights"*, Universal law publishing private limited, Delhi, 2001.
3. S.R. Myneni, "*Law of Intellectual Property",* Asia law house, Hyderabad 2001.
4. Prabuddha Ganguly, "*Intellectual Property Rights: Unleasing Knowledge Economy",* TMH New Delhi, 1 st edition, 2001.

IV B.Tech – I Semester

14BT60308: **Managing Innovation and Entrepreneurship**

(Open Elective) (Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PRE-REQUISITES: Nil

Course Description:

Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts Shifting Composition of the Economy Purposeful Innovation & 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

Course Outcomes:

After successful completion of this course, students will be able to:

1. Define, explain and illustrate theories of business innovation and entrepreneurship, the evolution of industries and economies, and the roles of Entrepreneurs.
2. Develop a comprehensive and well structured business plan for a new venture.
3. Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan; and,
4. Work effectively in multidisciplinary, cross-cultural teams, towards the development of a Team Project.

DETAILED SYLLABUS:

UNIT I **(07 Periods**)

Entrepreneurship: Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, entrepreneurial growth and development.

UNIT II **(11Periods)**

Creativity and Innovation: Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies: Strategies that aim at introducing an innovation, innovation & entrepreneurship, planning -incompatible with Innovation & entrepreneurship.

UNIT III **(07 Periods)**

The Individual Entrepreneur: Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation Entrepreneurial motivation (nAch story); Achievement Motivation in Real life- Case Study. Entrepreneurs versus inventors.

UNIT IV **(11 Periods)**

International Entrepreneurship Opportunities: International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Entrepreneurial entry in to international business, strategic Issues in International Entrepreneurship.

UNIT V **(09 Periods)**

Creative Problem Solving: Problem Identification and Problem Solving: Problem Identification. Problem solving Innovation and Diversification.

Total Periods: 45

Text Books:

1. Martin, M.J. *"Managing Innovation and Entrepreneurship in Technology based Firm",* John Wiley Interscience, 1994.
2. Ettlie, J.E. "*Managing Technology Innovation"*, John Wiley & Sons, 2000.
3. Robert D Hisrich., Michael P Peters., Dean A Shepherd, *"Entrepreneurship" The McGraw-Hill Companies*, 6th Edition, 2011

Reference Books:

1. Christensen, C. M. and Raynor, M. E. *The Innovators Solution: Creating and Sustaining Successful Growth,* Boston, MA: Harvard Business School Press, (2003).
2. Drucker, P. F., *Innovation and Entrepreneurship*, New York: Harper, 1985.
3. Harvard Business Review on Innovation (Collection of articles), Harvard Business School Press (2001).
4. Harvard Business Review on Entrepreneurship (Collection of articles), Harvard Business School Press (1999)
5. Rogers, E.M., "*Diffusion of Innovations",* New York: Simon and Schuster, 5th Edition, 2003.
6. Drucker, P. F. "*The Discipline of Innovation,"* Harvard Business Review, May2000. (Originally published 1985, May-June)

IV B.Tech – I Semester

14BT60309: **Materials Science**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PRE-REQUISITES:

Engineering Chemistry, Engineering Physics.

COURSE DESCRIPTION

Structure and Bonding in metals; Steels ,Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semi conductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics engineering, Material Selection and manufacturing of Optical fibers

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Understand how materials are formed and their classification based on atomic arrangement.
2. Illustrate how the design of the various types of steels, cast Irons and Non ferrous alloys influence various engineering applications.
3. Understand the basic difference in properties of various conductors, Insulators and Semiconductors and application of various advanced materials for different branches of Engineering.

UNIT I **(07 periods)**

INTRODUCTION TO MATERIALS SCIENCE: Structure of metals: Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size.

Constitution of alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT II **(12 periods)**

CAST IRONS , STEELS & NON-FERROUS METALS: Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels. Structure and properties of Copper and its alloys, Aluminum and its alloys.

UNIT III **(12 periods)**

ELECTRIC CONDUCTORS & INSULATORS: Type of materials selected for conductors, Insulators and semi conductors. Introduction to ceramics- Bonding and microstructure-DC properties of ceramic materials–AC properties– mechanical properties - Ceramics as Conductors, Insulators and capacitors, introduction to Plastics-DC properties-AC properties-mechanical properties.

UNIT IV **(09 periods)**

SEMICONDUCTORS AND MAGNETIC MATERIALS: Fabrication of Semiconductors-Producing a silicon wafer-Lithography and Deposition-Packaging of semiconductors materials-Types of magnetic materials- Measuring magnetic properties-Application of soft magnetic materials in Electromagnets and relays, AC transformers, Generators and motors.

UNIT V **(05 periods)**

ADVANCED MATERIALS AND APPLICATIONS: Composites – Fiber reinforced, Metal Matrix, Ceramic Matrix – properties and applications; Ceramics – Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Glasses– properties and applications, manufacturing of Optical fibers.

Total periods : 45 Periods

TEXT BOOKS:

1. Kodigre V D, *Material Science and Metallurgy*, 31st edition, Everest Publishing House, Pune, 2011.
2. Ian.P.Jones, *Material Science for Electrical and Electronic Engineers*, Oxford University Press, New Delhi,2000

REFERENCE BOOKS:

1. V. Raghavan, *Physical Metallurgy: Principles and Practices*, 2nd edition, PHI, New Delhi, 2006.
2. William. D. Callister, *Materials Science & Engineering-An Introduction,* 6th edition, John Wiley and sons, New Delhi, 2002.
3. A.J. Dekkar, *Electrical Engineering Materials*, PHI, New Delhi, 1970.

IV B. Tech. – I Semester

14BT60502: **ENGINEERING SYSTEMS ANALYSIS AND DESIGN**
(Open-Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PRE-REQUISITES: NIL

COURSE DESCRIPTION:

Overview of the Systems Process, Technologies for systems, System Development Life Cycle, system Analysis and Modeling, levels of management, Project Management, Systems Implementation and importance of UML Prototyping, Maintaining and Managing the Systems output Process.

COURSE OUTCOMES:

After successful completion of this course, a student will be able to:

1. Gain knowledge on:
   - Systems Process and System Design
   - Systems Analysis and Modeling
   - System Development Life Cycle
   - Design Management and Maintenance Tools.
2. Apply the CASE Tools for System Processand estimation the given models.
3. Design, Develop and implement new Techniques for modeling thesystems.
4. Work effectively as team member on projects
5. Manage and Maintain the System Process.

UNIT IV **(09 periods)**

OBJECT ORIENTED ANALYSIS AND DESIGN USING UML: Object oriented analysis and design-Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT V **(09 periods)**

DESIGNING EFFECTIVE OUTPUT: Output design objectives, relating output content to output method, realizing how output bias affects users, designing output for display, Case studies- Designing a web site management, online exam management.

Total Periods: 45

TEXT BOOKS:

1. Kenneth E.Kendall and Julie E.Kendall, "*System analysis and Design*",8th Edition, Pearson Education , India,2011.

REFERENCE BOOKS:

1. Dennis, Wixom, and Roth "*Systems Analysis and Design"*5th Edition, John Wiley. 2012.
2. Shelly and Rosenblatt, "Systems Analysis and Design" 9th Edition, Cengage Learning, 2012.

IV B. Tech. I Semester

14BT71005: **MICROELECTROMECHANICAL SYSTEMS**

(Open Elective)

(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

Pre-requisites: Basic knowledge in Physics.

Course Description: Overview of Micro Electro Mechanical Systems (MEMS), scaling laws, working principles of microsensors and microactuators, materials, microfabrication processes, packaging of Microsystems.

Course Outcomes:

After completion of the course the student is able to

1. Demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators.
2. Identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

Overview of MEMS and Scaling Laws: Introduction, MEMS and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.

Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid- body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT II **(09 Periods)**

Working Principles of Microsystems: Microsensors, acoustic wave sensors, biomedical and biosensors, chemical sensors, pressure sensors, thermal sensors. Microactuation: actuation using thermal forces, shape-memory alloys, piezoelectric crystals, electrostatic forces. MEMS with microactuators, microgrippers, micromotors, microvalves, micropumps. Microaccelerometers, microfludics.

UNIT III **(09 Periods)**

Materials for MEMS and Microsystems: Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

UNIT IV **(09 Periods)**

MEMS Fabrication Process and Micromanufacturing: Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.

UNIT V **(09 Periods)**

MEMS Packaging: Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging.

Total: 45 Periods

Text Books:

1. Tai-Ran Hsu, *MEMS & Microsystems, Design and Manufacture*, McGraw Hill Education (India) Pvt. Ltd., 2002.

References:

1. G.K.Ananthasuresh, K.J.Vinoy, *Micro and Smart Systems*, Wiley India, Ist edition, 2010
2. Nitaigour Premchand Mahalik, *MEMS*, McGraw Hill Education (India) Pvt. Ltd., eighth reprint, 2013.

IV B.Tech – I Semester

14BT61205: **BIO INFORMATICS**

(Open Elective)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES:

After successful completion of the course student will be able to:

1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.
2. Analyze biological database management system.
3. Create, select and apply appropriate techniques and tools to manage the biological data.

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

INTRODUCTION TO BIOINFORMATICS: Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

UNIT II **(07 Periods)**

BIOLOGY AND INFORMATION: Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT III **(10 Periods)**

SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING: Heuristic alignment algorithms, global sequence alignments- Needleman-Wunsch algorithm, local sequence alignments- smith-waterman algorithm, amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.

UNIT IV **(11 Periods)**

PRIMARY DATABASES AND THEIR USE: Introduction to biological databases- organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT V **(09Periods)**

SECONDARY DATABASES: Introduction to secondary databases- organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-organization and Management of databases, KEGG, ExPASy, BRENDA.

(Total Periods: 45)

TEXT BOOKS:

1. David W. Mount "Bioinformatics: Sequence and Genome Analysis", CSHL Press, 2nd edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, "Bioinformatics Basics, Applications in Biological Science and Medicine", CRC Press, Taylor & Francis Group, 2nd edition,2005.
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, "Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery", PHI Learning Pvt. Ltd.,3rd edition, 2011.

IV B.Tech - I Semester

14BT61206: CYBER SECURITY AND LAWS
(Open Elective)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Nil

COURSE DESCRIPTION: Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

COURSE OUTCOMES:

After successful completion of the course student will be able to:

1. Demonstrate knowledge in Cyber security, Cyber crimes and its related laws in Indian and Global Act.
2. Analyze the legal perspectives and laws related to cyber crimes in Indian context.
3. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

INTRODUCTION TO CYBER CRIMES: Introduction, Definition, Origin, Cyber Crime and Information Security, Cyber Criminals, Classifications of Cyber Crimes, The Legal Perspectives and Indian Perspective, Cyber Crime and Indian ITA 2000, Global Perspective on Cyber Crimes.

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Café and Crimes, Botnets.

UNIT II **(09 Periods)**

TOOLS AND METHODS USED IN CYBER CRIME: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT III **(08 Periods)**

CYBER CRIMES AND CYBER SECURITY-LEGAL PERSPECTIVES: Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT IV **(10 Periods)**

CYBER SECURITY-ORGANIZATIONAL IMPLICATIONS: Introduction, Cost of Cyber Crimes and IPR issues, Web Threats for Organizations – Evils and Perils, Security and Privacy Implications from Cloud Computing, Social Media Marketing-Security Risks and Perils for Organizations, Social Computing and Associated Challenges for Organizations, Protecting People's Privacy in Organization, Organizational Guidelines for Internet Usage, Safe Computing and Usage Policy, Incident Handling and Best Practices, Media and Asset Protection.

UNIT V **(09 Periods)**

CYBER TERRORISM AND INFORMATION WARFARE: Introduction, Intellectual Property in the Cyber Space, the Ethical Dimension of Cyber Crimes, the Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.

Cyber Crime Illustrations: Indian Banks lose Millions of Rupees, Justice vs. Justice, Parliament Attack, The Indian case of online Gambling, Bank and Credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam.

(Total Periods: 45)

TEXT BOOK:

1. Nina Gobole, Sunit Belapure, *"Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,"* 1st edition, Wiley India, 2011.

REFERENCE BOOKS:

1. Ferrara et al., *"Cyber Law: Text and Cases,"* 3rd edition, Cengage Learning, 2012.
2. Vivek Sood, *"Cyber Law Simplified",* Tata McGraw-Hill, 1st edition, 2012.
3. Prashant Mali, *"Cyber Law and Cyber Crimes,"* 1st edition, Snow White Publications Pvt. Ltd., 2013.

IV B.Tech I Semester

14BT70110: **STRUCTURAL DYNAMICS**

(PROFESSIONAL ELECTIVE-II)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Engineering Mechanics, Structural Analysis–1 & Structural Analysis–2.

COURSE DESCRIPTION: Introduction to principle of vibration analysis, single degree of freedom Two degree of freedom and Multi–degree of freedom systems–Vibration Analysis– Dynamic analysis of continuous systems.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Evaluate the structural properties, mode shapes for the different structures under the different loading conditions .
2. Analyse the problems on the single degree of freedom and multi degrees of freedom .

DETAILED SYLLABUS:

UNIT I (10 Periods)

INTRODUCTION TO STRUCTURAL DYNAMICS AND SINGLE DEGREE OF FREEDOM (SDOF) SYSTEM : Single degree of freedom– introduction–Alembert's principle–Theory of vibrations – Lumped mass and continuous mass systems – Single degree of freedom (SDOF) systems – Formulation of equations of motion – Undamped and damped free vibration – Damping– Critical damping– Logarithmic decrement.

UNIT II (09 Periods)

TWO DEGREE OF FREEDOM SYSTEMS: Equations of motion of two degree of freedom systems–normal mode of vibrations–applications.

UNIT III (09 Periods)

MULTI–DEGREE OF FREEDOM (MDOF) SYSTEMS: Formulation of equations of motion – Free vibration – Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response

UNIT IV (09 Periods)

VIBRATION ANALYSIS: Vibration analysis–Rayleigh's method–Approximate methods–Improved Rayleigh method.

UNIT V (08 Periods)

DYNAMIC ANALYSIS OF CONTINUOUS SYSTEMS: Differential equation of motion–Transverse vibration of linearly elastic beams–Analysis of undamped free vibration of simply supported and cantilever beams.

Total Periods:45

TEXT BOOKS

1. Anil.K.Chopra, *Dynamics of Structures*, 3rd Edition, Pearson Education, 2007.
2. Mario Paz, *Structural Dynamics: Theory and computation*, Kluwer Academic Publication, 2004.

REFERENCE BOOKS

1. Clough and Penzien*, Dynamics of Structures*, 3rd Edition, McGraw–Hill International Edition, 2008.
2. C.V.R. Murty, *Earthquake Tips*, NICEE, IIT, Kanpur.
3. R. Ayothiraman and HemanthHazarika, *Earthquake Hazard Mitigation*, I.K. International Publishing House Pvt. Ltd.,
4. PankajAgarwal and Manish Shrikhande, *Earthquake Resistant Design of Structures*, 1st Edition, Prentice Hall of India, 2006.
5. S.K. Duggal, *Earthquake Resistant Design of Structures*, 1st Edition, Oxford University Press, 2010.

IV B.Tech I Semester

14BT70111: **ADVANCED FOUNDATION ENGINEERING**

[PROFESSIONAL ELECTIVE – II]

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Soil Mechanics, Foundation Engineering

COURSE DESCRIPTION:

Advanced bearing capacity theories; Analysis and design of shallow foundations; Pile foundations; Well foundations; Sheet pile walls; Foundations in problematic soils; Underreamed pile foundations; Marine substructures.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Select the best foundation solution for different types of civil engineering problems.
2. Analyze and design different types of foundations based on different ground conditions and sheet pile walls.
3. Identify expansive soils and select an appropriate method for controlling swelling.

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

SHALLOW FOUNDATIONS : Theories of bearing capacity – Effects of size, depth and shape of footings, tilt and eccentricity of applied loads, water table, compressibility, non–homogeneity and anisotropy of soil – Bearing capacity of footings resting on stratified soils, on slope and on top of the slopes – Settlement of foundation – Bearing pressure using SPT, CPT, Dilatometer and Pressuremeter – Types of foundation – Design principles of isolated, combined footing and mat foundation (conventional rigid method only).

UNIT II **(10 Periods)**

PILE FOUNDATIONS: Bearing capacity of vertically loaded piles: Static capacity-á, â and ë Methods, IS Code - Dynamic formulae - Point Bearing Resistance with SPT and CPT Results; Bearing Resistance of Piles on Rock - Pile Load Test - Negative Skin Friction – Uplift Resistance - Laterally Loaded Piles - Ultimate Lateral Resistance - Batter Piles - Under Reamed Piles - Mini and Micro Piles - Ultimate Capacity of Pile Groups in Compression, Pullout & Lateral Load - Efficiency; Settlements of Pile Groups.

UNIT III **(09 Periods)**

SHEET PILE WALLS: Sheet pile structures – cantilever sheet pile walls in granular soils and cohesive soils – Anchored Bulk head – Free earth supported method – Fixed earth support method – Lateral earth pressure on Braced sheet pile walls.

UNIT IV **(08 Periods)**

FOUNDATIONS ON EXPANSIVE SOILS: Foundations in black cotton soils – basic foundation problems associated with black cotton soils – Lime column techniques – Use of Cohesive Non Swelling [CNS] layer below shallow foundations – Underreamed piles – principle of functioning of underreamed pile – Analysis and design of underreamed pile.

UNIT V **(09 Periods)**

MARINE SUBSTRUCTURES : Introduction – Type of marine structures – Breakwaters, wharves, piers, seawalls, docks, quay walls – Design loads – Wave action – Wave pressure on vertical wall – Ship impact on piled wharf structure – Design of rubble mount break water and wall type break water.

Total Periods:45

TEXT BOOKS

1. Donald P. Coduto, *Foundation Design Principles and Practices*, 2nd edition, PHI, 2008.
2. Swami Saran, *Analysis and Design of Substructures – Limit State Design,* 2nd Edition, Oxford & IBH Publishing Company Pvt. Ltd., 2010

REFERENCE BOOKS

1. V. N. S. Murthy, *Text Book of Soil Mechanics and Foundation Engineering,* 3rd Edition, CBS Publishers & Distributors [P] Ltd., 2010.
2. Braja M. Das, Principles *of Foundation Engineering,* 7th Edition, Cengage Learning India, 2010.
3. Bowles J.E., *Foundation Analysis and Design,* 5th Edition, McGraw–Hill Publishing Company, 2001.
4. Shamsher Prakash, Gopal Ranjan and Swami Saran, *Analysis and Design of Foundations and Retaining Structures,* 2nd Edition, Sarita Publishers, 1987.

IV B.Tech I Semester

14BT70112: **WATER RESOURCES SYSTEMS PLANNING AND MANAGEMENT**

(Professional Elective – II)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Surveying, Engineering Hydrology, Water Resources Engineering.

COURSE DESCRIPTION: Concepts of water resources system planning and management – Linear programming – Dynamic programming – Non–linear optimization techniques – Simulation – Water resources economics – Water resources management.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Apply mathematics and optimization techniques for effective water resources planning .
2. Analyze availability of water resources for sustainable development .
3. Develop simulation techniques for water resources, planning and management .
4. Address the importance of water resources planning and management .
5. Carryout cost benefit analysis and give insights for the benefit of society .

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

WATER RESOURCE SYSTEMS: Concepts of systems analysis – Systems approach to water resources planning and management – Role of optimization models – Objective function and constraints – Types of optimization techniques.

UNIT – II **(09 Periods)**

LINEAR PROGRAMMING: Formulation of linear programming models – Graphical method – Simplex method – Application of linear programming in water resources – Revised simplex method – Duality in linear programming – Sensitivity and post optimality analysis.

UNIT – III **(09 Periods)**

DYNAMIC PROGRAMMING: Belman's principles of optimality – Forward and backward recursive dynamic programming – Case of dimensionality – Application of dynamic programming for resource allocation.

UNIT – IV **(09 Periods)**

NON–LINEAR OPTIMATIZATION TECHNIQUES AND SIMULATION: Classical method of optimization – Kun–Tucker – Gradient based techniques for simple unconstrained optimization – Application of simulation techniques in water resources planning.

UNIT – V **(09 Periods)**

WATER – RESOURCES ECONOMICS AND MANAGEMENT: Principles of economic analysis **–** Benefit cost analysis – Socio–economic institutional and pricing of water resources – Planning of reservoir system **–** Optimal operation of single reservoir system **–** Allocation of water resources **–** Optimal cropping pattern **–** Conjunctive use of surface and sub–surface water resources.

Total Periods:45

TEXT BOOKS

1. S. Vedula and P.P. Mujumdar, *Water Resources Systems*, 5th Edition, Mc.Graw Hill, 2010.
2. N. Ramanathan, *Operations research*, TMH Publications, 2005.

REFERENCE BOOKS

1. P.R. Bhave, *Optimal Design of Water Distribution Networks*, Narosa Publishing House, 2003.
2. P. Sankar Iyer, *Operations Research*, TMH Publications, 2008.
3. S.S. Rao, *Engineering Optimization,* 4th Edition, John Wiley and Sons Inc., 2009.
4. James and Lee, *Water Resources Economics,* Oxford Publishers, 2005.

IV B.Tech I Semester

14BT70113: **TRANSPORTATION MANAGEMENT**

(PROFESSIONAL ELECTIVE – II)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Transportation Engineering – I

COURSE DESCRIPTION: Transportation Planning and Management – Traffic Assessment, Land use transport models, Theory of Traffic flow – Transport economics, Public Transportation – Mass Transit System – Construction plant, Machinery, Tools and Vehicles used in Transportation Projects.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Acquire the knowledge on the transportation planning and management .
2. Assemble, analyze, and appropriately apply transportation engineering data from existing graphs, reports, and other documents .
3. Use Statistical methods and Electronic technology to support the planning, design, operation and management of transportation facilities and projects .
4. Apply latest techniques in Planning and Controlling of Transportation Projects .

DETAILED SYLLABUS:

UNIT I **(09 Periods)**

TRANSPORTATION PLANNING AND MANAGEMENT: Introduction to the process of urban transport planning – Travel demand forecasting – Trip generation analysis – Trip classification – Multiple regression analysis – Category analysis – Modal split analysis: introduction, earlier modal split models, modal split models with behavioral basis – Trip distribution analysis: introduction, methods of trip distribution, uniform and average factor method, Fratar method,Furness method, The Gravity model, Intervening and competing, Linear programming approach to trip distribution.

UNIT II **(09 Periods)**

TRAFFIC ASSIGNMENT: Purpose of traffic assignment- Assignment techniques - All or nothing assignment - Multiple route assignment - Capacity restraint assignment - Diversion curves - Route building algorithms.

LANDUSE TRANSPORT MODELS: Introduction, selection of Land–use transport models, The Lowry model, Grain – Lowry model, Applications of Lowry model.

THEORY OF TRAFFIC FLOW: Scope, definitions and basic relationship, review of flow density speed studies, hydrodynamic analogies, Application of hydrodynamic analogy, Car following theory and its application to traffic engineering, probabilistic description of traffic flow, an introduction to queuing theory as applied to traffic flow problems for study state conditions, simulation studies.

UNIT III **(08 Periods)**

TRANSPORT ECONOMICS: Economic evaluation of highway schemes - need for economic evaluation - cost and benefits of transportation projects - basic principles of economic evaluation - Net present value method, benefit/cost ratio method - internal rate of return method - Vehicle operating costs - Value of travel time saving - Accident costs.

PUBLIC TRANSPORTATION–MASS TRANSIT SYSTEMS: Bus and rail transit, characteristic capacities – Introduction to advanced computational techniques for transportation planning.

UNIT IV **(08 Periods)**

CONSTRUCTION PLANT, MACHINERY, TOOLS AND VEHICLES USED IN TRANSPORTATION PROJECTS (HIGHWAY, RAILWAY, AIRPORT, NAVAL DOCKYARD) : Dewatering, Blasting, Excavation, Grading, Haulage; Dredging; Concreting – RMC Plant, Batching Plant, Concrete Pumps, Transit Mixers; Piling – Pile Driving in equipment; Air Compressors and Pneumatic tools; Equipment for Flexible Pavements – Hot Mix Plant, Paver; Railway Track–laying equipment; Time, Cost, Output and FOL calculation; Numerical Problems

SCHEDULING AND CONTROLLING OF PLANT, MACHINERY, TOOLS AND VEHICLES: Grouping of Plant and Machinery; Incorporating in Project Planning; Preparation of Plant Schedule, Numerical Problems.

UNIT V **(11 Periods)**

PLANNING AND CONTROLLING OF TRANSPORTATION PROJECTS: WBS, Network Development, Resource allocation, Planning and Controlling

INTRODUCTION TO SOFTWARE PACKAGES LIKE PRIMAVERA AND MS PROJECT

Total Periods:45

TEXT BOOKS

1. L.R.Kadyali, *Traffic Engineering and Transportation Planning,* 7th Edition, Khanna Publications, 2012.
2. KK Chitkara, *Construction Project Management: Planning, Scheduling and Controlling,* Mc.Graw Hill Education Pvt. Ltd., 2010

REFERENCE BOOKS

1. S.P. Saxena, S.P. Arora, *Railway Engineering – A Text Book of Transportation Engineering,* 7th Edition, S.Chand and Co. Ltd., 2010
2. SP Chandola, *A Text book of Transportation Engineering*, S Chand & Co Ltd, 2011

IV B.Tech I Semester

14BT70114: ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT (PROFESSIONAL ELECTIVE – II)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Environmental Science

COURSE DESCRIPTION: Introduction to environmental impact assessment – EIA methodologies – Environmental impact on soils, ground water and surface water – Environmental impact assessment of air, vegetation and wild life – Environmental audit and acts.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain the parameters of EIA and its methods and Environmental audit .
2. Analyze and interpret the parameters that affect the study area .
3. Address the issue related to the impact of parameters on the environment and society .
4. Conduct audit and write EIA report without bias and give recommendations .

DETAILED SYLLABUS:

UNIT I (08 Periods)

INTRODUCTION TO ENVIRONMENTAL IMPACT ASSESSMENT

Basic concept of EIA – Initial environmental examination – Elements of EIA – Factors affecting EIA – Impact evaluation and analysis – Preparation of environmental base map – Classification of environmental parameters.

UNIT II (08 Periods)

EIA METHODOLOGIES

Criteria for the selection of EIA Methodology – EIA methods – Adhoc methods, matrix methods, network method – Environmental medium quality index method, overlay methods and cost/benefit analysis.

UNIT III (10 Periods)

ENVIRONMENTAL IMPACT ON SOIL, GROUND WATER AND SURFACE WATER Prediction and assessment – Soil quality – Methodology for the assessment of soil and groundwater – Delineation of study area – Identification of activities. Impact prediction – Assessment of impact significance – Identification and incorporation of mitigation measures – EIA in surface water: Methodology for the assessment of impacts on surface water environment.

UNIT IV (08 Periods)

ENVIRONMENTAL IMPACT ASSESSMENT OF AIR, VEGETATION AND WILDLIFE

Air pollution sources – Generalized approach for assessment of air pollution Impact. Assessment of impact of developmental activities on vegetation and wildlife – Environmental impact of deforestation – Causes and effects of deforestation.

UNIT V (11 Periods)

ENVIRONMENTAL AUDIT AND ACTS

Environmental audit and environmental legislation – Objectives of environmental audit – Types of environmental audit – Audit protocol – Stages of environmental audit – Onsite activities – Evaluation of audit data and preparation of audit report. Post audit activities – The Environmental Protection Act – The water act – The Air act – Wild life Act – Case studies– Preparation of Environmental Impact Assessment(EIA) statement for various projects.

Total Periods:45

TEXT BOOKS

1. Y. Anjaneyulu, *Environmental Impact Assessment Methodologies,* 2nd Edition B.S. Publications, 2010.
2. J. Glynn and Gary W. Heinke, *Environmental Science and Engineering,* 2nd Edition , Prentice Hall, 1996.

REFERENCE BOOKS

1. Suresh K. Dhameja, *Environmental Engineering and Management,* S.K. Kataria and Sons, 2010.
2. H.S. Bhatia, *A Text Book of Environmental Pollution and Control,* Galgotia Publications (P) Ltd., 2003.
3. Charless H.Eccleston, *Environmental Impact Assessment*, CRC Press, Taylor and Francis Group, 2011.
4. Balakrishna Moorthy, *Environmental Management*, 2nd Edition, PHI Publications, 2008.

IV B.Tech I Semester

14BT70121: **REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEMS LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: –

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Apply the knowledge of aerial photographs, satellite imagery to civil engineering applications .
2. Analyze the Remote sensing and GIS techniques to generate the geographical information for natural resources .
3. Recommend suitable methods for Flood and drought mitigation with overlay analysis .
4. Assess the landuse and landcover of a particular area .

LIST OF EXPERIMENTS:

1. Digitization of Toposheet/Map
2. Drainage analysis
3. Developing digital elevation model
4. Preparation of thematic maps
5. Landuse and Landcover analysis
6. Study of feature estimation
7. Rainfall –Runoff analysis
8. Road network analysis
9. Watershed analysis
10. Site suitability analysis
11. Natural hazard zones map

IV B.Tech I Semester

14BT70122: **COMPUTER AIDED DESIGN AND DETAILING LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	–	–	3	2

Prerequisites: Engineering Graphics, RCCS–I & II

Course Description: Simple Beams and 2–D, 3D Frame Analysis.

Course Outcomes:

After completion of the course, a successful student will be able to:

1. Acquire knowledge on the theoretical concepts of analysis, design and use of software .
2. Analyze structure under different loading conditions .
3. Estimate the reinforcement required and sizes of different members using Stadd–Pro .
4. Prepare drawings with detailed report of a building for the necessary approvals .

LIST OF EXPERIMENTS:

1. Analysis of simple beams
2. 2–D Frame Analysis and design
3. Steel tabular truss analysis and design
4. 3–D Frame Analysis and design
5. Retaining wall analysis and design
6. Simple tower analysis and design
7. Analysis and design of INTZ type water tank, circular and rectangular water tanks
8. Analysis and design plate girder bridge

REFERENCE

1. IS 456 – 2000
2. IS 800 – 2007
3. IS 875 Part – I, II & III – 2000

IV B. Tech I Semester

14BT70123: **SEMINAR**

Internal Marks	External Marks	Total	L	T	P	C
0	50	50	-	-	-	2

PREREQUISITES:

All the courses of the program up to III B. Tech. – I Semester.

COURSE DESCRIPTION:

Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Demonstrate in-depth knowledge on the seminar topic.
2. Analyze critically, chosen seminar topic for substantiated conclusions.
3. Undertake investigation of issues related to seminar topic providing valid conclusions.
4. Function effectively as individual on the chosen seminar topic.
5. Develop communication skills, both oral and written for preparing and presenting seminar report.
6. Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

IV B.Tech II Semester

14BT80101: **PRESTRESSED CONCRETE**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Structural Analysis, Reinforced Concrete constructions

COURSE DESCRIPTION: Introduction to prestressing, methods and materials– Analysis of sections for flexure– Design of section for flexure and shear– Analysis of end blocks– Deflection of prestressed concrete sections

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Demonstrate knowledge on the preparation of prestressed concrete and members
2. Analyze prestressed members under flexure and shear .
3. Design the prestressed members using elastic design method .

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

INTRODUCTION: Introduction to prestressing – Materials – Types of prestressing – Loss of prestress – Methods of Pretensioning and post tensioning

UNIT II **(10 Periods)**

ANALYSIS OF SECTIONS FOR FLEXURE: Analysis of sections for flexure – Prestressed with straight, concentric, eccentric tendons, bent and parabolic tendons.

UNIT III **(09 Periods)**

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: Kern Zone, cable zone– Allowable stresses – Design criteria as per I.S.Code – Design of section for flexure and shear.

UNIT IV **(10 Periods)**

ANALYSIS OF END BLOCKS : Anchorage zone stresses: Guyon's method and Mugnel method– Anchorage zone reinforcement – Transfer of prestress pre–tensioned members.

UNIT V **(08 Periods)**

DEFLECTION OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections – Factors influencing deflections – Short term deflections of uncracked members–prediction of long term deflections.

TEXT BOOKS

1. N. Krishna Raju, *Prestressed Concrete,* 4th Edition, Tata McGraw–Hill Publications, New Delhi, 2011.
2. N. Rajagopalan, *Prestressed Concrete,* 2nd Edition, Narosa Publications, New Delhi, 2014.

REFERENCE BOOKS

1. Ramamrutham, *Prestressed Concrete,* 5thEdition, Dhanpat Rai Publications, New Delhi, , 2003.
2. T.Y. Lin and Ned H. Burns, *Design of Prestressed Concrete Structures,* 3rdEdition, John Wiley and Sons, 2010.
3. Praveen Nagaraju, *Prestressed Concrete Design,* Dorling Kindersley Publication, 2013.
4. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Reinforced Concrete Structures – Vol. I,* 19thEdition, Laxmi Publications Pvt. Ltd., New Delhi, 2010.

IS Codes

IS 1343– is to be permitted into the examination hall.

IV B.Tech II Semester
14BT80102: ESTIMATION, COSTING & VALUATION

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Building Materials, Surveying

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain estimation, specifications of materials and valuation
2. Calculate various quantities required for a structure .
3. Prepare agreements, tenders and valuation of buildings .

DETAILED SYLLABUS:

UNIT I
ESTIMATE OF BUILDINGS (10 Periods)
Load bearing and framed structures – Calculation of quantities of brick work, RCC, PCC, Plastering, white washing, colour washing and painting / varnishing for shops, rooms, residential building with flat and pitched roof – Various types of arches – Calculation of brick work and RCC works in arches – Estimate of joineries for panelled and glazed doors, windows, ventilators, handrails etc.

UNIT II
ESTIMATE OF OTHER STRUCTURES (13 Periods)
Estimating of septic tank, soak pit – sanitary and water supply installations – water supply pipe line – sewer line – tube well – open well – estimate of bituminous and cement concrete roads – estimate of retaining walls – culverts – estimation of reinforcement for different structures

UNIT III
SPECIFICATION AND RATE ANALYSIS (08 Periods)
Purpose and method of writing specifications – General and Detailed specification for different items of building construction – Lead statement – Data – Schedule of rates – Analysis of rates for concrete, RCC works, Brick work, Plastering, Flooring and Painting.

UNIT IV
CONTRACTS AND TENDERS (08 Periods)
Purpose of contract – Types of contract – Agreement – Tenders – Tender notice and form – Arbitration and Legal requirements

UNIT V
VALUATION (06 Periods)
Necessity – Basics of value engineering – Capitalised value – Depreciation – Escalation – Value of building – Calculation of Standard rent – Mortgage – Lease

Total Periods:45

TEXT BOOKS

1. Dutta, B.N., *Estimating and Costing in Civil Engineering*, 27th Edition, UBS Publishers & Distributors Pvt. Ltd., 2003
2. Kohli, D.D and Kohli, R.C., A Text Book of Estimating and Costing (Civil), 12th Edition, S. Chand & Company Ltd. 2004.

REFERENCE BOOKS

1. M. Chakraborthi, *Estimating Costing Specification and Valuation in Civil Engineering*, 23rd Edition, Laxmi Publications, New Delhi, 2010.
2. Standard Schedule of Rates and Standard Data Book, Public works Department.
3. IS 1200(Parts I to XXV – 1974/ Method of Measurement of Building and Civil Engineering Works – B.I.S)
4. National Building Code of India – 2005, BIS, Govt. of India, New Delhi.

IV B.Tech II Semester
14BT80103: **ADVANCED STEEL STRUCTURES**
(PROFESSIONAL ELECTIVE - III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Steel Structures
COURSE DESCRIPTION: Riveted plate girders and welded plate girders–Roof and Tubular trusses– Gantry Girder– steel water tanks– plastic analysis and composite construction

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain plate girders, roof trusses and water tanks due to various loading conditions .
2. Design roof trusses, plate girders and composite construction.

DETAILED SYLLABUS:
UNIT I **(10 Periods)**
RIVETED PLATE GIRDERS AND WELDED PLATE GIRDERS:

RIVETED PLATE GIRDERS Design of cross section– Curtailment of flange plates – connection of flange angles to web and flange angles to flange plates.
WELDED PLATE GIRDERS: Design of cross section of plate girders – Design of vertical, horizontal and bearing stiffeners.

UNIT II **(09 Periods)**
ROOF AND TUBULAR TRUSSES: ROOF TRUSSES: Different types of trusses – Design loads – Load combinations – IS Code recommendations – Structural details – Design of simple roof trusses involving the design of purlins, members and joints.
TUBULAR TRUSSES: Design of tension members, compression members and – Tubular trusses – Connections.

UNIT III **(09 Periods)**
GANTRY GIRDER: Gantry girder impact factors – Longitudinal forces – Design of gantry girders.

UNIT IV **(09 Periods)**
STEEL WATER TANKS: Specifications – Design of rectangular steel tank.

UNIT V **(08 Periods)**
PLASTIC ANALYSIS AND COMPOSITE CONSTRUCTION: Introduction to plastic analysis –Shape factor, plastic hinge, collapse loads for simply supported beams, propped cantilevers, and two span continuous beams – Design simple beams.

Total Periods:45

TEXT BOOKS

1. S.K. Duggal, *Design of Steel Structures,* 2nd Edition, Tata McGraw Hill, New Delhi, 2014.
2. B.C.Punmia, *Design of Steel Structures,*1st Edition, Laxmi publication (P) LTD, New Delhi, 2013.

REFERENCE BOOKS

1. S.S. Bhavikatti, *Design of Steel Structures,* 2nd Edition, I.K. International Publishing House Pvt. Ltd, 2010.
2. N. Krishna Raju, *Structural Design and Drawing,* 3rd Edition, Universities Press, Hyderabad, 2009.
3. Ramachandra and Virendra Gehlot, *Design of Steel Structures,* 11th Edition, Scientific Publishers, Jodhpur, 2005.
4. N. Subramanian, *Design of Steel Structures,* 1st Edition, Oxford University Press, 2010

IS Codes: IS 800–2007, IS 875– Part III, IS 1161–1979 and Steel Tables are to be permitted into the examination hall.

IV B.Tech II Semester

14BT80104: **SOIL DYNAMICS AND MACHINE FOUNDATIONS**

(PROFESSIONAL ELECTIVE – III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Soil Mechanics

COURSE DESCRIPTION: Knowledge of vibration; wave propagation through soil deposits; vibration isolation; Determination of dynamic soil properties; Analysis and design of machine foundations.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Understand causes and characteristics of vibration
2. Analyse soil properties due to dynamic loading
3. Design machine foundations.

DETAILED SYLLABUS:

UNIT I **(9 Periods)**

FUNDAMENTALS OF VIBRATION : Definitions – Simple harmonic motion – Free and forced vibrations with and without viscous damping – Frequency dependent excitation – Systems under transient loads – Rayleigh's method of fundamental frequency – Logarithmic decrement.

FREQUENCY OF SOIL SYSTEMS: Determination of viscous damping – Transmissibility – Systems with two and multiple degrees of freedom – Vibration measuring instruments.

UNIT II **(9 Periods)**

WAVE PROPAGATION: Propagation of seismic waves in soil deposits – Attenuation of stress waves – Stress–strain behavior of cyclically loaded soils – Strength of cyclically loaded soils.

DYNAMIC SOIL PROPERTIES : Dynamic soil properties – Laboratory and field testing techniques – Elastic constants of soils – Correlations for shear modulus and damping ratio in sands, gravels, clays and lightly cemented sand – Liquefaction of soils.

UNIT III **(9 Periods)**

VIBRATION ANALYSES : Types – General requirements – Permissible amplitude – Allowable soil pressure – Modes of vibration of a rigid foundation block – Methods of analysis – Lumped mass models – Elastic half space method – Elastodynamics – Effect of footing shape on vibratory response – Dynamic response of embedded block foundation – Vibration isolation.

UNIT IV **(9 Periods)**

DESIGN OF MACHINE FOUNDATIONS: Analysis and design of block foundations for reciprocating engines – Dynamic analysis and design procedure for a hammer foundation – IS code of practice – Design procedure for foundations of reciprocating and impact type machines.

UNIT V **(9 Periods)**

MACHINE FOUNDATIONS ON PILES: Introduction – Analysis of piles under vertical vibrations – Analysis of piles under translation and rocking– Analysis of piles under torsion – Design procedure for a pile supported machine foundation.

VIBRATION ISOLATION: Types and methods of isolation – Active isolation and passive isolation – Dynamic properties of isolation materials.

Total Periods:45

TEXT BOOKS

1. Braja M. Das and G. V. Ramana, *Principles of Soil Dynamics,* 2nd Edition, Cengage Learning Inc., 2011.
2. P. Srinivasulu, and C. Vaidyanathan, *Hand book of Machine Foundations,* 1st Edition, Tata McGraw–Hill, 2007.

REFERENCE BOOKS

1. Arya, S. D, O'Neil, M. and Pincus, *Design of Structures and Foundations for Vibrating Machines,* G.Gulf Publishing Co., 1979.
2. Prakash S., *Soil Dynamics,* McGraw Hill, 1981.
3. Swami Saran, *Soil Dynamics and Machine Foundations,* 1st Edition, Galgotia Publications Pvt. Ltd, 2010.
4. Kameswara Rao, *Vibration Analysis and Foundation Dynamics,* Wheeler Publishing, 2000.

IV B.Tech II Semester

14BT80105: **WATERSHED MANAGEMENT**

(PROFESSIONAL ELECTIVE – III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Surveying and Hydrology.

COURSE DESCRIPTION: Concept of watershed – Need and objectives – Characteristics of watershed – Principles of erosion – Measures to control erosion – Water harvesting – Land and ecosystem management – Planning and administration.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain the principles of watershed and its management
2. Assess water availability and suggest different water harvesting techniques .
3. Develop and strengthen community based watershed management for sustainable growth .

DETAILED SYLLABUS:

UNIT I **(10 Periods)**

INTRODUCTION AND CHARACTERISITCS OF WATERSHED : Concept of watershed development – Objectives of watershed development – Need for watershed development in India – Integrated and multidisciplinary approach for watershed management – Size – Shape – Physiography– Slope – Climate – Drainage – Land use – Vegetation– Geology and soils – Hydrology and Hydrogeology – Socio–economic characteristics – Basic data on watersheds.

UNIT II **(08 Periods)**

PRINCIPLES OF EROSION : Types of erosion – Factors affecting erosion – Effects of erosion on land fertility – Estimation of soil loss due to erosion – Universal soil loss equation – Contour techniques – Ploughing – Furrowing – Trenching – Bunding – Terracing – Gully control – Rock fill dams – Brushwood dam – Gabion.

UNIT III **(10 Periods)**

WATER HARVESTING AND LAND MANAGEMENT: Rainwater harvesting – Catchment harvesting – Harvesting structures – Soil moisture conservation – Check dams – Artificial recharge – Farm ponds – Percolation tanks – Land use and land capability classification – Management of forest – Agricultural – Grassland and wild land – Reclamation of saline and alkaline soils.

UNIT IV **(09 Periods)**

ECOSYSTEM MANAGEMENT : Role of ecosystem – Crop husbandry– Soil enrichment – Inter, mixed and strip cropping – Cropping pattern– Sustainable agriculture – Bio–mass management – Dry land agriculture – Silvi pasture – Horticulture – Social forestry and afforestation.

UNIT V **(08 Periods)**

PLANNING AND ADMINISTRATION: Planning of watershed management activities – Stake holder's participation – Preparation of action plan – Administrative requirements – Trends in watershed management.

Total Periods:45

TEXT BOOKS

1. JVS Murthy, *Watershed Management,* 2nd Edition, New Age International Publishers, 2009.
2. R. A. Wurbs and W.P. James, *Water Resource Engineering*, 1st Edition, PHI Publications, 2001.

REFERENCE BOOKS

1. V.V.N. Murthy*, La*nd *a*nd *Water Management,* 4th Edition, Kalyani Publications, 2008.
2. D.K. Majumdar, *Irrigation a*nd *Water Management,* 1st Edition, PHI, 2010.
3. Vijay P. Singh, Ram Narayan yadava, *Watershed Management*, 1st Edition, Allied Publishers, 2003.
4. Timothy O. Randhir, *Watershed Management: Issues a*nd *Approaches*, IWA Publishing, 2007.

IV B.Tech II Semester

14BT80106: **INDUSTRIAL WASTE WATER TREATMENT**

(PROFESSIONAL ELECTIVE – III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Wastewater Technology

COURSE DESCRIPTION: Introduction to waste water treatment – Principles of Biological treatment – Studies in Biological Waste treatment design – Industrial Waste treatment – Treatment of Liquid Wastes.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Apply the principles of science in the treatment of water.
2. Analyses various pollutant present in industrial waste water.
3. Develop solutions for the treatment of industrial waste water and safe disposal of industrial waste.

DETAILED SYLLABUS:

UNIT I **(10 Periods)**

INTRODUCTION TO WASTE WATER TREATMENT: Characteristics of Waste Water – Characteristics of Treatment Plant Effluents – Self Purification – D O – p^H Values of wastes and recycling water – Toxic Substances – Primary Treatment of Waste water.

UNIT II **(09 Periods)**

PRINCIPLES OF BIOLOGICAL TREATMENT: Microbiological Metabolism – Basic Kinetic Equations – Continuous flow treatment models – Oxygen Requirement in Aerobic Process – Design of Conventional Biological Treatment Facilities.

UNIT III **(09 Periods)**

STUDIES IN BIOLOGICAL WASTE TREATMENT DESIGN : Introduction – Aerobic Treatment – Anaerobic Treatment – Nitrogen Removal by Biological Nitrification and Denitrification – Anaerobic Filters – U–Tube Aeration System.

UNIT IV **(08 Periods)**

INDUSTRIAL WASTE TREATMENT: Introduction – Characteristics – Treatment – Pulp and Paper mill Wastes – Manufacturing – Characteristics and Treatment.

UNIT V **(09 Periods)**

TREATMENT OF LIQUID WASTES : Breweries, Wineries and Distilleries Waste – Tannery waste – Textile Mill Waste – Sugar Mill Waste.

Total Periods:45

TEXT BOOKS

1. M.N. Rao and Dutta, *Waste Water Treatment,* , Oxford and IBH Publishers, 3rd Edition , 2009.
2. Met Calf and Eddy, *Waste water Engineering, Treatment and Re Use,* Mc.Graw Hill Education Private Limited, 4th Edition , 2010.

REFERENCE BOOKS

1. Newmerow, *Liquid Waste of Industry,* Pearson Education Publishing Co., 1971.
2. Mark J. Hammer and Mark J. Hammer Jr., *Water and Waste Water technology,* 6th Edition, 2008.
3. A.D.Patwardhan, Industrial Waste Water Treatment,PHI Publisher,2008.
4. Rakesh Kumar; R.N.Singh, Municipal Water and Waste Water Treatment, TERI, 2009.

IV B.Tech II Semester

14BT80107: INFRASTRUCTURE DEVELOPMENT AND MANAGEMENT
(PROFESSIONAL ELECTIVE – III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Construction Planning and Project Management

COURSE DESCRIPTION: Introduction – Overview of Indian Infrastructure – Tenders, Contracts and Specifications – Policies on Infrastructure Development – Construction and Infrastructure – Infrastructure Management.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Understand contract, tendering and infrastructure development scenario in India
2. Give suggestions as per the policies of Infrastructure development and issues
3. Prepare a tender document for an infrastructure project (PO 10)
4. Forecast future development in Infrastructure project development and management .

DETAILED SYLLABUS:

UNIT I (06 Periods)

INTRODUCTION: Impact of Infrastructure development on economic development, standard of living and environment – Reasons for rise of public sector and government in infrastructural activities – Changed socio – economic scenario and current problems and related issues.

UNIT II (09 Periods)

OVERVIEW OF INDIAN INFRASTRUCTURE: Energy – Power, Water resources –Dams – Bridges – canals, Rural Infrastructure – Urban Infrastructure, housing, Roads, Railways, Ports, Airports – social Infrastructure – education, health care– Infrastructure deficiencies.

TENDERS, CONTRACTS AND SPECIFICATIONS: Methods of tendering for projects – Contracts – Different types of contracts – Importance of specifications – Preparation of tender document, Build operate and transfer contracts – Turn key contracts. Legal problems. Arbitration. Payment schedule. FIDIC clauses.

UNIT III (09 Periods)

POLICIES ON INFRASTRUCTURE DEVELOPMENT: A historical review of the Government policies on infrastructure – Current public policies on transportations, power and telecom sectors – Plans for infrastructure development – Legal framework for regulating private participation in – roads and highways, Ports & Airports, Power and Telecom.

UNIT IV (09 Periods)

CONSTRUCTION AND INFRASTRUCTURE: Construction component of various infrastructure sectors – Highway – ports and aviation – oil and gas – power – telecom, railways – irrigation – Current scenario, future needs, investment needed, regulatory framework, government policies and future plans. – Technological and methodological demands on construction management in infrastructure development projects.

UNIT V (09 Periods)

INFRASTRUCTURE MANAGEMENT: Importance, scope and role in different sectors of construction.

- **Highway Sector:** Repayment of Funds – Toll Collection Strategy – Shadow tolling, and direct tolls – Maintenance strategy – Review of toll rates & structuring to suit the traffic demand,
- **Irrigation Projects:** Large / Small Dams – Instrumentation, monitoring of water levels – catchments area – rainfall data management – prediction – land irrigation planning & policies, processes Barrages, Canals.
- **Power Projects:** Power scenario in India – Estimated requirement – Generation of Power distribution strategies – national grid – load calculation & factors, Hydropower – day to day operations – management structures – maintenance – Thermal Power – Nuclear Power.
- **Airports:** Requisites of domestic & International airports & cargo & military airports, facilities available – Terminal management, ATC.
- **Railways:** Mass Rapid Transport System MRTS – LRT – Multi–modal Transport System.

Total Periods:42

TEXTBOOKS

1. K. Narindar Jetli and Vishal Sethi, "*Infrastructure Development In Indi: Post Liberalisation Initiatives and Challengesa*", New Century Publications, Ist Edition, 2007.
2. Raghuram, G. & Jain, R., *Infrastructure Development & Financing Towards a Public–Private Partnership*, Macmillan India Ltd., 2002.

REFERENCE BOOKS

1. RN Joshi, *Public Private Parnership in Infrasturcture Perspectives, Principles, Practice*, Vision Books, Ist Edition, 2000.
2. Prasanna Chandra, *Projects: Planning, Analysis, Selection, Financing, Implementation and Review*, Mc.Graw Hill Education, 8th Edition, 2014.
3. Murty G R K, *Infrastructure Projects: Current Financing Trends,* ICFAI University Press, 2006.
4. Anup Chatterjee, K. Narinder Jetli, Vishal Sethi, *Industry and Infrasture Development in India since 1947*, Newcentry Publications, Ist Edition, 2009.

IV B.Tech II Semester

14BT80108: **EARTHQUAKE RESISTANT DESIGN OF STRUCTURES**

(PROFESSIONAL ELECTIVE–III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Structural Dynamics, Engineering Geology.

COURSE DESCRIPTION: Introduction to Structural Dynamics and Multi–Degree of Freedom Systems–Earthquake Analysis and Earthquake Engineering–Codal Design Provisions–Codal Detailing Provisions–Shear Walls.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain the principles of seismic resistant design of structures .
2. Analyze structure subjected to natural vibrations and estimate frequencies .
3. Design of an earthquake resistant building using IS codes .

DETAILED SYLLABUS:

UNIT I (10 Periods)

EARTHQUAKE ENGINEERING: Engineering seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate tectonics – Elastic rebound theory – Earthquake terminology – Source, focus, epicenter etc. – Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic zoning map of India.

UNIT II (09 Periods)

THEORY OF VIBRATIONS: Theory of vibrations– Free vibrations of single degree–Two degree and multi degree freedom systems– Vibrations absorbers–Brief introduction to instruments–Accelerograms.

UNIT III (08 Periods)

CODAL DESIGN PROVISIONS : Review of the latest Indian seismic code IS:1893 – 2002 (Part–I) provisions for buildings – Earthquake design philosophy – Assumptions – Design by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

UNIT IV (08 Periods)

CODAL DETAILING PROVISIONS: Review of the latest Indian seismic codes IS: 4326, IS: 13920 and SP – 34 provisions for ductile detailing of R.C buildings – Beam, column and joints.

UNIT V (10 Periods)

SHEAR WALLS: Types – Design of shear walls as per IS: 13920 – Detailing of reinforcements.

Total Periods:45

TEXT BOOKS

1. PankajAgarwal and Manish Shrikhande, *Earthquake Resistant Design of Structures*, 1st Edition, Prentice Hall of India, 2006.
2. S.K. Duggal, *Earthquake Resistant Design of Structures*, 1st Edition, Oxford University Press, 2010.

REFERENCE BOOKS

1. Clough and Penzien*, Dynamics of Structures*, 3rd Edition, Mc.Graw Hill International Edition, 2008.
2. Anil.K. Chopra, *Dynamics of Structures*, 3rd Edition, Pearson Education, 2007.
3. C.V.R. Murty, *Earthquake Tips*, NICEE, IIT, Kanpur.
4. Mario Paz, Structural Dynamics: Theory and computation, Kluwer Academic Publication, 2004.

Codes/Tables

IS Codes: IS 1893–2002, IS 4326–1993 and IS13920–1993 to be permitted into the examinations hall.

IV B.Tech II Semester

14BT80109: **BRIDGE ENGINEERING**

(PROFESSIONAL ELECTIVE – IV)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Reinforced concrete structures, Foundation Engineering.

COURSE DESCRIPTION: Bridge loading standards– Box culvert and Deck slab bridge– Beam and Slab bridge– Bridge beams– Piers and Abutments.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Understand the concept of loading and their pattern on the bridges
2. Carryout stability analysis of bridge piers and bridge slab.
3. Design box culvert and deck slabs for different classes of vehicles .

DETAILED SYLLABUS:

UNIT I **(06 Periods)**

BRIDGE LOADING STANDARDS: Highway Bridge loading standards – Impact factor – Railway bridge loading standards (BG ML Bridge) – Various loads in bridges – Importance of site investigation in bridge design.

UNIT II **(08 Periods)**

BOX CULVERT AND DECK SLAB BRIDGE: General aspects – Design loads – Design of box culvert subjected to class AA tracked vehicle only.

DECK SLAB BRIDGE:Effective width method of analysis and design of deck Slab Bridge (simply supported) subjected to class AA tracked vehicle only.

UNIT III **(10 Periods)**

BEAM AND SLAB BRIDGE (T–BEAM BRIDGE) : General features – Design of interior panel of slab – Pigeauds method –Design of a T–beam bridge subjected to class AA tracked vehicle only.

UNIT IV **(10 Periods)**

BRIDGE BEARINGS: General features – Types of bearings – Design principles of steel rocker and roller bearings – Design of a steel rocker bearing – Design of elastomeric pad bearing.

UNIT V **(11 Periods)**

PIERS AND ABUTMENTS : General features – Bed block – Materials piers and abutments – Types of piers – Forces acting on piers – Stability analysis of piers – General features of abutments – Forces acting on abutments – Stability analysis of abutments – Types of wing walls – Approaches – Types of bridge foundations (excluding design).

Total Periods:45

TEXT BOOKS

1. N. Krishna Raju, *Design of Bridges,* 4th Edition, Oxford and IBH, Publishing Company Pvt. Ltd., New Delhi, 2010
2. T.R. Jagadish and M.A. Jayaram, *Design of Bridges Structure,*2nd Edition Prentice Hall of India Pvt. Ltd., New Delhi, 2004.

REFERENCE BOOKS

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Design of Steel Structures,* 2nd Edition, Laxmi Publications, New Delhi, 2013.
2. Ramachandra, *Design of Steel Structures,* 11th Edition, Scientific Publishers (India), 2009.
3. PonnuSwamyS.,*Bridge Engineering,* 2nd Edition, Tata Mcgraw–Hill Company, New Delhi, 2010.
4. Swami Saran, *Analysis and Design of Substructures – Limit State Design,* 2nd Edition, Oxford and IBH Publishing Company Pvt. Ltd., New Delhi, 2010.
5. *Relevant IRC & Railway Bridge Codes*

IV B.Tech II Semester

14BT80110: **GROUND IMPROVEMENT TECHNIQUES**

[PROFESSIONAL ELECTIVE – IV]

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Soil Mechanics and Foundation Engineering

COURSE DESCRIPTION: Scope of ground improvement; Methods of ground improvement – Drainage and dewatering – In–situ treatment of cohesionless and cohesive soils – Stabilisation – Earth reinforcement

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Explain various methods available for ground improvement
2. Use both mechanical and chemical methods/geosynthetics for improvement of soils.

DETAILED SYLLABUS:

UNIT I **(08 Periods)**

GROUND IMPROVEMENT

Role of ground improvement in foundation engineering – methods of ground improvement – Geotechnical problems in alluvial, laterite and black cotton soils – Selection of suitable ground improvement techniques based on soil condition.

UNIT II **(09 Periods)**

DRAINAGE AND DEWATERING

Drainage techniques – Well points – Vaccum and electroosmotic methods – Seepage analysis for two dimensional flow–fully and partially penetrating slots in homogenous deposits [Simple cases only].

UNIT III **(10 Periods)**

INSITU DENSIFICATION

Granular soils: Principles of Insitu Densification– Insitu Densification Methods– Dynamic Compaction, Blasting, Vibrocompaction, Granular Pilees – Relative Merits and their Limitations

Cohesive soils: Principles of Insitu Densification– Insitu Densification Methods– vertical driains, sand wick, geodrains, stone and lime coloms and thermal methods – Relative Merits and Their Limitations.

UNIT IV **(09 Periods)**

STABILISATION

Types of grouts – Grouting equipment and machinery – Injection methods – Grout monitoring – Shotcreting and Gunting Technology – Stabilisation with mechanical bituminous cement, lime and chemicals – Stabilisation of expansive soils.

UNIT V **(09 Periods)**

GEOSYNTHETICS AND EARTH REINFORCEMENT

Concept of reinforcement – Types of reinforcement material – Applications of reinforced earth –Types of Geosynthetics – Functions and applications of Geosynthetics.

(Total 45 Periods)

TEXT BOOKS

1. Hausmann M.R., *Engineering Principles of Ground Modification,* International Edition, Mc.Graw Hill, 1990.
2. Purushotham Raj, P., *Ground Improvement Techniques,* 1st Edition, Laxmi Publications [P] Ltd., 2005.

REFERENCE BOOKS

1. Moseley, M.P. and Kirsch. K., *Ground Improvement,* 2nd Revised Edition, Taylor Francis Ltd, 2004.
2. Xanthakos P.P, Abramson, L.W and Bruce, D.A, *Ground Control and Improvement,* 1st Edition, John Wiley and Sons, 1994.
3. Koerner, R. M., *Designing with Geosynthetics,* 6th Edition, Prentice Hall Inc., 2012.
4. Jewell, R.A., *Soil Reinforcement with Geotextiles [Report],* CIRIA Special Publication, 1996.

IV B.Tech II Semester

14BT80111: REHABILITATION AND RETROFITTING OF STRUCTURES (PROFESSIONAL ELECTIVE – IV)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: CPPM

COURSE DESCRIPTION: Maintenance and Repair strategies– Serviceability and Durability of concrete– Materials and Technology for repair– Repairs, Rehabilitation and Retrofitting of structures– Demolition techniques

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Describe various types of materials used for retrofitting .
2. Suggest proper materials for the repair of structure.
3. Understand the importance of safety of structure and provide solutions for the rehabilitation of structure.

DETAILED SYLLABUS:

UNIT I (8 Periods)

MAINTENANCE AND REPAIR STRATEGIES: Maintenance, repair and rehabilitation, Facets of Maintenance, importance ofMaintenance various aspects of Inspection, Assessment procedure for evaluatinga damaged structure, causes of deterioration.

UNIT II (10 Periods)

SERVICEABILITY AND DURABILITY OF CONCRETE: Quality assurance for concrete construction concrete properties – strength, permeability,Thermal properties and cracking. – Effects due to climate, temperature, chemicals, Corrosion – design and construction errors – Effects of cover thickness and cracking.

UNIT III (15 Periods)

MATERIALS AND TECHNIQUES FOR REPAIR: Special concretes and mortar, concrete chemicals, special elements for acceleratedstrength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, ferrocement, Fibre reinforced concrete. Rust eliminators and polymers coating for rebarsduring repair, foamed concrete, mortar and dry pack, vacuum concrete, Gunite andShotcrete, Epoxy injection, Mortar repair for cracks, shoring and underpinning. Methodsof corrosion protection, corrosion inhibitors, corrosion resistant steels, coating andcathodic protection.

UNIT IV (8 Periods)

REPAIRS, REHABILITATION AND RETROFITTING OF STRUCTURES: Repairs to overcome low member strength, Deflection, Cracking, Chemical disruption,weathering corrosion, wear, fire, leakage and marine exposure.

UNIT V (4 Periods)

DEMOLITION TECHNIQUES: Engineered demolition techniques for Dilapidated structures – case studies

Total Periods:45

TEXT BOOKS

1. Vidivelli,B,*Rehabilitation of Concrete Structures*, Standard PublishersDistributors, New Delhi,2008
2. Santhakumar, A.R., *Training Course notes on Damage Assessment and repairs in Low Cost Housing*, "RHDC – NBO" Anna University, July 1992.

REFERENCE BOOKS

1. Shetty, M.S*, Concrete Technology – Theory and Practice*, S.Chand and Company, New Delhi, 2005.
2. Zongjin li, *Advanced concrete technology,* published by John Wiley & Sons 2011.
3. 3.M.G.Alexander, H.–D.Beushausen, F. Dehn and P. Moyo, *Concrete Repair, Rehabilitation and Retrofitting III,* CRC press/Balkama, 2012.
4. 4.P.K.Guha, *Maintenance and Repairs of Buildings*, New Central Book Agency (P)Ltd, Kolkata, 2006.

IV B.Tech II Semester

14BT80112: **DESIGN AND DRAWING OF IRRIGATION STRUCTURES**

(Professional Elective – III)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Water Resources Engineering

COURSE DESCRIPTION: Design and drawing of surplus weir – Tank sluice with tower head – Trapezoidal notch fall – Canal regulator – Type III siphon aqueduct –sloping glacis weir.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Design and develop an irrigation structure as per the suitability of a site .

DETAILED SYLLABUS:

Design and drawing of the following irrigation structures:

1. Surplus weir
2. Tank sluice with tower head
3. Trapezoidal notch fall
4. Canal regulator
5. Type III Siphon aqueduct.
6. Direct Sluice

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

TEXT BOOKS

1. C. Satyanarayana Murthy, *Design of Minor Irrigation a*nd *Canal Structures,* Wiley Eastern Ltd, 1990.
2. B.C. Punmia, Pande B.B. Lal, Ashok Kumar Jain and Arun Kumar Jain, *Irrigation a*nd *Water Power Engineering*, 16th Edition, Laxmi Publications, 2011.

REFERENCE BOOKS

1. S.K. Garg, *Irrigation Engineering a*nd *Hydraulic Structures*, 23rd Edition, Standard Book House, 2010.
2. Adrian Laycock*, Irrigation Systems: Design, Planning a*nd *Construction*, 2nd Edition, CABI, 2011.
3. R.S.Varshney, S.C.Gupta, R.L.Gupta, Th*eory & Design of Irrigation Structures: Canal a*nd *Storage Works*, 4th Edition, Nem chand and Bros publishers, 1988.
4. S.K. Sharma, *Design of Irrigation Structures*, RSM Press publishers, 1984.

IV B.Tech II Semester

14BT80113: ARCHITECTURE AND TOWN PLANNING

(PROFESSIONAL ELECTIVE – IV)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: CPPM

COURSE DESCRIPTION: Architectural design and site planning – Building Architecture and Services – Town Planning and Structure – Land Use Planning – Regional Planning and Standards

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

1. Apply the principles of light and sound for the best architectural design of a building
2. Assess the importance of land use pattern and design landscape
3. Plan, design and develop town using various models of urban structure
4. Use modern techniques and methods in the construction of the building for sustainable development.

DETAILED SYLLABUS:

UNIT I (09 Periods)

ARCHITECTURAL DESIGN AND SITE PLANNING: Architectural design – Analysis – Integration of function and aesthetics – Introduction to basic elements and principles of design – Surveys – Site analysis – Development control – Layout regulations – Layout design concepts – Integration of building services – Interior design.

UNIT II (09 Periods)

BUILDING ARCHITECTURE AND SERVICES : Residential, institutional, commercial and industrial – Application of anthropometry and space standards – Inter relationships of functions – Safety standards – Building rules and regulations, National Building Code – Integration of building services – Interior design – Man and environment interaction – Factors that determine climate – Characteristics of climate types – Design for various climate types – Passive and active energy controls – Green building concept.

UNIT III (09 Periods)

TOWN PLANNING AND STRUCTURE : Planning – Definition, concepts and processes– Aims and objectives of planning – Levels of planning in India and their interrelationship – Planning administration – Models of

planning processes – Components of Settlement structures – Models of urban structure – Demand and supply of land for urban use – Means and mechanism – Impact on urban structure – Goals of land policy.

UNIT IV (09 Periods)

LAND USE PLANNING: Concept of land use – Locational attributes of land use – Land use planning information system – Activity system and choice of space qualities – System approach and physical planning – Approach to land use planning– Introduction to spatial planning at regional level – Choice theory and advocacy planning and their application action plan and its relevance – Development plan types – Scope and objectives – Principles of landscape design

UNIT V (09 Periods)

REGIONAL PLANNING AND STANDARDS : Planning practices in India – Method of identifying urban and regional problem – Setting of goals objectives and priorities – Performance standards – Spatial standards and standard for utilities – Classification of regions – Regionalization and delineation techniques for various types of regions – Cluster and factor analysis method.

Total Periods:45

TEXT BOOKS

1. Biswas Hiranmay, *Principles of Town Planning and Architecture*, 1st Edition, Vayu Education of India, 2012
2. Satish Chandra Agarwala, *Architecture and Town Planning*, Dhanpat Rai and Company, 2008.

REFERENCE BOOKS

1. Rangwala, K.S., *Town Planning*, Charotar Publishing House, 2014
2. Hiraqskar, G.K., *Fundamentals of Town Planning,* Dhanpat Rai & Sons, 2001.
3. A.Bandopadhyay, *Text book of Town Planning*, Books and Allied, 2000.
4. Faludi, Andreas, *Planning Theory*, Pergamon Press, 1973.

IV B.Tech II Semester

14BT80114: RAILWAY, HARBOUR AND AIRPORT ENGINEERING

[PROFESSIONAL ELECTIVE – IV]

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Surveying, Soil Mechanics

COURSE DESCRIPTION: Railway, Airport, Harbor: Development and Planning – Siting Considerations – Geometric Design– Alignment and Drainage –Construction and Equipment . Railway Engineering: Tracks, Curves, Alignment. Airport Engineering: Runway & Lighting Systems – Tunneling

COURSE OUTCOMES:

After the completion of the course, a successful student will be able to:

1. Acquire knowledge on railway engineering, airport and harbor engineering .
2. Assemble, analyze, and appropriately apply transportation engineering data from existing graphics, reports, and other documents .
3. Design of Railway Tracks, airport runway and layout of harbor, tunnels and Geometrics and other components & maintenance and safety aspects
4. Understand the safety and maintenance aspects of railway tracks, runway, harbours and tunnels .

DETAILED SYLLABUS:

UNIT I (08 Periods)

RAILWAY ENGINEERING: Railway terminology – railway track –rails – rail joints and welding of rails – creep of rails – sleepers – track fittings and fastenings – ballast – subgrade and embankments – points and crossings – construction and renewal of track – track drainage – maintenance of track – safety in railways – modernization of tracks for high speeds –

UNIT II (09 Periods)

GEOMETRIC DESIGN OF RAILWAY TRACK: necessity of design of a railway track – Gradient and grade compensation: ruling gradient, momentum gradient, Pusher or Helper gradient, Gradient in station yards, Grade compensation on curves – speed of the train, safe speed on curves – Radius of degree of curve – Super elevation or cant: Objects of providing super elevation, Relationships of super elevation, gauge, speed and radius of curve, average speed, limits of super elevation, cant deficiency, negative super elevation – curves: necessity, effects of curvature, types of curves, necessity of providing transition curve, types of transition curves, length of transition curves – Realignment of curves by string line

method: procedure for string lining the curves, computation of slews or shifts, slewing curve to the adjustment – widening of gauge on curves, shift

UNIT III (10 Periods)

AIRPORT ENGINEERING: Airport planning – Airport characteristics – airport obstructions – airport capacity and configuration – taxiway design – structural design of airport pavements – maintenance and rehabilitation of airfield pavements – visual aids – airport grading and drainage – environmental guidelines for air port projects

UNIT IV (09 Periods)

DOCKS AND HARBOURS: Dry docks and Spillways – Transition shed and warehouses – Quays, jetties and wharfs– tide, wind and wave – Dry docks (repair dock) – maintenance dredging – maintenance of ports and harbours – navigational aids

UNIT V (09 Periods)

TUNNELING: Tunnels – Tunnel Surveying – Methods of Tunneling in soft strata, Pneumatic process or compressed air methods – Tunneling in rock – safety precautions in tunneling work – tunnel lining – shafts and caissons in tunneling – tunnel drainage – tunnel ventilation, dust prevention and lighting – tunneling for underground railway and tube railway – tunnels conveying water

Total Periods:45

TEXT BOOKS

1. S.C. Saxena, S.P. Arora, a Text Book of *Railway Engineering,* 7th Edition, Dhanpat Rai Publications Pvt Ltd, New Delhi, 2014.
2. S.K. Khanna and Arora, *Airport Planning and Design,* 6th Edition, Nemchand and Brothers, 2012

REFERENCE BOOKS

1. KK Chitkara, *Construction Project Management: Planning, Scheduling and Controlling*, Tata McGraw Hill Education Pvt. Ltd., 2010
2. SP Chandola, *A Text book of Transportation Engineering*, S Chand & Co Ltd, 2011

NOTE. Booklet containing relevant extracts from Standards and Codes, should be made available to Students during examinations

IV B.Tech II Semester

14BT80121:**COMPREHENSIVE VIVA–VOCE**

Internal Marks	External Marks	Total	L	T	P	C
0	100	100	-	-	-	2

PREREQUISITES: —

COURSE DESCRIPTION:

Assessment of student learning outcomes.

COURSE OUTCOMES:

Comprehensive Viva-Voce enables a successful student to

1. Demonstrate knowledge in the program domain.
2. Exhibit professional etiquette suitable for career progression.
3. Present views cogently and precisely.

IV B.Tech. II Semester

14BT80122:**PROJECT WORK**

Internal Marks	External Marks	Total	L	T	P	C
60	140	200	-	-	20	10

PREREQUISITES: —

COURSE DESCRIPTION:

Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES: On completion of project work the student will be able to

1. Demonstrate in-depth knowledge on the project topic.
2. Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.
3. Design solutions to the chosen project problem.
4. Undertake investigation of project problem to provide valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for project work.
6. Address the issues related to health and safety of the society
7. Provide solutions for sustainability through society and environmental related projects
8. Understand professional and ethical responsibilities while executing the project work.
9. Function effectively as individual and a member in the project team.
10. Develop communication skills, both oral and written for preparing and presenting project report.
11. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.
12. Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

MECHANICAL ENGINEERING

I Year B.Tech. (Yearly Pattern)

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT1HS01	Technical English	2	-	-	4	30	70	100
14BT1BS01	Engineering Physics	2	1	-	4	30	70	100
14BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
14BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
14BT10301	Engineering Mechanics	3	1	-	6	30	70	100
14BT1ES01	Programming in C and Data Structures	3	1	-	6	30	70	100
14BT1ES03	Computer-Aided Engineering Drawing	-	1	3	3	25	50	75
14BT1BS05	Engineering Physics and Engineering Chemistry Lab.	-	-	3	3	25	50	75
14BT1ES04	Programming in C and Data Structures Lab.	-	-	3	3	25	50	75
14BT1ES06	Engineering and IT Workshop	-	-	3	3	25	50	75
14BT1HS02	English Language Communication Skills Lab.	-	-	3	3	25	50	75
	TOTAL	15	6	15	45	305	670	975

SREE VIDYANIKETHAN ENGINEERING COLLEGE

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COURSE STRUCTURE (2014-2015)

MECHANICAL ENGINEERING
II B.Tech I SEMESTER

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS01	Matrices and Numerical Methods	3	1	-	3	30	70	100
14BT30234	Basics of Electrical and Electronics Engineering	3	1	-	3	30	70	100
14BT30301	Strength of Materials	3	1	-	3	30	70	100
14BT30302	Materials Science and Metallurgy	3	1	-	3	30	70	100
14BT30303	Thermodynamics	3	1	-	3	30	70	100
14BT30304	Manufacturing Technology-I	3	1	-	3	30	70	100
14BT30321	Computer Aided Machine Drawing Lab	-	1	3	2	25	50	75
14BT30322	Strength of Materials and Materials Science Lab	-	-	3	2	25	50	75
Total:		**18**	**7**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

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COURSE STRUCTURE (2014-2015)

MECHANICAL ENGINEERING

II B.Tech II SEMESTER

Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT3BS03	Probability and Statistics	3	1	-	3	30	70	100
14BT3HS01	Environmental Sciences	3	1	-	3	30	70	100
14BT4HS01	Business Communication and Presentation Skills	3	1	-	3	30	70	100
14BT40301	Kinematics of Machinery	3	1	-	3	30	70	100
14BT40302	Fluid Mechanics and Hydraulic Machinery	3	1	-	3	30	70	100
14BT40303	Thermal Engineering - I	3	1	-	3	30	70	100
14BT40304	Manufacturing Technology-II	3	1	-	3	30	70	100
14BT40321	Fluid Mechanics and Hydraulic Machinery lab	-	-	3	2	25	50	75
14BT40322	Manufacturing Technology Lab	-	-	3	2	25	50	75
Total:		**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

MECHANICAL ENGINEERING
III B.Tech I SEMESTER

Course code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT4HS02	Professional Ethics	3	1	-	3	30	70	100
14BT50301	Dynamics of Machinery	3	1	-	3	30	70	100
14BT50302	Industrial Engineering and Management	3	1	-	3	30	70	100
14BT50303	Thermal Engineering - II	3	1	-	3	30	70	100
14BT50304	Machine Tools	3	1	-	3	30	70	100
14BT50305	Design of Machine Elements-I	3	1	-	3	30	70	100
14BT50306	Automobile Engineering	3	1	-	3	30	70	100
14BT50321	Machine Tools Lab	-	-	3	2	25	50	75
14BT50322	Thermal Engineering Lab	-	-	3	2	25	50	75
Total:		**21**	**7**	**6**	**25**	**260**	**590**	**850**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

MECHANICAL ENGINEERING
III B.Tech II SEMESTER

Course code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT5HS01	Managerial Economics and Principles of Accountancy	3	1	-	3	30	70	100
14BT60301	Design of Machine Elements-II	3	1	-	3	30	70	100
14BT60302	Operations Research	3	1	-	3	30	70	100
14BT60303	Heat Transfer	3	1	-	3	30	70	100
14BT60304	CAD/CAM	3	1	-	3	30	70	100
----	Open Elective	3	1	-	3	30	70	100
14BT60321	Heat Transfer & Dynamics lab	-	-	3	2	25	50	75
14BT60322	CAD/CAM Lab	-	-	3	2	25	50	75
Total:		**18**	**6**	**6**	**22**	**230**	**520**	**750**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

MECHANICAL ENGINEERING

III B.Tech II SEMESTER
(OPEN ELECTIVES)

Offering Dept	Course Code	Course Title
BS&H	14BT6HS01	Banking and Insurance
BS&H	14BT6HS02	Cost Accounting and Financial Management
BS&H	14BT6HS03	Entrepreneurship for Micro, Small and Medium Enterprises
CE	14BT70105	Disaster Mitigation and Management
CE	14BT70106	Environmental Pollution and Control
CE	14BT70107	Contract Laws and Regulations
CE	14BT70108	Planning for Sustainable Development
CE	14BT70109	Rural Technology
ME	14BT60305	Artificial Intelligence and Robotics
ME	14BT60306	Global Strategy and Technology
ME	14BT60307	Intellectual Property Rights and Management
ME	14BT60308	Managing Innovation and Entrepreneurship
ME	14BT60309	Material Science
CSE	14BT60502	Engineering Systems Analysis and Design
EIE	14BT71005	Microelectromechanical Systems
IT	14BT61203	Bio-Informatics
IT	14BT61204	Cyber Security and Laws

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

MECHANICAL ENGINEERING
IV B.Tech I SEMESTER

Course code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT70301	Finite Element Methods	3	1	-	3	30	70	100
14BT70302	Manufacturing System Design	3	1	-	3	30	70	100
14BT70303	Metrology & Measurements	3	1	-	3	30	70	100
14BT70304	Industrial Automation & Robotics	3	1	-	3	30	70	100
Professional Elective-I								
14BT70305	Refrigeration and Air Conditioning	3	1	-	3	30	70	100
14BT70306	Mechanical Vibrations							
14BT70307	Tool Design							
14BT70308	Supply Chain Management							
Professional Elective-II								
14BT70309	Power Plant Engineering	3	1	-	3	30	70	100
14BT70310	Geometric Modeling							
14BT70311	Advanced Welding Technology							
14BT70312	Entrepreneurship							
14BT70321	Metrology & Measurements Lab	-	-	3	2	25	50	75
14BT70322	Manufacturing Systems Simulation Lab	-	-	3	2	25	50	75
14BT70323	Seminar	-	-	-	2	-	50	50
Total:		**18**	**6**	**6**	**24**	**230**	**570**	**800**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2014-2015)

MECHANICAL ENGINEERING
IV B.Tech II SEMESTER

Course code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
14BT80301	Production & Operations Management	3	1	-	3	30	70	100
14BT80302	Mechatronics	3	1	-	3	30	70	100
Professional Elective-III								
14BT80303	Computational Fluid Dynamics	3	1	-	3	30	70	100
14BT80304	Product Design							
14BT80305	Advanced Casting Technology							
14BT80306	Quality Management and Reliability							
Professional Elective-IV								
14BT80307	Non-Conventional Energy Sources	3	1	-	3	30	70	100
14BT80308	Composite Materials							
14BT80309	Rapid Prototype Technology							
14BT80310	Project Management							
14BT80321	Comprehensive Viva-Voce	-	-	-	2	-	100	100
14BT80322	Project Work	-	-		10	60	140	200
Total:		**12**	**4**	**20**	**24**	**180**	**520**	**700**

B.Tech I Year

14BT1HS01: **TECHNICAL ENGLISH**

(Common to All Branches of Engineering)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

Detailed Syllabus:

UNIT – I: (10 periods)

My Early Days by **A. P. J. Abdul Kalam** from **All About English** by Cambridge University Press India Pvt Ltd. 2014.

Communication: Importance of Communication – Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-Verbal Communication.

UNIT – II: (10 periods)

A Speech by N. R. Narayana Murthy from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: (10 periods)

The Town by the Sea by Amitav Ghosh from **All About English** by Cambridge University Press India Pvt Ltd, 2014.

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: (10 periods)

Sir. C. V. Raman: The Celebrated Genius from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Reading: Reading and Interpretation – Intensive and Extensive Reading–Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: (10 periods)

The Model Millionaire by **Oscar Wilde** from **All About English** by Cambridge University Press India Pvt. Ltd, 2014.

Writing: Characteristics – Language – Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism - Referencing and Styling.

Total Periods: 50

TEXT BOOKS:

1. **All About English***,* Cambridge University Press India Pvt. Ltd., First Edition, 2014.
2. Meenakshi Raman and Sangeetha Sharma, **Technical Communication**, Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, **Effective Technical Communication**, Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.
2. Martin Hewings, **Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,** Cambridge University press, First South Asian Edition, New Delhi, 1999.

B.Tech. I Year

14BT1BS01**: ENGINEERING PHYSICS**

(Common to All Branches of Engineering)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

COURSE OUTCOMES :

After completion of the course a successful student will be able to

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.
2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.
3. Develop problem solving skills in engineering context.

Detailed syllabus:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, Ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY (16 periods)

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III :PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

(17 periods)

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative treatment), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS

(17 periods)

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V :MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS (17 periods)

Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total :85 periods

TEXTBOOKS :

1. S. Mani Naidu, **Engineering Physics**, Pearson Education, 2013.
2. P. K. Palaniswamy, **Engineering Physics**, Scitech Publications India Private Limited, 2009

REFERENCE BOOKS:

1. R. K. Gaur and S. L. Gupta, **Engineering Physics,** DhanpatRai Publications (P) Ltd., 8th Edition, 2001.
2. M. R. Srinivasan, **Engineering Physics,** New Age International (P) Limited, Publishers, 1st Edition,2010.

B.Tech. I Year

14BT1BS02 **: ENGINEERING CHEMISTRY**

(Common to All Branches of Engineering)

Int. Marks: 30 Ext. Marks: 70 Total Marks: 100

L	T	P	C
2	1	-	4

PRE REQUISITE: Intermediate/Senior Secondary Chemistry

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.

COURSE OUTCOMES:

After successful completion of the course the student is able to:

1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.
2. Develop analytical skills in:
   a. Determination of hardness of water.
   b. Determination of viscosity, flame and fire points, cloud and pour points.
   c. Determination of calorific value of fuels.
3. Develop skills in design of:
   a. Methods for control of corrosion
   b. Chemical methods for the synthesis of Nanomaterials.
4. Develop skills for providing solutions through:
   a. Mitigation of hardness of water.
   b. Control of corrosion
   c. Newer Nanomaterials for specific applications
5. Acquire awareness to societal issues on:
   a. Chemical materials utility and their impact.
   b. Quality of water.
   c. Phenomenon of corrosion.
6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:
   a. Green computing
   b. Green construction

c. Green manufacturing systems

Detailed syllabus:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.

Conducting Polymers – Definition, types of conducting polymers and their engineering applications. **Composites** – Introduction, advantages of composites, constituents of composites, types of composites, applications of composites. **Sensors** - Introduction, types of sensors, electrochemical sensors, applications. **Insulators** – Definition, characteristic properties of insulators and classification of insulators.

UNIT–II: WATER TECHNOLOGY (15 periods)

Introduction, types of water, impurities in water and their consequences. Hardness of water, units of hardness, measurement of hardness by EDTA method, disadvantages of hardness. Softening methods – Ion exchange process, Zeolite process-Municipal water treatment. Boiler Troubles. Desalination of brackish water by Electro dialysis and Reverse osmosis. Numerical problems on measurement of hardness of water.

UNIT–III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst's equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, H_2 – O_2 fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT–IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.

UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY (17 periods)

Nano Chemistry: Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

Green Chemistry: Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems. **Total Periods : 85**

TEXT BOOKS:

1. P.C.Jain & Monika Jain, **Engineering Chemistry**, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah **Engineering Chemistry**, Mc. Graw-Hill Higher Education, Hyderabad, 1st edition, 2013.

REFERENCE BOOKS:

1. A.K. Bandyopadhyay, **Hand book of Nanostructured materials and Nanotechnology**, New Age international publishers, 2nd edition, 2010.
2. Paul T. Anastas, John C Warner, **Green Chemistry: Theory and practice,** Oxford University Press, 2000.

B.Tech. I Year

14BT1BS03 **: ENGINEERING MATHEMATICS**

(Common to All Branches of Engineering)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	6

PRE REQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas , surfaces and volumes of revolutions.
3. Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton's Law of cooling and heat transfer.
4. Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

Detailed syllabus:

UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS (20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton's Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for $Q(x) = e^{ax}$, $\sin ax$, $\cos ax$, x^n, $e^{ax} V(x)$, $x V(x)$. Method of variation of parameters . Applications to L-R-C circuits.

UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES (22 periods)

Functions of two or more variables – Homogeneous functions – total derivatives – derivatives of implicit function – Jacobian – maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers. Radius ,centre and circle of curvature, tracing of curves in cartesian, parametric and polar forms.

UNIT-III: APPLICATIONS OF INTEGRATION (18 Periods)

Applications of integration to – length of curves, area of surfaces of revolution and volume of solids of revolution – Double integrals – change of variables and change of order of integration. Evaluation of Triple integrals -volume as double integral.

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS (20 periods)

Laplace transforms of standard functions – Properties of Laplace transforms–First and second shifting Theorems. Laplace transforms of derivatives and integrals–Laplace transforms of periodic functions – Unit step function – Dirac delta function – Inverse transforms–Convolution theorem. Applications of Laplace transforms to linear differential equations with constant coefficients.

UNIT-V : VECTOR CALCULUS (20 periods)

Vector differentiation – gradient, divergence, curl and vector identities. Laplacian Operator. **Vector integration**: Line integrals independent of path – work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals. Verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

Total periods : 100

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, **Engineering Mathematics, Vol. 1**, S. Chand & Company, 12/e ,2013.

REFERENCE BOOKS:

1. Grewal, B.S., **Higher Engineering Mathematics**, Khanna Publishers, 42/e,2012.
2. Kreyszig, E., **Advanced Engineering Mathematics**, John Wiley and Sons, 8/e.2006

B.Tech. I Year

14BT10301**: Engineering Mechanics**

(Common to CE and ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	—	6

PREREQUISITE : Intermediate/Senior Secondary Mathematics and Physics

COURSE DESCRIPTION: Engineering Mechanics is a foundation course for all other courses belonging to the broad knowledge area Design Engineering as applied to Civil Engineering and Mechanical Engineering. Basic concepts of statics and dynamics are presented in this course. Several aspects such as resultant of a system of forces, couple, support reactions, moment of inertia, member forces in trusses and preliminaries of friction, virtual work are included in the "statics" part of the course. Similarly characteristics of motion, cylindrical / Cartesian coordinates, centripetal acceleration and Newton's second law are included in the "dynamics" part of the course.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Apply the knowledge of Mathematics, Science, Engineering fundamentals to the solutions of complex engineering problems.
2. Analyse :
   (a) multi-body systems under equilibrium and under dynamic conditions.
   (b) systems involving dry friction and computing the efficiency of the system forces in trusses under suitable assumptions.
3. Design solutions to complex engineering problems using first principles of engineering mechanics.
4. Exercise awareness to assess the safety of system and other ethical issues related to engineering mechanics.
5. Communicate effectively engineering and allied information through free body diagram.
6. Sustain interest in Engineering Mechanics to upgrade knowledge and skills through self learning concepts in mechanics.

Detailed Syllabus:

UNIT I-BASIC CONCEPTS (24 periods)

Axioms of Mechanics – basic quantities of mechanics and their units, System of forces– Lami's theorem, Moment of forces and its Application, Couples and Resultant of Force System, concurrent force systems, parallel force systems, non-concurrent force systems. Free body diagrams, Friction as a force – Laws of dry friction – Wedge, screw-jack, and differential screw-jack, Introduction to Virtual work principle – Very simple and elementary problems using virtual work.

UNIT II-STRUCTURAL ANALYSIS (16 periods)

Types of Supports – Support reactions for beams with different types of loading, concentrated, uniformly distributed and uniformly varying loading

Types of frames –perfect frames, Analysis of frames using method of joints and method of sections.

UNIT III-CENTROID, CENTER OF GRAVITY, MOMENTS OF INERTIA (18 periods)

Centroids of simple figures, Centroids of Composite figures, Centre of Gravity of bodies, Centre of Gravity of Composite figures. Parallel axis and perpendicular axis theorems, Theorems of Pappus and Guldinus, Moments of Inertia of Composite Figures, Mass Moment of Inertia of Simple solids, Moment of Inertia of composite masses.

UNIT IV-KINEMATICS (14 periods)

Rectilinear and Curvilinear motion – Velocity and Acceleration, motion of a projectile, Normal and tangential accelerations.

UNIT V-KINETICS (18 periods)

Analysis as particle and Analysis as a Rigid Body in Translation – Newton's laws, Work Energy Method – Equation for Translation, Work – Energy application to Particle Motion, Impulse-Momentum Equation, Fixed axis Rotation.

Total Periods: 90

TEXT BOOKS:

1. S.S. Bhavikatti and K.G. Rajashekarappa, **Engineering Mechanics**, New Age International (P) Ltd., 3rd edition, 2008
2. Basudeb Bhattacharya, **Engineering Mechanics**, Second Edition, Oxford University Press, 2nd Edition, 2014.

REFERENCE BOOKS:

1. S. Timoshenko, D.H. Young, and J.V. Rao, **Engineering Mechanics**, Tata McGraw-Hill Publishing Company Limited, Revised 4th Edition, 2007.
2. R.C. Hibbeler, **Engineering Mechanics - Statics and Dynamics**, Prentice Hall, 8th Edition, 1998
3. K. Vijaya Kumar Reddy and J. Suresh Kumar, **Singer's Engineering Mechanics – Statics and Dynamics**, BS Publications, 3rd Edition.

B.Tech. I Year

14BT1ES01**: PROGRAMMING IN C & DATA STRUCTURES**

(Common to ECE, EEE, EIE, ME and CE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	—	6

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with fundamentals of programming in C language such as syntax of C, mechanisms of input and output processing, derived data types like arrays, strings and pointers. Also file in C and data structures are discussed.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Gain knowledge on developing algorithms and programming techniques.
2. Gain analytical skills on
    a. Searching and sorting
    b. File management functions.
    c. Various Data Structures
3. Design various applications using basic data structures like linked list, stacks and queues
4. Gain competence to represent and solve real time problems using tree data structures.

DETAILED SYLLABUS

Unit-I **(15 periods)**

Programming Languages- Compiler, Interpreter, Loader, and Linker- Program execution- Classification of programming-Algorithms and flowcharts .

Basics of C: Introduction, Standardizations of C language, Developing Programs in C, Structure of C program, Variables, Data Types, Declaration, Token, Operators and expressions, L values and R values, Type Conversion in C.

Unit-II **(20 periods)**

Input and Output: Basic screen and key board I/O in C , Non formatted input and output , Formatted Input and output. Control Statements: Specifying Test Condition for Selection and Iteration, Writing Test Expressions, Conditional Execution and Selection, Iterative and Repetitive Execution, GOTO Statement, Special Control statements, Nested loops.

Unit-III **(20 periods)**

Arrays and Strings: One dimensional Array, Strings: One-Dimensional Character Arrays, Multidimensional Arrays, Arrays of Strings. Functions: Concept of function, Call by Value Mechanism, passing arrays to Functions, Scope and extent, Storage classes, Inline function, Recursion, Searching and sorting.

Unit-IV **(25 periods)**

Pointers: Introduction, Understanding Memory Address, Address Operators, pointer, Void pointer, Null pointer, use of pointers, arrays and pointers, Pointer and strings, pointer arithmetic, pointers to pointers, pointer to arrays, Pointers to functions, Dynamic memory allocation, Pointer and const Qualifier. User-defined data types and variables: Structures, union, Enumerations types, Bitfields.

Files in C: Working with text files, Binary files, Random Access files, other file management functions, Command line arguments, C preprocessor, Type qualifier.

Unit-V **(20 periods)**

Linked Lists: Singly Linked Lists, Circular Linked lists, Doubly Linked list Applications of Linked Lists. Stacks and Applications, Queues, Other Variations of Queues, Applications, Tree-Binary tree, Traversals, Kinds of binary tress, Binary Search tree, Application of tree.

Total periods: 100

TEXT BOOK:

1. PradipDey and Manas Ghosh, "**Programming in C**,"Second Edition, Oxford University Press, New Delhi, 2007

REFERENCE BOOKS:

1. D. Samanta, "**Classic Data Structures**", Second Edition, PHI Learning, New Delhi, 2004
2. Behrouz A. Forouzan and Richard F. Gilberg, "**A Structured Programming Approach using C**,"Third Edition, Cengage Learning, New Delhi, 2007.

B.Tech. I Year

14BT1ES03**: COMPUTER AIDED ENGINEERING DRAWING**

(Common to All Branches of Engineering)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	1	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with the concepts of computer-aided sketching, and orthographic and isometric projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

COURSE OUTCOMES: After completion of the course, a successful student is able to :

1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general audience.

Detailed Syllabus:

UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING (20 periods)

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, Different types of lines, Material conventions and free hand practicing, Definitions of Principle planes and other planes. Computer screen, layout of the software, Creation of 2D/3D environment, Selection of drawing size and scale, Standard tool bar/menus, Coordinate system, and description of most commonly used toolbars, Navigational tools, Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS (20 periods)

Introduction, Definitions- Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), Projection of lines inclined to one plane, inclined to both the planes, finding true lengths and true inclinations (No application problems).

UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES (20 periods)

Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS (20 periods)

Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS (20 periods)

Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.

Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts. **Total Periods: 100**

TEXT BOOKS:

1. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, **Engineering Graphics with Auto CAD**, PHI Learning Private Limited, Revised Edition, August 2010.
2. N D Bhat & V M Panchal, **Engineering Drawing**, Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS:

1. Sham Tickoo, **AutoCAD 2013 For Engineers And Designers**, Dreamtech Press, 2013
2. T Jeyapoovan, **Engineering Drawing and Graphics Using Autocad**, Vikas Publishing House, 3rd Edition, 2010.
3. Jolhe, **Engineering Drawing**, Tata McGraw Hill Education Private Limited, 1st Edition, 2007.
4. Basant Aggarwal, **Engineering Drawing**, Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

B.Tech I Year

14BT1BS05**: ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LABORATORY**

(Common to All Branches of Engineering)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wave length of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:

After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.

Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of P^H of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments :

Engineering Physics:

Conduct a minimum of any **Ten** of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
4. Characteristics of LED source.
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee's method
9. Melde's experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
12. Characteristics of laser source.
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum

Engineering Chemistry:

List of Experiments:

A minimum of any **Ten** experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Conductometric titration of strong acid Vs strong base
6. Determination of P^H of a given solution by P^H metry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
10. Synthesis of Nano metal-oxide using sol– gel process.
11. Determination of the capacity of the given cation-exchange Resin.
12. Measurement of viscosity by Redwood viscometer.

Duration: 3 Periods for each experiment **Total periods: 30**

TEXT BOOKS:

1. **Physics Laboratory Manual**
2. K. Mukkanti, **Practical Engineering Chemistry**, BS Publications, 2013.
3. K.N. Jayaveera, K.B. Chandra Sekhar, **Chemistry laboratory manual**, S.M. Enterprises Limited, 2013.

B.Tech I Year

14BT1ES04**: PROGRAMMING IN C & DATA STRUCTURES LAB**

(Common to ECE, EEE, EIE, ME and CE)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION: This course provides programming practice in C language specifically syntax of C, input-output processing, derived data types, file processing, and data structures.

COURSE OUTCOMES:

After the completion of this course, a successful student is able to

1. Design, code, test, debug and execute programs in C.
2. Implement and use common features found in C programs – arrays, pointers, strings, stacks and queues.
3. Select the appropriate data structure and algorithm design method for a specified problem.

Week 1:

a) Write a C program to print the string "SVEC" at four corners and center of the screen using single printf statement.

b) Mr. Gupta deposits Rs.1000 in a bank. The bank gives simple interest of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I=PTR/100)

c) Write a program to exchange the values of two variables without using the third variable.

Week 2:

a) A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

b) In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.

c) Assume that any month is of 30 days. Input total days through keyboard. Find out the exact number of Years, Months & Days.

Week-3

a. Write a program that reads in a number, then reads in a single digit and determines whether the first number contains the digit. If it does, the program should display how many times the digit occurs in the number.

b. Write a program to print Pythagoras triplets a = m* n , b=(n^2 + m^2)/2, c=(n^2-m^2)/2 where m = 1,3, 5 ……; n = m + 2, m + 4 ……

c. Write a program to produce the following pattern:

a.
```
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7
1 2 3 4 5 6
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

b.
```
1 2 3 4 5 6 7 8 9 10
  2 3 4 5 6 7 8 9 10
    3 4 5 6 7 8 9 10
      4 5 6 7 8 9 10
        5 6 7 8 9 10
          6 7 8 9 10
            7 8 9 10
              8 9 10
                9 10
                  10
```

Week-4

a. Write a C program to generate Pascal's triangle.

b. Write a C program to construct a pyramid of numbers.

Week-5

a. The formula used to calculate the amount of interest on a bank account that compounds interest daily is

$$i = p\ (1 + r)^d - p$$

where:

i is the total interest earned,

p is the principal (the amount originally deposited in the account),

r is the rate of interest as a decimal less than 1 (for example, 15 percent is expressed as 0.15), and

d is the number of days the money is earning interest.

Write a program that accepts values for p, r and d and calculates the interest earned.

b. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127

c. Write a C program to convert a given decimal number into its equivalent
   i. Binary Number
   ii. Octal Number
   iii. Hexadecimal Number
   iv. Quinary Number(base 5)

Week-6

a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %, use switch statement)
b. Write a program to find the sum of individual digits of a positive integer.
c. A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.
d. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:

a. Write a program to find the largest and smallest number in a list of integers.
b. Write a program to perform the following:
   i) Addition of two matrices.
   ii) Multiplication of two matrices.

Week-8

a. Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
b. Write a C program to determine if the given string is a palindrome or not
c. Write a C Program to implement all string operations.
   1. Find the length of string 2. Reverse the string.
   3. Comparing the two strings. 4. Copy the string .

Week -9:

a. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 10:

a. Write a C program to count the lines, words and characters in a given text.
b. Write a program that simulates a password entry.
c. Write a program to read a five letter word and generate all possible combinations of two-letter words using those five letters.

Week 11:

Write a program to perform the following:
   i) Linear search ii) Binary search

Week 12:

Write a program to perform the following:
   i) Selection sort ii) Insertion sort
   iii) merge Sort iv) Quick sort

Week 13:

Write programs to perform the following using recursion
   i) To find the factorial of a given integer.
   ii)To solve Towers of Hanoi problem

Week-14

a. Write a C Program to return a substring from a main string using pointers.
b. Write a C program to return character frequency count in a text using pointers

Week-15

a. Write a C program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers
   (Note: represent complex number using a structure.)

b. Write a Program to enter records of students display in sorted order according to ID number.

c. Define a structure to store employee's data with the following specifications:
   Employee-Number, Employee-Name, Basic pay, Date of Joining
   i) Write a function to store 10 employee details.
   ii) Write a function to implement the following rules while revising the basic pay.
   If Basic pay <= Rs.5000 then increase it by 15%.
   If Basic pay > Rs.5000 and <= Rs.25000 then it increase by 10%.
   If Basic pay > Rs.25000 then there is no change in basic pay.
   iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

Week-16

a. Write a program which copies one text file to another.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

c. Consider the following text file:

Input File:

S.No.	Customer_ID	Item No.	Qty.	Price Per Item (Rs.)
1.	C01	I1	2	10
2.	C02	I2	5	50
3.	C03	I2	5	50
4.	C04	I4	10	10

Write a program to print the output in following format by giving the Customer_ID as an input.

Output:

S.V. PROVISION STORES
TIRUPATI
Customer_ID: C01 Date: 12-08-2010

Item	Qty	Price
I1	2	20
	Total	20

Week - 17:

Write a program to implement the following operations on Singly Linked List
a. List Creation b. Insertion c. Deletion d. Display

Week -18:

Write a program to implement the following operations on Circular Linked List
a. List Creation b. Insertion c. Deletion d. Display

Week -19 :

Write a program to implement the following operations on Doubly Linked List
a. List Creation b. Insertion c. Deletion d. Display

Week- 20:

Write a program to implement stack operations using:
i) Arrays ii) Pointers

Week -21 :

Write a program to implement linear queue operations using:
i) Arrays ii) Pointers

Week -22:

a) Write a program to implement circular queue operations using arrays
b) Write a program to implement traversals of a Binary tree
   i. Preorder ii. Post order iii. Inorder

Week- 23

Write a program to implement insertion and deletion in a binary search tree.

REFERENCE BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "**A Structured Programming Approach using C**," Third Edition, Cengage Learning, New Delhi, 2007.
2. PradipDey and Manas Ghosh, "**Programming in C**", Second Edition, Oxford University Press, New Delhi, 2007
3. D. Samanta, "**Classic Data Structures**", Second Edition, PHI Learning, New Delhi, 2004.

B.Tech. I Year

14BT1ES06**: ENGINEERING & IT WORKSHOP**

(Common to All Branches of Engineering)

Int. Marks: 25 Ext. Marks: 50 Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

After completion of the course, a successful student is able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a)	**Carpentry Shop**	:	Cross lap joint, mortise and tenon, T-joint, dove tail joint.
b)	**Fitting Shop**	:	Square fit and V-fit, semi circular fit, dove tail fit.
c)	**Sheet Metal Shop**	:	Trapezoidal tray, square tin, funnel, cylinder.
d)	**House wiring**	:	Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.
(e)	**Foundry**	:	Preparation of casting using single piece pattern, Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) Welding
b) Metal Cutting
c) Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

IT WORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources.

Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.

Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.

Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.

Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

Total Periods: *48*

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, **Engineering Work shop practice**, VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, **Work shop Manual**, SciTech Publishers, 2009.
3. K. Venkata Reddy, **Workshop Practice Manual**, BS Publications, 2008

IT WORKSHOP:

1. Vikas Gupta, "**Comdex Information Technology Course Tool Kit**," 2nd Edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, "**Introduction to Information Technology**," 2nd Edition, Pearson Education, New Delhi, 2005.
3. **IT Workshop Laboratory Manual**, Department of IT, SVEC, 2014.

B.Tech I Year

14BT1HS02: **ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY**

(Common to All Branches of Engineering)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	-	3	3

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which are classified into software based learning, grammar and activities. English Speech Sounds and Phonemic Transcription, Word Stress and Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features, Vocabulary Building, are aided by software. Grammar sessions include Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays, Telephonic Etiquette, Listening Skills, Describing People, Places and Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to

1. Gain practical knowledge in
   - English Speech Sounds
   - Stress Patterns in word and sentence
   - Intonation Patterns
   - Paralinguistic Features
   - Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts.
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.
6. Demonstrate various language functions by participating in
   - Just A Minute
   - Impromptu Speech
   - Elocution
   - Role Plays
   - Presentations
7. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling
   b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes
   c. Idioms and Phrases–Homophones–Homonyms–Homographs.
6. Functional Grammar
   a. Parts of Speech b. Tenses c. Change of Speech d. Change of Voice
   e. Word Order and Error Correction f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India.

II B.Tech - I Semester

14BT3BS01: **MATRICES AND NUMERICAL METHODS**

(Common to CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Mathematics of I year B.Tech

COURSE DESCRIPTION:

Matrices, systems of equations; eigen values, eigen vectors; solutions of algebraic and transcendental equations, curve fitting, interpolation, Numerical differentiation and integration, numerical solutions of ordinary differential equations, Fourier series and integrals, partial differential equations.

COURSE OUTCOMES:

After the completion of this course, a successful student will be able to:

CO1 : Acquire knowledge in

(a) Estimating ranks and solutions of linear equations through matrices.
(b) Solutions of algebraic and transcendental equations
(c) Fitting of different curves to discrete data.
(d) Estimating the unknown values of different parameters through interpolation.
(e) Estimating values of derivatives from the given data
(f) Numerical differentiation and integration
(g) Numerical solutions of differential equations
(h) Fourier series, Fourier transforms and partial differential equations.

CO2 : (i) Develop analytical skills for the problems involving

(a) differential equations through numerical methods
(b) partial differential equations.

(ii) Develop skills in analyzing

(a) Properties of functions through Fourier series.
(b) Numerical techniques in differentiation and integration of higher complexity.

CO3: Develop skills in the design of mathematical equations and arrive at numerical solutions involving

(a) Curves that best fits the given data.
(b) Integrations of higher complexity.
(c) Ordinary differential equations.
(d) Oscillatory motion and heat transformations.

Detailed syllabus :

UNIT - I: MATRIX THEORY & APPLICATIONS (9 periods)

Matrices: Rank of a matrix, echelon form, normal form, inverse of a matrix by row operaton; Homogenous and non-homogenous linear systems , consistency and solutions of linear system of equations, solutions of equations by Gauss elimination method; Eigen values, eigen vectors - properties; Cayley - Hamilton theorem (without proof); Inverse and powers of a matrix using Cayley- Hamilton theorem.

UNIT -II: NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION (9 periods)

Solutions of algebraic and transcendental equations by bisection method, Regula-falsi method, Newton-Raphson method. Curve fitting by the principle of least squares - fitting of a straight line, parabola, exponential curves. Interpolation:Newton's forward formula, Newton's backward formula, Lagrange's interpolation formula.

UNIT- III: NUMERICAL DIFFERENTIATION, INTEGRATION AND SOLUTIONS OF O D E (8 periods)

Numerical differentiation using Newton's forward formula , Newton's backward formula; Numerical integration using trapezoidal rule , Simpsons 1/3rd Rule ; Simpsons 3/8th Rule. Numerical solutions of first order ordinary differential equations by Euler's method, Euler's modified method , Runge - Kutta method (4^{th} order only).

UNIT-IV: FOURIER SERIES AND FOURIER INTEGRALS (9 periods)

Fourier series of functions in (0, 2?), (-?, ?), (0, 2?), (- ?, ?); Determination of Fourier coefficients by Euler's formulae. Even and odd functions , Fourier series for periodic functions; Half - range fourier sine and cosine expansions. Fourier integral theorem (statement only); Fourier sine and cosine integrals, Fourier sine and cosine transforms.

UNIT-V: PARTIAL DIFFERENTIAL EQUATIONS (9 periods)

Formation of partial differential equations, method of separation of variables for second order partial differential equations, solutions of one dimensional wave equation- heat equation. **Total periods: 45**

TEXTBOOKS:

1. T.K.V. Iyenger, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N Prasad, Mathematical Methods, S.Chand and Company, 8th edition, 2013.

REFERENCE BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42/e, 2012.
2. S.S.Sastry, Introductory methods of Numerical Analysis, Prentice Hall of India, 4th edition, 2005.

II B. Tech - I Semester

14BT30234: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:
Engineering Mathematics and Engineering Physics.

COURSE DESCRIPTION:
Basics of electrical DC and AC circuits; principle of operation and applications of DC machines, transformers, and induction motors; Electrical and electronic measuring instruments construction and operation; Rectifier devices; bipolar transistors and its characteristics.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:

CO1: Demonstrate knowledge on
i. Electrical and electronic circuits.
ii. Construction and operation of electrical machines, electrical and electronic instruments.

CO2: Analyze various electrical and electronic circuits.

CO3: Evaluate the electrical and electronic circuit parameters and performance of electrical machines.

Detailed Syllabus:

UNIT- I BASICS OF ELECTRICAL ENGINEERING (9 Periods)

Sources of electricity, basic circuit components, electric field, electric current, potential and potential difference, EMF, electric power, Ohm's law, node, path, loop, branch, resistive networks, inductive networks, capacitive networks, Kirchhoff's laws, series-parallel circuits, nodal analysis, mesh analysis, star-delta and delta-star transformations; problems.

UNIT - II AC FUNDAMENTALS (9 Periods)

Production of alternating voltage, phase and phase difference, phasor representation of alternating quantities, behavior of AC series, parallel and series-parallel circuits, power factor, power in AC circuit - problems.

UNIT - III DC AND AC MACHINES (10 Periods)

DC Machines : Construction and working of a DC Generator and DC motor and their types, EMF equation of a DC generator, torque equation of a DC motor, applications of DC generators and DC motors - problems.

Transformers: Construction and working of a single phase transformer, EMF Equation.

AC Machines : Construction and working of a three phase induction motor, applications of three phase induction motors, problems.

UNIT-IV: ELECTRICAL AND ELECTRONIC MEASURINGINSTRUMENT (9 Periods)

Electrical Measuring instruments: Construction, working principle, torque equation and applications of PMMC and moving iron (repulsion type and attraction type) instruments; Dynamometer type wattmeter: construction and working principle.

Electronic Measuring instruments : Electronic voltmeters and ammeters, rectifier type voltmeter and ammeter, advantages and disadvantages, digital voltmeters, digital multi-meters (elementary concepts only).

UNIT-V: RECTIFIER CIRCUITS AND BIPOLAR JUNCTION TRANSISTORS (8 Periods)

Rectifier circuits : DC voltage and current, Peak Inverse Voltage (PIV), ripple factor, efficiency and regulation of half wave and full wave rectifiers.

Bipolar Junction Transistors : Formation of PNP / NPN junctions, transistor as an amplifier, need for biasing, single stage CE amplifier, frequency response of CE amplifier, necessary conditions for oscillators, RC phase shift oscillator and Crystal oscillator.

Total Periods: 45 periods

TEXT BOOKS:

1. V.K. Mehta and Rohit Mehta, Principles of Electrical and Electronics Engineering, 2nd edition, S.Chand, New Delhi, 2007.
2. M.S. Naidu and S. Kamakshaiah, Introduction to Electrical Engineering, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2007.

REFERENCE BOOKS:

1. Theraja B.L & Theraja A.K, A text book of electrical technoogy, Vol-I, S.Chand, New Delhi, 2009.
2. T. K. Nagsarkar, M. S. Sukhija, Basic Electrical Engineering, Oxford University Press, New Delhi, 2011.
3. K. Lal Kishore, Electronic Devices and Circuits, 3rd Edition, BS Publications, Hyderabad, 2008.

II B.Tech - I Semester

14BT30301: **STRENGTH OF MATERIALS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Mechanics

COURSE DESCRIPTION:

Analysis of stresses and strains of mechanical and structural components; Action of shear; Bnding and torsional stresses; deflection of springs and beams due to axial and transverse loadings; Thin and thick walled pressure vessels.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Utilize knowledge of computing the stresses and strains to provide information required for further design.

CO2: Analyze the requirements and arrive at estimates of loading on machine elements.

CO3: Analyze components under complex loading conditions by simplifying under suitable assumptions.

CO4: Show loading diagrams pictorially and represent principal stresses.

Detailed Syllabus:

UNIT - I: SIMPLE STRESSES AND STRAINS (10 periods)

Types of Stresses, small strains; Hooke's law, stress-strain diagram, working stress, factor of safety, lateral strain, poisson's ratio, volumetric strain, elastic moduli and relationship between them, bars of varying section, composite bars, temperature stresses, strain energy, principal stresses(elementary treatment should be given), Mohr's circle.

UNIT - II: SHEAR FORCE AND BENDING MOMENT (8 periods)

Concept of shear force and bending moment, S.F and B.M diagrams for cantilever, simply supported beams subjected to point loads, uniformly distributed loads, uniformly varying loads and combination of these loads, point of contraflexure.

UNIT - III: BENDING, SHEAR AND TORSIONAL SHEAR STRESSES (13 periods)

Theory of simple bending, bending equation, determination of flexural stresses for simple cases, section modulus, shear stress formula, Shear stress distribution across various beams & sections like rectangular, circular, triangular, I, T-sections; Theory of pure torsion, torsion equation, Assumptions made in the theory of pure torsion, Torsional moment of resistance, Polar section modulus.

UNIT - IV DEFLECTION OF BEAMS (7 periods)

Relationship between curvature, slope and deflection, slope and deflection of cantilever and simply supported beams by double Integration method & Macaulay's method, moment area method.

UNIT - V PRESSURE VESSELS (7 periods)

Thin seamless cylindrical shells, derivation of formula for longitudinal and circumferential stresses, volumetric strain; Thin spherical shells; Thick cylinders under internal and external pressure.

Total Periods:45

TEXT BOOKS:

1. Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Mechanics of Materials, Laxmi Publications, 1st edition,2009.
2. S.Ramamrutham, R.Narayanan, Strength of Materials, Dhanpat Rai Publications, 14th edition, 2011.

REFERENCE BOOKS:

1. James M.Gere, Stephen Timoshenko, Mechanics of Materials, CBS Publications, 2nd edition, 2004.
2. Beer, Johnston & Dewolf, Mechanics of Materials, Tata McGraw-Hill Education,3rd edition, 2004.
3. S.S Rattan, Strength of materials, Tata McGraw Hill Publications, 2nd edition, 2011.

II B.Tech - I Semester

14BT30302: MATERIALS SCIENCE AND METALLURGY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:
Engineering Physics and Chemistry.

COURSE DESCRIPTION:
Atomic and crystal structure of metal; Types of metals and their application; formation of alloys; Equilibrium diagrams; Heat treatment procedures and their influence on mechanical properties; Structure and properties of ferrous materials and Non-Ferrous materials; Production of metal powders and study of composite materials.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Explain how materials are formed and are classified on the basis of atomic arrangement.
CO2: Apply the Iron Iron-carbide diagram in ferrous material selection problems.
CO3: Suggest suitable heat treatment to endow required mechanical behavior as per industrial requirements.
CO4: Identify different materials by their microstructure and their applications.

Detailed Syllabus:

UNIT - I: STRUCTURE OF METALS (9 periods)
Introduction to engineering materials, classification, Primary and secondary bonding in materials, space lattice, unit cell; mechanical properties of materials; Structure of materials: SC, BCC, FCC, HCP; crystal defects: point, line, planar, and volume, grain and grain boundaries; Effect of grain boundaries on properties of metal/alloys, determination of grain size.

UNIT - II: PHASE DIAGRAMS (9 periods)
Cooling curve of pure metal and alloy, phase, Phase diagram, Gibbs's phase rule, Hume Rothery rules, binary isomorphous system, binary eutectic alloy system (Lead-Tin System), invariant Reactions: Eutectic, eutectoid, Peritectic, Peritectoid, Iron-Iron Carbide phase diagram, Effect of alloying elements on Iron-Iron carbon system.

UNIT - III: HEAT TREATMENT (9 periods)
Introduction, Annealing and its types, Normalizing, Hardening, Tempering, TTT diagrams, surface heat treatment processes: Carburizing, Nitriding, Cyaniding, Carbonitriding, Flame and Induction hardening, Cryogenic treatment of alloys.

UNIT -IV FERROUS, NON FERROUS MATERIALS AND THEIR ALLOYS (9 periods)
Ferrous materials and its alloys: Structure and properties of Cast Iron: White cast iron, Malleable cast iron, Grey cast iron, Spheroidal cast iron, Alloy cast iron, classification of steels, structure and properties of steels, Plain carbon steel, Low alloy steels, Hadfield manganese steels, stainless steel, and Tool steels.
Non-ferrous materials and its alloys: Properties and applications of copper and its alloys, Aluminium and its alloys, Titanium and its alloys, and super alloys.

UNIT-V: POWDER METALLURGY AND COMPOSITE MATERIALS (9 periods)
Powder Metallurgy: Introduction, methods of production of metal powders, mixing, Blending, Compacting, Sintering, applications and limitations of powder metallurgy.
Composite Materials: Introduction, types of matrices and reinforcement, polymer Matrix Composites: GFRP, CFRP, Metal Matrix Composites(MMC).

Total Periods: 45

TEXT BOOKS:

1. Sidney H. Avner, Introduction to Physical Metallurgy, Tata Mc Graw Hill, 2nd edition, 1997.
2. Kodigre V D, Material Science and Metallurgy, Everest Publishing House, 31st edition, 2011.

REFERENCE BOOKS:

1. V. Raghavan, Physical Metallurgy: Principles and Practices, PHI, 2nd edition, 2006.
2. William. D. Callister, Materials Science & Engineering-An Introduction, John Wiley and sons, 2nd edition, 2014.
3. Donald R. Askeland, Pradeep P.Fulay, D.K.Bhattacharya, Materials Science and Engineering, Cengage Learning, 1st edition, 2010.
4. R.K.Rajput, Engineering Materials and Metallurgy, S. Chand, 1st edition, 2006.

II B.Tech - I Semester

14BT30303: **THERMODYNAMICS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Physics, Engineering Chemistry & Engineering Mathematics

COURSE DESCRIPTION:

Thermodynamic system; Energy interactions; Work transfer and Heat Transfer in flow and non- flow systems; Kinetic theory of gases; Equation of state; Laws of thermodynamics; Reversible and irreversible processes; Entropy; Pure substance and Gas power cycles.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Employ the basic concepts such as conservation of mass and energy, work interaction, heat transfer and first law of thermodynamics.

CO2: Apply the concept of second law and entropy to design simple systems.

CO3: Analyze the gas power cycles and identify methods to improve the cycle efficiency.

Detailed Syllabus:

UNIT - I: BASIC CONCEPTS (7 Periods)

System, control volume, surrounding, boundaries, Universe, types of systems, Thermodynamic equilibrium, state, property, process, cycle; reversibility, Quasi - static process, point and path function, irreversible process, work transfer and heat transfer, Zeroth law of thermodynamics.

UNIT-II: FIRST LAW OF THERMODYNAMICS AND SECOND LAW OF THERMODYNAMICS (9 Periods)

First Law of Thermodynamics: Perpetual Motion Machine (PMM) of first kind, limitations of first law, first law for a closed system, Energy-A property of system; First law applied to a flow process: steady flow energy equation.

Kelvin-Planck and Clausius statements of second law and their equivalence; Thermal reservoir, heat engine, refrigerator, heat pump; PMM of second kind, Carnot cycle, Carnot's theorem.

UNIT - III: ENTROPY AND AVAILABILITY (7 Periods)

Clausius theorem and Clausius inequality, entropy as a property, Principle of entropy, Third law of Thermodynamics; Availability and irreversibility; Available energy: Maximum work in arReversible process; Availability in Non - flow and flow Processes.

UNIT - IV: PURE SUBSTANCES AND PROPERTIES OF GASES AND GAS MIXTURES (11 Periods)

Introduction: P-V, P-T and T-S diagrams for pure substances, Mollier diagram, quality and dryness fraction, use of steam tables for thermodynamic properties.

Thermodynamic relations: Gibbs and Helmholtz functions, Maxwells relation and TDS equations.

Ideal gas: equation of state,mole fraction, mass friction gravimetric and volumetric analysis, Dalton's law of partial pressure, Mole fraction, volume fraction and partial pressure, equivalent gas constant molecular internal energy, enthalpy, specific heats and entropy of mixture of perfect gases and vapour.

UNIT-V: GAS POWER CYCLES (11 Periods)

Air standard cycles: Stirling cycle, Ericsson cycle, Joule cycle, Atkinson cycle, Lenior cycle , Otto cycle, Diesel cycle, Dual cycle, comparison of Otto, Diesel and Dual cycles.

Total Periods: 45

TEXT BOOKS:

1. P. K. Nag, Engineering Thermodynamics, TMH, 5th Edition, 2013.
2. Chatttopadhyay, Engineering Thermodynamics, Oxford Publisher, 1st revised edition, 2011.

REFERENCE BOOKS:

1. Yunus Cengel & Boles, Thermodynamics-An Engineering Approach, TMH, 8th Edition, 2015
2. J.P.Holman,Thermodynamics, Mc GrawHill , 2nd Edition 2004.
3. R.S.Khurmi , Thermal engineering , S.Chand publications, 15th Edition, 2015.

Note: Steam Tables with Mollier diagram should be supplied during the examination.

II B.Tech - I Semester
14BT30304: MANUFACTURING TECHNOLOGY-I

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Workshop.

COURSE DESCRIPTION:

Introduction to manufacturing processes; metal casting and melting procedures, introduction to joining processes, gas welding, electric arc welding, resistance welding, advanced fabrication processes.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Specify a manufacturing method suitable for fabricating a given product.

CO2: Investigate, analyze and synthesize complex information, problems, concepts and theories from manufacturing practices.

CO3: Use workshop tools to enhance productivity.

CO4: Propose eco friendly manufacturing methods for development of new products.

Detailed Syllabus:

UNIT - I: METAL CASTING PROCESSES (9 periods)

Classification of manufacturing processes, introduction to casting process, sand moulding procedures, patterns, pattern allowances, pattern materials, types of patterns, moulding materials, Types of moulding sands, testing sand properties, types of sand moulds, moulding machines, types of cores, casting defects, design of gating systems.

UNIT-II: MELTING AND SPECIAL CASTING PROCESSES (9 periods)

Crucible, cupola, electric arc furnaces, shell moulding, precision investment casting, permanent mould casting, die casting, low pressure die casting, centrifugal casting, continuous casting and squeeze casting.

UNIT - III: INTRODUCTION TO JOINING PROCESSES (9 periods)

Introduction, adhesive bonding, mechanical fastening, classification of welding processes, types of welds and welded joints and their characteristics, design of welded joints, welding fluxes and filler rods, soldering, brazing and braze welding.

Gas welding processes: Introduction, Oxy-fuel welding processes, Oxy-fuel gas cutting.

UNIT - IV ELECTRIC ARC AND RESISTANCE WELDING (9 periods)

Electric arc welding: Principle of arc, arc-welding equipment, electrodes, manual metal arc welding, arc blow, carbon arc welding.

Inert-Gas shielded Arc Welding: TIG and MIG welding, shielding gases, submerged arc welding (SAW).

Resistance welding: spot welding, seam welding, projection welding, upset welding and flash welding and plasma arc welding.

UNIT - V: ADVANCED FABRICATION PROCESSES (9 periods)

Thermit welding, Electro slag welding, Electron beam welding, laser beam welding, forge welding, friction welding, diffusion welding, explosion welding, ultrasonic metal welding, destructive & non-destructive testing of welds.

Total Periods: 45

TEXT BOOKS:

1. P.N. Rao, Manufacturing Technology, Vol:1,TMH, 4th edition, 2013.
2. Kalpakjian, Serope, Manufacturing Engineering and Technology, Pearson education, 7th edition, 2014.

REFERENCE BOOKS:

1. R.K. Jain, Production Technology, Khanna Publishers, 17th edition, 2010.
2. Rosenthal, Principles of Metal Castings, McGraw-Hill Professional Publishing, 3rd edition, 2013.
3. R.S. Parmar, Welding Engineering and Technology, Khanna Publishers, 1st edition, 2014

II B.Tech - I Semester

14BT30321: COMPUTER AIDED MACHINE DRAWING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	1	3	2

PRE-REQUISITE:

Computer Aided Engineering Drawing.

COURSE DESCRIPTION:

Principles and requirements of Machine drawings; Assembling and Disassembling important parts used in major mechanical engineering applications by using AUTOCAD software; CAD Drawings of mechanical components and their assemblies such as bolts and nuts, cotter and pin joints, couplings along with their utility for design of components.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Read and interpret a given CAD drawing.

CO2: Analyze features on a part and develop 2-D & 3-D models using AutoCAD.

CO3: Present suitable drawing views to represent assembly and part drawings of different machine parts in AutoCAD.

CO4: Interpret the implications of drawings of machine components.

List of Excersises:

1.Experiments on machine drawing conventions using drafting software.

a) Conventional representation of materials.
b) Conventional representation of sectional views.
c) Conventional representation of limits, fits and tolerances-form and positional tolerances and machining symbols.
d) Conventional representation of dimensioning on the drawings.

2.Experiments on drawing of machine elements and simple parts using drafting software.

a) Types of thread profile:-square, metric, ACME, Worm.
b) Bolted joints: Hexagonal bolt and nut, square bolt and nut.
c) Locking arrangements for nuts, locking by split pin, castle nut.
d) Foundation bolts: Eye, bent, rag foundation bolts.

3.Assembly Drawings.

Drawing of assembled views for the part drawings of the following, using conventions and easy drawing proportions. (Below mentioned assembly drawings ONLY)

a) Stuffing box b) Pipe vice
c) Eccentric d) Screw jack

4.Part Drawings.

Preparation of part drawing representing limits, fits and tolerances and surface finish indications (Below mentioned part drawings ONLY).

a)Petrol Engine connecting rod
b)Oneway(Single) tool post
c)Plummer block

NOTE: First angle projection to be adopted.

TEXT BOOKS:

1. S. Trymbaka Murthy, A Text Book of Computer Aided Machine Drawing, CBS Publishers, New Delhi, 2007.
2. K.L Narayana, P. Kannaiah & K. Venkata Reddy, Machine Drawing, New Age Publisher.
3. Goutam Pohit & Goutham Ghosh, Machine Drawing with AutoCAD, Pearson Education.

REFERENCE BOOKS:

1. K.C.John, Text book of Machine Drawing, PHI learning, 2009.
2. Sidheshwar, Machine Drawing, TMH
3. N.D.Bhatt, V. M. Panchal, Machine Drawing, Charotar Publishing House Pvt.
4. Sham Tickoo, AutoCAD 2006 For Engineers and Designers, Dream tech publishers, 2005.

II B.Tech - I Semester

14BT30322: STRENGTH OF MATERIALS AND MATERIALS SCIENCE LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:
Engineering Mechanics, Engineering Chemistry, Strength of Materials, Materials Science and knowledge on measuring instruments.

COURSE DESCRIPTION:
Experiments to find yield strength and ultimate strength in tension, compression, shear, torsion, bending; strain gauges, Dial gauges and data acquisition systems, Types of Metals, Steels, Cast irons and their Microstructures; Heat Treatment procedures; Data acquisition and recording; Grain size analysis; Phase segmentation.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Perform tensile, shear, and torsion tests on test specimens in a real life situation.
CO2: Analyze the experimental results and compute Young's modulus for a materials using appropriate test procedure.
CO3: Report experimental results and provide systematic documentation for various experimentation efforts.
CO4: Prepare metallographic samples for microscopic examinations.
CO5: Analyze the microstructure and estimate the amount of porosity and grain size of the casted specimen.
CO6: Apply the knowledge of phase diagrams and testing methods to suit design specification in related areas.
CO7: Use the software for various analysis of microstructures.

STRENGTH OF MATERIALS LAB

LIST OF EXPERIMENTS

1. Tensile test on mild steel rod
2. Bending test on simply supported beam
3. Bending test on cantilever beam
4. Torsion test
5. Shear test
6. Test on springs - tension and compression
7. Compression test
8. Impact test

MATERIALS SCIENCE LAB

LIST OF EXPERIMENTS:

1. Study of metallurgical instruments & microscope.
2. (a) Preparation of mounted specimen using cold setting die.
   (b) Preparation of mounted specimen using hydraulic specimen mounting press.
3. Preparation and study of the microstructure of cast irons.
4. Preparation and study of the microstructure of carbon steels.
5. Preparation and study of the microstructure of Non-Ferrous alloys.
6. (a) Study of the microstructures of heat treated steels.
   (b) Measurement of hardness of heat treated and untreated steels.
7. Determination of hardenability of steel by Jominy End Quench Test.
8. Determination of grain size, porosity and phase distribution of any 4 selected specimens by Material Plus software.

II B.Tech - II Semester

14BT3BS03: **PROBABILITY AND STATISTICS**

(Common to CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITES:

Engineering Mathematics.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Acquire basic knowledge in

(a) probability distributions, correlation and regressions.

(b) statistical quality control and testing of hypotheses.

(c) finding regression coefficients ,elucidating relationships in bivariate data.

(d) Tests of significance for small and large samples.

CO2: (i) Develop analytical skills for the problems involving

(a) Means, probability distributions and standard deviations.

(b) Sampling techniques for decision making in uncertain environments.

(ii) Develop skills for analyzing the data with

(a) Suitable tests of significance for practical situations.

(b) Through probability distributions for practical situations.

CO 3: Develop skills in applying

(a) Statistical techniques employed for quality control and maintenance of uniform quality in the manufacturing processes.

Detailed syllabus :

UNIT - I: PROBABILITY & MATHEMATICAL EXPECTATIONS (9 periods)

Probability-Conditional probability, Bayes theorem. Random Variables: Discrete and continuous random variables, cistribution function of random variable, properties,probability mass function, probability density function, mathematical expectation, properties of mathematical expectations, mean and variance.

UNIT - II: PROBABILITY DISTRIBUTIONS (9 periods)

Discrete Distributions: Binomial distribution, mean and standard deviations of Binomial distribution, Poisson distribution, mean and standard deviations of Poisson distribution.

Continuous Distributions: Normal distribution, mean, variance and area properties.

UNIT-III: STATISTICAL QUALITY CONTROL AND CORRELATION- (9 periods)

Introduction, advantages and limitations of statistical quality control, control charts, specification limits, X , R, p, np and c charts, definition of correlation, correlation coefficient, rank correlation. simple linear regression, regression lines and properties.

UNIT-IV: SAMPLING DISTRIBUTIONS AND TESTS OF SIGNIFICANCE FOR LARGE (9 periods)

Population and sample, parameter and statistic, statistic, standard Error of statistic sampling distribution, null and alternative hypothesis, type I and II errors, level of significance, critical region, degrees of freedom. Test of significance for single proportion, difference of proportions, single mean, difference of means.

UNIT-V: TESTS OF SIGNIFICANCE FOR SMALL SAMPLES (9 periods)

Student's t-test: single mean, difference of means, F-test for equality of population variance, Chi-Square Test for goodness of fit, contingency table, Chi-Square Test for independence of attributes.

Total Periods: 45

TEXT BOOKS:

1. T.K.V. Iyengar, B. Krishna Gandhi et al, Probability and Statistics, S. Chand & Company, 3rd edition, 2011.
2. S.P.Gupta, Statistical Methods, Sultan and Chand, New Delhi, 34th edition, 2005.

REFERENCE BOOKS:

1. Shahnaz Bathul, A text book of Probability and Statistics, Ridge Publications, 2nd edition.
2. S.C.Gupta and V.K.Kapoor, Fundamentals of Applied Statistics, Sultan and Chand, New Delhi, 1998.

II B.Tech - II Semester
14BT3HS01: ENVIRONMENTAL SCIENCES
(Common to CSE,CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Physics; Engineering Chemistry.

COURSE DESCRIPTION:

Introduction to environment, need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and control; Social issues and environment; Human population and environment; field study and analysis.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Acquire knowledge in

a) diverse components of environment and natural resources

b) ecosystem and biodiversity & its conservation methods

c) population growth and human health

d) green technology.

CO2: Identify and resolve the issues related to sources of different types of pollutions.

CO3: Provide solutions to individuals, industries and government for sustainable development of natural resources.

CO4: Create awareness on environmental degradation and to bring best management practices to protect environment.

CO5: Develop skills in analyzing reports on environment for sustainable development.

CO6: Apply environmental ethics in protection of diversified ecosystems.

Detailed Syllabus:

UNIT-I:

MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES (11 periods)

Multidisciplinary nature of environment: Definition, scope and importance of multidisciplinary nature of environment, segments of environment-lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness.

Natural Resources: Renewable and Non-renewable resources and associated problems- (a) forest resources: use and over exploitation, deforestation-causes, effects and remedies, case studies(b) water resources-use and over utilization of surface & ground water, conflicts over water-benefits and problems of large dams, case studies.

(c) mineral resources- mining, adverse effects, case studies, (d) food resources-world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging and salinity, case studies, (e) energy resources-growing needs, renewable energy resources-solar, wind, hydropower, hydrogen fuel and non-renewable energy resources-coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

UNIT-II: ECOSYSTEMS AND BIODIVERSITY (10 periods)

Ecosystems: Definition and concept of an ecosystem, structure and function of an ecosystem-producers, consumers and decomposers, food chains, food webs and ecological pyramids-introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem-ponds, lakes & oceans, energy flow in the ecosystem, ecological succession. Biodiversity: Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity-habitat loss, poaching of wildlife, man-wild life conflicts, endemic, endangered and extinct species of India, conservation of biodiversity-in-situ and ex-situ.

UNIT-III: ENVIRONMETAL POLLUTION AND CONTROL (8 periods)

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management-causes, effects and control measures of urban and industrial wastes, hazards and disaster management-floods, earthquakes, tsunamis, case studies.

UNIT-IV: SOCIAL ISSUES AND THE ENVIRONMENT (8 periods)

From unsustainable to sustainable development, urban problems related to energy, environmental ethics-issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

UNIT-V: HUMAN POPULATION AND THE ENVIRONMENT (8 periods)

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies. Field work: visit to a local area to document environmental assets-pond/ forest/ grassland/ hill/ mountain/ Environment Impact Assessment procedures for local environmental issues or assignment/ seminar.

Total periods: 45

TEXT BOOKS:

1. A.Kaushik and C.P. Kaushik, Environmental Studies, New Age International (P) Ltd Publications, 4th Edition, 2014
2. Erach Barucha, Environmental Studies, Orient Blackswan, 2nd Edition, 2013.

REFERENCE BOOKS:

1. R. Rajagopalan, Environmental Studies, Oxford University Press, 2nd Edition, 2011.
2. Benny Joseph, Environmental Studies, Tata McGraw-Hill, 2nd Edition, 2009.
3. Dr. B S Chauhan, Environmental Studies, University Science Press, 1st Edition, 2008.
4. M. Anji Reddy, Textbook of Environmental Sciences and Technology, BS Publications, 2007.
5. Larry W Canter, Environmental Impact Assessment, McGraw Hill Education, 2nd edition, 1996.

II B.Tech - II Semester

14BT4HS01: **BUSINESS COMMUNICATION AND PRESENTATION SKILLS**

(Common to CSE, IT,CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE REQUISITES:

Basic grammar and fundamentals of listening, speaking, reading and writing skills.

COURSE DESCRIPTION:

Nature and scope of communication; non-verbal communication; writing business documents; business presentations and public speaking; careers and résumé.

COURSE OUTCOMES:

After completion of the course, a successful student will be able to:

CO1: Acquire knowledge in
- a) Managerial Communication.
- b) Corporate Communication.
- c) Business Writing.
- d) Presentation Skills.
- e) Career Building.

CO2: Analyze and judge the situation through non-verbal communication for effective organizational communication.

CO3: Achieve personal excellence and ability to work in groups.

CO4: Develop effective communication to meet professional needs.

Detailed Syllabus :

UNIT - I : NATURE AND SCOPE OF COMMUNICATION (9 periods)

Introduction ,functions of communication, roles of a manager, communication Basics, communication networks, informal communication, tips for effective internal communications, interpersonal communication, communication barriers, effective managerial communication, strategies for improving organizational communication.

UNIT - II : NON-VERBAL COMMUNICATION (9 periods)

Introduction ,significance of non-verbal communication in organizations forms of non-verbal communication, types of non-verbal communication. Cross Cultural Communication: Introduction concept of cross cultural communication , different communication styles, cross-cultural communication strategies, corporate communication: introduction, crisis management / communication, case study.

UNIT - III : WRITING BUSINESS DOCUMENTS (10 periods)

Business Writing: Introduction, importance of written business communication, five main stages of writing business messages. Business letter writing; common components of business letters, strategies for writing the body of a letter, kinds of business letters. Business reports: Kinds of reports, characteristics of business reports, steps in writing a routine business report, corporate reports.

UNIT - IV : BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 periods)

Introduction, business presentations speeches, introduction to a presentation, main body, conclusion, effective sales presentations, case Study; Group Discussions: Introduction, work place GD guideline, functional and non-functional roles in Group Discussions, team presentations, benefits of team presentations, purpose of team, presentations, case studies.

UNIT - V: CAREERS AND RESUME (7 periods)

Introduction; Career Building: Understanding yourself, setting a career goal ; Résumé Writing: Résumé formats; Interviews: Introduction, fundamental principles of interviewing, general preparation for an interview, success in an interview, types of interviewing questions, important non-verbal aspects, types of interviews, styles of interviewing, case Interviews.

Total periods: 45

TEXT BOOKS:

1. Meenakshi Raman and Prakash Singh, Business Communiction, Oxford University Press, New Delhi, Second Edition, 2012.

REFERENCE BOOKS:

1. M K Sehgal and Vandana Khetarpal, Business Communication, Excel Books, New Delhi, 2011.
2. M Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill, 2009.

II B.Tech - II Semester

14BT40301: **KINEMATICS OF MACHINERY**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Mathematics;Engineering Mechanics; Computer Aided Engineering Drawing.

COURSE DESCRIPTION:

Basic concepts of static and motion applications; design of mechanical sub-assemblies and assemblies such as simple machines; various components ranging from basic machine elements such as four bar mechanisms, steering mechanisms, Hooke's joint, cams, gear and gear trains; calculation and analysis of velocities and accelerations. Application of kinematic theories to real world machines.

COURSE OUTCOMES:

After the completion of the course, a successful student will be able to:

CO1: Identify various mechanisms and choose one best suited for a given situation.

CO2: Analyze a given mechanism and find motion characteristics using mathematical models.

CO3: Specify kinematic design to suit given requirements in select situations.

CO4: Trouble-shoot problems associated with simple machine components such as cams, gears, gear trains.

Detailed syllabus:

UNIT - I: MECHANISMS AND MACHINES (8 Periods)

Elements or links; Classification: Rigid, Flexible and Fluid link; Types of Kinematic Pairs: Sliding, turning, rolling, screw and spherical pairs; Lower and Higher pairs; Closed and Open pairs; Constrained Motions: Completely, partially or successfully and incompletely constrained motions; Classification of machines; Kinematic chain; Types of joints: Binary, Ternary and Quaternary joints; Number of degree of freedom for plane mechanisms and its applications: Kutzbach and Grubler's criterions; Inversion of mechanisms: Quadric cycle, Single slider and Double slider crank chains.

UNIT - II: VELOCITY AND ACCELERATION ANALYSIS (8 Periods)

Instantaneous center of rotation, centroids and axodes, relative motion between two bodies, Aronhold Kennedy (three center in line) theorem, method for determination of Instantaneous Centre, diagrams for simple mechanisms and determination of angular Velocity of links and linear
velocities of point, velocity and acceleration diagrams, relative velocity method for four bar mechanism with revolute joint, slider-crank mechanism, and its inversions.

UNIT - III: MECHANISMS WITH LOWER PAIRS (10 Periods)

Pantograph; Exact Straight Line Motion Mechanisms: Peaucellier, Hart and Scott Russell's mechanism; Approximate Straight Line Motion Mechanisms: Watt's, Grasshopper, Tchebicheff's and Robert mechanisms; Steering Mechanisms: Conditions for correct steering, Davis Steering gear and Ackerman steering gear mechanisms, Hooke's joint, single and double Hooke's joint.

UNIT - IV: CONSTRUCTION OF CAM PROFILE (8 Periods)

Introduction to cams and followers, their uses, types of followers and cams, terminology, types of follower motion for translating follower, uniform velocity, simple harmonic motion and uniform acceleration, maximum velocity and maximum acceleration during outward and return stroke in the case of uniform velocity, SHM, and uniform acceleration and retardation, knife edge, roller and flat followers (axis of follower passes through the axis of cam shaft, and offset).

UNIT - V: MECHANISMS WTH HIGHER PAIRS: (11 Periods)

Friction wheels and toothed gears: Types, Law of gearing, velocity of sliding of teeth; Forms of teeth: Cycloidal and involute profiles; expressions for arc of contact and path of contact, contact ratio, phenomena of interference, condition for minimum number of teeth to avoid interference (pinion and wheel); Gear trains: Simple, compound, reverted and epicyclic gear train, velocity ratio (analysis) of epicyclic gear train, compound epicyclic gear train (sun and planet wheel).

Total Periods: 45

TEXT BOOKS:

1. S. S. Rattan, Theory of Machines and Mechanisms, Tata McGraw Hill Education, Third Edition, 2009
2. R.S. Khurmi, Theory of Machines, S.Chand Publications, Fourteenth Revised Edition, 2012

REFERENCE BOOKS:

1. Dr. R. K. Bansal, Dr. J. S. Brar , Theory of Machines, Laxmi Publications, Fourth Edition, 2013
2. Ballaney. P. L., Theory of Machines and Mechanisms, Khanna Publishers, 2005
3. Joseph Edward Shigley and John Joseph Uicker,Jr., Theory of Machines and Mechanisms, MGH, Fourth Edition, New York, August 2013.
4. Bevan T, Theory of Machines, CBS Publishers and Distributors, New Delhi, 2002.

II B.Tech - II Semester

14BT40302: FLUID MECHANICS AND HYDRAULIC MACHINERY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:
Engineering Physics; Engineering Mathematics; Engineering Mechanics.

COURSE DESCRIPTION:
Properties of fluids; pressure measurements; types of flow; Onedimensional steady flow energy & momentum equations; flow measurements; impact of jets on stationary & moving plate; Hydraulic turbines and its performance; Pumps; components and phenomena of hydroelectric power stations.

COURSE OUTCOMES:
After completion of this course, a successful a student will be able to:

CO1: Employ the basic knowledge of hydraulics in finding fluid properties, performance parameters of hydraulic turbines and pumps.
CO2: Analyze hydraulic machines by developing mathematical models to study characteristics of various steady flow and performance parameters of hydraulic machinery.
CO3: Present feasible design solutions to the construction of efficient hydraulic turbines and pumps.
CO4. Identify the manageable areas in hydraulic machinery to reduce the mechanical losses.

Detailed Syllabus:

UNIT - I: PROPERTIES OF FLUIDS AND PRESSURE MEASUREMENT (9 Periods)

PROPERTIES OF FLUIDS: Dimensions and units; Physical properties of fluids: Mass density, specific weight, specific volume, specific gravity, viscosity, surface tension, capillarity, vapor pressure and its influence on fluid motion, bulk modulus, compressibility; Types of fluids: ideal and real fluids, Newtonian and Non-Newtonian fluids.

PRESSURE MEASUREMENT: Absolute, gauge, atmospheric and vacuum pressure; Manometers: Piezometer, U-tube, single column manometer and differential manometers.

UNIT - II: FLUID KINEMATICS AND DYNAMICS (9 Periods)

FLUID KINEMATICS:
Classification of fluid flows: Steady,unsteady, uniform , Non-uniform, laminar, turbulent, rotational and irrotational flows, compressible and incompressible flows; Types of flow lines: Path line, stream line, streak line and stream tube, equation of continuity for one dimensional flow.

FLUID DYNAMICS:
Surface and body forces, different types of heads, Euler's and Bernoulli's equations for flow along a stream line, Momentum equation and its application on force on pipe bend.

MEASUREMENT OF FLOW: Pitot tube, Venturimeter, and Orifice meter.

UNIT - III: FLOW THROUGH PIPES AND IMPACT OF JETS (10 Periods)

FLOW THROUGH PIPES: Reynold's experiment, Darcy Weisbach equation, Chezy's equation, minor losses in pipes, equivalent pipe, pipes in series and pipes in parallel, total energy line and hydraulic gradient line.

IMPACT OF JETS: Hydrodynamic force of jets on stationary, moving flat, inclined, curved vanes, jet striking centrally and at tip, Velocity diagrams, Work done and efficiency.

UNIT - IV: HYDRAULIC TURBINES AND THEIR PERFORMANCE (9 Periods)

HYDRAULIC TURBINES: Classification of turbines: Impulse, Reaction turbines, construction and working of Pelton wheel, Francis turbine, and Kaplan turbine: Working proportions, work done, efficiencies, draft tube theory: functions and efficiency.

PERFORMANCE OF HYDRAULIC TURBINES: Geometric similarity, specific speed, unit quantities, characteristic curves, governing of turbines, selection of type of turbine, water hammer, cavitation, surge tank.

UNIT - V: PUMPS AND HYDROELECTRIC POWER STATIONS (8 Periods)

PUMPS: Classification; Single Stage Centrifugal Pump; Working Principle, work done, heads, losses and efficiencies; Multi Stage Centrifugal Pump; pumps in series, parallel, characteristic curves, specific speed, net positive suction head; Reciprocating pumps; Working Principle, discharge, slip, indicator diagrams.

HYDROELECTRIC POWER STATIONS: Elements of hydro electric power station: Types, heads, and efficiencies; Concept of pumped storage plants and storage requirements.

Total Periods: 45

TEXT BOOKS:

1: R.K. Rajput, Fluid Mechanics and Hydraulic Machines, S. Chand, 4th Edition, 2008.

2: Modi and Seth, Fluid Mechanics and Hydraulic Machinery, Standard book house, 17th Edition, 2011.

REFERENCE BOOKS:

1: R.K. Bansal, Fluid Mechanics and Hydraulic Machinery, Laxmi publications, 9th Edition 2005.

2: D.S. Kumar, Fluid Mechanics and Fluid Power Engineering, Kotaria & Sons, 7th Edition 2009.

II B.Tech - II Semester

14BT40303: **THERMAL ENGINEERING-I**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Thermodynamics.

COURSE DESCRIPTION:

Comparison of air-standard and actual cycles; components and working of 2-stroke and 4-stroke engines; combustion phenomena in spark ignition and compression ignition engines; performance parameters of an internal combustion engine; estimating heat losses in an engine; components and working of reciprocating and rotary compressors.

COURSE OUTCOMES:

After the completion of course, a successful student will be able to:

CO1: Employ the basic knowledge of an engine and compressor in developing the analytical models.

CO2: Analyze the parameters useful to increase the performance and reducing the knock in spark ignition and compression ignition engines.

CO3: Identify and implement the fuel requirements and fuel rating.

CO4: List design considerations favorable for minimizing harmful emissions and maximum power Output.

CO5: Present feasible design of compressors for simple domestic industrial applications.

Detailed Syllabus:

UNIT - I: I.C. ENGINES (9 Periods)

Basic engine components, Classification of I.C. Engines, working of two stroke and four stroke engines, comparison of two stroke and four stroke engines, comparison of SI and CI engines, valve and port timing diagrams, application of I.C. engines, fuel-air cycles: Composition of cylinder gases, variable specific heats, dissociation, number of moles, Actual cycle: heat loss, time loss, exhaust blow down factors and loss due to rubbing friction.

UNIT - II: COMBUSTION IN S.I. AND C.I. ENGINES (9 Periods)

Normal combustion and abnormal combustion in S.I. engines, flame propagation and effect of engine variables, stages of combustion, pre-gnition and knocking, types of combustion chambers in S.I engines, fuel Requirements and fuel rating.

Stages of combustion in C.I. Engines, factors affecting delay period, phenomenon of knock in C.I. Engine, comparison of knock in S.I. and C.I engines, types of combustion chambers in C.I. Engines, Ffuel requirements and fuel rating.

UNIT - III: ENGINE PERFORMANCE PARAMETERS,MEASUREMENTS AND TESTING (11 Periods)

Brake power, indicated power, friction power, mean effective pressure, engine efficiencies, performance calculations and heat balance. Measurement of Brake power: Rope brake, Hydraulic, Eddy current and Swinging field DC Dynamometers; Measurement of Friction Power: William's line method, Morse test, Motoring Test and Retardation Test, air and fuel measurement.

UNIT -IV: NON-CONVENTIONAL ENGINES (7 Periods)

Working principles of CRDI engine, Dual fuel and Multifuel engines, GDI engine, HCCI engine, Lean burn engines, Stirling Engine, stratified charge engines, VCR engine and Wankel engines.

UNIT -V: AIR COMPRESSORS (9 Periods)

Air Compressors: Reciprocating Compressors, effect of Clearance volume in compressors, volumetric Efficiency, single stage and multi stage compressors, effect of inter cooling and pressure drop in multi stage compressors, working principles of Roots , Vane type Compressor, Centrifugal Compressor; Axial Flow Compressors.

Total Periods: 45

TEXT BOOKS:

1. V. Ganesan, I.C. Engines, TMH, 3rd Edition, 2008.

2. R.K.Rajput, Thermal Engineering, Laxmi Publications,8th Edition, 2010

REFERENCE BOOKS:

1. M.L Mathur & R.P.Sharma, Internal Combustion Engines, Dhanpat Rai & Sons, 8th Edition, 2014.

2. Heywood, I.C. Engines, McGrawHIll. 1st Edition, 2013.

3. Pulkrabek, Engineering Fundamentals of IC Engines, Pearson, 2ndEdition, 2004.

4. R.S.Khurmi & J.K. Guptha, Thermal Engineering, S.Chand, 16thEdition, 2008.

II B.Tech - II Semester

14BT40304: **MANUFACTURING TECHNOLOGY-II**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Workshop; Manufacturing Technology-I.

COURSE DESCRIPTION:

Metal forming processes, sheet metal operations, plastic processing, introduction to various machining operations and study of various process parameters in Non-Traditional machining process; Various cutting tools, cutting forces, and surface finish and tool wear mechanisms during machining of metals and non-metals; ultrasonic machining, abrasive jet machining & water jet machining, electro-chemical processes, electron beam machining, plasma arc machining.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Choose a metal forming processes to fabricate a metallic and plastic processing methods on plastics for material removal with a given accuracy.

CO2: Estimate the effects of mechanical and thermal loading when machining metal and Non-metal cutting using a non-traditional machining process.

CO3: Estimate the material removal rate and cutting force and the surface finish attainable using a non-traditional machining process and suggest a suitable process for a given application.

CO4: Propose, where possible, environment-friendly and sustainable solutions to suit non-traditional machining processes.

Detailed Syllabus:

UNIT -I: METAL FORMING PROCESSES (9 Periods)

Nature of plastic deformation, rolling, forging, extrusion, wire drawing, rod and tube drawing, swaging, tube making, explosive forming and thread rolling.

UNIT -II: SHEET METAL OPERATIONS (9 Periods)

Press tool operations, shearing action, shearing operations, drawing, draw die design, spinning, bending, stretch forming, embossing and coining.

UNIT - III: PLASTIC PROCESSING (6 Periods)

Introduction, properties of plastics, additives in plastics, extrusion of plastics, injection moulding, blow moulding, thermoforming,thermosetting materials.

UNIT - IV: NON-TRADITIONAL MACHINING METHODS (8 Periods)

Need for non-traditional machining methods, classification of modern machining processes, comparative study of different processes, considerations in process selection, materials and its applications.

Ultrasonic machining process: Mechanics of metal removal, process variables, applications and limitations.

Abrasive and Water Jet Machining: Types of abrasives, mechanics of metal removal, process variables, applications and limitations.

UNIT-V: ELECTRO-CHEMICAL & THERMAL REMOVAL PROCESSES (13 Periods)

Chemical machining, electro chemical machining, electro chemical grinding, electro chemical honing, deburring process, electric discharge machining, electric discharge grinding, electric discharge wire cutting processes**:** mechanics of metal removal, process variables, applications and limitations.

Total Periods: 45

TEXT BOOKS:

1. P.N. Rao, Manufacturing Technology, Vol.1,TMH, 4th Edition, 2013
2. Kalpakjian, Serope, Manufacturing Engineering and Technology, Pearson education, 7th Edition, 2014.

REFERENCE BOOKS:

1. Pandey, P.C. and Shah H.S., Modern Machining Process, TMH, 1980.
2. V.K. Jain, Advanced Machining Processes, Allied Publishers, 2009.

II B.Tech - II Semester

14BT40321: **FLUID MECHANICS AND HYDRAULIC MACHINERY LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:

Engineering Physics, Engineering Mathematics, Engineering Mechanics

COURSE DESCRIPTION:

Study and calibration of gauges; Orifice meter, Venturi meter; Determination of Darcy's coefficient; the Performance test on hydraulic machines; Centrifugal pump, reciprocating pump, Francis turbine, Kaplan turbine, and Pelton wheel turbine; study of Bernoulli's theorem verification, Head losses in pipes and impact of jet on vanes.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Use various flow measurement instruments.

CO2: Calculate the losses and discharge in pipes and conduct performance tests on pumps and turbines to find the efficiency.

CO3: Demonstrate systematic approach in conducting experiments.

LIST OF EXPERIMENTS

Any twelve experiments are to be conducted.

1. Calibration of Venturimeter
2. Calibration of Orifice meter
3. Determination of coefficient of discharge for a small Orifice by a constant head method
4. Calibration of Rectangular notch
5. Determination of loss of head due to sudden contraction
6. Determination of friction factor for pipes
7. Verification of Bernoulli's equation
8. Impact of jet on vanes
9. Study of hydraulic pumps
10. Performance test on Pelton wheel turbine
11. Performance test on Francis turbine
12. Performance test on Kaplan turbine
13. Performance test on single stage centrifugal pump
14. Performance test on multi stage centrifugal pump
15. Performance test on reciprocating pump

II B.Tech - II Semester

14BT40322: **MANUFACTURING TECHNOLOGY LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITE:
Engineering Workshop

COURSE DESCRIPTION:
Integrated approach to Manufacturing Science and Engineering practices; techniques for fabricating parts; pattern making and mould preparation and metal casting; wood working; exposure to mechanical press working, welding, sheet bending, casting and processing of plastic; cold, hot and wood working.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:
CO1: Specify and identify a method suitable for fabricating simple parts.
CO2: Analyze the part to be fabricated and manufacture simple parts using a combination of the manufacturing techniques.
CO3: Communicate effectively with industry personnel by developing a manufacturing-centric vocabulary.
CO4: Demonstrate work habits that are ethical and safe in a labora-tory, independently and in teams.

Any TWELVE experiments to be conducted.

I. PATTERN & MOULD PREPARATION AND METAL CASTING
1. Preparation of pattern on a wood turning lathe
2. Preparation of a casting by using single piece and multi piece patterns
3. Preparation of a casting of a hollow pipe/T-Bend with core

II.SAND TESTING
4. (a) Determination of Grain fineness number for sand sample using sieve shaker
   (b) Estimation of moisture content in a given sand sample
5. Determination of of clay content in a given sand sample
6. Determination of permeability of the given sand sample
7. Determination of compression, Shear strength of a given sand specimen using universal sand strength testing machine

III.WELDING LAB
8. Preparation of Lap and Butt joint using Arc & Gas welding
9. Exercise on a TIG & MIG welding equipment
10. Exercise on spot welding machine

IV. MECHANICAL PRESS WORKING
11. Exercise on fly press machine(Blanking & Piercing)
12. Exercise on hydraulic Press(Deep drawing & Extrusion)
13. Exercise on bending machine

V. PROCESSING OF PLASTICS
14. Preparation of a specimen on injection moulding machine
15. Preparation of a specimen on a blow moulding machine

III B.Tech - I Semester

14BT4HS02: **PROFESSIONAL ETHICS**

(Common to: CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Engineering ethics, moral autonomy and moral dilemmas - professional and ideal virtues, professional responsibility and moral leadership ; Engineering as social experimentation, conscientiousness and law of Engineering- Responsibilities and Rights, Whistle blowing; Global issues and managerial ethics.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Apply the principles of ethics to solve engineering problems

CO2: Analyze the problems in the implementation of moral autonomy and resolve through consensus

CO3: Responsible to follow the codes of ethics.

CO4: Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas.

CO5: Function as a member, consultant, manager, advisor and leader in multi-disciplinary teams

CO6: Write reports without bias and give instructions to follow ethics

Detailed Syllabus:

UNIT I: ENGINEERING ETHICS (8 Periods)

Scope and aim of engineering ethics-senses of engineering ethics, variety of moral issues, types of inquiry, moral dilemmas, moral Autonomy- Kohlberg's Theory, Gilligan's theory, consensus and controversy.

UNIT II: PROFESSIONAL IDEALS AND VIRTUES (10 Periods)

Theories about virtues, professions, professionalism, characteristics, expectations, professional responsibility, integrity, self-respect, sense of Responsibility. self-interest, customs and religion- self-interest and ethical egosm, customs and ethical relativism, religion and divine command ethics. use of ethical theories- resolving moral dilemmas and moral leadership.

UNIT III: ENGINEERING AS SOCIAL EXPERIMENTATION (9 Periods)

Engineering as experimentation, similarities to standard experiments, learning from the past and knowledge gained, engineers as Responsible Experimenters-Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations, industrial standards, problems with the law of Engineering.

UNIT-IV: RESPONSIBILITIES AND RIGHTS (9 Periods)

Collegiality and loyalty, respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime, rights of Engineers, professional rights, whistle-blowing, the bart case, employee rights and discrimination.

UNIT-V: GLOBAL ISSUES (9 Periods)

Multinational corporations, professional ethics, environmental ethics, computer ethics, engineers as consultants, witnesses, advisors and leaders, Engineers as Managers; Managerial ethics applied to engineering profession, moral leadership.

Total Periods: 45

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, Ethics in Engineering, 3rd Edition, Tata McGraw-Hill, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S., Engineering Ethics, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, Human Values and Professional Ethics, Taxmann Allied Services Pvt. Ltd., 2009.
2. Scientists and Engineers, 1st Edition, Oxford University Press, 2001.
3. Charles F. Fledderman, Engineering Ethics, Pearson Education, 2004.
4. R. Subramanaian, Professional Ethics, Oxford Higher Education, 2013.

III B.Tech - I Semester

14BT50301: **DYNAMICS OF MACHINERY**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Mathematics, Engineering Mechanics, Kinematics of Machinery

COURSE DESCRIPTION:

Static force analysis, dynamic analysis; Principles of linear and angular momentum and the work-energy relationships, graphical and analytical methods; Analysis and balancing of shaking forces in machines, governors; Vibrations, single degree, multi degree of freedom vibrations, spring mass systems; transmissibility of forces, Dunkerley's method, Rayleigh's method; Whirling of shafts, isolation of system, vibration instrumentation and standards.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Identify situations where dynamics of machinery needs to be studied.

CO2: Use analysis methods to provide preliminary and case specific information for design of mechanical dynamic systems involvingimbalance, flywheel and gyroscopic effects.

CO3: Detect possible sources of imbalance and suggest means of rectification.

CO4: Analyze complex dynamic systems through systematic approach by identifying suitable subsystems.

C05: Address the issues of safety in dynamic systems involving moving parts.

Detailed Syllabus:

UNIT - I: STATIC AND DYNAMIC ANALYSIS (8 Periods)

Static force analysis of four bar mechanism and slider crank mechanism by principle of superposition andvVirtual work; Dynamic force analysis: Four-bar mechanism; velocity and acceleration of the reciprocating parts in engines by Klien's construction; Forces on the reciprocating parts of an engine neglecting and considering weight of the connecting rod; Graphical and Analytical methods.

UNIT -II: FLYWHEEL AND GYROSCOPIC MOTION (12 Periods)

Turning moment diagrams and fly wheels, single cylinder double acting engines, four stroke IC engines, multi-cylinder engines, fly wheels and their design, Gyroscopes: Precessional angular motion: Gyroscopic forces and couple; applications: spinning disc, Aeroplane (Right and Left turn),ships (steering, pitching and rolling), stability of four and two wheel vehicles moving on curved paths.

UNIT - III: BRAKES AND CLUTCHES (7 Periods)

Types of Brakes: Simple block brakes, Single block, pivoted block, double block, simple band brake, differential band brake, band and block brake, internal expanding brake.

Friction clutches: Single disc or Plate clutch, multi disc clutch, cone clutch and centrifugal clutch.

UNIT - IV: GOVERNORS AND BALANCING OF MASSES (12 Periods)

Watt, Porter and Proell governors, spring loaded governors, Hartnell and Hartung governors with auxiliary springs.

Balancing of rotating masses: Single and multiple, single and different planes; **Balancing of reciprocating masses:** shaking force and shaking couple, primary and secondary unbalanced forces of reciprocating parts; balancing of single cylinder engine (partial balancing of primary unbalanced force); balancing of two cylinder engines (partial balancing, balancing of locomotives), variation of tractive force, swaying couple, hammer blow.

UNIT-V: VIBRATIONS (6 Periods)

Basic features of vibratory systems, degrees of freedom, single degree of freedom system, free vibration of mass attached to vertical spring, transverse loads, vibrations of beams with concentrated and distributed loads, Dunkerley's method, Rayleigh's method, whirling of shafts, critical speeds and torsional vibrations, simple problems on forced, damped vibration, vibration isolation & transmissibility.

Total Periods: 45

TEXT BOOKS:

1. S.S.Rattan, Theory of Machines and Mechanisms, Tata McGraw Hill Publishers, Fourth Edition, 2014.
2. R.S Khurmi, Theory of Machines, S.Chand Publications, Fourteenth Revised Edition, 2012.
3. S. Balaguru, Dynamics of Machinery, Scitech Publications, Second Edition, 2009.

REFERENCE BOOKS:

1. Joseph Edward Shigley and John Joseph Uicker, Jr. Theory of Machines and Mechanisms, Second Edition, MGH, New York.
2. Ballaney P L, Theory of Machines and Mechanisms, Khanna Publishers, New Delhi.
3. Bevan T, Theory of Machines, Third Edition, CBS Publishers and Distributors, New Delhi,2002.
4. J.S. Rao and R.V. Dukkipati, Mechanism and Machine Theory, New age International, Second Edition, 2007.

III B.Tech - I Semester

14BT50302: INDUSTRIAL ENGINEERING AND MANAGEMENT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Concepts and functions of management and organization; Selection and analysis of plant location and plant layout; Method study and work measurement; Inventory, stores and purchase management functions; Techniques of statistical process control; Engineering ethics; Industrial safety.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Use industrial engineering and management concepts for solving routine management related problems in an industrial scenario.

CO2: Analyze an industrial problem and identify probable causes and to suggest suitable remedies to increase the productivity and reduce the cost/wastages.

CO3: Exercise discernment in following ethical code of conduct in professional activities.

CO4: Motivate people towards greater productivity and synergy.

Detailed Syllabus:

UNIT - I: PRINCIPLES OF MANAGEMENT (9 Periods)

Concepts of management and Organization: Evolution of management thought, Taylor's scientific management, Fayol's principles of management, systems approach to management.

Functions of management: planning, organizing, staffing, controlling and directing, corporate planning process, ethics and social responsibilities of an engineers.

UNIT- II: FACILITIES PLANNING AND MAINTENANCE (10Periods)

Plant location, definition, factors affecting the plant location, comparison of rural and urban sites, plant layout, definition, objectives, types of production, types of plant layout, plant maintenance: objectives of plant maintenance, importance of plant maintenance, functions and responsibilities of plant maintenance, types of maintenance, concepts of reliability: definition, MTBF, series, parallel and series-parallel device configurations; Redundancy; Industrial safety, factory Act, workmen compensation Act; Industrial disputes Act.

UNIT - III: WORK STUDY (7 Periods)

Productivity ;Definition; Objectives of Workstudy; Method study: Definition, Objectives; Steps involved; work measurement: definition;

Time study: Steps involved, equipment, different methods of performance rating, allowances, standard time calculation, work sampling: definition, steps involved, standard time calculations.

UNIT - IV: MATERIALS MANAGEMENT (10 Periods)

Objectives of Materials Management; Inventory: Functions, types, associated costs, inventory classification techniques, stores management and stores records, purchase management, Value Analysis; Factors involved in inventory problem analysis, inventory costs and deterministic inventory control models, single item inventory control models: without shortages, with shortages, with quantity discounts.

UNIT - V: QUALITY CONTROL (9 Periods)

Introduction and meaning of Quality, quality control, process control, control charts: types of control charts, objectives X-bar, R-chart, process capability, theory underlying attribute control charts,comparison between attribute charts and variable charts, Acceptance sampling:OC Curve, sampling plan; Total Quality Management (TQM): Total Quality Control; Concepts of TQM, elements of TQM, benefits of TQM, benchmarking.

Total Periods: 45

TEXT BOOKS:

1. O.P. Khanna, Industrial Engineering and Management, Dhanpat Rai Publications, 17th Edition, 2014.
2. Martand T.Telsang, Industrial Engineering and Production Management, S.Chand, 2nd Edition, 2006.

REFERENCE BOOKS:

1. Stoner, Freeman, Gilbert, Management, Pearson Education, 6th Edition, 2003.
2. M.Mahajan. Industrial Engineering and Production Management, Dhanpat Rai Publications.
3. Besterfield et al., Total Quality Management, Pearson Education, 3rd Edition, 2011.
4. Pannerselvam, Production and Operations Management, PHI, 3rd Edition, 2012.
5. Ralph M Barnes, Motion and Time Studies, John Wiley and Sons, 7th Edition, 2002.
6. Amrine, Ritchey, Moodie, Kmec, Manufacturing Organization and Management, Pearson, 6th Edition, 2004.

III B.Tech - I Semester

14BT50303: **THERMAL ENGINEERING-II**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Thermodynamics, Thermal Engineering - I.

COURSE DESCRIPTION:

Concepts of Rankine cycle; Several aspects such as steam and its properties; Various boiler mountings and accessories; Draught and performance criteria of boilers; Characteristics of flow through nozzle; Steam turbines; Condensers; Introduction to gas turbines and jet propulsion.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Apply the knowledge of Thermal Science, and Engineering fundamentals to the solution of Thermal Power Engineering problems.

CO2: Conduct an elementary energy audit and develop heat balance sheet for boilers, turbines and such thermal engineering equipment.

CO3: Identify various components in select thermal engineering setups and troubleshoot a problem.

CO4: Report calculations and diagrams in systematic manner

Detailed Syllabus:

UNIT - I: STEAM GENERATORS (9 periods)

Classification of boilers, functions of mountings and accessories, Green's economiser, Sugden's super heater, air Preheater; Working of fire tube boilers: Cochran, Lancashire and Locomotive boilers; Water tube boilers: Lamont, Babcock and Wilcox, Benson boilers; Boiler horse power, equivalent evaporation and efficiency of boiler, heat balance sheet.

UNIT-II: DRAUGHT AND VAPOUR POWER GENERATION (9 periods)

Draught: Classification of draught, height of chimney, condition for maximum discharge, efficiency of chimney.

Vapour Power Generation: Rankine cycle, Modified Rankine Cycle, Rankine Cycle with reheating and regeneration.

UNIT-III: STEAM NOZZLES AND STEAM CONDENSERS (9 periods)

Steam Nozzles: Function and types of nozzles, flow through nozzles, steady flow assumptions, velocity at nozzle exit, ideal and actual expansion in nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, Wilson line.

Steam Condensers: Classification of condensers, working of jet and surface condensers, vacuum efficiency and condenser efficiency, cooling water requirement, Edward's air pump.

UNIT - IV: STEAM TURBINES (9 periods)

Impulse Turbine: Working of single stage impulse turbine, De-laval Turbine, velocity diagrams and combined velocity diagrams, effect of friction, axial, tangential and resultant thrust, power developed, diagram efficiency, condition for maximum efficiency, compounding, governing.

Reaction Turbines: Working of Parson's reaction turbine, degree of reaction, stage velocity diagram and combined velocity diagram, condition for maximum efficiency, governing.

UNIT - V: GAS TURBINES AND JET PROPULSION (9 periods)

Gas Turbines: Components of simple gas turbine plant, ideal gas turbine cycle, specific work and efficiency of simple gas turbine cycle; methods to increase specific work: Inter cooling and reheating, methods to increase efficiency : Regeneration; Brief concepts about gas turbine combustion, thrust augmentation techniques.

Jet Propulsion: Introduction, classification of jet propulsion devices; Working of air breath engines: Ramjet, Pulsejet, Turbojet and Turbopropeller engines; Thrust power and propulsive efficiency, Thermodynamic cycle of turbojet engine, introduction to rocket propulsion.

Total Periods:45

TEXT BOOKS:

1. R.K. Rajput, Thermal Engineering, Laxmi Publication, 9th Edition, 2013.
2. R.S. Khurmi & J.S Gupta, Thermal Engineering, S.Chand, 15th Edition, 2015.

REFERENCE BOOKS:

1. V. Ganesan, Gas Turbines , TMH, 3rd edition, 2010.
2. B. Srinivasulu Reddy and K.Hema Chandra Reddy, Thermal Engineering Data Book, I.K. International, 2007.
3. R. Yadav, Thermodynamics and Heat Engines, Pearson, 7th edition 2007.

Note: Steam tables with Mollier diagram should be supplied during examination.

III B.Tech - I Semester

14BT50304: **MACHINE TOOLS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Manufacturing Technology.

COURSE DESCRIPTION:

Theory of Metal Cutting: Geometry of Cutting Tools; Merchants force diagram; Lathe machine, principle of operation, tools, multispindle lathes; Shaping;Slotting and Planning machines; Drilling; Boring; Jig boring; Milling machine, specifications; Grinding; Lapping; Honing,principles of design of jigs and fixtures.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1. Identify and explain the functions of the basic components of a machine tool.

CO2. Apply merchant circle diagram to estimate geometry of tool from estimated forces.

CO3. Specify required machining operation to achieve the specified geometry, and estimate machining time and metal removal rate.

Detailed Syllabus:

UNIT - I : THEORY OF METAL CUTTING (11 Periods)

Introduction: Basic elements of machining, sources of heat in metal cutting, basic definitions: cutting speed, feed and depth of cut, orthogonal and oblique cutting, classification of cutting tools, principal angles of single and multi point tools, tool signature, tool geometry in coordinate system- ASA and ORS system, types of chips, chip thickness ratio, and chip breakers.

Mechanics of metal cutting: velocity relationships,force relationship in orthogonal cutting, Merchant's circle diagram, forces on a single point tools in turning, stress and strain in the chip, work done in cutting, horse power calculation, popular metal cutting theories, estimation of machining time.

UNIT - II: TOOL MATERIALS AND ENGINE LATHE (9 periods)

Cutting tools: Types of cutting tool materials, tool failure, mechanism of wear, tool life, factors affecting tool life, machinability, dynamometers.

Engine lathe: Lathe and its principle of working, types of lathes, lathe specification and sizes, parts of a lathe, lathe accessories; Chucks, driving plates, dogs, tool holders and posts, centers, collets, rests, mandrels, jigs and fixtures, operations done on a lathe, standard and special operations, Lathe tool dynamometers, taper turning methods, thread cutting, estimation of machining time.

UNIT - III: SPECIAL MACHINES-I (7 periods)

Shaping, Slotting and Planning machines: Principles of working, principal parts, operations performed.

Drilling and Boring Machines: Working principle, types, operations performed, tool holding devices, twist drill, boring machines, fine boring machines, jig boring machine, deep hole drilling machine.

UNIT - IV: SPECIAL MACHINES-II (9 periods)

Grinding machine: Theory of grinding, classification, cylindrical and surface grinding machine, tool and cutter grinding machine, special types of grinding machines, grinding wheel, different types of abrasives, bonds, specification and selection of a grinding wheel, static and dynamic balancing of a wheel truing and dressing of wheels.

Lapping, Honing and Broaching machines: Comparison of grinding, lapping and honing.

UNIT - V: MILLING MACHINE, JIGS AND FIXTURES (9 periods)

Milling machines: Working principle in milling, types of column and knee type milling machines, milling machine attachments, milling methods, milling cutters, milling operations, indexing or dividing heads, plain, universal and optical dividing head, indexing methods, direct indexing, plain or simple indexing, compound indexing, differential indexing.

Jigs and fixtures: important considerations in jigs and fixture design, main principles of design of Jigs and fixtures, principle of six point location (3-2-1 principle), classification of jigs & fixtures, principles of location and clamping, types of clamping & work holding devices, typical examples of jigs and fixtures.

Total Periods: 45

TEXT BOOKS:

1. B.S.Raghuwansi, A course in Workshop Technology, Vol 1, Dhanpat Rai and Co(P) Ltd, New Delhi, 10th revised edition, 2014
2. Hazra Choudary S.K. and A.K., Workshop Technology, Vol II, Media Promoters

REFERENCE BOOKS:

1. C.Elanhezhian and M. Vijayan, Machine Tools, Anuradha Agencies Publishers.
2. Kalpakzian, Manufacturing Technology, Pearson
3. R.K. Jain and S.C. Gupta, Production Technology, Khanna Publishers.
4. G.R.Nagpal, Tool Engineering And Design, Khanna Publishsers, 2004.

III B.Tech - I Semester

14BT50305: DESIGN OF MACHINE ELEMENTS - I

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:
Engineering mechanics; strength of materials; computer aided machine drawing.

COURSE DESCRIPTION:
General considerations of design, design process; BIS codes of materials; Preferred numbers; Simple stresses, combined stresses; theories of failure; Fatigue; Stress concentration; Goodman's line; Soderberg's line; Design of riveted joints; Threaded joints; Shafts; Keys; Muff and split muff and flange couplings; Flexible couplings; Spigot and socket cotter join; Knuckle joint.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.

CO2: Analyze the mechanical properties and understand, identify and quantify failure modes for mechanical parts suggest means of rectification.

CO3: Address the issues of safety in design involving of threaded joint, riveted joint, shafts, keys, and couplings, cotter and knuckle joint etc.,

CO4: Provide environmentally safe and cost effective design solutions.

Detailed Syllabus :

UNIT - I: INTRODUCTION TO DESIGN AND STRESSES IN MACHINE ELEMENTS (9 Periods)

INTRODUCTION: Types of design, general considerations of design, design process; Selection of engineering materials, properties, manufacturing considerations in the design, BIS codes of materials, preferred numbers.

STRESSES IN MACHINE MEMBERS: Simple stresses,ombined stresses, torsional and bending stresses, impact stresses, stress-strain relation, various theories of failures, factor of safety.

UNIT-II: DESIGN FOR FLUCTUATING LOADS (7 Periods)

Stress concentration, notch sensitivity, design for fluctuating stresses fatigue failure, endurance limit, estimation of endurance strength, Goodman's line, Soderberg's line, design of components for finite and infinite life.

UNIT-III: DESIGN OF THREADED AND RIVETED JOINTS (11Periods)

THREADED JOINTS: Basic types of screw fastenings, cap screws and set screws, bolts of uniform strength, locking devices, I.S.O. metric screw threads, bolts under tension, eccentrically loaded bolted joint in shear, eccentric load parallel and perpendicular to the axis of bolts, and plane containing the bolts.

RIVETED JOINTS: Types of riveted heads, riveted joints; types of failure; efficiency of joint; Boiler shell riveting design and eccentrically loading design of riveted joints.

UNIT-IV: SHAFTS, KEYS AND COUPLINGS (11 Periods)

SHAFTS: Shaft design on the basis of strength, torsional rigidity and lateral rigidity, A.S.M.E. code for shaft design.

Design of Keys: Sunk, saddle, tangent, round, woodruff, splines, keyways.

COUPLINGS: Design of rigid couplings, sleeve or muff, split-muff or compression and flange couplings; Design of flexible couplings, bushed-Pin type flange coupling.

UNIT-V: DESIGN OF COTTERS AND KNUCKLE JOINTS (7 Periods)

DESIGN OF COTTER JOINTS: spigot and socket, sleeve and cotter, jib and cotter joints; Knuckle joint.

Total Periods: 45

TEXT BOOKS:

1. V. B. Bhandari, Design of Machine Elements, Tata McGraw-Hill, 3rd Edition, 2011.
2. R.S. Khurmi and J.K. Gupta, Machine Design, S. Chand, 14th Edition, 2012.

REFERENCE BOOKS:

1. Joseph E. Shigely, Mechanical Engineering Design, TMH, 9th Reprint Edition, 2011.
2. T. Krishna Rao, Design of Machine Elements, I K International, 1st Edition, 2008.
3. Kannaiah, Machine Design, Scitech, 3rd Reprint Edition, 2010.

NOTE: Design data books are not permitted in the examinations.

III B.Tech - I Semester

14BT50306: **AUTOMOBILE ENGINEERING**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Thermal Engineering-I, Thermal Engineering Lab.

COURSE DESCRIPTION:

Basic components and classification of automobiles; Fuel Supply System; Cooling System; Ignition System; Emissions from automobiles; Pollution control Techniques; Transmission System; Steering System; Suspension and Braking System.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Employ the basic knowledge in building chassis and the body of an automobile.

CO2: Analyze the transmission losses, fuel injection losses, steering geometry, heat losses and over steering of an automobile.

CO3: Present the probable solution in the design of mechanical, hydraulic, pneumatic, and vacuum braking systems, and low stress suspension systems, high pressure injection system of an auto mobile.

CO4: Develop the emissions-free automobiles and hybrid vehicles.

Detailed Syllabus:

UNIT- I: BASICS OF AUTOMOBILE (12 periods)

Classification of automobiles, components of a four wheeler automobile, chassis and body, rear wheel drive, front wheel drive, four wheel drive, turbo charging, super charging, oil filters, oil pumps, crank case ventilation.

FUEL SYSTEM: S.I engine: Fuel supply systems, mechanical and electrical fuel pump air and fuel filters, carburetor types, multipoint fuel injection, C.I. Engines: Requirements of diesel injection systems, types of injection systems, fuel pump, types of nozzles, nozzle spray formation, injection timing.

UNIT- II: COOLING & IGNITION SYSTEMS (10 periods)

Necessity of cooling system, cooling requirements, types, natural and forced circulation system: Thermostat, evaporative cooling system, types of radiators, cooling fan, water pump, antifreeze solutions, ignition system: Function of an ignition system, battery ignition system, magneto coil ignition system, electronic ignition system using contact breaker, capacitive discharge ignition system.

UNIT- III: EMISSIONS FROM AUTOMOBILES (8 periods)

Pollution standards: National and International, pollution control techniques for SI engines and CI engines, comparison of electronic catalytic converter and conventional catalytic converter, alternative energy sources for automobiles, emissions from alternative energy sources: Hydrogen, biomass, alcohols, LPG, CNG, bio-diesel, their merits and demerits.

UNIT- IV: TRANSMISSION & STEERING SYSTEMS (10 periods)

Types of clutches, cone clutch, single and multi plate clutch, centrifugal clutch; Types of Gear box: constant mesh, sliding mesh, synchromesh gear box; Layout of gear box; gear shifting mechanism; automatic transmission; propeller shaft, universal joint, differential, real axle arrangement, steering system: Requirements, and functions of steering system, Ackermann and Davis principle, steering gears; steering geometry, under steering, over steering, steering ratio, camber, caster, toe-in, toe out ; steering linkages; power steering, wheel alignment, balancing.

UNIT- V: SUSPENSION & BRAKE ACTUATING SYSTEMS (5 periods)

Requirements and functions of suspension system, elements of suspension systems; rigid axle suspension system, torsion bar, shock absorber, telescopic damper, independent suspension system. Brake actuating system: Need and functions of braking system; classification of brakes: Mechanical, Hydraulic, Pneumatic, Vacuum brake systems.

Total Periods: 45

TEXT BOOKS:

1. Dr. Kirpal Singh, Automobile Engineering, Vol.1& Vol.2, standard Publishers distributor, 12th edition, 2011.
2. R.K.Rajput, Automobile Engineering, Lakshmi Publication, 2nd edition 2014.

REFERENCE BOOKS:

1. K.K. Ramalingam, Automobile Engineering, Scitech Publication, reprint August 2013.
2. V.Ganesan, IC Engines, Tata McGraw-Hill, 3rd Edition, 2007.
3. Srinivasan, Automotive Engines, Tata McGraw-Hill Education, New Delhi, 1st edition, 2001.
4. V.M.Domkundwar, A course in internal combustion engines, Dhanpat Rai & Co, Reprint 2014.

III B.Tech - I Semester

14BT50321: **MACHINE TOOLS LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:
Metal cutting and Machine Tools.

COURSE DESCRIPTION:
Hands-on-practice on machine tools such as lathe, milling machine, drill press, power saw, surface grinder and other machine shop.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Employ knowledge of different machine tools used in machine shop.

CO2: Analyze machine tool problems and offer a qualitative assessment on problem solutions.

CO3: Identify different manufacturing techniques to produce complex shapes.

CO4: Manufacture simple parts using lathe/milling/drilling/shaper and other allied machine tools.

Any TWELVE experiments to be conducted.

1. Demonstration of construction & operations of general purpose machines: Lathe, drilling machine, milling machine, shaper, planning machine, slotting machine, cylindrical grinder, surface grinder and tool & cutter grinder.
2. Step turning operation.
3. Taper turning operation.
4. Eccentric turning operation.
5. Right hand threading.
6. Square threading.
7. Multiple operations on capstan lathe.
8. Drilling, reaming and tapping & external threading using die.
9. Shaping and planning operations.
10. Slotting operation.
11. Cylindrical surface grinding operation.
12. Gear cutting operation.
13. End milling operation.
14. Centerless grinding operation.
15. Grinding of tool angles on a cutting tool.

III B.Tech - I Semester
14BT50322: **THERMAL ENGINEERING LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:
Engineering Thermodynamics; Thermal Engineering.

COURSE DESCRIPTION:
Assembly and disassembly of an automobile models; Finding performance parameters of 2-stroke and 4-stroke engines; Heat balancing of an engine; Practicing valve and port timing diagrams; Determining friction power for single and multi-cylinder engines; Determining Fuel properties; Compressor performance.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Experimentally determine the performance of 2- stroke, 4-stroke I.C. engines, multi stage reciprocating compressor and blower.

CO2: Experimentally determine the conditions for maximizing efficiency w.r.t load and changes in compression ratio on load.

CO3: Provide solutions to reduce heat losses

CO4: Identify methods to reduce emissions of CO_X, NO_X and SO_X.

CO5: Report experimental results, calculations, and inferences systematically

LIST OF EXPERIMENTS

Any TWELVE experiments to be conducted.

1 (a) Valve Timing Diagram using a model of 4 -S Diesel, CI engine
(b) Port timing diagram of a model of 2-S , SI engine
2. Morse Test on 4-S, 4-C, Petrol Engine using Hydraulic Loading
3. Retardation Test on 4-S, 1-C, Diesel Engine using Electrical Loading
4. Performance Test on 2-S, 1-C, Petrol Engine using Electrical Loading
5. Economic speed test on 2-S, 1-C, Petrol Engine using Electrical Loading
6. Performance Test on 4-S, 1-C diesel Engine using Mechanical Loading
7. Heat Balance Test on 4-S, 1-C diesel Engine using Mechanical Loading
8. Performance Test on Variable Compression Ratio Engine (VCR Engine)
9. Motoring Test on Variable Compression Ratio Engine (VCR Engine)
10. Performance Test on Blower rig
11. Performance Test on 2-Stage Reciprocating Air compressor
12. Assembly and Disassembly of an IC engine components
13 (a) Bomb calorimeter for finding calorific value of solid and liquid fuel
(b) Junker's gas calorimeter for calorific value of gaseous fuel
14. Flue gas analysis for engine emissions
15. Performance test on Computerized 4-S, 1-C,C.I engine with electrical loading.

III B.Tech - II Semester

14BT5HS01: **MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY**

(Common to: CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Nil

COURSE DESCRIPTION:

Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1 : Acquire Knowledge in

a) Tools and concepts of Micro Economics.
b) Basic Principles and concepts of Accountancy.
c) Provides life skills for effective utilization of scarce resources.
d) Financial Accounting.
e) Using advanced tools like tally and SAP.
f) Significance of Economics and Accountancy

CO2: Develop skills in analyzing problems for

a) Managerial decisions of an organization.
b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.

CO3: Develop effective communication in Business and Accounting transactions.

Detailed syllabus:

UNIT -I: INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS: (9 Periods)

Definition, Nature and Scope of Managerial Economics. Demand: Determinants of demand - Demand function - Law of demand, assumptions and exceptions - Elasticity of demand -Types of elasticity of demand -Demand forecasting and methods of demand forecasting, Supply- Determinants of Supply and Supply function.

UNIT - II : THEORY OF PRODUCTION AND COST ANALYSIS (9 Periods)

Production Function: Isoquants and Isocosts - Input-output relationship - Law of returns. Cost Concepts: Total, Average and Marginal Cost - Fixed vs. Variable costs -Opportunity Costs Vs Outlay Costs- Separable Costs Vs Joint Costs, Urgent Costs Vs Postponable Costs- Avoidable Costs Vs Unavoidable Costs - Break Even Analysis (BEA)-Assumptions, Merits and demerits - Determination of Break Even Point (Simple problems).

UNIT - III : INTRODUCTION TO MARKETS AND PRICING (9 Periods)

Market Structure: Types of Markets - Features of perfect competition - Monopoly and monopolistic competition - Price and Output determination in perfect competition and monopoly.

Pricing : Objectives and policies of pricing - Sealed bid pricing - Marginal cost pricing - Cost plus pricing - Going rate pricing - Market penetration - Market skimming - Block pricing - Peak load pricing - Cross subsidization.

Capital: Significance - Types of capital - Sources of Capital.

UNIT - IV: INTRODUCTION AND PRINCIPLES OF ACCOUNTING (9 Periods)

Accountancy: Introduction - Concepts - Conventions - Accounting Principles - Double Entry Book Keeping - Journal - Ledger - Trial Balance (Simple problems).

UNIT - V : FINAL ACCOUNTS (9 Periods)

Introduction to Final Accounts - Trading account - Profit and Loss account and Balance Sheet with simple adjustments (Simple problems). Computerization of Accounting System : Manual Accounting Vs Computerized Accounting - Advantages and Disadvantages of Computerized Accounting.

Total periods: 45

TEXT BOOKS:

1. A.R. Aryasri, Managerial Economics and Financial Analysis, Tata Mc- Graw Hill, New Delhi, 3rd Edition, 2007.ISBN 13: 9780070078031.
2. R.Cauvery, U.K. Sudhanayak, M. Girija and R. Meenakshi, Managerial Economics, S. Chand and Company, New Delhi, 2nd Edition, 2010.ISBN13:

REFERENCE BOOKS:

1. Vershaney and Maheswari, Managerial Economics, Sultan Chand and Sons,New Delhi, 19th Edition, 2005.
2. H. Craig Petersen and W. Cris Levis, Managerial Economics, Pearson Education, 4th Edition, 2009 ISBN-13: 9786 2833
3. Lipsy and Chrystel, Economics, Oxford University Press, New Delhi, 12th Edition, 2011.ISBN 978-0-19-956338-8
4. S.P. Jain and K.L. Narang, Financial Accounting, Kalyani Publishers, Ludhiana, 6th Edition, 2002. ISBN 8127204242

III B.Tech - II Semester

14BT60301: **DESIGN OF MACHINE ELEMENTS -II**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Mechanics, Strength of materials, Design of Machine Elements

COURSE DESCRIPTION:

Study, analysis and design of machine components such as curved beams; mechanical springs; spur gears, helical gears; Journal bearings - anti friction bearings; internal combustion engine parts such as piston, crank and connecting rod; Safety and reliability consideration in machine design; detailed design to define the shape, size and material.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.

CO2: Identify and quantify failure modes for mechanical parts.

CO3: Provide innovative solutions/improvisation to improve trial designs.

CO4: Provide environmentally safe and cost effective design solutions

Detailed Syllabus:

UNIT - I: DESIGN OF CURVED BEAMS (9 Periods)

Stresses in curved beams; expression for radius of neutral axis for Rectangular, Circular, Triangular, Trapezoidal and T-Section; Design of crane hooks, C -clamps, Ring and chain link; Deflection of a closed ring, Chain link.

UNIT - II: BEARINGS (9 Periods)

Bearing materials; Types of Journal bearings; Lubrication; Bearing Modulus; McKee's equation; Static and Dynamic Load rating; Equivalent Radial Load; Bearing life; Design and Selection of Ball and Roller Bearings; Thrust Bearings, Foot-step and Pivot Bearings, Collar Bearing, bearing life.

UNIT - III: GEARS (10 Periods)

Classification of Gears; Condition for Constant Velocity, Ratio of Gears-Law of Gearing; Forms of Teeth; Systems of gear teeth; minimum number of teeth on the pinion in order to avoid Interference; Gear Materials; Design considerations for a Gear Drive; Beam Strength of Gear Teeth - Lewis Equation; Dynamic Tooth Load; Static Tooth Load; Wear Tooth Load; Causes of Gear Tooth Failure; Design Procedure for Spur Gears; Design of Shaft for Spur Gears; Face Width of Helical Gears; Strength of Helical Gears.

UNIT - IV: MECHANICAL SPRINGS (9 Periods)

Introduction - Classification of springs; Stress and deflections of helical springs; Springs for fatigue loading; Eccentric loading of springs; energy storage capacity in helical springs; Concentric springs; Design of leaf springs.

UNIT - V: I.C ENGINE PARTS (8 Periods)

Design of principal Parts of an I.C Engine: Piston, Cylinder, Connecting Rod and Crankshaft.

Total Periods: 45

TEXT BOOKS:

1: V. B. Bhandari, Design of Machine Elements, Tata McGraw-Hill, 3rd Edition, 2010.

2: R.S. Khurmi and J.K. Gupta, Machine Design, S. Chand, 14th Edition, 2012.

REFERENCE BOOKS:

1: Joseph E. Shigley, Mechanical Engineering Design, TMH Publishers, 9th Edition, 2011.

2: T. Krishna Rao, Design of Machine Elements, I K International, 1st Edition 2008.

3: Balaveera Reddy & Mahadevan, Design Data Handbook for Mechanical Engineers, CBS publishers, 4th Edition, 2013.

NOTE: Design data book should be supplied during examinations(Reference Book No.3).

III B.Tech - II Semester

14BT60302: **OPERATIONS RESEARCH**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Mathematics, Matrices and Numerical Methods.

COURSE DESCRIPTION:

Quantitative methods and techniques for effective decision making; model formulation and applications pertinent to business decision problems; mathematical tools for solving deterministic problems, linear programming formulation and optimization; transportation models; queuing models and simulation; network models; game theory application.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Identify mathematical model to employ in a given application requiring optimization.

CO2: Analyze a practical situation and formulate appropriate objective function and constraints.

CO3: Apply concepts of operations research to maximize the efficiency and minimize the wastage in select situations.

Detailed Syllabus:

UNIT - I: LINEAR PROGRAMMING (10 Periods)

Requirements of Linear Programming Problem; Formulation of linear programming problems; Graphical solution; Linear Programming special cases: infeasible solution, unboundedness, redundancy, alternate optimal solutions; Simplex method, Two-phase method, Big-M method; Dual formulation, Dual simplex method.

UNIT - II: TRANSPORTATION AND ASSIGNMENT MODELS (10 Periods)

Transportation model, Initial solution methods: north-west corner rule, least cost method and Vogel's approximation method; Modified distribution (MODI) method of optimal solution; special cases of transportation problems; Transshipment problem; Assignment model: Hungarian method of optimal solution, Variants of Assignment Problem; Travelling salesmen problem.

UNIT - III: NETWORK MODELS (9 Periods)

Minimal spanning tree, maximal flow and shortest route techniques; Project management through network analysis: CPM, PERT, cost analysis and crashing.

UNIT -IV: WAITING LINES AND SIMULATION (8 Periods)

Single Channel - Poisson arrivals - exponential service times - with non finite queue length model; Multichannel - Poisson arrivals - exponential service times with non finite queue length model; Simulation: Monte Carlo simulation, simulation of a waiting line problem, simulation and inventory analysis, simulation model for a maintenance policy, verification and validation.

UNIT - V: DECISION ANALYSIS AND GAMES (8 Periods)

Types of decision making environment; decision making under risk: Expected value of perfect information and imperfect information, and decision tree; decision making under uncertainty: Hurwicz criterion, Laplace criterion, and Savage criterion; Two person zero sum games: Minimax (maximin) Criterion and optimal strategy, Solution of games with saddle points, Rectangular games without saddle points, 2 x 2 games, dominance principle, Graphical method: m x 2 and 2 x n games.

Total Periods : 45

TEXT BOOKS:

1. J.K. Sharma, Operations Research: Theory and Applications, Macmillan, New Delhi, 5th Edition, 2013.
2. Hamdy A Taha, Introduction to Operations Research, Pearson India, 9th Edition, 2014.
3. Kanti Swarup, P.K. Gupta, Manmohan, Operations Research, Sultan Chand & Sons, 2014.

REFERENCE BOOKS:

1. Hillier, Libermann, Introduction to Operations Research, McGraw Hill Education (India) Private Limited, 9th Edition, 2011.
2. Wayne L. Winston, Operations Research: Applications and Algo- rithms, Thomson Brooks/Cole, 4th Edition(India Edition), 2007.
3. R.Panneerselvam, Operations Research, PHI Learning Pvt. Ltd., 2nd Edition, 2012.

III B.Tech - II Semester

14BT60303: **HEAT TRANSFER**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Mathematics, Thermodynamics, and Fluid Mechanics.

COURSE DESCRIPTION:

Heat transfer concepts of conduction, convection, and radiation; One- dimensional steady and transient conduction; Analysis of extended surfaces; Convection heat transfer for both free and forced convection regimes; boiling and condensation ; Heat exchangers; general characteristics of radiation; properties of radiating surfaces and radiative heat exchange between surfaces.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Employ knowledge of Mathematics and Heat transfer in solving heat transfer problems and building mathematical models for further analysis.

CO2: Analyze the various heat transfer problems and provide numeri- cal solutions.

CO3: Provide preliminary heat transfer calculations needed for detailed system design.

CO4: Identify societal applications of heat transfer and provide solutions.

Detailed Syllabus:

UNIT - I: BASICS AND CONDUCTION HEAT TRANSFER

(9 periods)

Basics of Heat Transfer: Modes and Mechanism of heat transfer, Conduction, convection and radiation; General differential equation of heat conduction: Cartesian, Cylindrical and Spherical Coordinates; Boundary and Initial Conditions; One dimensional steady state heat conduction: Conduction through plane wall, cylinders and spherical systems; Composite systems; Critical thickness of insulation.

UNIT - II: FINS AND TRANSIENT HEAT CONDUCTION

(9 Periods)

Extended surfaces: Efficiency, Effectiveness and Temperature distribution on Long Fin, Fin with Insulated Tip and Short Fin; Unsteady heat conduction: Lumped heat analysis, Infinite and semi infinite solids.

UNIT - III: CONVECTION HEAT TRANSFER (9 Periods)

Hydrodynamic and thermal boundary layer theory, Dimensional analysis, Buckingham's –theorem applied to free and forced convection heat

transfer. Forced convection: External flow over plates, cylinders and spheres; Internal flow through Horizontal pipe, Annular pipe; Free convection: Flow over vertical plate, horizontal plate, and cylinders.

UNIT - IV: HEAT EXCHANGERS AND PHASE CHANGE HEAT TRANSFER (9 Periods)

Heat Exchangers: Classification of Heat Exchangers, Overall Heat Transfer Coefficient and Fouling Factor; Concepts of LMTD and NTU Methods.

Boiling: Pool Boiling Regimes, Determination of Heat Transfer Coefficient in Nucleate Boiling, Critical Heat Flux and Film Boiling; Condensation: Filmwise and Dropwise Condensation, Nusselt's Theory of Condensation on a Vertical Plate.

UNIT - V: RADIATION HEAT TRANSFER (9 Periods)

Fundamentals of Radiation: Emission Characteristics and Laws of Black Body Radiation; Irradiation, Total and Monochromatic radiation; Laws of Planck, Wien's displacement, Kirchoff, Lambert's cosine, Stefan and Boltzmann. Radiative Heat Exchange: Heat Exchange between Two Black Bodies, Concepts of Shape Factor, Emissivity, Heat Exchange between Gray Bodies, Radiation Shields.

Total Periods: 45

TEXT BOOKS:

1: R.C. Sachdeva, Fundamentals of Engineering Heat and Mass Transfer, New Age International, 4th Edition, 2014.

2: R.K.Rajput, Heat and Mass Transfer, S.Chand & Company Ltd, 6th Edition, 2015.

REFERENCE BOOKS:

1: P.K.Nag, Heat Transfer, TMH, 2nd Edition, 2010.

2: Holman.J.P, Heat Transfer, TMH, 9th Edition, 2010.

3: Incropera, Fundamentals of Heat Transfer, Wiley India, 6th Edition, 2012.

4: Yunus Cengel, Heat and Mass Transfer, Mc Graw Hill Publications, 4th Edition, 2014.

5: C.P Kothandaraman, Fundamentals of Heat and Mass Transfer, New Age International, 4th Edition, 2014.

6: C.P Kothandaraman and S.Subramanyan, Heat and Mass Transfer data book, New Age International, 8th Edition, 2014.

Note: Heat Transfer data books should be supplied during examinations (Reference Book No.6).

III B.Tech - II Semester

14BT60304: **CAD/CAM**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Computer Aided Engineering Drawing, Computer Aided Machine Drawing, Manufacturing Technology.

COURSE DESCRIPTION:

Fundamental and conventional CAD processes, Raster scan graphics co-ordinate system, 3D transformations, Geometric construction models, Curve representation methods, Conventional Numerical Control, Computer Control in NC, GT, CAPP, CIMs, CAQC.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Use the concepts of CAD/CAM to generate a suitable geometric model of an object.

CO2: Analyze the features on an object and develop process planning chart/ part program.

CO3: Use popular drafting packages to develop geometric models of parts and their assemblies.

CO4: Use computer aided quality control methods to detect manufacturing errors during inspections.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO CAD/CAM (8 Periods)

CAD/CAM: Introduction, Computers in Industrial manufacturing, Design process, CAD/CAM & CIM, CAD/CAM Hardware (Basic Structure, CPU, Memory Types, Storage Devices, Display devices, Software & System Configuration), CAD/CAM: Applications, Advantages & Disadvantages.

CAD STANDARDS: Objectives, Standardization in graphics, graphical kernel system, Other graphic standards.

UNIT - II: COMPUTER GRAPHICS & GEOMTERIC MODELING (14 Periods)

Computer Grapics: Raster Scan Graphics Coordinate system, Line Drawing Algorithms: DDA Algorithm, Bresenham's Line algorithm, 2D &3D Transformations (Scaling, Translation, Rotation & Reflection).

GEOMETRIC MODELING: Need & Requirement of Geometric Modeling, Curve Representation methods :(Line & circle), Types of models: Introduction to wireframe modeling, synthetic curves and its representation (Bezier & B-spline), Introduction to Surface modeling, synthetic curves and its representation(Nurbs, Bezier & B-spline), Introduction to Solid Modeling and representation of B-rep & CSG.

UNIT - III: INTRODUCTUION TO COMPUTER NUMERICAL CONTROL (7 Periods)

Computer Numerical Control: Introduction, Numerical Control, Numerical control modes, Numerical Control elements, NC machine tools, Structure of CNC machine tools, Automatic tool changers, CNC Machining centres, CNC Turning centres, Machine control unit.

CNC Programming: Part Programming fundamentals, Manual part programming methods, Computer Assisted Part Programming.

UNIT - IV: GROUP TECHNOLOGY & PROCESS PLANNING (7 Periods)

Group Technology: Introduction, Part Family, Classification and Coding, Three Parts classification and coding systems (Opitz, MICLASS, CODE), Group Technology Cells, Benefits of Group Technology.

CAPP: Planning Function, Types of Process Planning (Retrieval & Generative), Benefits of Computer Aided Process Planning.

UNIT - V: CIMs & CAQC (9 Periods)

Computer Intigrated Manufacturing System: Introduction, Types of Manufacturing System, Machine Tools and Related Equipments, Material Handling System, Computer Control System, Human Labor in Manufacturing System, CIMS Benefits.

Computer Aided Quality Control: Introduction, Terminology in quality control, Computers in Quality Control, Contact & Non-Contact inspection methods, Statistical Quality control, Integration of CAQC with CAD/CAM.

Total Periods: 45

TEXT BOOKS:

1: P.N. Rao, CAD/CAM: Principles and Applications, TMH, 2004.

2: Mikell P.Groover, Computer Aided Design & Computer Aided Manufacturing, Pearson Education, 2006.

REFERENCE BOOKS:

1: Ibrahim Zeid, CAD/CAM Theory and Practice, Mc Graw Hill,2010.

2: Radhakrishnan and Subramaniah, CAD/CAM/CIM, New Age International, 2004.

III B.Tech - II Semester

14BT6HS01: **BANKING AND INSURANCE**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE -REQUISITE:

Managerial Economics and Principles of Accountancy

COURSE DESCRIPTION:

Origin and growth of Banking, functions and importance, RBI; Debtor and Creditor relationship, Types of Accounts, Loans and Advances; e-payment, e-cash ,NEFT, RTGS, Credit and Debit cards; Insurance elements and risk; LIC, GIC, IRDA.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Acquire Knowledge in

a) Tools and concepts of Banking and Insurance.
b) Basic Principles and concepts of Insurance and Banking.
c) Provides life skills for effective utilization of Banking and Insurance facilities.
d) e-fund transfers, e-payments and e-business models.

CO2: Develop analytical skills in understanding problems pertaining to

a) Online banking and e - payments..
b) Risk anagement through insurance benefits the society at large.
c) money management by leveraging on technology, banking and insurance services.

Detailed Syllabus:

UNIT - I : INTRODUCTION TO BANKING (9 Periods)

Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT - II : BANK-CUSTOMER RELATIONSHIP (9 Periods)

Debtor-creditor relationship, anti money laundering, products or services, payment and collection of cheques and other negotiable instruments. Accounts - Types of accounts, procedure for opening and closing an account. Loans and Advances- principles of lending, types of loans.

UNIT - III : BUSINESS MODELS AND ELECTRONIC PAYMENT SYSTEM (9 Periods)

Features, types of e-payment system, e-cash, NEFT, RTGS, Electronic purses, Credit and Debit cards. Business models- B2B, B2C, C2C, and B2G.

UNIT - IV : INTRODUCTION TO INSURANCE (9 Periods)

Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT - V : INSURANCE OVERVIEW (9 Periods)

Principles of insurance, insurance types, LIC & GIC insurance contract- nature, elements, functions, IRDA, Insurance Players in India.

Total periods : 45

TEXT BOOKS:

1. A.V. Ranganadha Chary, R.R. Paul- Banking and Financial system, Kalyani Publisher, New Delhi, 2nd Edition.
2. P.K.Gupta- Insurance and Risk Management, Himalaya Publishing House, New Delhi, ISBN: 9789350516676

REFERENCE BOOKS:

1. Diwan, Praq and Sunil Sharma: Electronic Commerce- A Manager's Guide to E-Business, Vanity Books International, Delhi,2002. ISBN-13: 978- 8174462039
2. Kalakota Ravi and Whinston Andrew B: Frontiers of Electronic Commerce, Pearson Education India, 1996 New Delhi. ISBN: 978-81-7758-392-2
3. Schneider, Grey P: Electronic Commerce, Course Technology, Cengage Learning, 2008, 8th Edition, New Delhi. ISBN-13:978-1-4239-0305-5.

III B.Tech - II Semester

14BT6HS02: **COST ACCOUNTING AND FINANCIAL MANAGEMENT**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: Concept of Risk and Returns on Investment.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Acquire Knowledge in

a) Elements of Costing.
b) Basic concepts of Financial Management.
c) Risk and Return
d) Financial Accounting.
e) Using advanced tools like tally and SAP.
f) Significance of Economics and Accountancy

CO2: Do cost, risk and return of investment analysis.

CO3: Develop skills in providing solutions for

a)Material, Labor, Overheads control.
b) Excellence and ability to minimize the cost of the organization
c) Effective investment decisions

CO4: Prepare cost sheets pertaining to manufacturing of products.

Detailed Syllabus:

Unit I : INTRODUCTION TO COST ACCOUNTING (9 Periods)

Cost and Cost Accounting, Scope, Objectives, Advantages and disadvantages -Cost Accounting Vs Management Accounting - Elements of Costing -Installation of costing system - Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

Unit II: COST ANALYSIS (9 Periods)

Analysis of Cost - Preparation of cost sheet, estimate, tender and quotation (Simple problems) - Importance of Costing while pricing the products.

Unit III: STANDARD COSTING (9 Periods)

Introduction to Standard Costing & Variances - Variance Analysis: Material variances, Labor variances (Simple Problems).

Unit IV : FINANCIAL MANAGEMENT (9 Periods)

Financial Management-Meaning and Scope, Liquidity, Profitability, Financial Statement Analysis through ratios (Simple Problems).

Unit V: RISK AND RETURNS ON INVESTMENT (9 Periods)

Investment-Meaning and Definition- concept of risk and returns- Investment Alternatives- Introduction to Behavioral Finance - Anomalies -Key Concepts -Anchoring - Mental Anchoring-Confirmation and Hindsight Bias-Gambler's Fallacy-Herd Behavior-Over Confidence-Overreaction and Availability Bias-Prospect Theory.

Total periods : 45

TEXT BOOKS:

1. S.P. Jain and K.L. Narang: Cost Accounting, Kalyani Publishers, Ludhiana, 6th Edition, 2002.
2. James C Van Horne, Financial Management and Policy, Prentice-Hall of India/Pearson, 12th Edition, 2001 ISBN-10: 0130326577

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, Cost and Management Study Material, New Delhi.
2. I.M. Pandey, Financial Management, Vikas Publishing House Pvt. Ltd., 10th Edition, 2010, ISBN-13 9788125937142.

III B.Tech - II Sem

14BT6HS03: **ENTREPRENEURSHIP FOR MICRO SMALL AND MEDIUM ENTERPRISES**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Acquire Knowledge in
- a) Schemes and institutions encouraging entrepreneurship.
- b) Basic Principles and concepts of Accountancy.
- c) Significance of entrepreneurship.

CO2: (i) Develop analytical skills in understanding problems pertaining to
- a) Personal excellence through financial and professional freedom.
- b) Women entrepreneurship acts as contrivance in the societal development

(ii) Develop Critical thinking and evaluation ability.

CO3: Generate ideas for formulating business plans.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO ENTREPRENEURSHIP DEVELOPMENT (9 Periods)

Concept of Entrepreneurship - Growth of Entrepreneurship in India - Factors affecting entrepreneurship growth - Characteristics of an Entrepreneur - Functions of Entrepreneur - Need for an Entrepreneur - Entrepreneurial Decision Process - Types of Entrepreneurs - Distinction between an Entrepreneur and a manager - Intrapreneur - Entrepreneur Vs Intrapreneur.

UNIT-II: IDEA GENERATION AND FORMULATION OF BUSINESS PLANS (9 Periods)

Sources of Ideas - Methods of idea generation - - Product Identification - Opportunity Selection - Steps in Setting up of a Small Business Enterprise - Contents Of Business Plans - Significance - Formulation of Business Plan - Business Opportunities in Various Sectors - Common Errors in Business Plan Formulation - Project Report Preparation.

UNIT - III: MICRO AND SMALL ENTERPRISES (9 Periods)

Meaning and Definition - Micro and Macro units - Essentials - Features - Characteristics - relationship between Micro and Macro Enterprises - Rationale behind Micro and Small Enterprises - Scope of Micro and Small Enterprises - Objectives of Micro Enterprises - Problems of Micro and Small Enterprises

UNIT - IV: INSTITUTIONAL FINANCE AND SUPPORT TO ENTREPRENEUR (9 Periods)

Need for Institutional Finance - Commercial Banks – Industrial Development Bank of India (IDBI) - Industrial Finance Corporation of India Ltd. (IFCI) - Industrial Credit Investment Corporation of India Ltd. (ICICI)- State Financial Corporations (SFCs) - State Industrial Development Corporations (SIDCs) - Small Industries Development of Bank of India (SIDBI) -- Need For Institutional Support - National Small Industries Corporation Ltd (NSIC) - Small Industries Development Organisation (SIDO) - Small Industries Service Institutes (SISIs) - District Industries Centres (DICs) - National Institute of Entrepreneurship and Small Business Development (NIESBUD) - Technical Consultancy Organizations (TCOS)(Origin, Mission, and credit facility/support).

UNIT -V: WOMEN ENTREPRENEURSHIP (9 Periods)

Concept of Women entrepreneur - Functions of Women entrepreneurs - Growth of women entrepreneurship in India - Challenges of Women entrepreneurs- Programmes supporting women entrepreneurship - Rural Entrepreneurship - Meaning, Need for Rural entrepreneurship, Problems of rural entrepreneurship, Role of NGOs.

Total periods : 45

TEXT BOOKS:

1. Dr.S.S.Khanka, Entrepreneurial Development, S. Chand and Company Ltd, Revised Edition, 2012. ISBN: 9788121918015
2. Madhurima Lall & Shikha Sahai, Entrepreneurship, Excel Books India, 2nd Edition 2008. ISBN : 9789350620953

REFERENCE BOOKS:

1. Nandan, H., Fundamentals of Entrepreneurship, PHI Learning Pvt. Ltd., 2013, New Delhi, 3rd edition 2013. ISBN: 9788120347502
2. Vasanth Desai, "The Dynamics of Entrepreneurial Development and Management", Himalaya Publishing House, 4th edition 2009. ISBN: 9788183184113
3. Bholanath Dutta, Entrepreneurship Management - Text and Cases, Excel Books, 1st edition 2009. ISBN: 9789350621257

III B.Tech - II Semester

14BT70105: **DISASTER MITIGATION AND MANAGEMENT**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: Environmental Sciences

COURSE DESCRIPTION:

Natural disasters and hazards - Earthquakes - Floods and cyclones, droughts - Landslides - Disaster management.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Explain various types of disasters and mitigation strategies

CO2: Analyze and interpret the Guidelines for hazard assessment and vulnerability analysis

CO3: Use historical data of disaster losses and inform the people over preparedness

CO4: Address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society

CO5: Function in multidisciplinary teams for the effective displacement of people during disasters

UNIT - I: (8 Periods)

INTRODUCTION: Types of disasters - Natural disasters - Impact of disasters on environment - Infrastructure and development - Concepts of hazards and vulnerability analysis- Hazard Assessment - Guidelines for hazard assessment and vulnerability analysis - Basic principles and elements of disaster mitigation

UNIT -II: (11 Periods)

EARTHQUAKES : Introduction to earthquakes - Intensity scale (MSK-64) - Seismic activity in India - Seismic zones of India - Earthquakes in A.P. - Action plan for earthquake disaster preparedness - Elements at risk, recovery and rehabilitation after earthquake - Earthquake resistant design and construction of buildings. Tsunami - Onset, types and causes - Warning - Element at risk - Typical effects - Specific preparedness and mitigation strategies

UNIT - III: (11 Periods)

FLOODS AND CYCLONES: Onset, types, warnings - Elements at risk - Typical effects - Indian floods and cyclones - Hazard zones - Potential for reducing hazards - Mitigation strategies and community based mitigation.

DROUGHTS: Onset, types and warning - Kinds of droughts - Causes of droughts - Impact of droughts - Early warning and response mechanisms - Mitigation strategies - Droughts in India.

UNIT -IV: (7 Periods)

LANDSLIDES: Onset, types and warning - Causes of landslides - Elements at risk - Indian land slides - Hazards zones - Typical effects - Mitigation strategies and community based mitigation

UNIT -V: (8 Periods)

DISASTER MANAGEMENT: Disaster management organization and methodology - Disaster management cycle - Disaster management in India - Typical cases - Cost-benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Total Periods: 45

TEXT BOOKS:

1. V.K. Sharma, Disaster Management, National Centre for Disaster Management, IIPE, 1999.
2. A.S. Arya, Anup Karanth, and Ankush Agarwal, Hazards, Disasters and Your Community: A Primer for Parliamentarians, GOI-UNDP Disaster Risk Management Programme, 2005.

REFERENCE BOOKS:

1. Disaster Management in India, A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, August 2004.
2. R. B. Singh Natural Hazards And Disaster Management, Rawat Publications, 2009.
3. Pardeep sahni, Alka Dhameja, Uma Medury Disaster Mitigation, 4th Edition, PHI Learning Pvt. Ltd., 2011.
4. Sanjay K. Sharma Environment Engineering and Disaster Management, 1st Edition, USP Publishers, 2011.

III B.Tech - II Semester

14BT70106: **ENVIRONMENTAL POLLUTION AND CONTROL**

(OPEN ELECTIVE)

(Common to CSE,IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Environmental Sciences

COURSE DESCRIPTION: Introduction, Sources and Effects of Air Pollution - Dispersion of Pollutants and their control - Surface and Ground Water Pollution and control-Soil Pollution and remediation-Management of Municipal Solid Wastes.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Explain various pollutants, characteristics and their dispersion

CO2: Analyze the major pollutants that causes environmental pollution.

CO3: Conduct research and select suitable techniques to control pollution.

CO4: Understand the effects of environmental pollutions on human beings and vegetation

CO5: Communicate the methods of management and control of environmental pollution

Detailed Syllabus:

UNIT- I: (8 Periods)

INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS: Scope - Air Pollutants - Classifications - Natural and Artificial - Primary and Secondary, Point and Non- Point, Line and Area Sources of Air Pollution - Stationary and Mobile Sources - Dispersion of Pollutants - Dispersion Models - Applications.

UNIT -II: (9 Periods)

EFFECTS AND CONTROL OF PARTICULATES: Effects of Air Pollutants on Man, Material and Vegetation - Global Effects of Air Pollution - Green House Effect, Heat Island, Acid Rains, Ozone Holes - Control of Particulates - Control at Sources - Process Changes - Equipment Modifications - Design and Operation of Control Equipment - Settling Chambers - Centrifugal Separators - Bag Filters, Dry and Wet Scrubbers - Electrostatic Precipitators.

UNIT-III: (10 Periods)

WATER POLLUTION: Introduction-Water Quality in Surface Waters - Nutrients - Controlling Factors in Eutrophication-Effects of Eutrophication - Ground Water Pollution - Thermal Pollution - Marine Pollution - Sewage Disposal in Ocean - Types of Marine Oil Pollution - Cleanup of Marine Oil Pollution - Control of Water Pollution - Case Study on Tanneries - Drinking Water Quality Standards.

UNIT-IV: (9 Periods)

SOIL POLLUTION: Soil Pollutants - Sources of Soil Pollution - Causes of Soil Pollution and their Control - Effects of Soil Pollution-Diseases Caused by Soil Pollution - Methods to Minimize Soil Pollution - Effective Measures to Control Soil Pollution - Case Study on Fertilizer.

UNIT-V: (9 Periods)

MUNICIPAL SOLID WASTE MANAGEMENT: Introduction - Types of Solid Wastes - Principles of Excreta Disposal - Domestic Solid Waste - Production Collection of Solid Wastes - Transport of Solid Wastes - Management of Solid Wastes - Methods of Land Disposal - Sanitary Landfill - Composting - Incineration.

Total Periods: 45

TEXT BOOKS:

1. C.S.Rao, Environmental Pollution Control Engineering, 2nd Edition, New Age International Pvt Ltd., 2007.
2. Y.Anjaneyulu, Introduction to Environmental Science, 1st Edition, BS Publications., 2009.

REFERENCE BOOKS:

1. M.N. Rao and H.V.N. Rao, Air Pollution, 19th Edition, Tata McGraw-Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, Fundamentals of Air Pollution, 5th Edition, Academic Press (Elsevier), 2014.
3. S.M.Khopkar , Environmental Pollution Monitoring and Control, 2nd Edition, New Age International Pvt Ltd., 2007.
4. S.Deswal and K.Deswal, Environmental Science, 2nd Edition, Dhanpat Rai & Co, 2011.

III B.Tech - II Semester

14BT70107: **CONTRACT LAWS AND REGULATIONS**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION: Construction Contracts - Tenders - Arbitration - Legal Requirements - Labour Regulations.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Explain contract documents and tendering processes.

CO2: Analyze the legal issues in arbitration and in contracts documents.

CO3: Address the legal issues in collecting taxes.

CO4: Follow ethics while bidding, sale and purchase of property.

CO5: Develop and Prepare tender documents as per the standards.

UNIT- I: (9 Periods)

CONSTRUCTION CONTRACTS: Indian Contracts Act - Elements of Contracts - Types of Contracts - Features - Suitability - Design of Contract Documents - International Contract Document and laws - Standard Contract Document - Law of Torts.

UNIT-II: (9 Periods)

TENDERS: Prequalification - Bidding - Accepting - Evaluation of Tender from Technical, Contractual and Financial Points of View - Two Cover System - Preparation of the Documentation - Contract Formation and Interpretation - Potential Contractual Problems - Price Variation Clause - Comparison of Actions and Laws - Subject Matter - Violations.

UNIT-III: (9 Periods)

ARBITRATION: Arbitration - Comparison of Actions and Laws - Agreements - Appointment of Arbitrators - Conditions of Arbitration - Powers and Duties of Arbitrator - Rules of Evidence - Enforcement of Award - Arbitration Disputes - Dispute Review Board.

UNIT-IV: (9 Periods)

LEGAL REQUIREMENTS: Legal Requirements for Planning - Property Law - Agency Law - Tax Laws - Income Tax, Sales Tax, Excise and Custom Duties - Local Government Approval - Statutory Regulations -Insurance and Bonding - Laws Governing Purchase and Sale - Use of Urban and Rural Land - Land Revenue Codes - EMD - Security Deposits - Liquidated Damages.

UNIT-V: (9 Periods)

LABOR REGULATION: Social security-Welfare legislation-Laws relating to wages, bonus and industrial disputes-Labor administration-insurance and safety regulations-workmen-compensation act-meternity benefit act-other labour laws.

Total Periods: 45

TEXT BOOKS

1. G.C.V. Subba Rao Law of Contracts I & II, 11th Edition, S.Gogia & Co., 2011.
2. Jimmie Hinze, Construction Contracts, 2nd Edition, Mc Graw Hill, 2001.

REFERENCE BOOKS

1. Gajaria G.T, Kishore Gajaria, Laws Relating to Building and Engineering Contracts in India, 4th Edition, Lexis Nexis Butterworths India, 2000.
2. B. S. Patil, Civil Engineering Contracts and Estimates, 3rd Edition, University Press (India) Private Ltd., 2013.
3. Joseph T. Bockrath, Contracts and the Legal Environment for Engineers and Architects, 7th Edition, McGraw Hill Education, 2010.
4. Akhileshwar Pathak, Contract Law, 1st Edition, Oxford University Press, 2011.

III B.Tech - II Semester

14BT70108: **PLANNING FOR SUSTAINABLE DEVELOPMENT**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION: Introduction to Sustainable Development - Environment, Sciences and Sustainability - Sustainable Development Politics and Governance - Tools, Systems and Innovations for Sustainability - Communication and Learning for Sustainability.

COURSE OUTCOMES:

On completion of this course, a successful student will be able to:

CO1: Demonstrate the knowledge of planning, environment, tools and systems for sustainable development

CO2: Analyze the current challenges to sustainability.

CO3: Use theoretical frameworks and provide solutions to the real world sustainability issues.

CO4: Conduct awareness of contemporary issues on globalization in terms of sustainability.

CO5: Give recommendations for the sustainability issues and solutions using a holistic approach .

CO6: Explain a sense of civic responsibility, including reflection on the student's own role in developing and nurturing sustainable. communities.

CO7: Participate in decision making as individual and responsible for collective decision.

UNIT-I: (8 Periods)

INTRODUCTION TO SUSTAINABLE DEVELOPMENT: Definition and Concepts of Sustainable Development - Capitalization of Sustainability - National and Global Context - The Millennium Development Goals - Emergence and Evolution of Sustainability and Sustainable Development - Theories of Sustainability - Case Studies

UNIT- II: (8 Periods)

ENVIRONMENT, SCIENCES AND SUSTAINABILITY: Climate Change - Science, Knowledge and Sustainability - Unforeseen Environmental Impacts on Development - Challenges of Sustainable Development - Centrality of Resources in Sustainable Development - Case Studies

UNIT -III: (10 Periods)

SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE: Governance and Democracy and Eco-Welfare - Global Civil Society and World Civil Politics - Civic Environmentalism - Policy Responses to Sustainable Development - Economics of Sustainability - Social Responsibility in Sustainability - National Action

UNIT-IV: (11 Periods)

TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY: Need for System Innovation - Transition and Co-Evolution - Theories and Methods for Sustainable Development - Strategies for Eco-Innovation - Ecological Foot Print Analysis - Socio Ecological Indicators - Eco Labels- Policy Programmes for System Innovation - Case Studies

UNIT V (8 Periods)

COMMUNICATION AND LEARNING FOR SUSTAINABILITY: Role of Emerging Media - Remarkable Design and Communication Art, Activism and the Public Interest - Education for Sustainability - Participation in Decision Making - Critical Thinking and Reflection - Case Studies

Total Periods: 45

TEXT BOOKS:

1. John Blewitt, Understanding Sustainable Development, Earth Scan Publications Ltd., 2nd Edition, 2008.
2. Jennifer A. Elliot, An Introduction to Sustainable Development, Earth Scan Publications Ltd., 4th Edition, 2006.

REFERENCE BOOKS:

1. Peter Rogers, Kazi F Jalal , John A Boyd, An Introduction to Sustainable Development, Earth Scan Publications Ltd., 1st Edition, 2006.
2. Simon Dresner, The Principles of Sustainability, Earth Scan Publications Ltd., 2nd Edition, 2008.
3. Peter Bartelmus, Environment Growth and Development: The concepts and strategies of sustainability, Routledge, 3rd Edition, 2003.
4. Gabriel Moser, Enric Pol, Yvonne Bernard, Mirilia Bonnes, Jose Antonio Corraliza, Maria Vittoria Giuliani, People places and sustainability, Hogrefe & Huber Publishers, 2nd Edition, 2003.

III B.Tech -II Semester

14BT70109: **RURAL TECHNOLOGY**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION: Research & Development - Non Conventional Energy - Community Development - IT Management

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Acquire the knowledge of various nonconventional energy systems and technologies for rural development.

CO2: Apply the principles of IT for the rural development.

CO3: Responsible for the development of technologies in rural areas.

CO4: Understand the impact of technologies in societal and environmental aspects.

UNIT-I: (9 Periods)

RESEARCH & DEVELOPMENT: India - Ancient Indian Technologies - Rural India Life - Indian Farmer - Role of Science and Technology in Rural Development - Rural Technology and Poverty Eradication - Rural Business Hubs - Technology in improving rural infrastructure - Various organizations related to innovation - Issues of technology transfer: CAPART, NABARD, CSIR, NIF.

UNIT- II: (9 Periods)

NON CONVENTIONAL ENERGY: Definition of Energy, Types of alternative sources of energy, Sources of non conventional energy - Solar energy - Solar Cooker - Solar Heater - Biogas - Recycling and Management and Wastes Conservation - Assessment & Production of biomass products & their utilization.

UNIT -III: (9 Periods)

TECHNOLOGIES FOR RURAL DEVELOPMENT: Food & Agro based technologies - Tissue culture - Building and Construction technologies - Cultivation and processing of economic plants - Cottage and social Industries.

UNIT IV (9 Periods)

COMMUNITY DEVELOPMENT: Water conservation - Rain water Harvesting - Drinking water - Environment and Sanitation - Bio fertilizers - Medical and Aromatic plants - Employment generating technologies - Apiculture - Piciculture - Aquaculture.

UNIT -V: (9 Periods)

IT IN RURAL DEVELOPMENT: The Role of Information Technology in Rural Areas - Impact of Information Technology in Rural development - Need and Necessity of Technology - Corporate Social Responsibilities - Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and Saansad Adarsh Gram Yojana (SAGY) - village adoptions schemes.

Total Periods:45

TEXT BOOKS:

1. M.S Virdi, Sustainable Rural Technologies, Daya Publishing House, New Delhi, 1st Edition, 2009.
2. S.V. Prabhath & P. Ch. Sita Devi, Technology and Rural India, Serials Publications, New Delhi, 1st Edition, 2012.

REFERENCE BOOKS:

1. P. R. S. Murthy, R.C. Chackravarthy, Information Technology & Rural Development, Pacific Books International, 1st Edition, 2011.
2. Shivakanth Singh, Rural Development Policies and Programmes, Northern book centre, New Delhi, 1st Edition, 2002.
3. L.M.Prasad, Principles and Practice of Management, Sultan Chand & Sons, New Delhi, 8th Edition, 2014.
4. Venkata Reddy. K, Agriculture and Rural Development Gandhia Perspective, Himalaya Publishing House, 1st Edition, 2001.

III B.Tech - II Semester

14BT60305:**ARTIFICIAL INTELLIGENCE AND ROBOTICS**

(OPEN ELECTIVE)

(Common to CSE, IT,CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

COURSE DESCRIPTION:

Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning.

COURSE OUTCOMES:

On completion of this Course, a successful student will be able to:

CO1: Impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.

CO2: Employ effective methods to analyze a robot motion control while executing a specific task.

CO3: Design and Implement appropriate solutions for search Problems such as playing two person games and for planning problems which involve defining a sequence of actions of a robot.

CO4: Apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance.

UNIT-I: ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING (10 periods)

The Underlying assumption of AI; AI Technique: simple Tic-Tac-Toe program; Problem solving: State space search; Production systems: control strategies, search space control: depth-first, breadth-first search; Heuristic search: Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT-II: KNOWLEDGE REPRESENTATION & LEARNING (9 periods)

Knowledge Representation; Predicate Logic: Simple facts in logic, resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; slots; conceptual dependency; scripts; Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.

U**NIT-III: ROBOTICS -VISION & SENSING (8 periods)**

Robotics: Robot Classification, Robot Specification, notation; Sensing: Range sensing: Triangulation; proximity sensing: Inductive, Capacitive and Ultrasonic sensing; touch sensing: tactile sensing, artificial skins; Force and torque sensing: Wrist force sensors; Vision: low-level vision, high-level vision.

UNIT-IV: ROBOT PROGRAMMING & CONTROL (10 periods)

Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: characteristics, specifications; Task level languages; Language structure: VAL II.

UNIT-V: ROBOT INTELLIGENCE & TASK PLANNING (8 periods)

Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; graph search technique; Problem solving and problem reduction; robot learning; Task planning: Modelling, task specification, obstacle avoidance, grasp planning; Expert system.

Total Periods: 45

TEXT BOOKS:

1: E. Rich and K. Knight, Artificial intelligence, Tata Mc Graw Hill, 2nd edition, 1992.

2: K.S. Fu, R.C. Gonzalez, C.S.G. Lee, Robotics: Control, Sensing, Vision, and Intelligence, Mc Graw Hill, International Edition, 1987.

REFERENCE BOOKS:

1: Mikell P. Groover, Industrial Robotics, Technology, Programming, and Applications, Tata Mc Graw Hill, 9th reprint 2011.

2: D.W. Patterson, Introduction to AI and Expert Systems, PHI, 1992.

3: N.J. Nilsson, Principles of AI, Narosa Publishing House, 2000.

4: George Luger, Al-Structures and Strategies for and Strategiesfor Complex Problem solving, Pearson Educations, 4th edition, 2002.

III B.Tech - II Semester

14BT60306:**GLOBAL STRATEGY AND TECHNOLOGY**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: -Nil

COURSE DESCRIPTION:

Introduction to strategic management, strategic management process, principles of good strategy, globalisation, globalisation strategies, research & development strategies, technology management and transfer, significance, elements of transfer process, corporate governance: the Indian scenario.

COURSE OUTCOMES:

After completion of this Course, a successful student will be able to:

CO1. Decide upon a macroscopic management strategy to optimize the impact of decisions with limited resources.

CO2. Identify the impact of globalization in a given engineering scenario. Participate in elementary discussions on corporate governance.

CO3. Analyse an industrial Engineering problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.

Detailed Syllabus:

UNIT-I : INTRODUCTION TO STRATEGIC MANAGEMENT (9 periods)

Definitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT -II: GLOBALISATION (9 periods)

Meaning and dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouring Globalisation; Globalisation strategies.

UNIT-III: RESEARCH & DEVELOPMENT STRATEGIES (9 periods)

Introduction, Concept, Evolution of R & D Management, R & D as a business, R & D and competitive advantage, Integration of R & D, Elements of R & D strategies, Selection of R & D strategies, Implementation strategies, R & D trends, Responses to changes.

UNIT-IV: Technology Management and Transfer (9 periods)

Technology Management: Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.

Technology Transfer: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT -V: Corporate Governance: The Indian Scenario (9 periods)

Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance - Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family - owned business in India, Corporate Governance and the Indian ethos,

Total Periods: 45

TEXT BOOKS:

1. Francis Cherunilam, Stategic Management, Himalaya Publishing House, 3rd Edition, 2002.
2. C.S.G.Krishnamacharyulu and Lalitha Ramakrishnan , Management of Technology, Stategic Management, Himalaya Publishing House, 2nd Edition, 2012.

REFERENCE BOOKS:

1. White and Bruton, The Management of Technology and Innovation; a Strategic Approach, Cengage Learning, 1st Edition, 2007.
2. S.K.Mandak, Ethics in Business and Corporate Governance, TMH, 2s Edition, 2012.

III B.Tech - II Semester

14BT60307: **INTELLECTUAL PROPERTY RIGHTS AND MANAGEMENT**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:-Nil

COURSE DESCRIPTION:

Protection of ideas, innovation and artistic endeavors; Acts and procedure related to patents, trademarks, passing off, copy right, design registration, trade secrets and cyber laws, case studies in each.

COURSE OUTCOMES:

After the completion of course, a successful student will be able to:

CO1 : prepare documents and fill applications needed for filing a patent, design, copy right and trade mark

CO2 : ensure smooth transition from concept to final product.

CO3 : exercise discretion in following ethical aspects in dealing with intellectual property rights. .

UNIT - I: OVERVIEW OF INTELLECTUALPROPERTY RIGHTS (9 periods)

Introduction and importance of intellectual property rights (IPRs), types of intellectual property, International scenario in IPR: WIPO, WTO, TRIPS, international and national patent acts: United States of America patent act, United Kingdom patent act, India patent act, recent amendments in India patent act 1972.

UNIT - II: PATENTS (9 periods)

Introduction, Basic concepts, object and value of patent law, advantages of patent to inventor, patentable inventions, Not patentable inventions, overview of patent procedure, Bio technology patents, patents on computer program, patent rights on micro organism, plant breeding and breeders right, protection of bio diversity, protection of traditional knowledge, infringement of patents and remedy for infringement.

UNIT - III: TRADEMARKS (9 periods)

Basic concepts, definition, functions, kinds of trademarks: service trademarks, collective trademarks, certification trademarks, textile trade marks, registrable and non registrable trademarks, registration of trademarks, examination process, establishing trade mark right, good will, infringement and action for trademarks, passing off, trade mark and eco label, comparison with patents industrial design and copy right.

UNIT - IV: INDUSTRIAL DESIGN, TRADE SECRETS, CYBER LAWS (9 periods)

Industrial Design: Basic concepts, scope and nature of rights, process of registration rights, rights after registration, transfer of interest or rights, reliefs and remedies and action for infringement of rights, appeals.

Trade Secrets: Definition, significance, tools to protect trade secrets in India

Cyber laws: Co relation to intellectual property

UNIT - V: COPY RIGHTS (9 periods)

Introduction, nature and scope, subject matter, related or allied rights, works in which copy rights subsists, registration of copy rights, conferred by copy right, copy right protection in India, transfer of copy rights, right of broad casing organizations and of performer, computer software.

Total Periods: 45

TEXT BOOKS:

1. P.Narayan, Intellectual Property Law, Eastern Law House, New Delhi and Kolkata, 2005,
2. Deborah E. Bouchoux, Intellectual Property Rights, Cengage Learning, India edition, 2011.

REFERENCE BOOKS:

1. Bainbridge David, Intellectual Property Rights: Key to New Wealth, National Research Development Corporation, Pearson Education, New Delhi.
2. W.R.Cornesh, Intellectual Property Rights: Patent, Copy Right, Trade Mark, Allied Rights, Universal law publishing private limited, Delhi, 2001.
3. S.R. Myneni, Law of Intellectual Property, Asia law house, Hyderabad 2001.
4. Prabuddha Ganguly, Intellectual Property Rights: Unleasing Knowledge Economy, TMH New Delhi, 1st edition, 2001.

III B.Tech - II Semester

14BT60308:**MANAGING INNOVATION AND ENTREPRENEURSHIP (OPEN ELECTIVE)**

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

Course Description:

Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts Shifting Composition of the Economy Purposeful Innovation & 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

Course Outcomes:

After completion of this course, a suessful student will be able to:

CO1: Define, explain and illustrate theories of business innovation and entrepreneurship, the evolution of industries and economies, and the roles of Entrepreneurs.

CO2: Develop a comprehensive and well structured business plan for a new venture.

CO3: Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan; and,

CO4: Work effectively in multidisciplinary, cross-cultural teams, towards the development of a Team Project.

Unit-I: ENTREPRENEURSHIP (7 Periods)

Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, entrepreneurial growth and development.

UNIT II: CREATIVITY AND INNOVATION (11Periods)

Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies: Strategies that aim at introducing an innovation, innovation & entrepreneurship, planning -incompatible with Innovation & entrepreneurship.

Unit-III: THE INDIVIDUAL ENTREPRENEUR (7 Periods)

Entrepreneurial Motivation: Need for continuous learning & relearning; AcquiringTechnological Innovation Entrepreneurial motivation (nach story); Achievement Motivation in Real life- Case Study. Entrepreneurs versus inventors

Unit-IV: INTERNATIONAL ENTREPRENEURSHIP OPPORTUNITIES (11 Periods)

International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Entrepreneurial entry in to international business, strategic Issues in International Entrepreneurship.

Unit-V: Creative Problem Solving (9 Periods)

Problem Identification and Problem Solving: Problem Identification. Problem solving Innovation and Diversification.

Total Periods: 45

TEXT BOOKS:

1: Martin, M.J. "Managing Innovation and Entrepreneurship in Technology based Firm", John Wiley Interscience, 1994.

2: Ettlie, J.E. "Managing Technology Innovation", John Wiley & Sons, 2000.

3: Robert D Hisrich., Michael P Peters., Dean A Shepherd,"Entrepreneurship"The McGraw-Hill Companies, 6th Edition, 2011

REFERENCE BOOKS:

1: Christensen, C. M. and Raynor, M. E. The Innovators Solution: Creating and Sustaining Successful Growth, Boston, MA: Harvard Business School Press, (2003).

2: Drucker, P. F., Innovation and Entrepreneurship, New York: Harper, 1985.

3: Harvard Business Review on Innovation (Collection of articles), Harvard Business School Press (2001).

4: Harvard Business Review on Entrepreneurship (Collection of articles), Harvard Business School Press (1999)

5: Rogers, E.M., "Diffusion of Innovations", New York: Simon and Schuster, 5th Edition, 2003.

6: Drucker, P. F. "The Discipline of Innovation," Harvard Business Review, May2000. (Originally published 1985, May-June)

III B.Tech - II Semester

14BT60309: **MATERIAL SCIENCE**

(OPEN ELECTIVE)

(Common to ME, CSE, IT & CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Chemistry, Engineering Physics.

COURSE DESCRIPTION

Structure and Bonding in metals; Steels ,Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semi conductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics engineering, Material Selection and manufacturing of Optical fibers

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1. Understand how materials are formed and their classification based on atomic arrangement.

CO2. Illustrate how the design of the various types of steels, cast Irons and Non ferrous alloys influence various engineering applications.

CO3. Understand the basic difference in properties of various conductors, Insulators and Semiconductors and application of various advanced materials for different branches of Engineering .

UNIT - I: INTRODUCTION TO MATERIALS SCIENCE (7 periods)

Structure of metals: Bonds in Solids - Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys - determination of grain size.

Constitution of alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT - II: CAST IRONS , STEELS & NON-FERROUS METALS (12 periods)

Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels. Structure and properties of Copper and its alloys, Aluminum and its alloys.

UNIT - III: ELECTRIC CONDUCTORS & INSULATORS (12 periods)

Type of materials selected for conductors, Insulators and semi conductors. Introduction to ceramics-Bonding and microstructure-DC properties of ceramic materials-AC properties- mechanical properties - Ceramics as Conductors, Insulators and capacitors, introduction to Plastics-DC properties-AC properties-mechanical properties.

UNIT - IV: SEMICONDUCTORS AND MAGNETIC MATERIALS (9 periods)

Fabrication of Semiconductors-Producing a silicon wafer-Lithography and Deposition-Packaging of semiconductors materials-Types of magnetic materials- Measuring magnetic properties-Application of soft magnetic materials in Electromagnets and relays, AC transformers, Generators and motors.

UNIT -V: ADVANCED MATERIALS AND APPLICATIONS (5 periods)

Composites - Fiber reinforced, Metal Matrix, Ceramic Matrix - properties and applications; Ceramics - Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Glasses- properties and applications, manufacturing of Optical fibers.

Total periods : 45

TEXT BOOKS:

1: Kodigre V D, Material Science and Metallurgy, Everest Publishing House, Pune, 31st edition, 2011.
2: Ian.P.Jones, Material Science for Electrical and Electronic Engineers, Oxford University Press, New Delhi,2000

REFERENCE BOOKS:

1. V. Raghavan, Physical Metallurgy: Principles and Practices, PHI, New Delhi, 2nd edition, 2006.
2. William. D. Callister, Materials Science & Engineering-An Introduction, John Wiley and sons, New Delhi, 6th edition, 2002.
3. A.J. Dekkar, Electrical Engineering Materials, PHI, New Delhi, 1970.

III B. Tech. - II Semester

14BT60502: **ENGINEERING SYSTEMS ANALYSIS AND DESIGN (OPEN ELECTIVE)**

(Common to CSE, IT , CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Overview of the Systems Process, Technologies for systems, System Development Life Cycle, system Analysis and Modeling, levels of management, Project Management, Systems Implementation and importance of UML Prototyping, Maintaining and Managing the Systems output Process.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Gain knowledge on:
- Systems Process and System Design
- Systems Analysis and Modeling
-System Development Life Cycle
-Design Management and Maintenance Tools.

CO2:. Apply the CASE Tools for System Process and estimation the given models.

CO3: Design, Develop and implement new Techniques for modeling the systems.

CO4: Work effectively as team member on projects

CO5: Manage and Maintain the System Process.

UNIT - I: INTRODUCTION (9 periods)

Introduction- Systems, Types of systems, integrating technologies for systems, Need for system analysis and design, Roll of the systems analyst, the system development life cycle, CASE tools for analysis and design.

UNIT - II: ANALYSIS AND MODELING ORGANIZATIONAL SYTEMS (9 periods)

Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, levels of management, organizational culture.

UNIT- III: PROJECT MANAGEMENT (9 periods)

Project initiation, Problem in organization, Determining feasibilities, ascertaining hardware and software needs, identifying, forecasting, comparing costs and benefits, activity planning and control, managing the project.

UNIT -IV: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (9 periods)

Object oriented analysis and design- Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT- V: DESIGNING EFFECTIVE OUTPUT (9 periods)

Output design objectives, relating output content to output method, realizing how output bias affects users, designing output for display, Case studies- Designing a web site management, online exam management.

Total Periods: 45

TEXT BOOKS:

1. Kenneth E.Kendall and Julie E.Kendall, System Analysis and Design, 8th Edition, Pearson Education, India,2011.

REFERENCE BOOKS:

1. Dennis, Wixom, and Roth, Systems Analysis and Design, 5th Edition, John Wiley. 2012.
2. Shelly and Rosenblatt, Systems Analysis and Design, 9th Edition, Cengage Learning, 2012.

III B. Tech. - II Semester

14BT71005: **MICROELECTROMECHANICAL SYSTEMS**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

Pre-requisites:

Basic knowledge in Physics.

Course Description:

Overview of Micro Electro Mechanical Systems (MEMS), scaling laws, working principles of microsensors and microactuators, materials, microfabrication processes, packaging of Microsystems.

Course Outcomes: After completion of this course the student will be able to:

CO1: Demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators.

CO2: Identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.

Detailed Syllabus:

Unit-1: OVERVIEW OF MEMS AND SCALING LAWS (9 Periods)

Introduction, MEMS and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.

Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid- body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

Unit -2: WORKING PRINCIPLES OF MICROSYSTEMS (9 Periods)

Microsensors, acoustic wave sensors, biomedical and biosensors, chemical sensors, pressure sensors, thermal sensors. Microactuation: actuation using thermal forces, shape-memory alloys, piezoelectric crystals, electrostatic forces. MEMS with microactuators, microgrippers, micromotors, microvalves, micropumps. Microaccelerometers, microfludics.

Unit-3: MATERIALS FOR MEMS AND MICROSYSTEMS (9 Periods)

Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

Unit-4: MEMS FABRICATION PROCESS AND MICROMANUFACTURING (9 Periods)

Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.

UNIT-5: MEMS Packaging (9 Periods)

Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging.

Total: 45 Periods

TEXT BOOKS:

1. Tai-Ran Hsu, MEMS & Microsystems, Design and Manufacture, McGraw Hill Education (India) Pvt. Ltd., 2002.

REFERENCE BOOKS:

1. G.K.Ananthasuresh, K.J.Vinoy, Micro and Smart Systems, Wiley India, Ist edition, 2010
2. Nitaigour Premchand Mahalik, MEMS, McGraw Hill Education (India) Pvt. Ltd., eighth reprint, 2013.

III B.Tech - II Semester

14BT61203: **BIO - INFORMATICS**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Demonstrate knowledge on concepts of biological databases, Genome and proteome.

CO2: Analyze biological database management system.

CO3: Create, select and apply appropriate techniques and tools to manage the biological data.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO BIOINFORMATICS (8 Periods)

Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

UNIT-II: BIOLOGY AND INFORMATION (7 Periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT-III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 Periods)

Heuristic alignment algorithms, global sequence alignments- Needleman-Wunsch algorithm, local sequence alignments- smith-waterman algorithm, amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.

UNIT-IV: PRIMARY DATABASES AND THEIR USE (11 Periods)

Introduction to biological databases- organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT-V: SECONDARY DATABASES (9 Periods)

Introduction to secondary databases- organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-organization and Management of databases, KEGG, ExPASy, BRENDA.

Total Periods: 45

TEXT BOOKS:

1. David W. Mount, Bioinformatics: Sequence and Genome Analysis, CSHL Press, 2nd edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, Bioinformatics Basics, Applications in Biological Science and Medicine, CRC Press, Taylor & Francis Group, 2nd edition,2005.
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery, PHI Learning Pvt. Ltd., 3rd edition, 2011.

III- B.Tech. II Semester

14BT61204: **CYBER SECURITY AND LAWS**

(OPEN ELECTIVE)

(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing ad Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

COURSE OUTCOMES:

After completion of the Course, a successful student will be able to:

CO1: Demonstrate knowledge in Cyber security, Cyber crimes and its related laws in Indian and Global Act. .

CO2: Analyze the legal perspectives and laws related to cyber crimes in Indian context.

CO3: Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

Detailed Syllabus:

UNIT-I: INTRODUCTION TO CYBER CRIMES (9 Periods)

Introduction, Definition, Origin, Cyber Crime and Information Security, Cyber Criminals, Classifications of Cyber Crimes, The Legal Perspectives and Indian Perspective, Cyber Crime and Indian ITA 2000, Global Perspective on Cyber Crimes.

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Café and Crimes, Botnets.

UNIT-II: TOOLS AND METHODS USED IN CYBER CRIME (9 Periods)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT-III: CYBER CRIMES AND CYBER SECURITY-LEGAL PERSPECTIVES (8 Periods)

Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT-IV: CYBER SECURITY-ORGANIZATIONAL IMPLICATIONS (10 Periods)

Introduction, Cost of Cyber Crimes and IPR issues, Web Threats for Organizations - Evils and Perils, Security and Privacy Implications from Cloud Computing, Social Media Marketing-Security Risks and Perils for Organizations, Social Computing and Associated Challenges for Organizations, Protecting People's Privacy in Organization, Organizational Guidelines for Internet Usage, Safe Computing and Usage Policy, Incident Handling and Best Practices, Media and Asset Protection.

UNIT-V: CYBER TERRORISM AND INFORMATION WARFARE (9 Periods)

Introduction, Intellectual Property in the Cyber Space, the Ethical Dimension of Cyber Crimes, the Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.

Cyber Crime Illustrations: Indian Banks lose Millions of Rupees, Justice vs. Justice, Parliament Attack, The Indian case of online Gambling, Bank and Credit card related frauds, Purchasing goods and services scam, Nigerian 419 scam.

Total Periods: 45

TEXT BOOKS:

1. Nina Gobole, Sunit Belapure, Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley India, 1st edition, 2011.

REFERENCE BOOKS:

1. Ferrara et al., Cyber Law: Text and Cases, Cengage Learning, 3rd edition, 2012.
2. Vivek Sood, Cyber Law Simplified, Tata McGraw-Hill, 1st edition, 2012.
3. Prashant Mali, Cyber Law and Cyber Crimes, Snow White Publications Pvt. Ltd., 1st edition, 2013.

III B.Tech - II Semester
14BT60321: HEAT TRANSFER AND DYNAMICS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:
Engineering Mathematics, Thermodynamics, Fluid mechanics, Dynamics of Machinery

COURSE DESCRIPTION:
Experimental studies on mechanisms of heat transfer; Film wise and drop wise condensation; Steady and unsteady flow; Effectiveness of heat exchanger; Investigation on various thermal properties such as conductivity, emissivity, Stefan - Boltzmann constant; Lateral, longitudinal, torsional vibrations; governors and gyroscopic effect.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Estimate heat transfer rates in conduction, convection, radiation heat transfer and also devise experimentation schemes for select scenarios in dynamic machinery.
CO2: Estimate the approximate imbalance in machines
CO3: Provide probable solution for heat transfer and dynamics related problems.
CO4: Provide experimentation schemes for sub-systems of a complex machine or thermal equipment to predict the characteristics of a complex system.

PART-A: HEAT TRANSFER LAB

LIST OF EXPERIMENTS:

1. Thermal conductivity of metal rod.
2. Overall heat transfer coefficient through Composite Slab Apparatus.
3. Thermal conductivity of insulating material through lagged pipe apparatus.
4. Heat transfer coefficient in natural convection.
5. Heat transfer coefficient in forced convection.
6. Heat transfer in drop and film wise condensation.
7. Emissivity of a gray body through Emissivity apparatus.
8. Experiment on Stefan Boltzmann Apparatus.
9. Heat transfer in pin-fin.
10. Experiment on Parallel and counter flow heat exchanger.

NOTE: Heat Transfer data books are permitted in the examinations.

PART-B: DYNAMICS LAB

LIST OF EXPERIMENTS:

1. Motorized gyroscope - Study of gyroscopic effect and couple.
2. Determination of Moment of Inertia of a Flywheel.
3. Experimental verification of dynamic balancing of
   (a) Rotating masses (b) Reciprocating masses.
4. Governor - Determination of range sensitivity, effort etc., for Watt, Porter, Proel, and Hartnel Governors.
5. Cams - Cam profile drawing, Motion curves and study of jump phenomenon.
6. Whirling of shaft - Determination of critical speed of shaft with concentrated loads.
7. Determination of pressure distribution in journal bearing.
8. To determine the natural frequency of damped vibration of single degree freedom system and to find it's damping coefficient.
9. To study shock absorbers and to plot transmissibility curve.
10. To verify natural frequency of torsional vibration of two rotor system and position of node.
11. To determine resonance frequency of transverse vibration of beam.

NOTE: Heat Transfer and Dynamics lab Internal and End examination evaluation will be done separately and the average will be recorded.

III B.Tech - II Semester

14BT60322: **CAD/CAM LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:
Computer Aided Engineering Drawing, Computer Aided Machine Drawing.

COUSRE DESCRIPTION:
Fundamental Concepts of CAD/CAM; 2D and 3D Part Modeling; Manual Part Programming, Analysis of simple Structures; CNC Code Generation.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Use software package CREO to generate 3D models of parts and assemblies, and choose appropriate module of ANSYS to perform stress analysis and identify the machine codes for developing CNC part programs to produce the parts.(PO1)

CO2: Analyze and Manufacture in a standardized manner suitable for industrial scenarios.(PO2)

CO3: Design Components and Develop part programs for mechanical components involving simple features.(PO3)

CO4: Identify simpler subsystems in a complex subsystem and employ bottom-up approach to build the model of the entire system and generate drawings or models.(PO4)

CO5: Implement appropriate hardware and software for CAD/CAM thereby enhancing productivity in design.(PO5)

LIST OF EXPERIMENTS:

1. Exercises (2-D & 3-D) using design packages (any 3 exercises from each section to be conducted)

(a)Drafting: Development of part drawings for various components in the form of orthographic and isometric, Representation of dimensioning and tolerances scanning and plotting.

(b)Part Modeling: Generation of various 3D models through protrusion, revolve, shell sweep, Creation of various features, Study of parent child relation, Feature based and Boolean based modeling surface and assembly modeling, Study of various standard translators, Design simple components.

2. Exercises using Analysis software

(a) Determination of deflection and stresses in 2D and 3D trusses and beams.

(b) Determination of deflections component and principal and Von-Mises stresses in plane stress, plane strain and axisymmetric components.

(c) Steady state heat transfer Analysis of plane and axisymmetric components.

3. Exercises on CNC machines

(a) Simulation of CNC Lathe and Milling Manual Part Programs.

(b) Machining of simple components on CNC lathe

(c) Machining of simple components on CNC Milling.

4. Experimentation and simulation of a robot.

Note: Any Two Software Packages from each of the module:

CAD Packages: AutoCAD, SOLIDWORKS, CATIA, CREO, Unigraphics.

IV B.Tech - I Semester
14BT70301: **FINITE ELEMENT METHODS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Engineering Mathematics, Strength of Materials, Design of Machine Elements-I, Design of Machine Elements-II, Heat Transfer.

COURSE DESCRIPTION:

Fundamentals of finite element analysis including, discrete system analysis, steady state and transient heat transfer analysis; static and dynamic analysis of structures. Modeling, analysis, and design using FEM.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Employ the theoretical knowledge in choosing a proper element type, and boundary conditions to use in a given situation to build a FEM model of a given physical situation.

CO2: Analyze the physical system under various types of loading (Structural & Thermal) and identify the problem areas and offer probable solutions to design related problems.

CO3: Identify the interrelationships existing between smaller sub-systems in a large-scale system and thus simplify the scope of analysis.

Detailed Syllabus:

UNIT - I: INTRODUCTION (9 Periods)

Introduction to Finite Element Method for solving field problems. Stress and Equilibrium. Strain-Displacement relations. Stress-strain relations.

ONE-DIMENSIONAL FINITE ELEMENT METHODS: Bar elements, temperature effects; Finite element modeling coordinates and shape functions. Principle of minimum potential energy; principle of virtual work; Von-mises stress, Element matrices, assembling of global stiffness matrix and load vector, Application of boundary conditions, Elimination and penalty approaches, solution for displacements, reaction, stresses, temperature effects, Quadratic Element.

UNIT - II: BEAMS & TRUSSES (9 Periods)

TRUSSES: Plane trusses, local and global coordinate systems, formulation for direction cosines, Element matrices, assembling of global stiffness matrix, solution for displacements, reaction, stresses, and temperature effects.

BEAMS: Element matrices, assembling of global stiffness matrix, solution for displacements, reaction, stresses.

UNIT - III: TWO-DIMENSIONAL & AXI-SYMMETRIC MODELS (9 Periods)

TWO-DIMENSIONAL PROBLEMS: Basic concepts of plane stress and plane strain, stiffness matrix of Constant Strain Triangular (CST) element, finite element solution of plane stress problems.

AXI-SYMMETRIC MODELS: Finite element modeling of Axi-symmetric solids subjected to Axi-symmetric loading with triangular elements.

UNIT - IV ISO-PARAMETRIC FORMULATION & HEAT TRANSFER ANALYSIS (11 Periods)

ISO-PARAMETRIC FORMULATION: Concepts, sub parametric, super parametric elements, 2-Dimensional 4 Noded iso-parametric elements, and numerical integration.

HEAT TRANSFER ANALYSIS: Derivation of the basic differential equation, Heat transfer with Conduction, Convection, through fins, Typical units of thermal conductivities; K, and heat transfer coefficients; h, One-dimensional finite element formulation using a variational method; Two-dimensional finite element formulation.

UNIT - V DYNAMIC ANALYSIS (7 Periods)

Introduction to dynamic considerations, formulation of Lagrangian, Hamilton's principle, Dynamics of a spring mass system; consistent mass matrix, Formulation of FEM Model, element matrices: One dimensional bar, Truss, CST elements; Lumped mass matrices, Evaluation of Eigen values and Eigen vectors for a stepped bar and a beam element.

Total Periods: 45

TEXT BOOKS:

1. Tirupathi R. Chandrupatla & Ashok D. Belegundu, Introduction to Finite Elements in Engineering, PHI Learning, 3rd Edition, 2011
2. Darly L. Logan, First Course in the Finite Element Method, Cengage Learning, 4th Edition 2007.

REFERENCES BOOKS:

1. S.S. Rao, Finite Element Methods in Engineering, Elsevier, 5th Edition, 2012.
2. J. N. Reddy, An Introduction to Finite Element Method, Tata McGraw-Hill, 3rd Edition, 2005.
3. K. J. Bathe, Finite Element Procedures, PHI, 1st Edition, 2008.

IV B.Tech - I Semester

14BT70302: **MANUFACTURING SYSTEM DESIGN**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Industrial Engineering and Management, CAD/CAM.

COURSE DESCRIPTION:

Introduction to Manufacturing systems and models; Automated Manufacturing systems; automated modeling systems; performance measures of manufacturing systems; assembly lines; high production lines; CFMS; Simulation in system design.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Employ knowledge of manufacturing philosophies in proposing a preliminary FMS.

CO2: Use the methodologies required for simulating a manufacturing system.

CO3: Identify the stages involved in the design and manufacturing of a product and conduct cost benefit analysis.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO AUTOMATION & MANUFACTURING SYSTEMS (8 periods)

History and overview of manufacturing; Components of manufacturing system; A classification Scheme for manufacturing systems; Overview of the classification scheme; Production systems; Automation in production systems; Manual labor in production systems; Automation principles and strategies; Basic elements of an automated system; Advanced automation functions; Levels of automation.

UNIT - II: MODELING OF AUTOMATED MANUFACTURING SYSTEM (9 periods)

Automated Manufacturing Systems: Manufacturing automation; Modeling of automated manufacturing systems; Role of performance modeling; **Performance measures:** Manufacturing lead time, Work-In-Process (WIP), Machine Utilization, Throughput, Capacity, Flexibility, Perform ability and quality; **Performance modeling tools:** Simulation model and Analytical models

UNIT-III: ASSEMBLY & PRODUCTION LINES (8 periods)

Single station: manned cells, automated cells; Application of single-station cells; Fundamentals of manual assembly lines; Applications of automated production lines; Fundamentals of automated assembly systems; Material handling system.

UNIT - IV: CELLULAR & FLEXIBLE MANUFACTURING SYSTEMS (10 periods)

Cellular Manufacturing System: Introduction to cellular manufacturing; machine cell design and its types; Objectives of Cellular manufacturing system; quantitative analysis in cellular manufacturing.

Flexible Manufacturing System: Introduction; Types; Components; Applications; benefits; FMS planning and Implementation issues; Quantitative analysis of FMS: Simple Bottle model.

UNIT-V: SIMULATION IN MANUFACTURING SYSTEM DESIGN (10 periods)

Introduction to simulation; Types of Simulation models: Static, Continuous and Deterministic Simulation; Techniques of Simulation; Simulation process for manufacturing systems analysis; Simulation software packages; Application of simulation; procedure for simulation using software; Application in Automotive Industry.

Total Periods: 45

TEXT BOOKS:

1: N.Viswanadham, Y. Narahari, Performance Modeling of Automated Manufacturing Systems, PHI, 1st edition 2008.

2: Mikell.P.Groover, Automation , Production Systems & Computer Integrated Manufacturing, PHI, 3rd edition 2008.

3: P.RadhaKrishnan, S.Subramanyan, V.Raju, CAD/CAM/CIM, New Age International, 3rd edition 2007.

REFERENCE BOOKS:

1: S.S.Rao,Engineering optimization, New Age International Publications 2nd edition , 2012.

2: P. Brandimarte, A Villa, Modeling Manufacturing Systems, Springer Verlag, Berlin, Illustrated edition, 1999.

3: Richard Crowson, Factory Operations: Planning and Instructional Methods- Ed2, CRC Press, Second Edition.

4: Phillip. F. Ostwald, Jairo Munoz, Manufacturing Processes and Systems, John Wiley and Sons Inc., 9th Edition, 2008.

IV B.Tech - I Semester

14BT70303: **METROLOGY AND MEASUREMENTS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

10+2 Physics, Engineering Physics, Machine Drawing, Machine tools.

COURSE DESCRIPTION:

The fundamental information pertaining to Metrology, use of a various measuring tools and instruments; calculation of geometric dimensions, form tolerances and others with accurate assessment of fits; precision and non-precision instruments; Gear and Screw thread measurement; Machine tool alignment tests, Requirements and preparation of assessment charts; measurement of force, torque, strain, pressure, temperature and others along with their calibration procedures .

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1 Identify the uncertainties in dimensional Metrology by defining measurement standards and use electronic Instrumentation.

CO2 Employ effective methods of measuring straightness, flatness, roundness and profiles of screw threads and gearteeth.

CO3 Employ knowledge in selecting a suitable instrument/measurement method for a given application.

CO4 Recognize the importance of accuracy and precision as a mechanical engineer through self motivation for a defect free product.

Detailed Syllabus:

UNIT - I: LIMITS, FITS AND TOLERANCES (10 Periods)

Limits, Fits and Tolerances: Introduction; Definitions; fits and their types; Unilateral and Bilateral Tolerance System; Hole and Shaft basis systems; Interchangeability and Selective Assembly; Compound Tolerances; Accumulation of Tolerances.

Limit Gauges and Gauge Design: Gauges: Plug, Ring, Snap, Gap, Taper gauges; Taylor's principle; Design of Go and No Go gauges.

Comparators: Introduction to Comparator; Characteristics; Classification of comparators; Mechanical comparators: sigma Comparators, Optical Comparators, LVDT, pneumatic comparators

UNIT -II: LINEAR, ANGULAR AND TAPER MEASUREMENT (10 Periods)

Linear Measurement: Length standard, line and end & wavelength standards; Slip Gauges: Calibration of the slip gauges; Dial Indicators; Micrometers; Vernier Height Gauges.

Measurement of Angles and Tapers: Different methods: Bevel protractor, angle gauges, spirit levels, sine bar, sine plate, rollers and spheres used to determine the tapers.

Flatness Measurement: Measurement of flatness of surfaces; straight edges; surface Plates, optical flat and autocollimators, interferometer and their Uses.

UNIT -III: SURFACE AND THREAD MEASUREMENT (9 Periods)

Surface Roughness Measurement: Differences between surface roughness and Surface waviness; Numerical assessment of surface finish: CLA, R.M.S Values; Ra, Rz values; Methods of measurement of surface finish: Profilograph, Talysurf, BIS symbols for indication of surface finish.

Screw Thread Measurement: Elements of measurement; Errors in screw threads; Measurement of effective diameter, angle of thread and thread pitch; profile thread gauges.

Gear Measurement: Gear measuring instruments; Gear tooth profile measurement; Measurement of diameter; pitch, Finding pressure angle and tooth thickness.

Machine Tool Alignment Tests: Requirements of Machine Tool Alignment Tests; Alignment tests on lathe; Milling and Drilling Machine Tools; Preparation of acceptance charts.

UNIT-IV: MEASUREMENT OF DISPLACEMENT, SPEED, STRESS & STRAIN (9 Periods)

Measurement of Displacement: Theory and construction; various transducers to measure displacement: Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers; Calibration procedures.

Measurement of Speed: Mechanical Tachometers; Electrical tachometers; Stroboscope; Non-contact type of Tachometer.

Stress & Strain Measurements: Various Types: Electrical Strain Gauge, Gauge Factor, Method of usage of resistance strain gauge for bending, compressive and tensile strains, usage for measuring torque, Strain gauge Rosettes.

(UNIT- V: MEASUREMENT OF TEMPERATURE, PRESSURE, FORCE, TORQUE & POWER (9 Periods)

Measurement of Temperature: Standards and calibration, thermal expansion methods, thermo electric sensors (thermocouples), Electrical Resistance sensors, Junction semiconductor sensors, Digital thermometers, Radiation methods.

Measurement of Pressure: Standards and Calibration; Basic Methods of Pressure measurement; Dead weight gauge.

Measurement of force, torque, and power: Standards and calibration; Basic methods of Force Measurement; Torque measurement on rotating shafts, shaft power measurement: Prony Brake, Hydraulic dynamometer; Vibrating Wire Force Transducers.

Total periods: 45

TEXT BOOKS:

1: R.K. Jain, Engineering Metrology, Khanna Publishers, 20th edition, 2013.

2: Thomas G. Beckwith, Roy D. Maragoni, John H. Lienhard V, Mechanical Measurements, Pearson Education International Publishers, 6th edition 2013 .

3: N.V Raghavendra, L.Krishnamurthy, Engineering Metrology and Measurements, Oxford Univ. Publisher, First Edition, 2013.

REFERENCE BOOKS:

1. M. Mahajan , Engineering Metrology, Dhanpat Rai and Co., 2nd edition, 2013.
2. Anand K Bewoor, Vinay A Kulkarni , Metrology & Measurement, McGraw Hill First Edition, 2013.
3. B.C.Nakra & K.K. Choudhary, Instrumentation, Measurement & Analysis, Tata Mcgraw Hill , 6th edition, 2011.

IV B.Tech - I Semester

14BT70304: INDUSTRIAL AUTOMATION AND ROBOTICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Matrices and Numerical Methods, Engineering Mechanics, Kinematics of Machinery, Dynamics of Machinery.

COURSE DESCRIPTION:

Integration of robots and CNC machines into manufacturing cells; motion control devices, such as actuators and sensors, conveyors and part feeder mechanisms; use of automation equipment in manufacturing. Integration of automation equipment such as PLCs, motion control devices.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Select suitable sensors and actuators for automating the operations in a given industry using simple automation schemes.

CO2: Calculate the forward kinematics, inverse kinematics, for a 3R manipulator and path planning of serial and parallel robot.

CO3: Propose preliminary designs for automating simple machining operations, pick and place operations, conveyor operations etc.

CO4: Use appropriate software for implementing automation schemes using robot programming languages.

Detailed syllabus:

UNIT -I: INTRODUCTION TO AUTOMATION (8 Periods)

Automation, need, types, Basic elements of an automated system, levels of automation, Part transfer methods and mechanisms, Types of flow lines, Flow line with/without buffer storage. Assembly process and systems assembly line, Line balancing methods, Flexible assembly lines.

UNIT - II: INTRODUCTION TO INDUSTRIAL ROBOTS (9 Periods)

Robots, Brief History, Types of Robots, classification, robot configurations, joint notation schemes, work volume, Degrees of freedom, Components, Common types of arms , joints, Grippers, Drives, pneumatic, hydraulic, Electric, comparison.

UNIT-III: MANIPULATOR KINEMATICS & DYNAMICS (11 Periods)

Mathematical Preliminaries on Vectors & Matrices. Homogeneous transformations as applicable to rotation and translation, (D-H) notation. Forward kinematics, inverse kinematics, Manipulators with two, three degrees of freedom.

Manipulator dynamics: Introduction, Inertia of a Link, Lagrangian formulation for a planar 2R manipulator.

UNIT-IV: TRAJECTORY PLANNING (9 Periods)

Trajectory planning and avoidance of obstacles, path planning, skew motion, joint integrated motion, and straight line motion.

Sensors: position sensors, potentiometers, resolvers encoders, velocity sensors, tactile sensors, proximity sensors, machine vision sensors, fail safe hazard sensor systems, and compliance mechanism.

UNIT - V: ROBOT PROGRAMMING & ROBOT APPLICATION (8 Periods)

Robot programming, types, features of languages and software packages, Robot application in industry, Task programming, Goals of AI Research, AI techniques, Robot intelligence and task planning, modern robots, future Application and challenges and case studies.

Total No of Periods:45

TEXT BOOKS:

1. M.P. Groover, Industrial Robotics, McGraw Hill Education (India) Private Limited, 2nd Edition, 2008.
2. S.R.Deb/S.Deb, Robotics Technology & Flexible Automation, McGraw Hill Education (India) Private Limited, 2nd Edition, 2009.

REFERENCE BOOKS:

1. Mikell P. Groover, Automation, Production Systems and CIM, Prentice-Hall of India Pvt. Ltd, 3rd Edition, 2008.
2. Mittal R.K & Nagrath IJ, Robotics and Control, TMH, First Edition, 1st Edition, 2003.
3. K. S. Fu., R. C. Gonzalez, C. S. G. Lee, Robotics: Control Sensing, Vision and Intelligence International Edition, McGraw Hill Book Co, 1st Edition, 2008.
4. Ashitave Ghosal, Robotics, Fundamental Concepts and analysis, Oxford Press, 1st Edition2006.
5. John. J. Craig, Introduction to Robotics, Pearson India, 3rd Edition, 2008.

IV B.Tech - I Semester

14BT70305: **REFRIGERATION AND AIR CONDITIONING**

(Professional Elective-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Thermodynamics, Fluid Mechanics

COURSE DESCRIPTION:

Refrigeration cycles; analysis and design of various refrigeration systems; components of refrigeration system and refrigerants selection. Properties of air and results of cooling, heating, humidifying or dehumidifying; heat gain and heat loss calculations. Study of air-conditioning equipment; heat pumps; heat pump circuits; analysis and design calculations. Thermal comfort principles, and practice of analysis and design of air-conditioning system, comfort Air conditions and load estimates.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO 1: Employ the knowledge of RAC systems to build mathematical models of physical Systems to predict their performance.

CO 2: Analyze refrigeration requirements to arrive at an outline configuration of the refrigeration system.

CO 3: Provide heat load estimates needed for detailed design of RAC Systems.

CO 4: Assess the safety issues in RAC systems and propose viable solutions.

Detailed Syllabus:

UNIT- I: BASICS OF REFRIGERATION (9 Periods)

Introduction, Unit of refrigeration; C.O.P: refrigerator, heat engine, heat pump; open and dense air refrigeration cycle; Carnot refrigerator; Bell-Coleman cycle; Air Refrigeration: simple air cooling system; simple air evaporative cooling system and bootstrap air cooling system.

UNIT- II: VAPOUR COMPRESSION REFRIGERATION (VCR) SYSTEM (9 Periods)

Basic cycle, Working principle, Essential components of the plant, COP, Representation of cycle on T-S and p-h charts; Cycle analysis; Actual cycle, effect of super heating, sub cooling on system performance; Refrigerants: Desirable properties, Classification of refrigerants used, Nomenclature, selection of refrigerants, and newer refrigerants.

UNIT III: VAPOR ABSORPTION REFRIGERATION (VAR) SYSTEM (9 Periods)

Description and working of NH_3-Water system; Li Br -Water (Two shell & Four shell) System, Calculation of maximum COP; Principle of operation of three Fluid absorption system.

STEAM JET REFRIGERATION SYSTEM : Working principle, basic Components, Estimation of motive steam required.

NON CONVENTIONAL REFRIGERATION SYSTEM: Principle and operation of Thermo-electric refrigerator and Vortex tube or Hilsch tube.

UNIT IV: AIR CONDITIONING SYSTEMS (10 Periods)

Psychrometry: Psychrometry terms, Psychrometric chart, Psychrometric processes, Air conditioning systems: classification of air-conditioning systems, summer, winter and year round air conditioning systems; RSHF, GSHF, ERSHF; Cooling Load calculations: components of cooling load, sensible heat load, latent heat load;

UNIT V: COMFORT AIR CONDITION AND QUIPMENT (8 Periods)

Comfort Conditions: Requirements of human comfort; concept of effective temperature; Comfort chart.

Humidifiers: Humidification by atomizing the water and Air washing; Dehumidifiers: Spray type dehumidifier; Air-filters; Fans; Blowers; Ducts; Heat pump: Introduction, different heat pump circuits; air to air, water to air.

Total Periods: 45

Text Books:

1. Domkundwar Arora Domkundwar, A Course in Refrigeration and Air Conditioning, Dhanpat Rai publication, 8th Edition, 2011.
2. R. S. Khurmi, J.K.Gupta, A Text book of Refrigeration & Air Conditioning, S. Chand, 5th Edition, 2014.

Reference Books:

1. P.L.Ballaney, Refrigeration and Air Conditioning, Khanna Publications, 15th Edition,2013
2. C.P Arora, Refrigeration and Air Conditioning, TMH, 8th Edition, 2011
3: Manohar Prasad, Refrigeration and Air Conditioning, New Age Iternational, 3rd Edition,2014

Note: Thermal Engineering Data Book containing Refrigerant and Psychometric property Tables and charts are permitted in examinations.

IV B.Tech - I Semester

14BT70306: **MECHANICAL VIBRATIONS**

(Professional Elective -I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Mechanics, Kinematics of Machinery, Dynamics of Machinery

COURSE DESCRIPTION:

Basics of vibration; analysis of single and two degrees of freedom of lumped mass systems; Undamped free vibrations, damped free vibration; Forced vibrations; Transmissibility and isolation; vibration absorber; critical speed; Spectrum analysis; Introduction to noise: Noise standards, Noise source control, path control and enclosures; sound intensity, sound fields.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Employ knowledge of the dynamics of mechanical systems to build analytical models.

CO2: Analyze the mathematical models of the system and provide a qualitative assessment of vibrations present in the system.

CO3: Detect possible sources of unwanted vibration and suggest means of rectification.

CO4: Analyze complex dynamic systems through systematic approach by identifying suitable sub systems.

CO5: Address the issue of safety in dynamic systems involving moving parts.

Detailed Syllabus:

UNIT-I: SINGLE DEGREE OF FREEDOM SYSTEMS - FREE AND DAMPED VIBRATIONS (10 Periods)

Fundamentals of vibration: Elements of a vibratory system, S.H.M, degrees of freedom; modeling of a system; concept of linear and non-linear systems; equivalent spring; linear and torsional systems.

Undamped free vibrations: Natural frequency by equilibrium and energy methods for longitudinal and torsional vibrations.

Damped free vibrations: Different types of damping, equivalent viscous damping; free vibrations with viscous damping: over damped, critically damped and under damped systems; initial conditions; logarithmic decrement; dry friction or coulomb damping, frequency and rate of decay of oscillations.

UNIT-II: SINGLE DEGREE OF FREEDOM SYSTEMS - FORCED VIBRATIONS (9 Periods)

Forced vibrations of longitudinal and torsional systems; FrequencyResponse Functions: Simple harmonic excitation, excitation due toreciprocating and rotating unbalance, base excitation; magnification factor; resonance phenomenon and phase difference; Quality Factor, Vibration Isolation, Force and Motion transmissibility.

UNIT-III: TWO DEGREE OF FREEDOM SYSTEMS - UNDAMPED VIBRATIONS (9 Periods)

Free vibration of spring coupled systems , longitudinal and torsional, natural frequency and mode shapes; Holzer Method; Free vibration of mass coupled systems, geared systems; undamped vibration absorber; critical speed of shaft having single rotor: damped and undamped systems.

UNIT-IV: INTRODUCTION TO NOISE (9 Periods)

Sound concepts, characteristics of sound wave, sound levels and decibels; fundamentals of noise, sound pressure level, sound intensity, sound fields, sound reflection, absorption and transmission;adding, subtracting and averaging decibels; human hearing mechanisms; sources of noise, Industrial noise and its hazards, Industrial noise control.

UNIT-V: VIBRATION MEASUREMENTS (8 Periods)

Vibration measurement process, classification of measuring instruments; Vibrometer: stylus type, optical type, seismic instrument, simple potentiometer, capacitance pick-up; Velometers: Active type, passive type pick-ups; Accelerometers; FFT spectrum analyzer and its applications; vibration monitoring techniques: time domain, and frequency domain analysis.

Total Periods: 45

TEXT BOOKS:

1. G.K.Groover, S.P. Nigam, Mechanical Vibrations, Nemchand & Brother's, 8thEdition, 2008.
2. V.P.Singh, Mechanical Vibrations, Dhanpat Rai& Co. Pvt Ltd, 4th Edition, 2014.
3. Ramamurti V. Mechanical Vibration Practice and Noise Control, Alpha Science International Ltd, 1st Edition, 2012.

REFERENCE BOOKS:

1. W.T. Thompson, Theory of Vibration with Applications, Pearson Publication, 5th Edition, 2008.
2. S.S.Rao, Mechanical Vibrations, Pearson Publication,4th Edition, 2003.
3. Meirovitch, Elements of Vibration Analysis, McGraw Hill Education (India) Pvt Ltd, 1st Edition, 2013.

IV B.Tech - I Semester

14BT70307: TOOL DESIGN

(Professional Elective-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Manufacturing Technology, Machine Tools, Machine Tools lab

COURSE DESCRIPTION:

Introduction and study of cutting tools and its design; determination of cutting forces, stresses and strains; comprehensive knowledge and insight into basic cutting parameters, machining and tooling techniques; tooling equipment and machine tool; tooling materials and heat treatment; design of multipoint cutting tools, jigs and fixtures.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Identify the basic cutting tool angles.

CO2: Analyze the cutting tool requirement and specify the material and geometry required for a given tool in a given machining situation.

CO3: Design single/multipoint cutting tools and jigs/fixtures in selected applications.

CO4: Identify the tooling and other requirements for machining an object with complex geometry.

Detailed Syllabus:

UNIT-I: TOOLING MATERIALS AND HEAT TREATMENT (9 periods)

Introduction, properties of materials, Ferrous tooling materials, Nonmetallic tooling materials, Nonferrous tooling materials, heat treating, factors affecting heat.

UNIT - II: DESIGN OF SINGLE POINT CUTTING TOOLS (9 periods)

Introduction, brief history of metal cutting, metal cutting process, mechanics and geometry of chip formation, general consideration for metal cutting, metal cutting tools, Cutting tool classification Design of single point cutting tools: Geometry of single point cutting tool, Nomenclature of single point cutting tool, Mechanics of orthogonal cutting, Merchants force diagram, geometry and their interrelation, theories of formation of chip and their effect.

UNIT - III: DESIGN OF MULTI POINT CUTTING TOOLS (9 periods)

Classification of various multi point cutting tools, Drill geometry, Design of Drills, Rake & Relief angles of twist drill, speed, feed and depth of cut, machining time, forces, milling cutters, cutting speeds and feed-machining times-design-form cutters, combination tools, reamers etc.

UNIT - IV: DESIGN OF SHEET METAL OPERATIONS (9 periods)

Design of sheet metal blanking and piercing: Fundamentals of die cutting operations, power press- types, Material handling equipment, cutting action in punch and die operation. Die clearance, Die design fundamentals-blanking and piercing die construction.

Design of sheet metal bending, forming and drawings die: Bending dies, drawing dies, forming dies, drawing operations, Determination of blank size, drawing force, single and double action draw dies

UNIT - V: DESIGN OF JIGS AND FIXTURES (9 periods)

Definition and types of jigs and fixtures,basic principles of location and clamping, locating, methods and devices, jigs, definitions, types, general consideration in the design of jigs, drills bushing, methods of construction, fixtures-vice fixtures milling, boring, and lathe grinding fixtures.

Total periods: 45

TEXT BOOKS:

1. Donaldson, Lecain and Goold, Tool Design, Tata McGraw Hill, 4th edition, 2012.
2. A Bhattacharya, Principles of Metal cutting, New Central Book Agency, Calcutta, 2nd revised edition 2009..
3. G.R.Nagpal, Tool Engineering and Design, Khanna Publishers, 2004.

REFERENCE BOOKS:

1. Surendra Kenav and Umesh Chandra, Satyaprakashan, Production Engineering Design (Tool Design), New Delhi.
2. Amitabha Battacharya and Inyong Ham, Design of Cutting Tools use of Metal Cutting Theory, ASTME Publication, Michigan USA.
3. V.Arshinov, G.Alekseev, Metal Cutting Theory and Cutting Tool Design, MIR Publications.
4. ASTME Fundamentals of tool design, PHI.
5. P. C. Sharma, Textbook of Machine Tools and Tool Design, S. Chand & Co Ltd.

IV B.Tech - I Semester

14BT70308: **SUPPLY CHAIN MANAGEMENT**

(Professional Elective -I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Industrial Engineering and Management / Management Science, Managerial Economics and Financial Analysis, Operations Research

COURSE DESCRIPTION:

Supply chain management fundamentals, Supply Chain Decisions, Achieving Strategic fit, Drivers of Supply Chain, Inventory management in a supply chain, Supply chain integration, Distribution Resources Planning, Bullwhip Effect, Role of IT in SCM, DSS for SCM, Designing and planning transportation networks thorough infrastructure and strategies, International and Contemporary issues in SCM, Demand and Supply planning, Mass customization, Global issues and Outsourcing problems, SCOR Model, Third party logistics, Retailer-Supplier Partnership, Metrics and Emerging trends in SCM.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1. Understand need for SCM practices in a firm and provide feasible strategies for better deployment of SCM practices in the firm.

CO2. Use software/hardware tools to enhance productivity of the firm through better SCM practices

CO3. Formulate appropriate and customized strategies & policies for managing supply chain of the firm and implement the same

CO4. Explore the possibility of imbibing emerging trends in SCM practices

Detailed Syllabus:

UNIT - I: INTRODUCTION TO SCM (9 Periods)

Supply Chain - Definition, Objectives; Global optimization, Importance of Supply Chain Decisions, Decision Phases in a Supply Chain and Importance of supply chain. SCM and objectives of SCM; Competitive and Supply Chain Strategies; Achieving Strategic fit, Obstacles to achieve strategic fit. Supply Chan Drivers - Inventory, Information, Transporta-tion and Facilities

UNIT - II: INVENTORY MANAGEMENT IN SCM (9 Periods)

Economic lot size model, Effect of demand uncertainty, Risk pooling, centralized and decentralized system, Managing inventory in the supply chain, Distribution Channel Management, Distribution Resource Planning

UNIT - III: VALUE OF INFORMATION (9 Periods)

Bullwhip effect, Information and supply chain technology, Supply chain integration- push, Pull and push-pull system, Demand driven strategies, Role of Information Technology in SCM - Impact of internet on SCM, DSS for SCM - Goals, Standardization and Infrastructure.

UNIT - IV: DESIGNING AND PLANNING TRANSPORATATION NETWORKS (9 Periods)

The role of transportation in a Supply chain, Modes of transportation and their performance characteristics, Transportation infrastructure and policies, Design options for a transportation network, Trade-offs in transportation design, tailored transportation,

UNIT - V: INTERNATIONAL & CONTEMPORARY ISSUES IN SCM (9 Periods)

Demand and Supply planning, Mass customization, Global issues and Outsourcing problems, aligning the Supply Chain with Business Strategy - SCOR Model, Third party logistics; Retailer-Supplier Partnership, Distributors integration, Supply Chain Management Metrics, Emerging trends in SCM

Total Periods:45

TEXT BOOKS:

1. Sunil Chopra & Peter Meindl, Supply Chain Management strategy, Planning & Operation, 4th Edition, Pearson Education Asia.
2. Janat Shah, Supply Chain Management, Pearson, 1st edition 2009.

REFERENCE BOOKS:

1. Thomas E Vollman and Clay Whybark D, Manufacturing Planning and Control for Supply Chain Management, Tata McGraw Hill, Fifth Edition, New Delhi, 2005
2. Simchi - Levi Davi, Kaminsky Philip and Simchi-Levi Edith, Designing and Managing the Supply Chain, Tata McGraw Hill, New Delhi, 3rd edition 2007.

IV B.Tech - I Semester

14BT70309: **POWER PLANT ENGINEERING**

(Professional Elective - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE:

Thermodynamics, Thermal Engineering-II, Heat transfer

COURSE DESCRIPTION:

Energy sources; types of Power Plants; thermal power plant; study of various systems of thermal power plant; Combustion and Firing Methods; Diesel Power plant; Gas Turbine Power Plants; Hydroelectric power plants and Nuclear power plants; Power generation and recovery systems; various conventional and non conventional sources of energy with power plant economics.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO 1: Employ the knowledge of thermodynamics, fluid mechanics and heat transfer to propose elementary design of Power plants.

CO 2: Use thermodynamic analysis to derive models of the components to predict the performance of the power plants.

CO 3: Suggest suitable type of power plant in a given location considering environmentally safe aspects.

CO 4: Provide preliminary estimates of the capital cost and operating costs of a power plant.

Detailed Syllabus:

UNIT --I: THERMAL POWER PLANT (9 Periods)

Introduction to the sources of energy; Plant layout; selection of site for power plant; Coal handling systems; overfeed and underfeed stoker principles, Traveling grate stokers, Spreader stokers, Multi retort stokers; Pulverised fuel firing: Pulverized fuel handling, pulversing mills, pulversied fuel burners; Ash handling systems; Dust collectors.

UNIT -II: DIESEL ENGINE AND GAS TURBINE POWER PLANTS (9 Periods)

DIESEL POWER PLANT: Essential components of diesel power plant, operation of diesel power plant, plant layout with auxiliaries, fuel supply system, Supercharging; Gas Turbine Plant: requirements, functions, classification, construction, and layout with auxiliaries, principles of working of closed and open cycle gas turbines, Intercooling, reheating and regeneration in gas turbines, combined cycle power plants and comparison.

UNIT- III: HYDRO ELECTRIC AND NUCLEAR POWER PLANTS (9 Periods)

HYDRO ELECTRIC POWER PLANT: Selection of site for power plant, typical layouts, Elements of plant, classification of dams, spill ways, surge tank, draft tube; Classification of hydroelectric power plants, Hydrology, hydrological cycle, Hydrographs; Nuclear Power Plants: Requirements, functions, Nuclear fuel, breeding and fertile materials, nuclear reactor, reactor operation; Types Of Reactors: Pressurized water reactor, Boiling water reactor, Sodium-graphite reactor, Fast breeder reactor, Homogeneous reactor, Gas cooled reactor, Radiation hazards and shielding, radioactive waste disposal.

UNIT- IV:

NON CONVENTIONAL POWER GENERATION AND DIRECT ENERGY CONVERSION SYSTEMS (9 Periods)

Non-Conventional Power Generation: solar, wind, tidal, Ocean energy conversion, geothermal, and biogas power plants;Direct energy conversion systems: Thermoelectric conversion system, thermionic conversion system, photovoltaic power systems, Magneto hydrodynamic systems, electrostatic mechanical generators, electro gas-dynamic generators, and fuel cells.

UNIT -V: POWER PLANT ECONOMICS AND PLANT POLLUTANTS (9 Periods)

Load curves, Load duration curve, Definitions of connected load, Maximum demand, demand factor, Load factor, Plant capacity factor; Plant use factor; Diversity factor; Cost Analysis; Power plant pollution: pollutions from thermal, nuclear, hydroelectric and solar power plants.

Total Periods: 45

TEXT BOOKS:

1: R.K.Rajput. A Text Book of Power Plant Engineering, Laxmi Publications, 3rd edition, 2006.

2: Arora and S. Domkundwar, A Course in Power Plant Engineering, Dhanpat Rai and Co, 3rd Edition, 1988.

REFERENCE BOOKS:

1: P.K.Nag, Power Plant Engineering, TMH, 2nd edition, 2006.

2: K.K Ramalingam, Power plant Engineering, Scitech Publishers. 2nd edition, 2010.

3: C. Elanchezhian, L. Saravanakumar, B. Vijaya Ramnath, Power Plant Engineering, I.K. International, 1st Edition, 2010.

IV B.Tech - I Semester
14BT70310: **GEOMETRIC MODELING**
(Professional Elective- II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Computer Aided Engineering Drawing, CAD/CAM, Computer Aided Machine Drawing.

COURSE DESCRIPTION:

Basic concepts of coordinate systems; Output primitives; 2-D and 3-D geometrical transformations and viewing; Surface detection methods; advanced modeling concepts.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1. Understand the role of computer graphics in the context of the object representation.

CO2. Represent and generate points, lines and circles using algorithms.

CO3. Work with multiple 2-D and 3-D geometrical transformations to represent and solve engineering problems.

CO4. Execute design projects through implementation of Modeling & Analysis Packages.

Detailed Syllabus:

UNIT -I: GRAPHICS CONCEPTS (2D AND 3D) (9 Periods)

Introduction to CAD process; Application area of Computer graphics, Output primitives: Points, lines and Circles, Drawing algorithms; transformations in Graphics - Coordinate systems, 2-D Transformations, Homogeneous and combination Transformations, 3-D Transformations- Projections, Techniques of Scan Conversion; Rendering, Hidden surface removal.

UNIT-II:MATHEMATICAL REPRESENTATION OF CURVES (8 Periods)

Types and Parametric Representations of Analytic Curves; wire frame models - Wire frame entities; parametric representation of synthetic curves - Hermite cubic splines, Bezier curves, B-splines rational curves; Curve Manipulations - Displaying, Evaluating points on Curves, Blending, Segmentation, Trimming, Intersection, Transformation.

UNIT -III: SURFACE MODELING (10 Periods)

Mathematical representation surfaces, Surface model, Surface entities surface representation; Parametric representation of surfaces: plane surface, rule surface, surface of revolution, Tabulated Cylinder, Parametric Representation of Synthetic Surfaces: Hermite Bicubic surface, Bezier surface, B-Spline surface, Coons surface, Blending surface, Sculptured, surface, Surface manipulation: Displaying, Segmentation, Trimming, Intersection.

UNIT -IV: SOLID MODELING (9 Periods)

Solid models, solid entities, Solid Representation; Fundamentals of Solid Modeling, Set Theory, Regularized Set Operations, Set Membership Classification; Boundary Representation (B-rep); Constructive Solid Geometry (CSG);Solid Manipulations, Displaying, Evaluating points, Curves and Surfaces on solids, Segmentation, Trimming and Intersection, Editing.

UNIT -V: ADVANCED MODELING CONCEPTS: (9 Periods)

Feature Based Modeling, Assembling Modeling, Behavioral Modeling, and Conceptual Design & Top down Design; Capabilities of Modeling & Analysis Packages such as solid works, Unigraghics, Ansys, Hyper mesh; Computer Aided Design of mechanical parts and Interference detection by motion analysis.

Total Periods: 45

TEXT BOOKS:

1. David F Rogers, Mathematical Elements for Computer Graphics, TMH. 2nd Edition 2010
2. Ibrahim Zeid, CAD/CAM - Theory and Practice, TMH, 2nd edition, New Delhi, 2010.

REFERENCE BOOKS:

1. Donald Hearn and M.Pauline Baker, Computer Graphics C version Pearson India. 2nd Edition, 1997.
2. Radhakrishnan.P, CAD/CAM/CIM, New age international, 3rd Edition, 2008.

IV B.Tech - I Semester

14BT70311: **ADVANCED WELDING TECHNOLOGY**

(Professional Elective -II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Workshop, Manufacturing Technology, Manufacturing Technology Lab

COURSE DESCRIPTION:

Welding and allied processes; heat flow in welding;basic metallurgy of fusion welds; welding stress and distortion, cracks in welds, weldability and weldability tests, weldability of specific materials, weld defects; weld inspection and quality control; weld joints, weld symbols; heavy welded fabrication; expert systems in welding

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Interpret welding symbols and the type of welded joint to be selected for fabrication process.

CO2: Describe the effect of welding parameters and accomplish an optimized choice weld ara meters etc. including optimization of quality and costs.

CO3: Locate the cracks in welded components using inspection methods and analyze the factors contributing towards the cracks and defects.

CO4: Use standards and codes for specifying welded elements.

Detailed Syllabus:

UNIT - I: WELDING AND WELDING PROCESSES (9 Periods)

Classification of welding and allied processes, Cast weld process, Arc and flame welding process, Resistance welding process, Solid-state welding process, Allied process, Thermal cutting process, Modes of welding and positions in welding, Types of joints and weld symbols.

UNIT - II: HEAT FLOW IN WELDING (9 Periods)

Introduction to heat flow in welding, resistance welding, Metallurgical effects of heat flow in welding, Time-Temperature-Transformation diagrams(TTT curves),Continuous Cooling Transformation diagrams(CCT curves), Weld metal zone, Fusion boundary zone, Heat affected zone, Properties of heat affected zone, Residual stresses, Causes of the development of residual stresses.

UNIT- III: CRACKS IN WELDS AND WELDABILITY (9 Periods)

Aims of preheating, Methods of preheating, Classification of weld cracks, Nomenclature, location and orientation of weld cracks, Factors contributing to weld cracking, Weldability assessment, Weldability tests-Theoretical, Simulated, Visual examination for weldability, Component sampling tests, Actual welding tests.

UNIT - IV: WELD DEFECTS, INSPECTION AND QUALITY CONTROL (9 Periods)

Classification of weld defects, General sources of weld defects, Weld defects in various welding processes, Visual inspection and measurement, Destructive tests, Non-Destructive tests, Pressure and Leak testing.

UNIT - V: EXPERT SYSTEMS IN WELDING WELDING CODES AND STANDARDS (9 Periods)

Expert Systems-Structure and working methodology, Types of expert systems, Explanation of weldex, Welding Information Network(WIN), Introduction to codes and standards, Welding procedure specification, Welding performance qualification.

Total Periods:45

TEXT BOOKS:

1. Dr.R.S.Parmar, Welding Engineering and Technology, Khanna Publishers, 2nd edition, 2010.
2. Richard L Little, Welding and Welding Technology, Tata McGraw Hill, 2004.

REFERENCE BOOKS:

1. Srinivasan.N.K., Welding Technology, Khanna Publications, Delhi, 1995.
2. Nadkarni S.V., Modern Welding Technology, Oxford IBH Publishers, 1996.

IV B.Tech - I Semester

14BT70312: **ENTREPRENEURSHIP**

(Professional Elective -II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Managerial Economics and Principles of Accountancy, Industrial Engineering & Management, Operations Research.

COURSE DESCRIPTION:

Introduction to Entrepreneurship ; Cultural diversity of entrepreneurship; Creating and starting the venture; Product planning and development process; Writing business plan; Launching formalities; Venture expansion and harvesting strategies; Methods of protecting innovation and creativity; Start-up capital and financial statements; Venture life cycle and valuation; E-commerce and growing the venture.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO 1: Develop an entrepreneurial mindset to deal with high uncertainty in regional and global market environments.

CO 2: Develop a business concept from an idea.

CO 3: Broaden the understanding of the status of the ethical and legislative framework which supports entrepreneurship development.

CO 4: Develop critical thinking and problem solving skills through creativity, innovation and logical applications.

CO 5: Identify information needs and sources for each critical section of the business plan.

CO 6: Develop a financial plan for a business venture to be submitted to a financing agency.

CO 7: Appreciate the increasing impact of disruptive innovations which lead to rapid transformation of current knowledge, technology and industries.

UNIT - I: ENTREPRENEURIAL MINDSET (10 Periods)

The nature and growth of entrepreneurship; Entrepreneurship and Intrapreneurship; Entrepreneurship and Small business management; Types of Entrepreneur: Nascent, Novice, Habitual, Serial, Portfolio; Characteristics of an entrepreneur; Cultural diversity of entrepreneurship; Mistakes of entrepreneurs; Factors that contribute to the success of entrepreneurs ; Myths of entrepreneurship; Ethics and social responsibility of entrepreneurs.

UNIT - II: ENTREPRENEURIAL PROCESS (8 Periods)

Generating ideas; Opportunity identification; Business concepts; Resources: Financial, Physical and Human; Implementing and managing the venture; Harvesting the venture; Harvesting strategies: absorption of new concept into mainstream operations, licensing of rights,family succession, go public (IPO), employee share ownership plan (ESOP), liquidate (Shut down) venture, selling the venture, management buy-out (MBO), mergers and acquisitions.

UNIT-III: CREATIVITY AND INNOVATION (9 Periods)

Principles of creativity and innovation; Disruptive, incremental and open innovations; Nurturing and managing innovation; Methods of protecting innovation and creativity: Intellectual property rights, Branding, Trademarks, Patents, Copyrights, Registered design protection, Trade secrets (processes, techniques, confidential disclosure agreements).

UNIT - IV: NEW VENTURE PLANNING AND CREATION (10 Periods)

Market research (venture opportunity screening); Feasibility analysis; Start-up capital; Sources of funding: equity financing, debt financing (loans, venture funding, angel funding), grants, gifts, bequests and financial statements; Developing the business model; Introduction to the business plan.

UNIT - V: MANAGING AND GROWING THE VENTURE (8 Periods)

Venture life cycle: new venture development, start-up activities, venture growth, business stabilization, innovation or decline; Venture models: promising start-ups, venture-backed start-ups, corporate-supported start-ups; Venture valuation methods: book value (balance sheet value), price earnings (multiple earnings value), discounted future earnings (discounted cash flow); E-Commerce and growing the venture.

Total Periods: 45

TEXT BOOKS:

1. Robert D. Hisrich, Mathew J. Manimala, Michael P. Peters, Dean A.Shepherd, Entrepreneurship, McGraw Hill Education (India) Private Limited, Eighth Edition, 2013.
2. Barringer, B.R., and D. Ireland, Entrepreneurship: Successfully Launching New Ventures, Pearson Education, Third Edition, 2011.

REFERENCE BOOKS:

1. S. S. Khanka, Entrepreneurial Development, S.Chand Publishing, Fourth revised Edition, 2012.
2. Norman M. Scarborough, Essential of Entrepreneurship and Small Business Management, PHI, Fifth Edition, 2011.

IV B.Tech - I Semester

14BT70321: **METROLOGY & MEASUREMENTS LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:

10+2 Physics, Engineering Physics, Machine Drawing, Machine tools.

COURSE DESCRIPTION:

Need of high precision Metrology and various techniques available with emphasis on standardization; Calibration of instruments such as Vernier calipers, Micrometer, Vernier height gauge etc. by using standard slip gauges; Measure dimensions of shafts, bearings &some other components in metric and imperial units using linear and angular measuring instruments; Alignment tests on lathes and milling machines; Straightness and flatness measurements by using spirit-level and auto collimeter; Identifying uncertainties in dimensional metrology by calculating errors ; Measurement of gear and threaded profiles by profilometer and toolmakers microscope; study of Bordan pressure gauge, LVDT and other instruments; piezoelectric and capacitive transducers.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Choose correct measurement tools and /or measurement systems in a practical situation.

CO2: Identify sources of measurement errors and eliminate them.

CO3: Use common and advanced Metrology and measurement appliances which are commonly used in industrial inspection process.

CO4: Measure surface roughness by precision measuring instruments such as SJ 210 roughness tester, Autocollimator and Calibrate instruments and/or measurement systems using known standards.

Any TWELVE experiments to be conducted (Six from Each)

PART-A: METROLOGY LAB

1. Measurement of lengths, Heights, Diameters, Internal bores by Vernier, Micrometer, Internal micrometer and dial bore indicators.
2. (a) Measurement of angle and taper by using Bevel protractor,sine bars.
   (b) Measurement of angle of taper plug gauge, Taper ring gauge, V- groove, and Radius of given ring.
3. Measurement of coordinates of a jig plate.
4. (a) To find module, Addendum, Dedendum, Pitch circle diameter, Tooth width, Pressure angle of a given spur gear by using gear teeth vernier.
   (b) Measurement of gear elements using profilometer.
5. (a) Study of screw thread profile using Tool Makers microscope.
   (b) Measurement of effective diameter of an external thread by using Two Wire/Three wire method.
6. (a) Measurement of straightness and flatness using spirit level and Autocollimator.
   (b) Measurement of surface roughness.
7. Checking the limits of dimensional tolerances using comparators
8. (a) Alignment test on lathe machine.
   (b) Alignment on milling machine.

PART-B: MEASUREMENTS LAB

1. Calibration of Bourdon Pressure Gauge.
2. Calibration of transducer for temperature measurement (RTD).
3. Study and calibration of LVDT transducer for displacement measurement.
4. Calibration of strain gauge for load measurement.
5. Calibration of capacitive transducer for angular displacement.
6. Study and calibration, measurement of speed pickups using Stroboscope.
7. Study of Piezo electric transducer.

IV B.Tech - I Semester

14BT70322: **MANUFACTURING SYSTEMS SIMULATION LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:

Industrial Engineering and Management, CAD/CAM and Operation Research

COURSE DESCRIPTION:

Modeling and simulation of conventional and advanced manufacturing systems; introduction to simulation softwares like Promodel, Arena, Lingo, SPSS, SAS and other softwares in order to demonstrate, predict and measure system strategies for effective, efficient and optimized performance of manufacturing systems.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO 1: Employ knowledge of the methodologies of designing and simulating a manufacturing system for prediction of performance under various constraints.

CO 2: Analyze different industrial systems, identify the problems, formulate and model the problems, and find solutions to these problems using simulation.

CO 3: Model real life industrial systems using computer simulation methodologies and identify the bottlenecks.

List of Experiments(Any twelve experiments to be conducted)

1. Solving LPP, Transportation, assignment problems using excel solver and or packages.
2. Solving inventory, scheduling lot sizing problems using manufacturing systems simulation software
3. Solving queuing problem and layout optimization using manufacturing systems simulation software
4. Building simulation models for manufacturing operations with layout and transport system.
5. Project evaluation and review based on time and cost
6. Weibull reliability plot creation using component / product failure data
7. Line balancing using manufacturing systems simulation software
8. Current state and future state mapping using value stream mapping software
9. Process capability studies using statistical software
10. Analysis of DoE results using statistical software
11. Statistical Analysis of Simulation models (input analysis)
12. Statistical Analysis of Simulation models (output analysis)
13. 5S practice / Poka Yoke for workplace improvement
14. Design and simulation of a simple manufacturing system using ProModel software.
15. Design and simulation of a simple manufacturing system using Arena software.

At least one software package(s) from each area from the following:

(a) **Statistics** : SYSTAT/MINITAB/SPSS/SAS
(b) **Simulation** : Flexsim/ARENA, ProModel, QUEST/WITNESS
(c) **OR packages** : LINGO/EXCEL

IV B.Tech - I Semester

14BT70323: **SEMINAR**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	50	50	-	-	-	2

PRE-REQUISITES:

All the courses of the program up to III B. Tech. - I Semester.

COURSE DESCRIPTION:

Identification of the topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES:

After completion of seminar work,a sucessful student will be able to:

CO1. Employ the fundamental knowledge in studying and simulating published works using the tools learnt.
CO2. Analyze critically chosen seminar topic for substantiated conclusions.
CO3. Apply the concepts of design and modeling learnt to the he seminar topic chosen and explore possible new ideas.
CO4. Identify subcomponents in the literature study with a view to solve a manageable subproblem in depth.
CO5. Use the appropriate techniques, resources and modern engineering tools necessary for conducting seminar work.
CO6. Explore possible avenues where mechanical engineering solutions may yield social benefit.
CO7. Study an existing problem and identify where possible environ mentally sustainable solutions to Mechanical Engineering problems.
CO8. Identify, after a thorough study, an ethically sound practice and implement it in a Mechanical Engineering situation.
CO9. Communicate clearly, fluently, and cogently both in written and spoke contexts.
CO10. Sustain everlasting curiosity to delve into the unknown and to have an attitude of attention to detail.

IV B.Tech - II Semester

14BT80301: PRODUCTION AND OPERATIONS MANAGEMENT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:
Industrial Engineering and Management

COURSE DESCRIPTION:
Overview of production and operations management concepts and issues from both strategic and operational perspective; relationships between operations and environment; analysis of strategic issues relating to competitiveness in production and operations management, and application of tools to improve productivity in production and operations; concepts/principles related to management of operations – forecasting demand; production, material and capacity requirements planning, scheduling; supply chain management systems.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Apply various planning practices of capacity planning, aggregate planning, project planning and scheduling.
CO2: Analyze the operations of an organization and integrate operations management principles and concepts to assess and improve operational performance.
CO3: Use basic management tools used in planning, scheduling and controlling production processes and costs and establish methods for maximizing productivity.
CO4: Optimize the use of resources which include plant, equipment, tools, premises and information systems.
CO5: Determine the necessary steps to increase the levels of skill, motivation and commitment in the workforce.

Detailed syllabus:

UNIT- I: OPERATIONS MANAGEMENT CONCEPTS (9 periods)
Introduction, Historical development, Information and Nonmanufacturing systems, Operations management, Factors affecting productivity, International dimensions of productivity, environment of operations, Production systems decisions.

UNIT- II : FORECASTING DEMAND (9 periods)
Forecasting objectives and uses, Forecasting variables, Opinion and judgmental methods, Time series methods, Exponential smoothing, Regression and correlation methods, Application and control of forecasts.

UNIT-III: AGGREGATE PRODUCTION PLANNING (9 periods)
Planning hierarchies in operations, Need for aggregate production planning, Alternatives for managing supply and demand, Basic strategies for aggregate production planning - level, Chase and mixed, Aggregate production planning methods, Master production scheduling. Introduction to aggregate capacity planning.

UNIT-IV: MATERIAL REQUIREMENTS PLANNING & LEAN SYSTEMS (9 periods)
MRP-underlying concepts, Bill of Material, System parameters, MRP logic, System refinements. Manufacturing Resource Planning, Enterprise Resource Planning. Just-in-Time, Pull method of materials flow, Consistently high quality, Small lot sizes, Uniform workstation loads, Standardized components and work methods, Close supplier ties, Flexible workforce, Line flows, Automated production, Preventive maintenance, continuous improvement, Kaizen.

UNIT-V: MACHINE SCHEDULING & SUPPLY CHAIN MANAGEMENT (9 periods)
Flow shop scheduling- Introduction, Johnson's rule for 'n' jobs on 2 and 3 machines, CDS heuristic, Palmer Heuristic, Nawaz Heuristic Technique. Job scheduling- Types of schedules, Heuristic procedure, scheduling 2 jobs on 'm' machines. Supply chain components, Supply chain structures, Bullwhip effect, Role of information technology in Supply ChainManagement.

Total Periods: 45

TEXT BOOKS:

1. B.Mahadevan, Operations Management, Pearson education, 2nd edition,2010.
2. Everett E. Adams and Ronald J. Ebert, Production and Operations Management, PHI learning, 5th edition, 2009.
3. Lee J Krajewski, Larry P Ritzman and M K Malhotra, Operations management - Processes and Value Chains, 8th edition.

REFERENCE BOOKS:

1. S N Chary, Production and Operations Management, Tata-Mc Graw-Hill education (India), pvt limited, 2013.
2. Monks J.G., Operations Management, Schaums outline series, Mc Graw-Hill International Edition, 5th edition, 1996.
3. R Pannerselvam, Production and Operations Management, PHI learning, 2nd edition, 2009.

IV B.Tech - II Semester
14BT80302: **MECHATRONICS**
(Common to ME & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:
Engineering mathematics, Basics of Electrical and Electronic Engineering, Kinematics of Machines, Design of Machine Elements.

COURSE DESCRIPTION:
Mechatronic system; Signal Conditioning; Actuating systems; sensors; Transducers; Linear Motion Guides; Electronic interface systems; Solenoids; PWM; DC Motor; Micro controller; AD converter; DA converter; PLC; PMC.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Employ the knowledge of Mathematics, Electronics and Mechanical engineering to design a system or component with respect to Mechatronic specifications.
CO2: Analyze and interpret the performance of a Mechatronic component, a system, or a process with relevance to simulation techniques.
CO3: Provide system level design involving interfacing and actuation used in industries.
CO4: Independently plan and design and define a Mechatronic problem by utilizing relevant engineering principles and techniques.

Detailed Syllabus:

UNIT-I: SCOPE OF MECHATRONICS (8 Periods)
Definitions of Traditional and Mechatronics design; Mechatronics in manufacturing and production; Examples of Mechatronics systems; Fundamentals of electronics; and Data conversion devices.

UNIT-II: PRECISION MECHANICAL SYSTEMS (9 Periods)
Pneumatic and Hydraulic actuation system: Electro-pneumatic actuator; Electro-hydraulic actuator; timing belts; control valves; LVDT; linear motion guides; piezoelectric actuators.
Electro-mechanical drives: Electric motor; LVDT; DC motor; AC motor; DC brushless motor; DC servo motor; 4-Quadrant servo drives, and Pulse Width Modulation-Variable

UNIT-III: SIGNAL PROCESSING AND CONDITIONING (9 Periods)
Discrete Time signals: sequences; representation of signals on orthogonal basis; discrete systems; Z-transformation; frequency analysis; inverse systems; discrete Fourier transformations (DFT); frequency selective filters;ideal filter characteristics; low pass; high pass-bandpass and bandstop filters, and notch filters.
Electronic interface systems: sensors; transducers; solenoids; transistors; MOSFET isolation scheme; opto coupling; buffer ICs; protection schemes; circuit breakers; over current sensing; resettable fuses; thermal dissipation, and power supply.

UNIT -IV: MICROCONTROLLERS (9 Periods)
8051 Microcontroller; Microprocessor structures; DA interfacing; DA convertors; AD convertors, and applications.

UNIT -V: LOGIC AND MOTION CONTROLLERS (10 Periods)
Programmable Logic Controllers: Basic structure; ladder diagram; timers; internal relays and counters; shift registers; PLC selection, and applications.
Programmable Motion Controller: Introduction, system transfer function, Control system performance and tuning, Digital Controllers, proportional P, proportional PI, proportional integral derivative PID control modes, position, velocity, torque, velocity profiles, controlled velocity profiles and applications.

Total Periods: 45

TEXT BOOKS:

1. K.P.Ramachandran, Mechatronics Integrated Mechanical Electronic Systems,Wiley, 1stedition, 2008.
2. Devdas Shetty, Richard, Mechatronic system design, Cengage learning, 1st edition, 2012.

REFERENCE BOOKS:

1. W. Bolton, Mechatronics Electronics Control systems in mechanical and electrical engineering, Pearson, 3rd Edition, 2005.
2. N.P. Mahalik, Mechatronics Principles concepts and applications, McGraw Hill Education (India) Private Limited, 1st Edition, 2012.
3. Dr. J.S. Chitode, Digital Signal Processing,Technical Publication, 1st Edition,2008.

IV B.Tech - II Semester

14BT80303: **COMPUTATIONAL FLUID DYNAMICS**

(Professional Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Mathematics, Thermodynamics, Fluid Mechanics, Heat Transfer.

COURSE DESCRIPTION:

Introduction to CFD; various Numerical methods; Solution methods for governing equations; Finite difference method and its application to heat transfer problems; Errors and stability analysis; governing equations for fluid flow and heat transfer; dimensionless analysis for Study flows; CFD techniques:

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Employ the knowledge of computational fluid dynamics to build mathematical models to predict the solutions using different techniques.

CO2: Analyze the Fluid mechanics and heat transfer problems and offer probable solutions using Finite Differential approach.

CO3: Provide estimates of fluid properties, pressure loadings needed for further detailed design.

CO4: Identify subsets of large scale systems to simplify analysis.

Detailed Syllabus:

UNIT - I: BASICS OF CFD (9 Periods)

Introduction to CFD; Applications of CFD in various fields; Methods to solve a physical problem; numerical methods: Runge-kutta method; Solution of a system of simultaneous linear algebraic equations; iterative schemes of matrix inversion; direct methods for matrix inversions; Finite difference method applications in heat conduction and convention; steady heat conduction in a rectangular geometry; transient heat conduction; finite difference application in convective heat transfer.

UNIT - II: DISCRETIZATION TECHNIQUES (9 Periods)

Brief comparison between FDM, FEM & FVM.

FDM: Discretization; Consistency; Stability and Fundamentals of fluid flow modeling; Introduction to elementary finite difference quotients; implementation aspects of finite-difference equations; explicit and implicit methods.

UNIT - III: Stability Analysis and Governing Equations (9 Periods)

Errors And Stability Analysis: Types of Errors; Introduction to first order wave equation; stability of hyperbolic and elliptic equations;fundamentals of fluid flow modeling; conservative property; the upwind scheme. Review Of Governing Equations For Fluid Flow And Heat Transfer: Introduction; Conservation of mass Newton's second law of motion; Navier-Stokes equations and its expanded forms; conservation of energy principle.

UNIT - IV: Dimensionless analysis for Steady flow (8 Periods)

Steady Flow; Dimensionless form: momentum and energy equations, Navier-Stoke equation, and conservative body force fields, stream function; vorticity formulation; boundary layer theory; buoyancy; driven convection; and stability.

UNIT - V: CFD Techniques (10 Periods)

The Lax-Wendroff Technique; Maccormack's Technique; Viscous flows; Conservation form; Space marching; Relaxation techniques; artificial viscosity; the alternating direction implicit techniques; pressure correction technique: SIMPLE Algorithm; computer graphic techniques used in CFD; Quasi-one-dimensional flow through a nozzle; turbulence models and their applications.

Total Periods: 45

TEXT BOOKS:

1. John. D. Anderson, Computational Fluid Dynamics, the Basics with Applications, Mc Graw Hill.6th Edition, 1995.
2. Nu Sumas V. Patankar, Numerical Heat Transfer and Fluid Flow, 1st Edition, CRC, 1980.

REFERENCE BOOKS:

1. Jiyuan and Others, Computational Fluid Dynamics, Butterworth-Heinemann Ltd; 2nd Revised Edition, 2012.
2. Niyogi, Computational Fluid Flow and Heat Transfer, Pearson, 1st Edition, 2005.
3. Fun Tapan K. Sengupta, Fundamentals of Computational Fluid Dynamics, 1st Edition, Universities Press, 2004.

IV B.Tech - II Semester

14BT80304: **PRODUCT DESIGN**

(Professional Elective -III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Engineering Drawing, Manufacturing Technology, Design of Machine elements, Industrial Engineering and Management, CAD/CAM, Operations Research.

COURSE DESCRIPTION:

Introduction to Design process; Identifying customer needs, Product specifications; Concept Generation, Theory of Inventive Problem solving (TRIZ), Conception selection, Conception testing; Introduction to Embodiment design, product architecture, Industrial design, Design for Environment & Manufacturing, Prototyping, Robust design; Team Work and Ethical issues considered during Engineering Design Process.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Express the basic concept of Embodiment Design to translate conceptual designs to Engineering designs.

CO2: Identify the sources of information to support and accelerate Engineering design process.

CO3: Illustrate the methods to define the customer needs.

CO4: Employ the intuitive and advanced methods used to develop and evaluate a concept.

CO5: Exercise discretion to follow ethics during Engineering Design process.

Detailed Syllabus:

UNIT -I: INTRODUCTION TO DESIGN (7 Periods)

Considerations of a Good Design, Design Process, Concurrent and Computer aided engineering concepts, Design codes and Standards, Design Review and societal considerations.

UNIT -II: NEED IDENTIFICATION AND GATHERING INFORMATION (10 Periods)

Evaluating Customer requirements and Bench marking, Quality Function Development - House of Quality (HOQ), Product Design Specification, Information sources, Copyright, Expert systems.

UNIT -III: CONCEPT GENERATION AND EVALUATION (10 Periods)

Creativity and Problem solving, Theory of Inventive Problem solving, Conceptual Decomposition and Axiomatic Design, Decision concept evaluation and decision making.

UNIT -IV: EMBODIMENT DESIGN (11Periods)

Introduction to Product Architecture, Configuration and Parametric design Concepts, Industrial Design, Ergonomics and Design for Environment, Modeling and Simulation for engineering design process, Material selection and detailed design.

UNIT - V: TEAM WORK AND ETHICS IN ENGINEERING DESIGN (7 Periods)

Team formation, functioning, discharge, team dynamics, Ethical issues considered during engineering design process.

Total Periods: 45

TEXT BOOKS:

1. George E Dieter, Linda C. Schmidt, Engineering Design 4th Edition, McGraw Hill 2013.
2. Karl T Ulrich, Steven Eppinger, Anita Goyal, Product Design & Development 4th Edition, McGraw Hill 2009.

REFERENCE BOOKS:

1. A. K. Chitale; R.C. Gupta, Product Design and Manufacturing, 5th Edition, Prentice - Hall India 2011.
2. Dieter Kevin Otto and Kristin Wood, Product Design: Techniques in Reverse Engineering and New Product Development, 1st Edition, Pearson Education Inc 2003.
3. Ken Hurst, Engineering Design Principles, Elsevier 2010.

IV B.Tech - II Semester
14BT80305: ADVANCED CASTING TECHNOLOGY
(Professional Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:
Manufacturing Technology, Material science & Metallurgy.

COURSE DESCRIPTION:
Trends and Scope In Foundry Industry, Its scope and Position worldwide and in India; Properties and Applications of Modern Cast alloys, Computer aided Design and Manufacturing of patterns & Dies; Design of Gating System ,Principles of solidification and Nucleation Kinetics, Melting Practices and Furnaces for Ferrous and Non- ferrous Alloys ; Modern Molding and Mechanization in Foundries ,Molding Line layout, Special casting process such as Centrifugal, Investment castings etc. with calculations ,Limitations applications.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Identify the core trends in foundry Industry by thoughtful awareness on various foundry equipment, process.

CO2: Employ effective methods of gating, die and pattern making which involves computer aided design and manufacturing strategies.

CO3: Employ knowledge in selecting a suitable casting process considering several vital factors for a given product application.

Detailed Syllabus:

UNIT-I: INTRODUCTION AND DESIGN OF PATTERNS AND DIES (11 Periods)

Trends and Scope In Foundry Industry: Position of foundry industry worldwide And in India: analysis of data in respect of production and demand; recent trends in Quality specifications like dimensional accuracy, surface finish and property Requirements, specifications; properties and applications of modern cast alloys: SG iron. Al - alloys, Cu- alloys, Zn - alloys.

Design considerations in manufacturing of patterns and dies: Computer Aided Pattern design and manufacture; pattern making machines and equipments; Computer Aided design of dies in die-casting and centrifugal casting; Materials used: Epoxy resins and heat treated Al alloys, allowances in patterns and dies.

UNIT-II: GATING SYSTEM AND SOLIDIFICATION (8 Periods)

Design of Gating System: Elements and types of gating systems; gating ratio; Pressurized and non-pressurized gating; applications; Risers: types and Functions of risers; Directional solidification : factor affecting and significance; use of Exothermic sleeves; Bricks; chills and their types; types and uses of filters; Computer Aided design for gating and risering systems.

Principles of Solidification: Nucleation kinetics; Fundamentals of growth; Solidification of single phase alloys; Solidification of eutectic alloys.

UNIT-III: FURNACES AND MELTING PRACTICES (9 Periods)

Melting Practices and Furnaces for Ferrous and Non- ferrous Alloys: Melting Practices of Al - alloys, Mg - alloys, Cu - based alloys and Zn- based alloys and SG Iron; Degassing process and methods in Al - alloys; Modification treatment in Al- alloys; Use of covering fluxes to avoid oxidation; Furnaces used: oil and gas fired furnaces, Induction furnaces, rotary furnaces, arc furnaces; Desulphurization; Spherodisation Treatment; Inoculation practice; de-oxidation and alloy additions; Energy saving in melting practices.

UNIT-IV: MODERN MOLDING AND MECHANIZATION (9 Periods)

Modern Molding and Core making Various types of Sands used for molding and core making, Sand testing, high pressure line molding, shell molding binder, hardener ;shell molding sands , procedure, plants used, properties and Tests on shell sand, stick point strength, advantages and applications; Resin bonded sands, Alkyl resins, phenolic resins and furnace sands, cold box method of core making, ceramic molding, vacuum molding, sand reclamation.

Mechanization in Foundries: Conveying systems: Sand bins, belt conveyors, roller Conveyors, Bucket elevators; Pouring systems: Monorail, Auto pour systems; sand plants; Molding line Mechanization and stack molding.

UNIT-V: SPECIAL CASTING PROCESS (8 Periods)

Special Casting Processes: Investment casting processes and applications; Continuous casting processes and applications; Die casting, low pressure / Gravity, pressure and squeeze, advantages, limitations and applications; Centrifugal Casting: Calculations of various parameters in centrifugal casting, die temperature, Rotational speeds, advantages, limitations and applications of centrifugal casting, defects in centrifugal casting. **Total periods: 45**

TEXT BOOKS:

1. Heine, Loper and Rosenthal, Principles of Metal Castings, McGraw Hill Education (India) Private Limited, 2nd edition 2013.
2. P.L. Jain, Principles of Foundry Technology, McGraw Hill Education (India) Private Limited, 5th edition 2009.

REFERENCE BOOKS:

1. T.V. Ramana Rao, Metal Casting: Principles and Practice , New Age International , 1 st edition 2013 .
2. B Ravi, Metal Casting: Computer-Aided Design And Analysis, Phi Learning Pvt. Ltd, 1st edition 2010.
3. P.C Mukharjee, Fundamentals of Metal casting Technology, Oxford & IBH Pub. Co., 2nd edition 1988.

IV B.Tech - II Semester

14BT80306: **QUALITY MANAGEMENT & RELIABILITY**

(Professional Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Industrial Engineering and Management

COURSE DESCRIPTION:

Introduction to Quality, Stages of evaluation, Standardadization, ISO certification process, Quality costs;Control limits, Quality circles, 7QC Tools, control charts; Acceptance sampling evaluation, Acceptance sampling for continuous production; Realiability, Failure data analysis,Types of failures; Realiability improvement,Active and Standby redundancies, Reliability optimization, Maintainability and availability.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Employ concepts of standardization and bodies of standardization for improvement of quality.

CO2: Implement the various control charts and quality tools for inspection of quality.

CO3: Analyze evaluation of sampling plans for continuous quality production.

CO4: Develop failure hazard models to improve reliability.

CO5: Employ skills of active and standby redundancies for reliability optimization.

Detailed Syllabus:

UNIT-I: QUALITY AND QUALITY COSTS (9 Periods)

Definition of quality, product quality, quality control, factors affecting quality, stages of evaluation, continuous improvement, quality management system, quality standards, need for standardardization, Bodies of standardadization, ISO9000 series, ISO14000 series, ISO certification process. Quality costs-prevention, appraisal, internal failure and external failure costs, quality function deployment (QFD), tools for continuous improvement-Deming cycle, Poka-yoke, and Kaizen.

UNIT-II : QUALITY CIRCLES AND CONTROL LIMITS (9 Periods)

Quality Circles- Concepts, Objectives and advantage, Introduction to Six Sigma Concept- advantages and limitations. Control limits,7QC tools, Natural tolerance limits, Process Capability indices, setting tolerances on assemblies and components, Control charts for variables- X and R charts, Interpretation of control charts, Control Charts for Attributes- P chart, C chart, U chart, Quality Rating System.

UNIT-III: Acceptance Sampling (9 Periods)

Acceptance Sampling Plans for Attributes- Types of Sampling Plans, Advantages and disadvantages of Sampling Plans, Evaluation of Sampling Plans-OC Curve, Characteristics of OC Curve, producer risk and Consumer risk, AOQ, AQL, ATI, ASN, Brief introduction to Acceptance Sampling plans for continuous production and Acceptance sampling plan for variables.

UNIT-IV : Concepts Of Reliability (9 Periods)

Quality and reliability, Importance of reliability, Reliability data collection,Failure data analysis- MTTF, MTBF, Failure rate, Hazard rate, Failure rate curve, Types of failures-Hazard models (Exponential and Weibull), System Reliability with components in Series, in Parallel and Mixed configurations.

UNIT-V : RELIABILITY IMPROVEMENT (9 Periods)

Active and Standby redundancies, Fault Tree Analysis,reliability optimization, maintainability and availability , application of reliability in maintenance strategies.

Total Periods:45

TEXT BOOKS:

1. Dale H Besterfield et al, Total Quality Management, Pearson Education,3rd edition, 2011.
2. L S Srinath, Reliability engineering, East west press, 4th edition, 2005.

REFERENCES:

1. Howard Giltow, Quality Management,Tata McGrawhill, 3rd edition,2008.
2. Amitava Mitra, Fundamentals of Quality Control and Improvement ,Wiley,3rd edition,2013.
3. Grant E.L, statistical Quality Control,McGraw Hill education (India) Pvt limited, 7th edition,2005.

IV B.Tech - II Semester
14BT80307: NON- CONVENTIONAL ENERGY SOURCES
(Professional Elective - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:
Heat Transfer, Thermodynamics

COURSE DESCRIPTION:
Overview and importance of non-conventional energy sources; Solar Energy collection, solar energy storage and applications; Wind energy conversion; Biomass energy conversion; Geothermal energy Conversion; Ocean energy conversion: Ocean thermal energy conversion, Wave energy and tidal energy conversion.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Employ the knowledge of non-conventional energy resources and build mathematical models to predict their performance.
CO2: Analyze requirements for various non-conventional energy conversion systems and propose probable designs for improvement of performance.
CO3: Present the feasible non-convention energy conversion systems for the different parts of the society.
CO4: Identify non-conventional energy conversion in a given geo-graphic region to reduce environmental pollution.

UNIT- I: ENERGY CONSERVATION AND SOLAR ENERGY(9 periods)

Basics of energy sources and Conservation: Classification and potential of energy sources, Importance of renewable energy sources and energy chain, principles of energy conservation, energy conservation opportunities

Fundamentals of Solar Energy: Extra terrestrial and terrestrial radiation, solar constant and solar radiation geometry, solar time and day length, estimation of monthly average daily total radiation on horizontal surface and tilted surface , measurement of solar radiation: Pyranometer, Pyrheliometer and Sunshine recorder.

UNIT - II: SOLAR ENERGY COLLECTION DEVICES (9 periods)

Flat plate collector, losses through flat plate collector: Top loss, side loss and bottom loss coefficients (no problems), transmissivity of the cover system, transmittance-absorptance product, parameters affecting the collector performance, efficiency of flat plate collector, selective surfaces, air collectors and types, classification and types of concentrating collectors, tracking of cylindrical paraboloid concentrating collector.

UNIT-III: SOLAR THERMAL ENERGY APPLICATIONS AND LATEST TRENDS IN NCES (9 periods)

Solar Thermal Applications: Methods of storing solar energy, solar water heating, Impact of conventional energy sources on environment, applications of solar thermal energy: solar refrigeration, solar thermal power generation, solar distillation, solar space heating and space cooling, solar pond, solar green house.

Solar Voltaic Systems & Emerging Technologies

Basic principle of PV cell, arrangements of PV cells, classification of PV cell, principle of power generation through Magneto Hydro Dynamics, power thermo electric and thermionic power generation, fuel Cell: H2-O2 cell, molten carbonate cell.

UNIT-IV: WIND ENERGY AND BIOMASS ENERGY CONVERSION (9 periods)

Wind Energy Conversion: Origin of wind, application of wind power, components and working of horizontal axis wind turbine, Betz limit, types of blades, upwind and downwind turbines , vertical axis Wind turbines: Savonius type, Darrieus type.

Biomass Energy Conversion: Photosynthesis process, Classification of biogas plants, Types of Digesters: KVIC and Deenabandhu digesters, Factors affecting digester performance of digester, Gasification , Types of gasifiers: Updraught, Downdraught and Cross draught gasifiers.

UNIT-V: GEOTHERMAL AND OCEAN ENERGY CONVERSION: (9 periods)

Geothermal Energy Conversion: Introduction, geothermal sources : Hydro thermal resources, geopressurized resources, hot dry rocks, Power generation through liquid dominated system, vapour dominated system and hot dry rocks, applications of geothermal energy, environmental consideration.

Ocean Energy Conversion: Ocean thermal Energy conversion: Lambert's law-, OTEC conversion technologies: Claude cycle and Anderson cycle.

Tidal energy conversion: Introduction, tidal energy conversion: single basin and double basin systems.

Wave energy conversion: Introduction, conversion methods: float method, high level reservoir machine and dolphin type machine. **Total Periods: 45**

TEXT BOOKS:

1. G.D, Rai, Non-conventional Energy Sources, 5th Editon, Khanna Publichers, 2011.
2. S.Rao and B.B Parulekar, Energy Technology , 3 rdEdition, Khanna Publishers, 2012.

REFERENCE BOOKS:

1. S.P.Sukhatme and J.K Nayak, Solar Energy principles of thermal collection and storage, third edition, TMH, 2008.
2. B.H.Khan, Non-conventional Energy Sources , 1st Edition, TMH, 2006.
3. W.R.Murphy & G.Mckay, Energy Management , 2nd Edition, Butterworth, London, 2007.
4. B.Sreenivasa Reddy & K.Hemachandra Reddy [2007], Thermal data hand book, IK International Publishers, Bangalore.

Note: Thermal Engineering data hand book is permitted during examinations. (Reference book no. 3)

IV B.Tech - II Semester
14BT80308: **COMPOSITE MATERIALS**
(Professional Elective-IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:
Engineering Mechanics, Materials Science

COURSE DESCRIPTION:
Composite materials and their classifications; various reinforcements and manufacturing methods; Hook's law and Hygrothermal stress-strain relationship; micromechanical analysis of a lamina and laminates; failure analysis and design of laminates.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO1: Identify and explain the types of composite materials and their characteristic features.

CO2:. Employ the theoretical basis of the experimental techniques to analyze the failure mode of composites and compute the elastic and strength properties of laminates using micromechanical theory.

CO3: Use the applicable engineering of composites in the design of light weight components.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO COMPOSITE MATERIALS (8 periods)
Introduction, Classification: Polymer matrix composites, Metal matrix composites, Ceramic matrix Composites, Carbon-Carbon Composites, Fiber, Reinforced composites and nature-made composites and applications.

UNIT - II: TYPES OF REINFORCEMENTS (9 Periods)
Fibres-Glass, Silica, Kevlar, Carbon, Boron, Silicon carbide, and boron carbide, Fibres, Particulate composites, Polymer composites, Thermoplastics, Thermosets, Metal matrix and ceramic composites.
Manufacturing methods
Autoclave, Tape production, Moulding methods, Filament winding, Man layup, Pultrusion, RTM.

UNIT - III: Macro mechanical Analysis of a Lamina (10 Periods)
Introduction, Definitions: Stress, Strain, Elastic Moduli, Strain energy, Hooke's law for different Types of materials, Hooke's law for a 2-D, Unidirectional Lamina, Plane stress assumption, Reduction of Hooke's law in three dimensions to two dimensions, Relationship of compliance and stiffness matrix to Engineering elastic constants of a lamina, Tsai-Hill failure theory, Tsai-Wu failure theory, Comparison of experimental results with failure theories, Hygrothermal stresses and strains in a Lamina: Hygrothermal stress-strain relationships for a unidirectional lamina, Hygrothermal stress-strain relationships for an angle lamina

UNIT-IV: MICROMECHANICAL ANALYSIS OF A LAMINA (11Periods)
Introduction, Volume and mass fractions, Density and void content, Evaluation of the four elastic moduli, Strength of materials approach, Semi empirical models, Elasticity approach, elastic moduli of lamina with transversely isotropic fibers, Ultimate strengths of a unidirectional lamina, Coefficients of thermal expansion, Coefficients of moisture expansion.

UNIT - V: MACRO MECHANICAL ANALYSIS OF LAMINATES (7 periods)
Introduction, Laminate Code, Stress-Strain Relations for a Laminate, In-Plane and Flexural Modulus of a Laminate, Hygrothermal Effects in a Laminate, Warpage of Laminates, Failure criterion for a laminate, Design of a laminated composite, Other mechanical design issues.

Total Periods: 45

TEXT BOOKS:
1. Isaac and M Daniel, Engineering Mechanics of composite Materials, Oxford University Press.
2. R. M. Jones, Mechanics of Composite Materials, Mc Graw Hill Company, New York.

REFERENCE BOOKS:
1. B. D. Agarwal and L.J. Broutman, Analysis and Performance of Fibre Composites, Wiley-Interscience, New York.
2. Autar K. Kaw, Mechanics of Composite Materials, (Mechanical Engineering), 2nd edition, CRC Publications.
3. Kishan K. Chawla, Composite Materials Science and Engineering, Springer.

IV B.Tech - II Semester

14BT80309: **RAPID PROTOTYPE TECHNOLOGY**

(Professional Elective-IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

CAD/CAM; Manufacturing Technology; Computer Aided Machine Drawing.

COURSE DESCRIPTION:

History of RP systems; Stereo; Data files and machine details; Type of machines; Solid Ground Curing; Principle of operation, Machine details; Applications; Thermal jet printer; 3-D printer; Genisys Xs printer HP system 5; Indirect Rapid tooling, Silicone rubber tooling; Aluminum filled epoxy tooling; Tooling; Quick cast process; Copper polyamide; Rapid Tool; DMILS; Software For RP; STL files; Overview of Solid view; Collaboration tools; Rapid manufacturing process optimization; Vacuum; Casting, Surface digitizing; data transfer to solid models.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1. Identify the tools needed to produce a prototype of the product using RPT techniques.

CO2. Analyze the simulation/prototyping need and select an RPT system in a given situation for economy and rapid results.

CO3. Use both hardware and software tools to enhance the productivity in an RPT process.

Detailed syllabus:

UNIT -I: INTRODUCTION (9 periods)

Definition of Prototype, Types of prototypes, Need for the compression in product development, History of RP systems, Survey of applications, Growth of RP industry, and classification of RP Systems.

UNIT -II: STEREO LITHOGRAPHY SYSTEMS (9 periods)

Principle, process parameters, process details, data preparation, data files and machine details, Application.

Selective Laser Sintering: Type of machine, principle of operation, process parameters, and data preparation for SLS, applications, and Fusion Deposition Modeling: Principle, process parameters, path generation, applications.

UNIT -III: SOLID GROUND CURING (9 periodS)

Principle of operation, Machine details, Applications, Laminated Object Manufacturing: Principle of operation, LOM materials, process details, application.

Concepts Modelers: Principle, Thermal jet printer, Sander's model market, 3-D printer, Genisys Xs printer HP system - 5, object Quadra systems.

UNIT -IV: RAPID TOOLING (9 periods)

Indirect Rapid tooling, Silicon rubber tolling, Aluminium filled epoxy tooling, Spray metal tooling, cast kirksite, 3D Keltool, Direct Rapid Tooling - Direct, AIM, Quick cast process, Copper polyamide, Rapid Tool, DMILS, Prometal, Sand casting tooling, Laminate tooling soft Tooling Vs Hard tooling.

UNIT -V: SOFTWARE FOR RP (9 periods)

STL files, Overview of Solid view, magics, magic communicator, Internet based software, Collaboration tools, Rapid Manufacturing Process Optimization: factors influencing accuracy, data preparation errors, Part building errors, Error in finishing, influence of build orientation.Allied Processes: Vacuum casting, surface digitizing, and surface generation from point cloud, surface modification, data transfer to solid models.

Total Periods: 45

TEXT BOOKS:

1. Paul F. Jacobs, Stereo lithography and other RP and M Technologies, SME, New York, 3rd edition, 1996.
2. Frank W. Liou, Rapid Prototyping and Engineering Applications, CRC Press Taylor and Francis Group, New York, Special Indian Edition, 2011.

REFERENCE BOOKS:

1. Fiham D.T, Dinjoy S. S, Rapid manufacturing, Verlog, London, 4th edition, 2002.
2. C. K. Chua, K. F. Leong, C. S. Lim, Rapid Prototyping - Principles and Applications,
3. Yesdee publications Pvt. Ltd., Mumbai, India, 2nd edition, 2010.
4. Hari Prasad, K.S. Badarinarayan, Rapid Prototyping and Tooling, SIP PageT uners, Bangalore, 1st Edition, 2013.

IV B.Tech - II Semester

14BT80310: **PROJECT MANAGEMENT**

(Professional Elective -IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES:

Industrial Engineering and Management, Managerial Economics and Principles of Accountancy, and Operations Research.

COURSE DESCRIPTION:

Project Characteristics; Project Selection; Economics; Feasibility Assessment and Evaluation; Project integration; Project scope management; Project time and cost management; Organizational and Work Breakdown; Scheduling; Budgeting; Project Control; Project Auditing; Financing for projects.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO1: Identify the resources required for a project and to produce a work plan and resource schedule.

CO2: Utilize key performance metrics and audit report in planning a project for success.

CO3: Monitor the progress for effective control of the project.

CO4: Steer the projects for maximizing societal benefit.

CO5: Employ ethical practices in implementing projects.

CO6: Provide accurate cost estimates and to plan various activities accordingly.

Detailed Syllabus:

UNIT -I: PROJECT SELECTION AND PLANNING (10 periods)

Project identification and formulation; Needs analysis: Resource surveys, Market research; Identification of investment opportunities; Feasibility analysis: Technical feasibility; Technology forecasting: Choice of technology, Techno economic analysis, Appropriate technology; Project environment: Nature, and Characteristics of projects; Projects screening: Project selection, Project portfolio process; Project life cycle; Work content: Work breakdown structure; Systems integration; Interface coordination; Social Cost Benefit Analysis.

UNIT -II: PROJECT IMPLEMENTATION (9 periods)

Estimating Project Budgets; Process of cost estimation; Project Scheduling tools; Developing Project Plan (Baseline); Project cash flow analysis; Project scheduling with resource constraints: Resource Leveling and Resource Allocation; Project Execution and Administration; Project contracting: Contract pricing, project time monitoring and cost monitoring, Project over runs.

UNIT -III: MONITORING AND INFORMATION SYSTEMS (8 periods)

Information needs and the reporting process; computerized project management information system; Earned value analysis; Planning-Monitoring-Controlling cycle; Project control: types of control processes, design of control systems, control of change and scope.

UNIT -IV: PROJECT APPRAISAL AND PROJECT AUDITING (9 periods)

Project Appraisal: Objectives, essentials of a project methodology, Market appraisal, Technical appraisal, Financial appraisal, Socio-economic appraisal, Management appraisal; Post-Project analysis: Construction and use of audit report, Project audit life cycle, Essentials of audit and evaluation, Varieties of project termination, the termination process.

UNIT -V: PROJECT FINANCING (9 periods)

Rationale of Project Financing; Essential elements of project financing; Analysis of project viability and risk management; Ownership and Financial Structuring; Legal Documentation; Project financing in India and abroad: Source, schemes, and various incentives for new projects.

Total Periods: 45

TEXT BOOKS:

1. Prasanna Chandra, Projects: Planning, Analysis, Selection, Financing, Implementation and Review, McGraw Hill Education (India) Private Limited, 8th edition, 2014.
2. Jack R. Meredith, and Samuel J. Mantel Jr., Project Management - A Managerial Approach, Wiley India Pvt. Ltd., New Delhi, 8th Edition, 2012.

REFERENCE BOOKS:

1. Harold Kerzner, Project Management - A Systems Approach to Planning, Scheduling and Controlling, Wiley India Pvt. Ltd., New Delhi, 10th Edition, 2013.
2. Larry Richman, Project Management: Step-by-Step, PHI Learning Private Limited, 2011.

IV B.Tech - II Semester

14BT80321: **COMPREHENSIVE VIVA-VOCE**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	100	100	-	-	-	2

PRE-REQUISITES:
All courses of the program.

COURSE DESCRIPTION:
Assessment of student learning outcomes.

COURSE OUTCOMES:

Comprehensive Viva-Voce enables a successful student to:

CO1: Demonstrate knowledge in the program domain.

CO2: Present his views cogently and precisely.

CO3: Exhibit professional etiquette suitable for career progression.

IV B. Tech. II Semester

14BT80322: **PROJECT WORK**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
60	140	200	-	-	-	10

PRE-REQUISITES:

All the courses of the program up to IV B. Tech. - I Semester.

COURSE DESCRIPTION:

Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES:

On completion of project work the student will be able to

CO1: Employ the fundamental knowledge to develop mathematical models and to infer useful mechanical engineering insights.

CO2: Analyze a situation or mechanical system and identify possible ideas for practical implementation.

CO3: Design mechanical engineering systems to meet the requirements specified in a given application.

CO4: Identify manageable sub-problems from complex situations for quicker solutions through rigorous research methodology.

CO5: Select and employ suitable hardware and software tools to enhance productivity as a Mechanical Engineer.

CO6: Understand the implications of mechanical systems from societal benefit point of view.

CO7: Understand the impact of project results in the context of environmental sustainability.

CO8: Understand professional and ethical responsibilities for sustain able development of society in chosen field of project.

CO9: Work effectively and amicably in a diverse group and lead the group towards excellence in Mechanical Engineering.

CO10: Communicate clearly, fluently, and cogently both in written and spoken contexts.

CO11: Manage finances and sizeable projects by choosing the right blend of common sense solutions, rigorous analytical tools, and time-tested traditional methods.

CO12: Exhibit sustained curiosity to delve into the unknown and to have an attitude of attention to detail.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

(Affiliated to J.N.T. University Anantapur, Anantapuramu)

ACADEMIC REGULATIONS

M.Tech. Regular Two Year Degree Program
(for the batches admitted from the academic year 2014–15)

For pursuing Two year degree program of study in Master of Technology (M.Tech) offered by Sree Vidyanikethan Engineering College under Autonomous status and herein after referred to as SVEC (Autonomous):

1. **Applicability** : All the rules specified herein, approved by the Academic Council, shall be in force and applicable to students admitted from the academic year 2014-2015 onwards. Any reference to "College" in these rules and regulations stands for SVEC (Autonomous).
2. **Extent:** All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, SVEC (Autonomous) shall be the Chairman, Academic Council.
3. **Admission** :

3.1. Admission into first year of Two Year M.Tech. Degree Program of study in Engineering:

3.1.1. Eligibility:

- A candidate seeking admission into the first year of two year M.Tech Degree Program should have
  - (i) Passed B.Tech / B.E or equivalent Program recognized by JNTUA, Anantapuramu, for admission as per the guidelines of Andhra Pradesh State Council of Higher Education (APSCHE).
  - (ii) a minimum percentage of marks in the qualifying degree as prescribed by the AICTE/UGC or Government at the time of admission.
- Admissions under General category & SC/ST Category shall be made either on the basis of merit rank obtained by the qualified candidates at an Entrance Test GATE / PGECET score, subject to reservations prescribed by the AICTE/UGC or Government policies from time to time.
- Sponsored category seats shall be filled-up with the candidates working in an Industry / Academic Institutions approved by AICTE/UGC. Candidate must have a minimum of one year of experience after the qualifying degree.

3.1.2. Admission Procedure: Admissions are made into the first year of two year M.Tech. Degree Program as per the stipulations of APSCHE, Government of Andhra Pradesh:

(a) By the Convener, PGECET (for Category–A Seats)

(b) By the Management (for Category-B Seats).

4. Programs of study offered leading to the award of M.Tech. Degree and Eligibility:

Following are the two year postgraduate degree Programs of study offered in various branches at in SVEC (Autonomous) leading to the award of M.Tech. degree and eligibility to get admission into the Programs:

Name of the specialization	Offered by the Department	Name of the Degree / Branch eligible for Admission
Electrical Power Systems	EEE	B.Tech / BE / AMIE in Electrical Engineering or equivalent
Digital Electronics & Communication Systems	ECE	B.Tech / BE / AMIE in ECE, AMIE (Electronics & Telecommunication Engineering) / AMIETE (Electronics & Telematics Engineering) or equivalent
VLSI		
Communication Systems		
Software Engineering	IT	B.Tech / BE / AMIE in CSE / CSIT / Electronics & Computers Engineering / IT / Computer Science and Systems Engineering or equivalent
Computer Science	CSE	B.E./B.Tech/AMIE in any Branch of Engineering / Tech. (or) equivalent Master's Degree in Physics, Statistics, Mathematics or Applied Mathematics, Applied Statistics, Applied Physics, Geophysics, M.Sc (Computer Science), M.Sc. (Information Systems), M.Sc. (Computer Applications and Electronics) and MCA (or) Equivalent (CS)
Computer Networks and Information Security	CSE	B.Tech/BE/AMIE in CSE/ECE/CSIT/IT/ETM/EEE/EIE & CSSE equivalent (or) MCA
Bio-Technology	Bio.Tech.	B.Tech / BE / AMIE in Chemical Engineering / Bio-Technology / Biochemical Engineering / Bio-Informatics / Agricultural Engineering or M.Sc. in Environmental Sciences/ Chemistry / Biochemistry / Microbiology / Biotechnology/ Life Sciences / B.V.Sc. / MBBS / BDS / B.Pharmacy/Food Technology

5. Academic Year: The College shall follow semester pattern for the two year M.Tech. Degre Program for conducting all its curricula. An academic year shall consist of two semesters with semester break after 1st & 3rd semesters and summer break after 2nd semester. The duration for each semester shall be a minimum of 16 weeks of instruction.

I SEMESTER (21 weeks)	**INSTRUCTION PERIOD**: I Spell : 7 Weeks II Spell : 9 Weeks	16 Weeks
	Internal Examinations : I Mid : 1 week II Mid : 1 week	2 Weeks
	Preparation & Practical Examinations	1 Week
	External Examinations	2 Weeks
	Semester Break	2 Weeks
II SEMESTER (21 weeks)	**INSTRUCTION PERIOD**: I Spell : 7 Weeks II Spell : 9 Weeks	16 weeks
	Internal Examinations : I Mid : 1 week II Mid : 1 week	2 Weeks
	Preparation & Practical Examinations	1 Week
	External Examinations	2 Weeks
	Summer Vacation	4 Weeks
III SEMESTER	Project Work Phase – I	18 Weeks
IV SEMESTER	Project Work Phase – II	18 Weeks

6. Course Structure: Each Program of study shall consist of:

- Professional core courses:

  The list of professional core courses are chosen as per the suggestions of the experts, to impart knowledge and skills needed in the concerned specialization of study.

- Professional elective courses:

  Professional elective courses shall be offered to the students to diversify their spectrum of knowledge. The elective courses can be chosen based on the interest of the student to broaden his individual knowledge and skills.

Contact hours: Depending on the complexity and volume of the course the number of contact hours per week shall be assigned.

7. Credit System: Credits are assigned based on the following norms given in Table 1.

Table 1

Course	Hours/Week	Credits
Theory	01	01
Practical	04	02
Seminar	--	02
Project Work Phase-I	--	04
Project Work Phase-II	--	12

i. As a norm, for the theory courses, **one credit** for one contact hour per week is assigned.
ii. As a norm, for practical courses **two credits** will be assigned for four contact hours per week.
iii. For courses like Project/Seminar, where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

The two year curriculum of any M. Tech Degree Program of study shall have total of **73** credits.

8. Examination System: All components in any Program of study shall be evaluated continuously through internal evaluation and/or an external evaluation conducted as semester-end examination.

8.1. Distribution of Marks:

Sl. No.	Course	Marks	Examination and Evaluation		Scheme of examination
1.	Theory	60	Semester-end examination of 3 hours duration (External evaluation)		The examination question paper in theory courses shall be for a maximum of 60 marks. The question paper shall be of descriptive type with 5 questions taken one from each unit of syllabus with internal choice and all 5 questions shall be answered. All questions carry equal marks.
		40	Mid-term Examination of 2 hours duration (Internal evaluation).		The question paper shall be of descriptive type with 5 essay type questions out of which 4 are to be answered and evaluated. Two mid-term examinations each for 40 marks are to be conducted. For a total of 40 marks, 75% of better one of the two and 25% of the other one are added and finalized. **Mid-I:** After first spell of instruction (I to II Units). **Mid-II**: After second spell of instruction (III to V Units).
2	Laboratory	50	Semester-end Lab Examination of 3 hours duration (External evaluation)		50 marks are allotted for laboratory examination during semester-end.
		25	15	Day-to-Day evaluation	Performance in laboratory experiments and Record.

			10	Internal evaluation	Two Practical Tests shall be conducted and the average of the tests is to be finalized for 10 marks.
3	Seminar	50	Semester-end examination		Seminar shall be evaluated at semester-end by the Departmental Committee (DC) as given in 8.2.1.
4	Project Work	200	120	External evaluation	Semester-end Project evaluation shall be done by a board as detailed under 8.2.2
			80	Internal evaluation	Continuous evaluation by the DC.

8.2 Seminar/ Project Work Evaluation:

8.2.1. Seminar: For the seminar, the student shall collect information through literature survey on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department a week before presentation. The report and the presentation shall be evaluated at the end of the semester by the DC consisting of Head of the Department, concerned Supervisor and two senior faculty members. The DC is constituted by the Principal on the recommendations of the Head of the Department.

8.2.2. Project Work:

8.2.2.1. Student shall register for the Project work with the approval of DC in the III Semester and continue the work in the IV Semester too. The DC shall monitor the progress of the project work. In III Semester, Phase–I of the Project Work has to be completed. A Student has to identify the topic of work, collect relevant Literature, preliminary data, implementation tools/ methodologies etc., and perform a critical study and analysis of the problem identified. He shall submit status report in two different phases in addition to oral presentation before the DC for evaluation and award of internal marks at the end of Phase –I. A candidate shall continue the Project Work in IV Semester (Phase – II) and submit a Project report at the end of Phase–II after approval of the DC. During Phase–II, the student shall submit status report in two different phases, in addition to oral presentation before the DC. The DC shall evaluate the project based on the progress, presentations and quality of work. A candidate shall be allowed to submit the dissertation only after passing all the courses of 1^{st} and 2^{nd} semesters and on recommendations of the DC. The Viva-Voce examination shall be conducted as per the IV Semester examinations schedule.

8.2.2.2 Three copies of the dissertation certified in the prescribed form by the concerned Supervisor and HOD shall be submitted to the Department. One copy is to be submitted to the Chief Controller of Examinations, SVEC (Autonomous) and one

copy to be sent to the examiner. The examiner shall be nominated by the Chief Controller of the Examinations from the panel of three examiners submitted by the Department for a maximum of 5 students at a time for adjudication.

8.2.2.3 If the report of the examiner is favorable, Viva-Voce examination shall be conducted by a board consisting of the concerned Supervisor, Head of the Department and the examiner who adjudicated the dissertation. The board shall jointly evaluate the candidates work for 120 marks.

8.2.2.4 The candidates who fail in Viva-Voce examination shall have to re-appear the Viva-Voce examination after three months. If he fails in the second Viva-Voce examination, the candidate should revise and resubmit the project report followed by Viva-Voce examination. Extension of time within the total permissible limit for completing the project is to be obtained from the Chairman, Academic Council, SVEC (Autonomous).

8.2.2.5 If a candidate desires to change the topic of the project already chosen, during Phase–II, he has to re-register for Project work with the approval of the DC and repeat Phases–I & II. Marks already earned in Phase–I stand cancelled.

8.3. Eligibility to appear for the semester-end examination:

8.3.1 A student shall be eligible to appear for semester-end examinations if he acquires a minimum of 75% of attendance in aggregate of all the courses in a semester.

8.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

8.3.3 Shortage of attendance below 65% in aggregate shall in no case be condoned.

8.3.4 Students whose shortage of attendance is not condoned in any semester shall not be eligible to take their semester-end examination and their registration shall stand cancelled.

8.3.5 A student shall not be promoted to the next semester unless he satisfies the attendance requirements of the semester, as applicable. The student may seek readmission for the semester when offered next. He will not be allowed to register for the courses of the semester while he is in detention.

8.3.6 A stipulated fee shall be payable to the college towards condonation of shortage of attendance.

8.4. Evaluation: Following procedure governs the evaluation.

8.4.1. Marks for components evaluated internally by the faculty should be submitted to the Controller of Examinations one week before the commencement of the semester-end examinations. The marks for the internal evaluation components shall be added to the external evaluation marks secured in the semester-end examinations, to arrive at total marks for any course in that semester.

8.4.2. Performance in all the courses is tabulated course-wise and shall be scrutinized by the Examination Committee and moderation is applied if needed, and course-wise marks are finalized. Total marks obtained in each course are converted into letter grades.

8.4.3. Student-wise tabulation shall be done and individual grade sheet shall be generated and issued.

8.5. Personal verification / Revaluation / Recounting:

Students shall be permitted for personal verification/request for recounting/ revaluation of the semester-end examination answer scripts within a stipulated period after payment of prescribed fee.

After recounting or revaluation, records shall be updated with changes if any and the student shall be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a notice.

8.6. Supplementary Examination:

In addition to the regular semester-end examinations conducted, the College may also schedule and conduct supplementary examinations for all the courses of other semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

9. Re-Registration for Improvement of Internal Marks: Following are the conditions to avail the benefit of improvement of internal evaluation marks.

9.1 The candidate should have completed the course work and obtained examinations results for I and II semesters.

9.2 Out of the courses the candidate has failed in the examinations due to internal evaluation marks secured being less than 50%, the candidate shall be given one chance for a maximum of 3 theory courses for improvement of internal evaluation marks.

9.3 He should have passed all the remaining courses for which the internal evaluation marks secured more than or equal to 50%.

9.4 The candidate has to register for the chosen courses and fulfill the academic requirements.

9.5 For each course, the candidate has to pay a fee equivalent to one third of the semester tuition fee and the amount is to be remitted in the form of D.D./ Challan in favour of the Principal, Sree Vidyanikethan Engineering College payable at Tirupati along with the requisition through the concerned Head of the Department.

9.6 In the event of availing the Improvement of Internal evaluation marks, the internal evaluation marks as well as the semester-end examinations marks secured in the previous attempt(s) for the re-registered courses stand cancelled.

10. Academic Requirements for completion of M.Tech Program of study:

The following academic requirements have to be satisfied in addition to the attendance requirements for completion of M.Tech Program of study.

10.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical and project if he secures not less than 40% of marks in the semester-end examination and a minimum of 50% of marks in the sum total of the internal evaluation and semester-end examination taken together. For the seminar, he should secure not less than 50% of marks in the semester-end examination.

10.2 A student shall register for all the **73** credits and earn all the **73** credits. Marks obtained in all the **73** credits shall be considered for the calculation of the DIVISION based on CGPA.

10.3 A student who fails to earn **73** credits as indicated in the curriculum within **four** academic years from the year of his admission shall forfeit his seat in M.Tech. Program and his admission stands cancelled.

11. Transitory Regulations:

Students who got detained for want of attendance (**or**) who have not fulfilled academic requirements (**or**) who have failed after having undergone the Program in earlier regulations (**or**) who have discontinued and wish to continue the Program are eligible for admission into the unfinished semester from the date of commencement of class work with the same (**or**) equivalent courses as and when courses are offered and they will be in the academic regulations into which they are presently readmitted.

A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of **four years** for the award of M.Tech Degree.

12. Grades, Grade Point Average and Cumulative Grade Point Average:

12.1. Grade System: After all the components and sub-components of any course (including laboratory courses) are evaluated, the final total marks obtained shall be converted to letter grades on a "**10 point scale**" as described below.

Grades conversion and Grade points allotted

% of Marks obtained	Grade	Description of Grade	Grade Points (GP)
≥ 95	S	Superior	10
≥ 85 to < 95	O	Outstanding	9
≥ 75 to < 85	A	Excellent	8
≥ 65 to < 75	B	Very Good	7
≥ 55 to < 65	C	Good	6
≥ 50 to <55	D	Pass	5
< 50	F	Fail	0
Not Appeared	N	Absent	0

Pass Marks: A student shall be declared to have passed theory course, laboratory course and project work if he secures minimum of 40% marks in Semester-end examination, and a minimum of 50% marks in the sum total of internal evaluation and Semester-end examination taken together. For the seminar, he shall be declared to have passed if he secures minimum of 50% of marks in the semester-end examinations. Otherwise he shall be awarded fail grade - **F** in such a course irrespective of internal marks. **F** is considered as a fail grade indicating that the student has to pass the semester-end examination in that course in future and obtain a grade other than **F** and **N** for passing the course.

12.2. Grade Point Average (GPA):

Grade Point Average (GPA) shall be calculated as given below on a "10 point scale" as an index of the student's performance at the end of each semester:

$$\text{GPA} = \frac{\sum(C\ X\ GP)}{\sum C}$$

where ***C*** denotes the credits assigned to the courses undertaken in that semester and ***GP*** denotes the grade points earned by the student in the respective courses.

Note: *GPA is calculated only for the candidates who passed all the courses in that semester.*

12.3. Cumulative Grade Point Average (CGPA):

The CGPA for any student is awarded only when he completes the Program i.e., when the student passes in all the courses prescribed in the Program. The CGPA is computed on a 10 point scale as given below:

$$\text{CGPA} = \frac{\sum(C\ X\ GP)}{\sum C}$$

where ***C*** denotes the credits assigned to courses undertaken up to the end of the Program and *GP* denotes the grade points earned by the student in the respective courses.

13. Grade Sheet: A grade sheet (Marks Memorandum) shall be issued to each student indicating his performance in all courses registered in that semester indicating the GPA.

14. Transcripts: After successful completion of the entire Program of study, a transcript containing performance in all academic years shall be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued upto any point of study to a student on request.

15. Award of Degree: The Degree shall be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapuramu on the recommendations of the Chairman, Academic Council, SVEC (Autonomous).

15.1. Eligibility: A student shall be eligible for the award of M.Tech Degree if he fulfills all the following conditions:

- Registered and successfully completed all the components prescribed in the Program of study to which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the Program of study within the stipulated time.
- Obtained CGPA greater than or equal to 5.0 (Minimum requirement for declaring as passed).
- Has no dues to the College, Hostel, Library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

15.2. Award of Division: Declaration of division is based on CGPA.

Awarding of Division

CGPA	Division
> = 7.0	First Class with Distinction
> = 6.0 and < 7.0	First Class
> = 5.0 and < 6.0	Second Class

16. Additional academic regulations:

16.1 A student may appear for any number of supplementary examinations within the stipulated time to fulfill regulatory requirements for award of the degree.

16.2 In case of malpractice/improper conduct during the examinations, guidelines shall be followed as shown in the **Annexure-I**.

16.3 When a student is absent for any examination (Mid-term or Semester-end) he shall be awarded **zero** marks in that component (course) and grading will be done accordingly.

16.4 When a component is cancelled as a penalty, he shall be awarded zero marks in that component.

17. Withholding of Results:

If the candidate has not paid dues to the College/University (or) if any case of indiscipline is pending against him, the result of the candidate shall be withheld and he will not be allowed/promoted to the next higher semester

18. Amendments to regulations:

The Academic Council of SVEC (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

19. General:

The words such as "he", "him", "his" and "himself" shall be understood to include all students irrespective of gender connotation.

Note: ***Failure to read and understand the regulations is not an excuse.***

Annexure-I

The following are the guidelines for disciplinary action in case of Malpractice/Improper Conduct during the Examinations.

GUIDE LINES FOR DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

Rule No.	Nature of Malpractices/ Improper conduct	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the course of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the course of the examination)	Expulsion from the examination hall and cancellation of the performance in that course only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that course only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the courses of the examination (including labs and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all Year-end/Semester-end examinations, if his involvement is established. Otherwise, The candidate is debarred for two consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.

4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that course only.
6.	Refuses to obey the orders of the Chief Controller of Examinations/Controller of Examinations/any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the Controller of Examinations or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the Controller of Examinations, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester/year. If the candidate physically assaults the invigilator/Controller of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already

		appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that course only or in that course and all other courses the candidate has appeared including practical examinations and project work of that semester/year examinations, depending on the recommendation of the committee.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Chairman, Academic Council, SVEC (Autonomous) for further action to award suitable punishment.	

Note: Whenever the performance of a student is cancelled in any course(s) due to Malpractice, he has to register for Year-end/Semester-end Examinations in that course(s) consequently and has to fulfill all the norms required for the award of Degree.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF CSE

COURSE STRUCTURE for M.Tech (CS)

I-SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1	14MT10501	Advanced Computer Networks	4	-	-	4	40	60	100
2	14MT10502	Advanced Database Management Systems	4	-	-	4	40	60	100
3	14MT10503	Advanced Software Engineering	4	-	-	4	40	60	100
4	14MT10504	Data Structures and Algorithms	4	-	-	4	40	60	100
5	14MT10505	Discrete Structures and Graph Theory	4	-	-	4	40	60	100
6		**Elective-1**							
	14MT10506	Computer Graphics and Animation	4	-	-	4	40	60	100
	14MT10507	Embedded Systems							
	14MT10508	Information Retrieval Systems							
	14MT10509	Software Project Management							
7	14MT10310	Research Methodology	3	-	-	3	40	60	100
8	14MT10521	Data Structures and Advanced Database Management Systems Laboratory	-	-	4	2	25	50	75
		Total:	**27**	**-**	**4**	**29**	**305**	**470**	**775**

II-SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT20501	Advanced Computer Architecture	4	-	-	4	40	60	100
2.	14MT20502	Advanced Operating Systems	4	-	-	4	40	60	100
3.	14MT20503	Data Warehousing and Data Mining	4	-	-	4	40	60	100
4.	14MT20504	Object Oriented Analysis and Design	4	-	-	4	40	60	100
5.	14MT20505	Web Programming	4	-	-	4	40	60	100
6.		**Elective-2**							
	14MT20506	Big Data Analytics	4	-	-	4	40	60	100
	14MT20507	Information Security							
	14MT20508	Mobile Computing							
	14MT20509	Virtualization and Cloud Computing							
7.	14MT20521	Seminar	-	-	-	2	--	50	50
8.	14MT20522	Web Programming and OOAD Laboratory	-	-	4	2	25	50	75
		Total:	**24**	**-**	**4**	**28**	**265**	**460**	**725**

III-SEMESTER

S. No	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P*		Int.	Ext.	Total
1.	14MT30521	Project Work – Phase I	-	-	-	4	40	--	40
Total:			**-**	**-**	**-**	**4**	**40**	**--**	**40**

*Fulltime Project Work

IV-SEMESTER

S. No	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P*		Int.	Ext.	Total
1.	14MT40521	Project Work – Phase II	-	-	-	12	40	120	160
Total:			**-**	**-**	**-**	**12**	**40**	**120**	**160**
Grand Total:						**73**	**650**	**1050**	**1700**

*Fulltime Project Work

M. Tech. (CS)-I Semester
(14MT10501) ADVANCED COMPUTER NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A Course on* "Computer Networks"

COURSE DESCRIPTION:

Computer networks and protocols; Data Link Layer, LAN and Network routing; Transport Layer and internet protocols; Wireless and Optical Networks; MANETS and wireless Sensor Networks.

COURSE OUTCOMES:
On successful completion of this course the students will be able to :

CO1. Gain knowledge on principles of computers, network topologies, routing mechanisms.
CO2. Analyze the computer network with suitable network protocols and routing algorithms.
CO3. Apply algorithms for a given network to calculate least-cost and non-least cost paths.

UNIT - I: REVIEW OF COMPUTER NETWORKS AND FOUNDATION OF NETWORKING PROTOCOLS (Periods:11)
Review of Computer Networks and the Internet-The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet, packet-Switched Networks.
Foundations of Networking Protocols-5_layer TCP/IP Model, 7_Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM.
UNIT - II: DATA LINKS, TRANSMISSION AND ROUTING (Periods:12)
The Link Layer and Local Area Networks-Link Layer Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Link Virtualization.
Routing and Internet Working-Network Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols

UNIT - III: TRANSPORT LAYER PROTOCOLS AND NETWORK APPLICATIONS (Periods:12)
Internet Protocol-Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6
Transport and End-to-End Protocols**-**Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), TCP Congestion Control.

UNIT - IV: WIRELESS NETWORKS AND OPTICAL NETWORKS (Periods:11)

Wireless Networks and Mobile IP-Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standards, Mobile IP, Wireless Mesh Networks (WMNs).

Optical Networks and WDM Systems-Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers

UNIT - V: MANETS AND WIRELESS SENSOR NETWORKS (Periods:12)

VPNs, Tunneling and Overlay Networks-Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks.

Mobile Ad-Hoc Networks Overview of Wireless Ad–Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks- DSDV, DSR, AODV

Wireless Sensor Networks-Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols

Total Periods:58

TEXT BOOKS:

1. Nader F. Mir, *"Computer and Communication Networks,"* Pearson Education, 2007.
2. F. Kurose, Keith W.Ross, *"Computer Networking: A Top-Down Approach Featuring the Internet,"* Pearson Education, Third Edition, 2007.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *"Data Communications and Networking,"* Tata McGraw Hill, Fourth Edition, 2007
2. Andrew S. Tanenbaum, *"Computer Networks,"* Fourth Edition, Pearson Education, New Delhi, 1997
3. S. Keshav, *"An Engineering Approach to Computer Networking*," Pearson Education, New Delhi, 2004.

M.Tech (CS) I-Semester
(14MT10502) ADVANCED DATABASE MANAGEMENT SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A course on* "Database Management Systems"

COURSE DESCRIPTION:
Database Languages and architecture; Concepts of database design and modeling; SQL and Object relational databases; database design and file organizations; Query and transaction processing, concurrency; Distributed databases

COURSE OUTCOMES:
On successful completion of this course the students will be able to :

CO1. Gain knowledge about the
- Characteristics of Databases
- Architecture and applications of Databases

CO2. Analyse the need for database systems for storing the data.
CO3. Design and model an effective and sustainable database for better performance using database management system tools.
CO4. Apply concepts of normalization for designing complex databases for enhanced performance.

UNIT-I: DATABASE LANGUAGES AND ARCHITECTURE, RELATIONAL MODEL, CONCEPTUAL DATA MODELING (Periods:11)
Introduction to Databases – Overview of Database Languages and Architecture – The Basic Relational Model
Conceptual Data Modeling Using Entities and Relationships: Using High-Level Conceptual data Model for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Refining the ER Design for the COMPANY Database, ER Diagrams, Naming Conventions, and Design Issues, Relationship Types of Degree Higher than Two.
UNIT-II: SQL, OBJECT RELATIONAL DATABASE AND XML (Periods:11)
Mapping a Conceptual Design into a Logical Design: Relational Database Design using ER-to-Relational Mapping, SQL**:** Data Definition, Constraints, Basic Queries and Updates, Advanced Queries, Assertions, Triggers, and Views. **Object and Object-Relational Databases:** Concepts, Models, Languages and Standards, **XML:** Concepts, Languages, and Standards.

UNIT-III: DATABASE DESIGN AND FILE ORGANIZATIONS (Periods:11)
Database Design Theory: Introduction to Normalization Using Functional and Multivalued Dependencies, Normalization Algorithms.
Database File Organizations: Unordered, Ordered, and Hashed Files of Records: Introduction, Secondary Storage Devices, Buffering of Blocks, Placing File Records on Disk, Operations on Files, Files of Unordered Records,

Files of Ordered Records, Hashing Techniques, Other Primary File Organizations, Parallelizing Disk Access Using RAID Technology, New Storage Systems.

UNIT-IV: QUERY AND TRANSACTION PROCESSING, CONCURRENCY AND RECOVERY (Periods:11)

Introduction to Query Processing and Query Optimization Techniques, Introduction to Database Tuning and Physical Design Issues, Foundations of Database Transaction Processing, Introduction to Protocols for Concurrency Control in Databases, Introduction to Database Recovery Protocols

UNIT-V: DISTRIBUTED DATABASES (Periods:12)

Concepts, Types of Distributed Database Systems, Distributed Database Architectures, Data Fragmentation, Replication, and Allocation Techniques for Distributed Database Design, Query Processing and Optimization, Overview of Transaction Management, Overview of Concurrency Control and Recovery, Distributed catalogue management, Current Trends, Distributed Databases in Oracle Emerging Database Technologies and Applications.

Total Periods: 56

TEXTBOOKS:

1. Ramez Elmasri & Shamkant B. Navathe, "*Database Systems: Models, Languages, Design and Application Programming,"* Sixth Edition, New Delhi, Pearson Education, 2013.
2. M. Tamer Ozsu, Patrick Valduriez, "*Principles of Distributed Database System,"* Second Edition, New Delhi, Pearson Education, 2006.

REFERENCE BOOKS:

1. Thomas M. Connolly, Carolyn E. Begg, "Database Systems – A Practical Approach to Design, Implementation and Management," Third Edition, New Delhi, Pearson Education, 2003.
2. Stefano Ceri, Giuseppe Pelagatti, "Distributed Databases Principles and Systems," N.Y, McGraw-Hill International Editions, 1985.
3. Rajesh Narang, "Object Oriented Interfaces and Databases," New Delhi, Prentice Hall of India, 2002.
4. Abraham Silberchatz, Henry F. Korth, S. Sudarsan, "Database System Concepts," Fifth Edition, N.Y, McGraw-Hill, 2006.

M. Tech. (CS)-I Semester
(14MT10503) ADVANCED SOFTWARE ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A course on* "Software Engineering".

COURSE DESCRIPTION:
Software Engineering and process models; Software requirements and modeling; Design engineering; Software testing and Metrics; Software quality, maintenance and reengineering

COURSE OUTCOMES:
On successful completion of this course the students will be able to :

CO1. Gain knowledge in the concepts of
- Software engineering requirements modeling.
- System Modeling.
- Pattern based design.
- Software Metrics and Maintenance.

CO2. Identify assumptions and underlying relationships to formulate an appropriate problem solving strategy.
CO3. Apply analytical and problem-solving skills to design a complex software system.
CO4. Work independently and in teams to analyze the project requirements and create a design that satisfies these requirements.

UNIT-I: INTRODUCTION TO SOFTWARE ENGINEERING AND PROCESS MODELS (Periods:12)
Role of Software, Changing Nature of Software, legacy software, Software myths, Software Engineering- A Layered Technology, The principles of software engineering practice, Generic process (framework), **Process patterns-** Process assessment, Personal and Team process models, CMMI.
Process models- The waterfall model, Incremental process models, Evolutionary process models, The Rational unified process, agile process.

UNIT-II: SOFTWARE REQUIREMENTS AND MODELLING (Periods:11)
Functional and Nonfunctional requirements, Requirements Specification, Requirements Elicitation and Analysis, Requirements Validation and Management, Software requirements document (SRD), Requirements engineering process.
Requirements Modeling-Data modeling concepts, Scenario based modeling; Class based modeling, Creating a behavioral modeling.

UNIT-III: DESIGN ENGINEERING (Periods:12)
Design Quality Guidelines and attributes, Design Concepts, Design Model, Architectural Design- Architectural Views, Architectural Styles and Patterns**.**

Pattern based design- Architectural patterns, Component level design patterns, User interface design patterns.
System Modeling- Context Models, Interaction Models, Structural Models, Behavioral Models.

UNIT-IV: SOFTWARE TESTING AND METRICS (Periods:13)

Basic Concepts in Testing, System and Software Test and Integration, Module level testing, Module Test Planning, Static Testing, White box and Black Box Testing.
Management and Metrics: The Management Spectrum, W5HH Principle. Size oriented metrics, Function oriented metrics, Product metrics, Metrics for Analysis model, Metrics for the design model, Metrics for source code, Metrics for testing ,Risk Management.

UNIT-V: SOFTWARE QUALITY AND MAINTENANCE (Periods:11)

Software Quality, Software Standards, Reviews and Inspections S**oftware Reuse-** Reuse landscape, Application Frameworks, Software Product lines, COTS Product Reuse, **Software Maintenance-**Software Maintenance Process, Maintenance Resource Estimation.
Software Reengineering: A Software Reengineering process model, Reverse engineering, Restructuring.

Total Periods: 59

TEXT BOOKS:

1. Roger S. Pressman, *"Software Engineering-A Practioner's Approach,"* McGraw-Hill Higher Education, Sixth Edition, 2010.
2. Ian Sommerville, *"Software Engineering,"* Addison-Wesley, Ninth Edition, 2010.

REFERENCE BOOKS:

1. Ali Behforooz and Frederick J Hudson, *"Software Engineering Fundamentals,"* Oxford University Press*,* USA 1996.
2. Waman S Jawadekar, *"Software Engineering principles and practice,"* TATA McGraw- Hill, First Edition, 2004.
3. K.K. Agarwal and Yogesh Singh, *"Software Engineering,"* New Age International Publishers*,* Third Edition, 2008

M. Tech (Computer Science) I-Semester
(14MT10504) DATA STRUCTURES AND ALGORITHMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A course on* "C programming".

COURSE DESCRIPTION:

Linear data structures - arrays, stacks, queues and lists; Non-linear data structures - trees and graphs, Binary Search trees; Algorithm design techniques- divide and conquer, Greedy method; Dynamic Programming

COURSE OUTCOMES:
On successful completion of this course the students will be able to :

CO1. Gain advanced knowledge in
- Data structures like binary search trees, linked list, B-Trees, Hashing.
- Algorithm design methods like Divide and Conquer Approach, Greedy Approach, Branch and Bound, Dynamic Programming and Backtracking.

CO2. Analyze time complexities of all types of algorithms including recursive algorithms.
CO3. To design new data structures and algorithms

UNIT-I: BASIC DATA STRUCTURES (Periods:12)
Review of Arrays, Stacks, Queues, Circular Queues, Singly Linked Lists, Doubly Linked Lists Circular Linked Lists, Terminologies and Applications.
Algorithm Analysis :Efficiency of algorithms, Apriori Analysis, Asymptotic Notations, Polynomial Vs Exponential Algorithms, Average, Best, and Worst Case Complexities, Analyzing Recursive Programs.
UNIT-II: SEARCHING, SORTING, TREES AND GRAPHS (Periods:13)
SEARCHING AND SORTING: Linear Search, Binary Search, Fibonacci Search, Bubble Sort, Insertion sort, Selection Sort, Radix Sort.
Introduction, Definition and Basic terminologies of trees and binary trees, Representation of trees and Binary trees, Binary tree Traversals, Threaded binary trees, Graphs-basic concepts, representation and applications , DFS and BFS Traversals.
UNIT-III: BINARY SEARCH TREES, AVL TREES, B- TREES, HASH TABLES
INTRODUCTION, BINARY SEARCH TREES: (Periods:12)
Definition, Operations and applications. **AVL Trees**: Definition, Operations and applications. **B-Trees**: Definition, Operations and applications **Hash Tables**: Introduction, Hash Tables, Hash Functions and its applications.
UNIT-IV: DIVIDE – AND – CONQUER & GREEDY METHOD (Periods:10)
DIVIDE-AND – CONQUER: General Method, Binary Search, Finding Maximum and Minimum, Quick Sort, Merge sort, Polyphase Merge Sort, Cascade Merge

Sort, Strassen's Matrix Multiplication, **Greedy Method -** General Method, Minimum Cost Spanning Trees, and Single Source Shortest Path.

UNIT-V: DYNAMIC PROGRAMMING, BACK TRACKING & BRANCH-AND-BOUND DYNAMIC PROGRAMMING (Periods:12)

General Method, All Pairs Shortest Path, Single Source Shortest Path, 0/1 Knapsack problem. Back Tracking: General Method, 8 – Queen's Problem, Graph Coloring. **Branch–and–Bound**: The Method, LC Search, Control Abstraction, Bounding, 0/1 Knapsack Problem.

Total Periods:59

TEXT BOOKS:

1. G. A. V. Pai, *"Data Structures and Algorithms: Concepts, Techniques and Applications,"* Mc Graw Hill, First Edition, 2008.
2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, *"Fundamentals of Computer Algorithms,"* Universities Press (India) Pvt. Ltd, Second Edition, 2008

REFERENCE BOOKS:

1. D. Samanta, *"Classic Data Structures,"* PHI learning, 2005.
2. Aho, Hopcraft, Ullman, *"Design and Analysis of Computer Algorithms,"* Pearson Education, New Delhi, 2006.
3. Goodman, Hedetniemi, *"Introduction to the Design and Analysis of Algorithms*," TMH,2008.
4. Drozdek, *"Data Structures and Algorithms in C++,"* Second Edition, Cengage learning, 2010.

M. Tech (Computer Science) I-Semester
(14MT10505) DISCRETE STRUCTURES AND GRAPH THEORY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITE: *A course on* "Engineering Mathematics".

COURSE DESCRIPTION:
Mathematical logic, predicates; Set Theory – functions and algebraic structures; Elementary combinatorics and recurrence relations; Graphs, Graph Theory and applications

COURSE OUTCOMES:
On Successful Completion of this course, the student will be able to:
CO1. Gain knowledge in:
- Statements and sets.
- Algebraic Structures.
- Graphs and trees.

CO2. Analyse problems related to discrete mathematics and graphs.
CO3. Develop solutions to problems related to discrete mathematics and graphs.

UNIT-I: MATHEMATICAL LOGIC, PREDICATES (Periods:11)
MATHEMATICAL LOGIC: Statements and notations, Connectives, Well formed formulas, Truth Tables, Tautology, equivalence implication, Normal forms.
Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT-II: SET THEORY, FUNCTIONS, ALGEBRAIC STRUCTURES (Periods:12)
SET THEORY: Properties of binary relations, equivalence, compatibility and partial ordering relations, Hasse diagram, Lattice and its properties
FUNCTIONS: Inverse functions, Composite of functions, Recursive functions
ALGEBRAIC STRUCTURES: Algebraic systems, examples and general properties, Semi groups and Monoids, groups and sub groups, Homomorphism, Isomorphism.

UNIT-III: ELEMENTARY COMBINATORICS, RECURRENCE RELATIONS (Periods:12)
ELEMENTARY COMBINATORICS: Basis of counting, Combinations & Permutations with repetitions, Constrained repetitions, Binomial Coefficients, Binomial and Multinomial theorems, the principles of Inclusion, Exclusion, Pigeon hole principles and its application.
RECURRENCE RELATIONS: Generating functions, function of Sequences, calculating coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating functions, Characteristics roots solution of in homogeneous recurrence relation.

UNIT-IV: GRAPHS (Periods:11)

GRAPHS: Introduction to Graphs, Types of Graphs, Graph basic terminology and Special types of simple graphs, Representation of Graphs and Graph Isomorphism, Euler Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs, Euler's formula and Graph coloring.

UNIT-V: GRAPH THEORY AND ITS APPLICATIONS (Periods:10)

GRAPH THEORY AND ITS APPLICATIONS:

Introduction to Trees, Properties of Trees, Applications of Trees-Spanning trees, Counting trees, Depth-First Search, Breadth-First Search, Minimum Spanning trees, Kruskal's Algorithm and Prim's Algorithm.

Total Periods: 56

TEXT BOOKS:

1. J.P. Trembly and R. Manohar, "*Discrete Mathematical Structures with Applications to Computer Science*," New Delhi:Tata McGraw Hill, 2009.
2. Kenneth H. Rosen, "*Discrete Mathematics and its Applications*," Sixth edition, New Delhi: Tata Mc Graw Hill, 2009

REFERENCE BOOKS:

1. Joe L.Mott and Abraham Kandel, "*Discrete Mathematics for Computer Scientists and Mathematicians*," Second edition, New Delhi, Prentice Hall of India Private Limited, 2004.
2. C.L. Liu and D.P. Mohapatra, "*Elements of Discrete Mathematics*," Third edition, New Delhi: McGraw Hill, 2008.
3. Ralph P. Grimaldi and B.V.Ramana, "*Discrete and Combinatorial Mathematics- An Applied Introduction*," Fifth edition, New Delhi: Pearson Education, 2006.

M. Tech. (CS)-I Semester
(14MT10506) COMPUTER GRAPHICS AND ANIMATION
(ELECTIVE-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Engineering Mathematics"

COURSE DESCRIPTION

Principles of computer graphics design; 2D, 3D geometric transformations and viewing; 3D object representations; Introduction to Animation

COURSE OUTCOMES

On successful completion of this course, the student will be able to:

CO1. Gain knowledge in
- Raster and Random Scan Display Devices.
- 2D and 3D transformations, 2D and 3D Viewing.
- Line and Circle Drawing, Line and Polygon Clipping algorithms.
- Visible Surface Detection Methods.
- Hermite, Bezier, B-Spline Curves and Surfaces.
- Design Animation and motion specification.

CO2. Analyze the issues in projecting graphical objects and identify solutions.

CO3. Develop solutions to problems related to computer graphics and animations by creating, rendering and projecting the Graphical objects

UNIT – I: INTRODUCTION TO COMPUTER GRAPHICS AND OUTPUT PRIMITIVES (Periods:12)

Introduction: Applications of Computer Graphics, Graphical Input and Output devices, Raster scan devices (Plasma Panel Display, LCD Panels), Random scan devices.

Output Primitives: Points and Lines, Line drawing algorithms(DDA Algorithm, Bresenham's Algorithm), Mid-Point circle and Ellipse algorithms, Filled area primitives: Scan line, Polygon fill algorithm, Boundary-fill algorithm, Flood-fill algorithm.

UNIT – II: TWO DIMENSIONAL GEOMETRIC TRANSFORMATIONS AND VIEWING (Periods:12)

Two Dimensional Geometric Transformations: Basic transformations, Matrix representations and homogeneous coordinates, Composite transformations, other transformations, transformations between coordinate systems, Raster methods for transformations.

Two Dimensional Viewing: The viewing Pipeline, Window-to-Viewport coordinate transformation, clipping operations, Point clipping, Line clipping (Cohen-Sutherland Line clipping), Polygon clipping (Sutherland-Hodgeman Polygon clipping).

UNIT -III: THREE DIMENSIONAL GEOMETRIC AND MODELING TRANSFORMATIONS AND VIEWING (Periods:12)

3D Geometric and Modeling Transformations: Introduction, translation, rotation, scaling, other transformations, composite transformations, modeling and coordinate transformations **3D Viewing**: Viewing Pipeline, Viewing coordinates, projections, View volumes and general projection transformations, Clipping.

UNIT – IV: THREE DIMENSIONAL OBJECT REPRESENTATIONS (Periods:11)

3D Object Representations: Visible surface detection methods (Back-Face Detection, Depth-Buffer Method, Depth Sorting Method), Spline representation, Hermite Curve, Bezier Curve and B-Spline Curves, Bezier and B-Spline surfaces.

UNIT–V: ANIMATION (Periods:09)

Animation: Introduction, Historical background, Uses of animation, Traditional animation, Principles of Animation, Design of Animation sequences, Computer based animation, Raster animations, motion specifications, Rendering algorithms, Animation file formats, animation software.

Total Periods: 56

TEXT BOOKS:

1. Donald D. Hearn, M. Pauline Baker, "*Computer Graphics-C Version*," Second Edition, New Delhi, Pearson Education, 2008.
2. Malay K.Pakhira, "*Computer Graphics Multimedia and Animation*," Second Edition, New Delhi, PHI Learning, 2010.

REFERENCE BOOKS:

1. Ranjan Parekh, "*Principles of Multimedia,*" Second Edition, New Delhi, Tata McGraw-Hill, 2013.
2. James D.Foley, Andries Van Dam, Steven K.Feiner and John F.Hughes*," Computer Graphics Principles and Practice in C,*" Second Edition, New Delhi, Pearson Education, 2012.
3. David F.Rogers, "*Procedural Elements for Computer Graphics,*" Second Edition, New Delhi, Tata McGraw-Hill, 1997.
4. Zhigang Xiang, Roy A. Plastock, *"Computer Graphics,"* Second Edition, United States of America, McGraw-Hill, 2000.

M. Tech. (CS)-I Semester
(14MT10507) EMBEDDED SYSTEMS (ELECTIVE-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITES: *Courses on* "Computer Organization" and "Operating Systems".

COURSE DESCRIPTION
Introduction to Embedded Systems and components; Micro controller and embedded programming; Processes and Real time operating systems; Embedded Systems development

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Gain advanced knowledge in
- Embedded system components.
- Micro controller programming.
- Programming in Embedded systems.

CO2. Analyze complex engineering problems critically for conducting research in Embedded Systems.
CO3. Solve engineering problems with wide range of solutions in Embedded Systems.
CO4. Apply appropriate techniques, resources and tools in the design and development of Embedded Systems.

UNIT-I: INTRODUCTION TO EMBEDDED SYSTEMS (Periods:12)
Introduction, Complex systems and Microprocessors, Component fundamentals and Design, Processor embedded into a system, Embedded hardware units and Devices in a system, Embedded software in a system, examples of embedded system, embedded System-on-chip (Soc) and Use of VLSI circuit design technology, Complex systems design and Processors, Design process in Embedded System, formalization of system design, Classification of Embedded Systems.

UNIT-II: MICRO CONTROLLER (Periods:12)
8051 Architecture, Real World Interfacing, Introduction to Advanced Architectures, Processor and Memory Organization, Instruction-level parallelism, memory-types, memory-maps and addresses, processor selection, memory selection.

UNIT-III: EMBEDDED PROGRAMMING (Periods:12)
Program Modeling Concepts and Embedded Programming: Program Models, DFG Models, State Machine Programming Models for Event-controlled Program Flow, Modeling of Multiprocessor Systems, UML Modeling. Software Programming in Assembly Language (ALP) and in High-Level Language 'C', **C Program Elements:** Header and Source Files and Preprocessor Directives, Program Elements: Macros and Functions, Program Elements: Data Types, Data Structures, Modifiers, Statements, Loops and Pointers.

UNIT-IV: PROCESSES AND REAL-TIME OPERATING SYSTEMS (Periods:14)

Processes, Threads and Tasks: Multiple Processes in an Application, Multiple Threads in an Application, Tasks, Task States, Task and Data, Concept of Semaphores, Shared Data , Inter-process Communication, Signal Function, Semaphore Functions, Message Queue Functions, Mailbox Functions, Pipe Functions.

Real-Time Operating Systems: OS Services, Process Management, Timer Functions, Event Functions, Memory Management.

UNIT-V: EMBEDDED SYSTEM DEVELOPMENT (Periods:10)

Embedded Software Development Process and Tools: Introduction to Embedded Software, Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware–Software Design and Co-design. Testing on Host Machine, Simulators, and Laboratory Tools

Total periods: 60

TEXT BOOKS:

1. Rajkamal, "Embedded Systems Architecture - Programming and Design," Tata McGraw Hill, Second Edition, 2003.

REFERENCE BOOKS:

1. Wayne Wolf, *"Computers as Components - Principles of Embedded Computing System Design,"* Morgan Kaufman Publishers, First Indian Reprint, 2001.
2. Steve Heath, *"Embedded Systems Design,"* Second Edition, Newnes Publications, 2003.
3. David E. Simon, *"An Embedded Software Primer,"* Pearson Education, First Indian Reprint, 2000.

M. Tech. (CS)-I Semester
(14MT10508) INFORMATION RETRIEVAL SYSTEMS
(ELECTIVE-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A Course on* **"**Database Management Systems".

COURSE DESCRIPTION
Information retrieval systems; Indexing and data structures; Automatic Indexing and clustering; User search techniques; Text search algorithms

COURSE OUTCOMES:
On successful completion of this course the students will be able to :
CO1. Gain knowledge in fundamental concepts of
- Information Retrieval System capabilities.
- Data Structures.
- Indexing and Search Algorithms.

CO2. Perform analysis of Databases, Data warehouses of Real time Applications.
CO3. Solve complex search problems.
CO4. Design and Develop text processing, text pattern matching algorithms
CO4. Implement clustering algorithms on different types of Term/Item sets.

UNIT - I: INTRODUCTION TO INFORMATION RETRIEVAL SYSTEMS (Periods:11)
Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses
Information Retrieval System Capabilities: Search, Browse.

UNIT - II: INDEXING AND DATA STRUCTURES (Periods:13)
Objectives of Indexing, Indexing Process, Automatic Indexing
Data Structures: Introduction to Data Structures, Stemming Algorithms, and Inverted file structures, N-gram data structure, PAT data structure, Hypertext data structure.

UNIT - III: AUTOMATIC INDEXING AND CLUSTERING (Periods:10)
Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing. **Document and Term Clustering:** Introduction to Clustering, Thesaurus generation, Manual clustering, Automatic Term Clustering, Hierarchy of clusters.

UNIT - IV: USER SEARCH TECHNIQUES (Periods:12)
Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems.

UNIT V: TEXT SEARCH ALGORITHMS (Periods:11)
Introduction to Text Search Techniques, Software text search algorithms, Hardware text search systems.

Information System Evaluation: Introduction to Information System Evaluation, Measures used in system evaluation.

Total Periods:57

TEXT BOOKS:

1. Kowalski, Gerald, Mark T Maybury Kluwer, *"Information Storage and Retrieval Systems: Theory and Implementation"*, Springer, Second Edition, 2008.
2. William B Frakes, Ricardo Baeza-Yates, *"Information Retrieval Data Structures and Algorithms"*, Pearson Education, 2009.

REFERENCES:

1. Ricardo Baeza-Yates,"*Modern Information Retrieval*", Pearson Education, 2007.
2. David A Grossman and Ophir Frieder, *"Information Retrieval: Algorithms and Heuristics*", Springer International Edition, Second Edition, 2012.

M.Tech (CS) I-Semester
(14MT10509) SOFTWARE PROJECT MANAGEMENT
(ELECTIVE-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A course on"*Software Engineering"

COURSE DESCRIPTION

Software effort estimation models; Improving software economics; Software life cycle; Model based software architectures; Project organizations and responsibilities

COURSE OUTCOMES:

On successful completion of this course the students will be able to :

CO1. Gain knowledge on project planning and management, client management and project Scheduling and monitoring.

CO2. Analyze the testing based approach to development, team management and ongoing Project schedule tracking.

CO3. Apply Software Metrics for a given Project to calculate Cost estimation models.

UNIT-I: SOFTWARE EFFORTS ESTIMATION TECHNIQUES (Periods:10)

The Waterfall model, Conventional Software Management Performance, Evolution of Software Economics, Software Economics

UNIT-II: IMPROVING SOFTWARE ECONOMICS (Periods:12)

Reducing Software product size, improving software processes, improving team effectiveness, improving automation, achieving required quality, peer inspections, the old way and the new, the principles of conventional software Engineering, and principles of modern software management.

UNIT-III: LIFE CYCLE PHASES (Periods:10)

Engineering and production stages, inception, Elaboration, construction phase, transition phases, Artifacts of the process, the artifact sets, Management artifacts, engineering artifacts.

UNIT-IV: MODEL BASED SOFTWARE ARCHITECTURES (Periods:11)

A Management perspective and Technical perspective, Workflows of the process, Software process workflows, Iteration workflows.

Checkpoints of the Process- Major mile stones, Minor Milestones, Periodic status assessments, Iterative Process Planning, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT-V: PROJECT ORGANIZATIONS AND RESPONSIBILITIES (Periods:12)

Line-of-Business organization, Project organizations, evolution of organizations, Automation building blocks, The project environment, the seven core metrics, Management indicators, quality indicators, life cycle expectations, Software Metrics automation, Tailoring the process discriminates, COCOMO cost estimation model.

Total Periods: 55

TEXT BOOKS:

1. Walker Royce, "*Software Project Management,"* Seventeenth Edition, Pearson Education, New Delhi, 2012.

REFERENCE BOOKS:

1. Bob Hughes and Mike Cottrell, "*Software Project Management*," Fourth Edition, Tata McGraw-Hill, New Delhi, 2006
2. JoelHenry," *Software Project Management,*" First Edition, Pearson Education, New Delhi,2008.
3. Pankaj Jalote, "*Software Project Management in Practice*," Seventh Edition, Pearson Education, New Delhi, 2008

I M. Tech (CS) I Semester
(14MT10521) DATA STRUCTURES AND ADVANCED DATABASE MANAGEMENT SYSTEMS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	--	--	4	2

PREREQUISITES: Courses on "Data structures" and "DBMS"

COURSE DESCRIPTION

Practical implementation of linked lists, stacks, queues, binary search tree, AVL tree, B-tree, graphs, N-Queen's problem using C++

Designing and implement basic SQL Queries, PL/SQL and advanced concepts in PL/SQL such as Object creation structures, Triggers, Embedded SQL using Oracle Database Management System Package.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Develop solutions to advanced data structures based problems and advanced DBMS problems.
CO2. Use modern software tools and technologies for designing simple to complex applications in real world.
CO3. Develop effective professional and business communication in data structures and DBMS.
CO4. Attitude for independent and continuous learning for improved knowledge with newer versions of object oriented software and DBMS packages.

Data Structures Exercises:

1. Implementation of Stacks and Queue operations using linked list.
2. Perform the following operations on binary search tree:
   a) Insertion
   b) Deletion
   c) Searching
3. Perform the following operations on AVL-tree:
   a) Insertion
   b) Deletion
4. Implementing the following operations on B-Tree:
   a) Insertion
   b) Searching
   c) Deletion
5. Implement the following using recursive and non-recursive traversals:
   a) Pre-order
   b) In-order
   c) Post-order.

6. Implement the following functions of a dictionary using hashing:
   a) Insertion
   b) Searching
   c) Deletion
7. Implement single source shortest path in a graph by using Bellman and Ford algorithm.
8. Implement N-queen's problem using Backtracking. The N Queen is the problem of placing N chess queens on an N×N chessboard so that no two queens attack each other. The expected output is a binary matrix which has 1s for the blocks where queens are placed. For example following is the output matrix for above 4 queen problem's solution.

   {0, 1, 0, 0}
   {0, 0, 0, 1}
   {1, 0, 0, 0}
   {0, 0, 1, 0}

ADBMS Exercises:

1. Consider the following tables:
   WORKS(Pname, Cname, Salary)
   LIVES(Pname, Street, City)
   LOCATED_IN(Cname, City)
   MANAGER(Pname, Mgrname)
   Where Pname = Person name, Cname = Company name, and
   Mgrname = Manager name.

   Write the SQL for the following:
   1. List the names of the people who work for the company Wipro along with the cities they live in.
   2. Find the people who work for the company 'Infosys' with a salary more than Rs. 50000/-. List the names of the people, along with the street and city address.
   3. Find the names of the persons who live and work in the same city.
   4. Find the names of the persons who do not work for 'Infosys'.
   5. Find the persons whose salaries are more than that of all of the 'Oracle' employees.
   6. Find the names of the companies that are located in every city where the company 'Infosys' is located.

2. Write a PL/SQL block to do the following:
   a. Read a number n, and print the multiplication table.
   b. Read a number and check whether it is a palindrome or not.
3. a. Write a PL/SQL block that updates salary of an employee in employee table by using incr function which takes employee number as argument, calculates increment and returns increment based on the following criteria.
   If salary <= 3000 increment = 30% of salary
   If salary > 3000 and <= 6000 increment = 20% of salary
   Else increment = 10% of salary.

b. Write a stored procedure, raise salary which accepts an employee number. It uses incr function of previous program to get the salary increase amount and uses employee number to select the current salary from employee table. If employee number is not found or if the current salary is null, it should raise an exception. Otherwise, updates the salary.

4. a. Consider the following Relation Schemas

SALGRADE

GRADE	LOSAL	HISAL

EMP_SAL

ENO	ENAME	SAL	GRADE

Create a database trigger emp_sal. This trigger is forced when an INSERT or an UPDATE is performed on the table EMP_SAL.Trigger to insert into EMP_SAL table when salary between lowsal and highsal (in SALGRADE table).And to update the record in EMP_SAL table.(before)

b. Consider the following Relation Schemas

PERSINFO

EMPNO	NAME	AGE

AUDITPERSINFO

EMPNO	NAME	AGE	OPERATION	ODATE

PERSINFO is the table for which the auditing must be performed and AUDITPERSINFO is the table which keeps track of the records deleted or modified. Create a database trigger audit_trial. This trigger is forced when an UPDATE or a DELETE is performed on the table PERSINFO. It first checks for the operation being performed on the table. Then depending on the operation, a variable (that corresponds to operation) is assigned the value 'UPDATE' or 'DELETE' and then inserts the updated/deleted record into AUDITPERSINFO.

5. Implement Database Objects and creation of object structures for complex relations.
6. Implement C program segment with embedded SQL.

M. Tech (Computer Science) – I Semester
(14MT10310) RESEARCH METHODOLOGY
(Common to all M. Tech. Programs)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	--	--	3

PRE-REQUISITES: --

COURSE DESCRIPTION:
Fundamentals of research work - research problem and design; Data collection, Analysis and hypothesis; Statistics in Research; Interpretation and Report Writing.

COURSE OUTCOMES:
On successful completion of course, the student will be able to
CO1. Gained knowledge on research approaches, research process and data collection.
CO2. Identify and analyze research problem.
CO3. Have skills to solve the problems using statistical methods.
CO4. Do literature survey and apply good research methodologies for the development of scientific/technological knowledge in one or more domains of engineering.
CO5. Select, learn and apply modern engineering tools to complex engineering activities.
CO6. Write effective research reports.

DETAILED SYLLABUS:
UNIT-I: INTRODUCTION TO RESEARCH METHODOLOGY (Periods:07)
Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research.
UNIT-II: RESEARCH PROBLEM AND DESIGN (Periods:09)
Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem. Features of Good Design, Research Design Concepts, Different Research Designs.
UNIT-III: DATA COLLECTION, ANALYSIS, AND HYPOTHESIS (Periods:09)
Different Methods of Data Collection, Processing Operations, Types of Analysis, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure.
UNIT-IV: STATISTICS IN RESEARCH (Periods:09)
Review of Statistical Techniques - Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry. Normal Distribution, Chi-Square Test as a Test of Goodness of Fit.
UNIT-V: INTERPRETATION AND REPORT WRITING (Periods:06)
Interpretation – Techniques and Precautions. Report Writing – Significance, Stages, Layout. Types of reports, Precautions in Writing Reports.

Total Periods: 40

TEXT BOOK:

1. C.R. Kothari, *Research Methodology: Methods and Techniques*, New Age International Publishers, New Delhi, 2nd Revised Edition, 2004.

REFERENCE BOOKS:

1. Ranjit Kumar, *Research Methodology: A step-by-step guide for beginners*, Sage South Asia, 3rd ed., 2011.
2. R. Panneerselvam, Research Methodology, PHI learning Pvt. Ltd., 2009

M. Tech (Computer Science) II-Semester
(14MT20501) ADVANCED COMPUTER ARCHITECTURE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A course on* "Computer Organization".

COURSE DESCRIPTION

Quantitative design and analysis, memory hierarchy design; parallel computer models and network properties; pipelining, superscalar techniques, multiprocessors and multi computers; Multi-Vector, SIMD and Multi-Core computers

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Gain knowledge of:
- Computational models and Computer Architectures.
- Concepts of parallel computer models.
- Scalable Architectures.
- Pipelining, Superscalar processors, multiprocessors, SIMD and Multi core Computers.

CO2. Analyze and design the architectures of parallel computers and their interconnection structures.

CO3. Apply the advanced computer architectures to solve complex engineering problems.

UNIT-I: FUNDAMENTALS OF QUANTITATIVE DESIGN AND ANALYSIS, MEMORY HIERARCHY DESIGN (Periods:10)

Fundamentals of Quantitative Design and Analysis: Introduction, Classes of computers, Defining Computer Architecture, Trends in technology, Trends in power and energy in ICs, Trends in cost, Dependability, Quantitative Principles of Computer Design.

Memory Hierarchy Design: Introduction, Advanced optimizations of cache performance, Memory technology and optimizations, Cross cutting issues–The design of memory hierarchies.

UNIT-II: PARALLEL COMPUTER MODELS AND NETWORKS PROPERTIES (Periods:12)

Parallel Computer Models: The state of computing, Multiprocessors and multi-computers, Multi vector and SIMD computers, PRAM and VLSI models.

P**rogram and Networks Properties:** Conditions of Parallelism, Program partitioning and scheduling, Program flow mechanisms, System interconnect architectures.

Examples: Detection of Parallelism in a program using Bernstein's conditions.

UNIT-III: PRINCIPLES OF SCALABLE PERFORMANCE AND MEMORY (Periods:12)

Principles of Scalable Performance: Performance metrics and measures, Parallel Processing applications, Speedup performance laws.

Bus, Cache and Shared memory: Bus systems, Cache memory organizations, Shared memory organizations.

Example Architectures: The virtual address split cache design in Intel i860

UNIT-IV: PIPELINING AND SUPERSCALAR TECHNIQUES, MULTIPROCESSORS AND MULTICOMPUTERS (Periods:12)

Pipelining and Superscalar Techniques: Linear pipeline processors, nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design.

Multiprocessors and Multi-computers: Multiprocessor system interconnects Cache Coherence and synchronization mechanisms.

Example Architectures: The floating point unit in Motorola MC68040

UNIT-V: MULTIVECTOR AND SIMD COMPUTERS, MULTICORE COMPUTERS (Periods:12)

Multi-Vector and SIMD computers: Vector processing principles, Multi-vector multiprocessors, SIMD computer organizations, and Graphics processing units.

Computer Architecture of Warehouse – Scale Computers, Cloud Computing – the return of utility computing.

Multi-Core computers: Hardware performance issues, Software performance issues, Multi-core organization.

Example Architectures: ARM11 MPCore

Total Periods:58

TEXT BOOKS:

1. Kai Hwang and Naresh Jotwani, "*Advanced Computer Architecture,"* Second Edition, New Delhi, McGraw Hill, 2011.
2. John L. Hennessy and David A. Patterson, "*Computer Architecture-A Quantitative Approach,"* Fifth Edition, Elsevier, 2012

REFERENCE BOOKS:

1. William Stallings, "*Computer Organization and Architecture-Designing for performance,"* Ninth Edition, Pearson Education, 2014.
2. Kai Hwang "*Advanced Computer Architecture,"* First Edition, New Delhi, Tata McGraw Hill, 2001.
3. Anantha Grama, Anshul Gupta, George Karypis and Vipin Kumar, "*Introduction to Parallel Computing,"* Second Edition, New Delhi, Pearson Education, 2003.

M. Tech. (CS)-II Semester
(14MT20502) ADVANCED OPERATING SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A Course on* "Operating Systems"

COURSE DESCRIPTION

Process management and process scheduling; Concurrency, synchronization and deadlocks; Memory management, file system and secondary storage; I/O systems, protection and security; Introduction to Distributed Systems, Synchronization in Distributed Systems, Real-time and multimedia systems

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1. Gain advanced knowledge in
- Process management concepts including scheduling.
- Synchronization.
- Inter Process Communication.
- Group Communication.
- Remote Procedure Call.

CO2. Understand how operating system manages resource sharing among the computer's users**.**

CO3. Develop solutions to problems related to synchronization to meet the needs of society and industry.

CO4. Use concepts such as semaphores, monitors, message-passing and other forms of synchronization among threads.

UNIT–I: INTRODUCTION TO OPEARATING SYSTEMS, PROCESS MANAGEMENT AND PROCESS SCHEDULING (Periods:12)

Introduction: Operating system operations, Protection and Security, Distributed Systems, Special Purpose Systems, Open-Source Operating Systems, Operating System Services, System Calls, Virtual machines.

Process Management: Process Concepts, Process State, Process Control Bloc k, Operations on Processes, Inter Process Communication, Multithreaded programming.

Process Scheduling: Scheduling Criteria, Scheduling Algorithms, Multiple-Processor scheduling, thread scheduling.

UNIT – II: CONCURRENCY AND SYNCHRONIZATION, DEADLOCKS (Periods:12)

Concurrency and Synchronization: Process Synchronization, Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of synchronization, Readers and Writers Problem, Dining Philosophers Problem, Monitors.

Deadlocks: System Model, Deadlock Characterization, Deadlock Prevention, Deadlock Detection and Avoidance, Recovery from Deadlock- Bankers Algorithm

UNIT -III: MEMORY MANAGEMENT, FILE SYSTEM IMPLEMENTATION AND SECONDARY STORAGE STRUCTURE (Periods:14)

Memory Management: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

File System Interface &Implementation: Concept of a File, Access Methods, Directory Structure, File Sharing, Protection, Allocation Methods, Free Space Management, Efficiency and Performance.

Secondary Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk scheduling algorithms, Swap-Space Management, Stable-Storage Implementation, Tertiary Storage Structure.

UNIT – IV: I/O SYSTEMS, PROTECTION AND SECURITY (Periods:12)

I/O Systems: I/O systems, Hardware, Application Interface, Transforming I/O requests Hardware Operation, STREAMS, Performance

Protection: Goals of Protection, Principles of Protection, Domain of Protection Access Matrix, Implementation of Access Matrix, and Access control, Revocation of Access Rights.

Security: The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication, Implementing Security Defenses, Firewalling to Protect Systems

UNIT–V: DISTRIBUTED SYSTEMS, SYNCHRONIZATION IN DISTRIBUTED SYSTEMS, SPECIAL PURPOSE SYSTEMS (Periods:08)

Introduction to Distributed systems: Goals of distributed system-hardware and software concepts- design issues, the client server model-Remote Procedure Call and Group Communication.

Synchronization in distributed systems: Clock Synchronization- Election Algorithms- the Bully Algorithm- a Ring Algorithm.

Special Purpose Systems: Real-Time Systems- Characteristics, Real-Time CPU Scheduling, Multimedia Systems-CPU Scheduling

Total Periods: 58

TEXT BOOKS:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne," *Operating System Concepts*," John Wiley and Sons**,** Eighth Edition, 2009.
2. Andrew. S. Tanenbaum, "*Distributed Operating System*," New Delhi, Prentice Hall,1995.

REFERENCE BOOKS:

1. William Stallings, "*Operating Systems – Internals and Design Principles*," New Delhi, Fifth Edition, Pearson Education, 2008
2. Andrew S Tanenbaum "*Modern Operating Systems*," New Delhi, Third Edition, Pearson Education, 2008
3. Charles Crowley "*Operating Systems - A Design Approach,*" New Delhi, First Edition, TMH, 2009.

M. Tech. (CS)-II Semester
(14MT20503) DATA WAREHOUSING AND DATA MINING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A course on* "Database Management Systems"

COURSE DESCRIPTION

Introduction to Data Warehouse and data mining; Data preprocessing, mining and associations; Data Classification and prediction; Cluster Analysis; Mining Data streams – Time series, Spatial, Multimedia and text data

COURSE OUTCOMES:

On successful completion of this course, the student will be able to:

CO1. Gain knowledge in:
- Data warehousing and enterprise intelligence in industry and government.
- Data mining algorithms.
- Association Rules, Classification and Prediction and Cluster Analysis.

CO2. Analyse the results generated from the constructed artifact to determine if patterns of clusters were detected in the Data sets.

CO3. Develop solutions to problems related to frequent item sets.

CO4. Apply data mining techniques in mining time series, spatial data, World Wide Web, text and multimedia data

UNIT-I: INTRODUCTION TO DATA WAREHOUSE AND DATA MINING (Periods:10)

Data Warehouse- A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehouse to Data Mining.

Data Mining – Kinds of Data, Data Mining Functionalities, Primitives, Major Issues in Data Mining

UNIT-II: DATA PREPROCESSING, MINING FREQUENT PATTERNS AND ASSOCIATIONS (Periods:10)

Data Preprocessing- Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction.

Mining Frequent Patterns and Associations- Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, Constraint based association mining.

UNIT-III: CLASSIFICATION AND PREDICTION (Periods:09)

Issues regarding classification and prediction, classification by decision tree induction, Bayesian classification, Rule based classification, classification by Back propagation, Prediction, Accuracy and Error Measures.

UNIT-IV: CLUSTER ANALYSIS (Periods:13)

Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, density based Methods,

Grid based methods, and model based clustering methods; Clustering high dimensional data, and Outlier analysis.

UNIT-V: MINING STREAM, TIME SERIES, SPATIAL DATA, MULTIMEDIA, TEXT AND WEB MINING (Periods:12)

Mining Data Streams, Mining Time Series Data, Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

Total Periods:54

TEXT BOOK:

1. Jiawei Han and Micheline Kamber, "*Data Mining: Concepts and Techniques*," Second Edition, Elsevier, 2009

REFERENCE BOOKS:

1. Margaret H Dunham, *Data Mining Introductory and Advanced Topics*," Second Edition, Pearson Education, 2006
2. Amitesh Sinha, "*Data Warehousing*," PHI Learning, 2007
3. Xingdong Wu, Vipin Kumar, "*The Top Ten Algorithms in Data Mining*," Taylor and Francis Group, 2009

M. Tech. (CS)-II Semester
(14MT20504) OBJECT ORIENTED ANALYSIS AND DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITE: *A Course on* "Object Oriented Programming".

COURSE DESCRIPTION
Introduction to Unified Modeling language; Sequence and collaboration diagrams; Behavioral Modeling; Unified Process and phases of unified process

COURSE OUTCOMES:
On successful completion of this course the students will be able to :

CO1. Gain knowledge on
- Object Oriented Methodologies.
- UML Diagrams.
- Unified Process.

CO2. Develop and apply analysis models which are required for solving problems.
CO3. Get exposure to Visual Modeling tools.
CO4. Develop UML models that are necessary for communication among stake holders.

UNIT – I: INTRODUCTION TO UML (Periods:13)
Introduction to UML: Importance of Modeling, Principles of Modeling Object Oriented Modeling, Conceptual Model of the UML Architecture.
Basic Structural Modeling: Classes, Relationships, Common Mechanisms, and Diagrams.
Advanced Structural Modeling: Advanced Classes, Advanced Relationships
Class Diagram: Terms, Concepts, Modeling Techniques for Class Diagram.

UNIT – II: INTERACTION DIAGRAMS AND COLLABORATION DIAGRAMS (Periods:12)
Interaction Diagrams: Sequence Diagrams: Terms, Concepts and Common Modeling Techniques **Collaboration Diagrams:** Terms, Concepts and Common Modeling Techniques.
Basic Behavioral Modeling: Use Cases, Use Case Diagrams, Activity Diagrams.

UNIT -III: ADVANCED BEHAVIORAL MODELING (Periods:11)
Advanced Behavioral Modeling: Events And Signals, State Machines, State Chart Diagrams.
Architectural Modeling: Component, Deployment, Component Diagrams and Deployment Diagrams.
Case Studies: Online Bookshop, A Multi Threaded Airport Simulation.

UNIT – IV: THE UNIFIED PROCESS: **(Periods:11)**
The Unified Process: Use Case Driven, Architecture Centric, Iterative and Incremental.
The Four Ps: People, Project, Product, and Process.

Use Case Driven Process: Why Use Case, Capturing Use Cases, Analysis, Design, and Implementation to realize the Use Cases, Testing the Use Cases.
Architecture-Centric Process: Architecture in brief, Use Cases and Architecture, An Architecture description.
Iterative Incremental Process: Iterative incremental in brief, the iterative approach is risk driven, the generic iteration.

UNIT – V: PHASES OF UNIFIED PROCESS (Periods:11)

Inception Phase: Early in the inception phase, the archetypal inception iteration workflow, execute the core workflows, Requirements to test.
Elaboration Phase: Elaboration phase in brief, Early in the Elaboration phase, the architectural elaboration iteration workflow, Execute core workflows, Requirements to test.
Construction Phase: Early in the construction phase, the archetypal construction iteration workflow, execute the core workflow.
Transition Phase: Early in the transition phase, Activities in transition phase.

Total Periods:58

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, *"The Unified Modeling Language User Guide, Pearson Education,"* Second Edition, 2006.
2. Ivar Jacobson, Grady Booch, James Rumbaugh, *"The Unified Software Development Process, Pearson Education,"* First Edition, 2009.

REFERENCE BOOKS:

1. Mark Priestley, *"Practical Object-Oriented Design with UML,"* Second Edition, Tata McGraw Hill, 2011.
2. Mike O'Docherty, *"Object-Oriented Analysis and Design with UML Version 2.0,"* Wiley India Pvt. Ltd, 2012.

M. Tech. (CS)-II Semester
(14MT20505) WEB PROGRAMMING

Int Marks	Ext Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITES: *Courses on* "Programming in C" and "JAVA".

COURSE DESCRIPTION:
Introduction to HTML, Cascaded Style sheets and Java Scripting; Dynamic HTML and XML; PHP and Web Forms; Web Applications using PHP and MYSQL

COURSE OUTCOMES:
On successful completion of this course the students will be able to :
CO1. Gain knowledge in
- HTML and CSS styling.
- Dynamic HTML with Java Script and XML.
- PHP dynamic programming and interaction with databases.

CO2. Analyze the design problems in HTML Web pages with CSS.
CO3. Design a dynamic webpage with HTML, CSS, Java Script, PHP concepts.
CO4. Assess the HTML Website using XML Parsers.
CO5. Create website of societal context for awareness on social and environmental issues.

UNIT – I: INTROUDCTION TO HTML AND CSS (Periods:11)
Hyper Text Markup Language: Basic HTML, the Document Body, Text, Hyper Links, Adding More Formatting, Lists, Using Color and Images, Images.
More HTML: Tables, Multimedia Objects, Frames, Forms – Towards Interactivity, The HTML Document Head in detail.
Cascading Style Sheets: Introduction, Using Styles, Defining Styles, Properties and Values in Style Sheets, Formatting Blocks of Information, Layers
UNIT – II: JAVA SCRIPTING (Periods:11)
An Introduction to Java Script: Dynamic HTML, Java Script: Basics, Variables, String Manipulation, Mathematical Function, Statements, Operators, Arrays, Functions.
Objects in Java Script: Data and Objects in Java Script, Regular Expressions, Exception Handling, Built – in Objects, Cookies, Events.
UNIT –III: ADVANCED JAVASCRIPTING AND XML (Periods:12)
Dynamic HTML With JavaScript: Data Validation, Opening in a new window, Messages and Confirmations, The Status Bar, Writing to a different frame, Rollover Buttons, Moving Images, A Text Only Menu System, Floating Logos.
XML: Defining Data for Web Applications: Basic XML, Document Type Definition, XML Schema, Document Object Model, Presenting XML, Using XML Parser.

UNIT – IV: PREPROCESSOR HYPERTEXT PROGRAMMING (Periods:14)

An Introduction To PHP: PHP, Introducing PHP, Including PHP in a HTML Page, Data Types, Program Control Structures, Arrays, User Defined Functions, Built-in Functions, Regular Expressions, Using files.

Advanced PHP: PHP and Web Forms, Handling File Uploads: Uploading files with PHP, Session Handlers: Working with Sessions.

UNIT – V: BUILDING WEB APPLICATIONS WITH PHP AND MYSQL (Periods:07)

Building Web Applications With PHP And MYSQL: Handling Installation Prerequisites, **Using the mysqli Extension** - Setting Up and Tearing down the Connection, Handling Connection Errors, Retrieving Error Information, Storing Connection Information in a Separate File, Securing Your Connection Information.

Interacting with the Database - Sending a Query to the Database, Parsing Query Results, Determining the Rows Selected and Rows Affected, Working with Prepared Statements, Executing Database Transactions, and Enabling Auto commit Mode, Committing a Transaction, Rolling Back a Transaction.

Total Periods:56

TEXT BOOKS:

1. Chris Bates, *"Web Programming: Building Internet Applications,"* Third Edition, New Delhi, India: Wiley India Pvt. Ltd., 2009.
2. W Jason Gilmore, *"Beginning PHP and MySQL: From Novice to Professional,"* Fourth edition, New Delhi, India: Springer India Pvt. Ltd., 2011.

REFERENCE BOOKS:

1. Robin Nixon, *"Learning PHP, MySQL, and JavaScript,"* Second edition, Sebastopol, CA: O'Reilly Media, Inc., 2012.
2. Kevin Tatroe, Peter MacIntyre, and Rasmus Lerdorf, *"Programming PHP,"* Third edition, Sebastopol, CA: O'Reilly Media, Inc., 2002.
3. Marc Wandschneider, *"Core Web Application Development with PHP and MySQL,"* First edition., Prentice Hall Professional Technical Reference, 2006
4. David Flanagan, *"JavaScript: The Definitive Guide,"* Sixth Edition, Sebastopol, CA: O'Reilly Media, Inc., 2011.

M.Tech (Computer Science) II-Semester
(14MT20506) BIG DATA ANALYTICS (ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITE: *A Course on* "Data Mining and Warehousing".

COURSE DESCRIPTION

Data Science and Analytics; unsupervised learning; big data from business perspective; Hadoop Technology and application development, Management, InfoSphere big insights and info sphere streams

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1. To gain knowledge about the
- Data Science and Unsupervised Learning.
- Big data Characteristics and Methods.
- InfoSphere Big insights and Streams.

CO2. To analyze the need for database systems for storing the large data

CO3. To design and model an effective and sustainable database for better performance using Big data tools.

CO4. To use Hadoop tools and Methodologies for modelling large databases and real time applications

UNIT I - INTRODUCTION TO DATA SCIENCE (Periods:11)

Introduction- Introduction of Data Science-Getting started with R, Exploratory Data Analysis, Review of probability and probability distributions, Bayes Rule Supervised Learning, Regression, polynomial regression, local regression, k nearest neighbors.

UNIT II - UNSUPERVISED LEARNING (Periods:12)

Unsupervised Learning, Kernel density estimation, k means- Naive Bayes, Data and Data Scraping Classification-ranking, logistic regression, Ethics- time series advanced regression, Decision trees, Best practices, feature selection.

UNIT III - BIG DATA FROM DIFFERENT PERSPECTIVES (Periods:11)

Big data from business Perspective- Introduction of big data, Characteristics of big data, Data in the warehouse and data in Hadoop, Importance of Big data, Big data Use cases, Patterns for Big data deployment, Big data from Technology Perspective History of Hadoop, Components of Hadoop, Application Development in Hadoop, Getting your data in Hadoop, other Hadoop Component.

UNIT IV – INFOSPHERE BIG INSIGHTS (Periods:11)

InfoSphere Big Insights- Analytics for Big data at rest, A Hadoop, Ready Enterprise, Quality file system, Compression, Administrative tooling, Security, Enterprise Integration, Improved workload scheduling, Adaptive map reduce, Data discovery and visualization, Machine Analytics.

UNIT V- INFOSPHERE STREAMS (Periods:10)

InfoSphere Streams- Analytics for Big data in motion, InfoSphere Streams Basics working of InfoSphere Streams, Stream processing language, Operators, Stream toolkits, Enterprise class.

Total Periods:55

TEXT BOOKS:

1. Noreen Burlingame and Lars Nielsen, "A Simple Introduction To Data Science", New Street Communications, LLC, Wickford, Rhode Island**,** 2012.
2. Paul Zikopoulos, IBM, Chris Eaton, Paul Zikopoulos "Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data", The McGraw-Hill Companies, 2012.

REFERENCE BOOKS:

1. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012
2. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.

M. Tech. (Computer Science)-II Semester
(14MT20507) INFORMATION SECURITY (ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITE: A Course on *"Computer Networks".*

COURSE DESCRIPTION:
Introduction to cryptography; message authentication and public key cryptography; Key distribution, user authentication and E-mail security; Internet security, intruders and firewalls

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain advanced knowledge in
- Symmetric and asymmetric encryption algorithms
- Key distribution and message authentication in secure network environment
- Hash algorithms and digital signature techniques
- Multiple access techniques and networking
- Firewall basing and configuration

CO2. Apply the appropriate cryptography scheme & security mechanism for information systems.

UNIT-I: INTRODUCTION TO CRYPTOGRAPHY (Periods:11)
Security Attacks, Security Services, Security Mechanisms, Model for Network Security.
Symmetric Block Encryption- Symmetric Block Encryption Algorithms-DES, Triple-DES, AES, Cipher Block Modes of Operation
UNIT-II: PUBLIC-KEY ENCRYPTION (Periods:11)
Message Authentication-Approaches to Message Authentication, Simple hash function, Secure Hash Functions –SHA-1, SHA-512, Message Authentication Codes and HMAC
Public-Key Cryptography-Public-Key Cryptography Algorithms-RSA, Diffie-Hellman Key Exchange, Digital Signatures, Digital signature standard.
UNIT-III: NETWORK SECURITY APPLICATIONS (Periods:12)
Key Distribution and User Authentication-Kerberos, Key Distribution Using Asymmetric Encryption, X.509 Certificates, Public Key Infrastructure
Electronic Mail Security-Pretty Good Privacy, Key Rings, Multipurpose Internet Mail Extensions, S/MIME - Functionality, Messages and certificate processing.
UNIT-IV: INTERNET SECURITY (Periods:11)
Transport Level Security- Secure Socket Layer and Transport Layer Security.
IP Security-Overview, policy, Encapsulating Security Payload and IKE
Network management security- Concepts of SNMP, SNMPv1 and SNMPv3

UNIT-V: SYSTEM SECURITY (Periods:12)

Intruders- Intrusion Techniques, Intrusion Detection, Malicious Software - Types, Viruses, Virus Countermeasures, Worms

Firewalls- Firewall Characteristics, Firewall Basing, Types of Firewalls, Firewall Location and Configurations.

Total Periods: 57

TEXTBOOKS:

1. William Stallings, "*Network Security Essentials: Applications and Standards,"* Fourth Edition, New Delhi, Pearson Education, 2011.
2. Douglas R.Stinson, "*Cryptography – Theory and Practice,"* Third edition, CRC Press, 2005.

REFERENCE BOOKS:

1. William Stallings, "*Cryptography and Network Security,"* Fifth edition, New Delhi, Pearson Education, 2011.
2. Eric Maiwald, "*Fundamentals of Network Security"*, First edition, McGraw-Hill, 2003.
3. Charlie Kaufman, Radia Perlman, Mike Speciner, "*Network Security, Private communication in a public world,"* Second edition, PHI Learning, 2002.

M. Tech (Computer Science) II-Semester
(14MT20508) MOBILE COMPUTING (ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A Course on* "Computer Networks".

COURSE DESCRIPTION
GSM architectures, Wireless MAC, and CDMA Systems; Mobile IP Layers; Databases, Data Dissemination and Broadcasting Systems; Synchronization in mobile Devices and mobile computing systems; Mobile application languages and operating systems.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Gain advanced knowledge in
- GSM and CDMA Systems.
- Mobile IP, and Mobile TCP
- Databases and Data Dissemination
- Mobile data Synchronization

CO2. Analyse various methods in data dissemination and broadcasting systems
CO3. Design Mobile File Systems for various Mobile Devices
CO4. Apply appropriate techniques and tools to design and implement mobile applications.

UNIT- I: GSM AND SIMILAR ARCHITECTURES & WIRELESS MAC AND CDMA – BASED COMMUNICATION (Periods:12)
GSM AND SIMILAR ARCHITECTURES: GSM, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services.
WIRELESS MAC AND CDMA – BASED COMMUNICATION: Medium Access control, Introduction to CDMA-based Systems, Spread Spectrum in CDMA Systems, Coding Methods in CDMA
UNIT- II: MOBILE IP NETWORK LAYER & MOBILE TRANSPORT LAYER (Periods:14)
MOBILE IP NETWORK LAYER: IP and Mobile IP Network Layer, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, Dynamic Host Configuration Protocol.
MOBILE TRANSPORT LAYER: Conventional TCP/IP Transport Layer Protocols, Indirect TCP, Snooping TCP, Mobile TCP, WAP Architecture.
UNIT –III:DATABASES AND DATA DISSEMINATION AND BROADCASTING SYSTEMS (Periods:14)
DATABASES: Database Hoarding Techniques, Data Caching, Client-Server Computing and Adaptation, Transaction Models, Query Processing, Data Recovery Process, Issues Relating to Quality Of Service.

DATA DISSEMINATION AND BROADCASTING SYSTEMS: Communication Asymmetry, Classification of Data-Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Techniques.

UNIT – IV:MOBILE SYNCHRONIZATION IN MOBILE COMPUTING SYSTEMS AND MOBILE DEVICES: SERVER AND MANAGEMENT (Periods:10)

MOBILE SYNCHRONIZATION IN MOBILE COMPUTING SYSTEMS: Synchronization, Synchronization Software for Mobile Devices, Synchronization Protocols, SynML- Synchronization Language for Mobile Computing, Sync4J (Funambol), Synchronized Multimedia Markup Language (SMIL).

MOBILE DEVICES: SERVER AND MANAGEMENT –Mobile Agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems, Security.

UNIT-V MOBILE APPLICATION LANGUAGES- XML, JAVA, J2ME, AND JAVACARD AND **MOBILE OPERATING SYSTEMS (Periods:10)**

MOBILE APPLICATION LANGUAGES- XML, JAVA, J2ME, AND JAVACARD: Introduction, XML, JAVA, Java 2 Micro Edition (J2ME), JavaCard.

MOBILE OPERATING SYSTEMS: Operating System, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices

Total Periods:60

TEXT BOOKS:

1. Raj Kamal, *"Mobile Computing,"* OXFORD University Press, Second Edition, 2007.

REFERENCE BOOKS:

1. Jochen H. Schiller, *"Mobile Communications,"* Pearson Education, Second Edition, 2004.
2. Asoke Talukder, Roopa Yavagal, *"Mobile Computing,"* Tata McGraw Hill, Second Edition, 2010.

M. Tech. (CS)-II Semester
(14MT20509) VIRTUALIZATION AND CLOUD COMPUTING (ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITES: *Courses on* "Distributed Computing" and "Computer Networks"

COURSE DESCRIPTION:
Introduction to Cloud Computing and virtualization; Map reduce programming; Cloud technologies – Amazon web services, Google App Engine, and Microsoft Azure; Scientific and business applications of Cloud

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Gain Knowledge on the technical foundations of Cloud technology.
CO2. Analyze the Cloud Architectures while developing the internet web applications.
CO3. Solve security issues in cloud applications.
CO4. Get exposure to cloud tools like Microsoft Azure, Google App Engine, and Amazon Web Services.

UNIT- I: VIRTUALIZATION (Periods:13)
Introduction to Virtualization, Objectives of Virtualization, History of Virtualization, benefits of virtualized technology, The virtual service desk, related forms of computing, Understanding Hypervisors, Load balancing & Virtualization. Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples-Xen, Para virtualization, VMware, Full Virtualization, Microsoft Hyper-V.

UNIT-II: CLOUD COMPUTING OVERVIEW (Periods:12)
Cloud computing at a Glance, The Vision of Cloud Computing, Defining a Cloud, A Closer Look, Cloud Computing Reference Model, Characteristics and Benefits, Pros and Cons of cloud, Challenges ahead, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies

CLOUD COMPUTING ARCHITECTURE
Cloud Reference Model, Types of Clouds, Economics of the Cloud, Open Challenges.

UNIT- III: DATA INTENSIVE COMPUTING: MAP-REDUCE PROGRAMMING (Periods:10)
Data-Intensive Computing, Technologies for Data-Intensive Computing, Aneka Map Reduce Programming.

UNIT-IV: CLOUD TECHNOLOGIES (Periods:10)
Amazon Web Services- Compute Services, Storage Services, Communication Services, Additional Services, **Google AppEngine** -Architecture and Core Concepts, Application Life-Cycle, **Microsoft Azure-**Azure Core Concepts, SQL Azure, Windows Azure Platform Appliance.

UNIT-V: CLOUD APPLICATIONS: (Periods:13)

Scientific Applications, Business and Consumer Applications

ADVANCED TOPICS IN CLOUD COMPUTING-Energy Efficiency in Clouds, Market Based Management of Clouds, InterCloud.

Total Periods:58

TEXT BOOKS:

1. Raj Kumar Buyya, Christian Vecchiola, S.Thamarai Selvi, *"Mastering Cloud Computing,"* Tata McGraw Hill ,New Delhi,2013.
2. Ivanka Menken, Gerard Blokdijk, *"Cloud Computing Specialist Certification Kit – Virtualization, The Art of Service,"* Emereo Pty Ltd, 2009.

REFERENCE BOOKS:

1. Michael Miller, *"Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online,"* Que Publishing, Pearson, August 2011.
2. George Reese, *"Cloud Application Architectures Building Applications and Infrastructure in the Cloud,"* O'Reilly Media Released, April 2009.
3. Gautham Shroff, *"Enterprise Cloud Computing: Technology, Architecture, Application,"* Cambridge University Press, 2010.
4. Barrie Sosinky, *"Cloud Computing Bible"*, Wiley Publishing Inc, 2011.

M. Tech. (CS) – II Semester
(14MT20521) SEMINAR

INT. MARKS	EXT. MARKS	TOTAL MARKS	L	T	P	C
--	50	50	--	--	--	2

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of seminar topic; Literature survey; Preparation of technical report and Presentation

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

CO1. Acquire in-depth knowledge in core and allied areas of interest.

CO2. Analyze and synthesize information related to the areas.

CO3. Conceptualize and construct research problems.

CO4. Extract information pertinent to a specific area through literature survey to conduct research.

CO5. Identify the applicability of modern software and tools.

CO6. Contribute positively to multidisciplinary groups in emerging areas with objectivity and rational analysis.

CO7. Plan, organize, prepare and present effective written and oral technical reports.

CO8. Engage in lifelong learning to improve competence.

CO9. Acquire awareness on professional code of conduct in the chosen area.

CO10. Develop independent and reflective learning.

M. Tech. (CS)-II Semester
(14MT20522) WEB PROGRAMMING AND OOAD LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	4	2

PREREQUISITES: *Courses on* "Web Programming" and "Object Oriented Programming".

COURSE DESCRIPTION

Develop and implement dynamic web applications on contemporary and social issues using HTML, CSS, JS and PHP technologies.

Hands on practice in using Visual Modeling Tools and design real time case studies such as Automated Teller Machine (ATM), Online Ticket Reservation for Railways, A Point-of-Sale (POS) System, A Multi-Threaded Airport Simulation, Hospital Management System, Unified Library Application, and Online Shopping.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. To apply knowledge of UML to design an object-oriented system
CO2. Gain knowledge in designing web pages using HTML, CSS, JS.
CO3. Analyze XML files using DTD parser.
CO4. Use Dreamweaver and Notepad++ for designing web pages and generating dynamic content.
CO5. Develop websites for self development and for promoting awareness among the community in societal and Environmental issues
CO6. Engage in lifelong learning by incorporating the best design practices.

OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY EXERCISES:

Draw the UML diagrams for the following case studies:

OOAD Tool to be used: Rational Rose, visual paradigm

Operating System: windows XP

Case Study No: 1

Problem Title: Automated Teller Machine (ATM)

Problem Statement:

Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

Case Study No: 2
Problem Title: Online Ticket Reservation for Railways
Problem Statement:
Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, data of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes ie Sleeper class, First class and the AC compartment. Design the application for the above problem description.

Case Study No: 3
Problem Title: A Point-of-Sale (POS) System
Problem Statement:
A POS system is a computerized application used to record sales and handle payments, it is typically used in a retail store, it includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant, that is, even if remote services are temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client-side terminals and interfaces such as browser, PDA's, touch-screens.

Case Study No: 4
Problem Title: A Multi-Threaded Airport Simulation
Problem Statement: Simulate the operations in an airport. Your application should multiple aircrafts using several runways and gates avoiding collisions/conflicts. Loading: an aircraft uses the runway, lands, and then taxis over to the terminal. Take-Off an aircraft taxies to the runway and then takes off.

Case Study No: 5
Problem Title: Hospital Management System
Problem Statement:
Hospital Management System (HMS) is state-of-the-art software that offers comprehensive solutions to various segments of Healthcare Industry such as Super Specialty, Multi-specialty and General Hospitals of varied capacities, small Nursing Homes, HMOs, Polyclinics and General Practitioners. This HMS solution addresses the issues from multi-discipline angels namely Patients, Doctors, Pharmacy, Hospital Management and Services.

The Software provides both clinical as well as patient care aspects to hospital management. The software is divided into different modules, each addressing a specific activity of the hospital and there by facilitating better patient care. Each module can be used as a standalone solution or can be integrated in a phased manner. Modules are designed so that they meet the present and

future requirements of the hospital. HMS offers various sub-systems and a seamless integration. By being modular, each module can be used as a standalone solution or can be integrated in a phased manner. Modules are also so designed to meet the present as well as future requirements of the organization and process a unique ability with the business growth.HMS consists of the Base modules, Add-on modules and Specialty modules. Additional modules both add-on and specialty modules can be seamlessly integrated to the HMS at any time. The Integration Manager takes care of all the data consistency issues.

Case Study No: 6

Problem Title: Unified Library Application

Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned by the library that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

Base Modules:

- Appointments , Registration, Consultation (OP),Ward Management(IP), Billing and Accounts,
- Packages and Health Plans , Corporate and Insurance, Electronic Medical Records, Services (Test/Results)

Case Study No: 7

Problem Title: Online Shopping

Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client – side terminals and interfaces such as browser, PDAs, touch screens.

WEB PROGRAMMING LABORATORY EXERCISES:

1. Create an HTML web page with at least the following features:
   Keywords & description meta tags, title, Page formatting, including a background color *and* picture, a non-default text color, and non-default text and link colors, A horizontal rule, At least three levels of headers, Text formatting, including specifying a non-default font as well as centered, bold, italics, subscript, superscript, and strikeout, A three-level bulleted list and a two-level numbered list, At least two external links, with one a text link and one an image link, Three internal "bookmark" links – that is, a link to further down on the current page, A relative link to an image in a different directory than the directory in which your current HTML page resides, An image with a non-standard-width border in a non-standard color. The image should appear off to the right side of the page, an image map with at least three links, a table that includes at

least three rows, two cells in each row, two cols pan attributes, and one row span attribute. Put a background color on the entire table, a different background color on one cell, and a background image on one entire row of the table.

2. Create an HTML web page with JavaScript for the following problem:
   Get two input numbers from an HTML form. On submit, call a function to edit them to make sure that they are within the range of 1-100. If not, display an error message and set focus to the field in error. If the entered numbers are valid, add the two numbers together and display the total in an alert box. Pop up a prompt box to get a third number and edit it to make sure it's in the range of 1 to 5. Multiply the original total (from the two input boxes) by this third number. Store the result in a cookie and then automatically open a second page to display the cookie that you saved on the prior page.
3.
   a. Write an XML file which will display the Book information which includes the following:
      1) Title of the book 2) Author Name 3) ISBN number
      4) Publisher name 5) Edition 6) Price
   b. Write a Document Type Definition (DTD) to validate the above XML file. Display the XML file as follows:
      The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose. Note: Give at least for 4 books. It should be valid syntactically. Hint: You can use some xml editors like XML-spy.
4. Write PHP Script to demonstrate
   a. String processing in PHP
   b. File uploading
   c. Sessions and Cookies
5. Write PHP Script that takes user input data (Personal Information like registration to a website) in a form and validates it and write the data into the database.

M. Tech. (CS) – III & IV Semesters
(14MT30521 and 14MT40521) PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
80	120	200	--	--	--	16

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

CO1. Acquire in-depth knowledge in the areas of interest.

CO2. Analyse critically chosen project topic for conducting research.

CO3. Apply knowledge gained through Program, self learning and experience for solution of a given problem efficiently.

CO4. Undertake research confidently in the project domain.

CO5. Use the techniques, skills and modern engineering tools necessary for project work.

CO6. Perform harmonically in multi-disciplinary, multi-cultural groups, and develop a high level of interpersonal skills.

CO7. Manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.

CO8. Develop communication skills, both oral and written for preparing and presenting reports.

CO9. Engage in lifelong learning to improve knowledge and competence continuously.

CO10. Understand professional and ethical responsibility for sustainable development of society.

CO11. Develop independent and reflective learning.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF CSE

COURSE STRUCTURE for M.Tech. (CNIS)

I-SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT10501	Advanced Computer Networks	4	-	-	4	40	60	100
2.	14MT20507	Information Security	4	-	-	4	40	60	100
3.	14MT20508	Mobile Computing	4	-	-	4	40	60	100
4.	14MT16301	Network Management	4	-	-	4	40	60	100
5.	14MT16302	Wireless Networks	4	-	-	4	40	60	100
6.		**Elective-1**							
	14MT16303	Database Security	4	-	-	4	40	60	100
	14MT20503	Data Warehousing and Data Mining							
	14MT22504	Software Security Engineering							
	14MT16304	Software Testing Techniques							
7.	14MT10310	Research Methodology	3	-	-	3	40	60	100
8	14MT16321	Wireless Networks and Information Security Laboratory	-	-	4	2	25	50	75
		Total:	**27**	**-**	**4**	**29**	**305**	**470**	**775**

II-SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT26301	Ad-hoc Wireless Networks	4	-	-	4	40	60	100
2.	14MT26302	Computer Forensics	4	-	-	4	40	60	100
3.	14MT26303	Intrusion Detection Systems	4	-	-	4	40	60	100
4.	14MT20505	Web Programming	4	-	-	4	40	60	100
5.	14MT20509	Virtualization and Cloud Computing	4	-	-	4	40	60	100
6.		**Elective-2**							
	14MT20506	Big Data Analytics	4	-	-	4	40	60	100
	14MT26304	Design of Secure Protocols							
	14MT26305	High Speed Networks							
	14MT26306	TCP/IP Protocols							
7.	14MT26321	Seminar	-	-	-	2	--	50	50
8.	14MT26322	Web Programming and Cloud Computing Laboratory	-	-	4	2	25	50	75
		Total:	**24**	**-**	**4**	**28**	**265**	**460**	**725**

III-SEMESTER

S. No	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT36321	Project Work – Phase I	-	-	-	4	40	--	40
Total:			**-**	**-**	**-**	**4**	**40**	**--**	**40**

*Fulltime Project Work

IV-SEMESTER

S. No	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT46321	Project Work – Phase II	-	-	-	12	40	120	160
Total:			**-**	**-**	**-**	**12**	**40**	**120**	**160**
Grand Total:						**73**	**650**	**1050**	**1700**

*Fulltime Project Work

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
M. Tech (CN&IS) - I Semester
(14MT10501) ADVANCED COMPUTER NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITE: *A Course on* "Computer Networks"

COURSE DESCRIPTION:
Computer networks and protocols; Data Link Layer, LAN and Network routing; Transport Layer and internet protocols; Wireless and Optical Networks; MANETS and wireless Sensor Networks.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge on principles of computers, network topologies, routing mechanisms.
CO2. Analyze the computer network with suitable network protocols and routing algorithms.
CO3. Apply algorithms for a given network to calculate least-cost and non-least cost paths.

UNIT I: REVIEW OF COMPUTER NETWORKS AND FOUNDATION OF NETWORKING PROTOCOLS (Periods:11)
Review of Computer Networks and the Internet-The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet, packet-Switched Networks.
Foundations of Networking Protocols-5_layer TCP/IP Model, 7_Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM.
UNIT II: DATA LINKS, TRANSMISSION AND ROUTING (Periods:12)
The Link Layer and Local Area Networks-Link Layer Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Link Virtualization.
Routing and Internet Working-Network Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols
UNIT III: TRANSPORT LAYER PROTOCOLS AND NETWORK APPLICATIONS (Periods:12)
Internet Protocol-Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6
Transport and End-to-End Protocols**-**Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), TCP Congestion Control.
UNIT IV: WIRELESS NETWORKS AND OPTICAL NETWORKS (Periods:11)
Wireless Networks and Mobile IP-Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standards, Mobile IP, Wireless Mesh Networks (WMNs).

Optical Networks and WDM Systems-Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers

UNIT V: MANETS AND WIRELESS SENSOR NETWORKS (Periods:12)

VPNs, Tunneling and Overlay Networks-Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks.

Mobile Ad-Hoc Networks-Overview of Wireless Ad**–**Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks- DSDV, DSR, AODV

Wireless Sensor Networks-Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols

Total Periods:58

TEXT BOOKS:

1. Nader F. Mir, *"Computer and Communication Networks,"* Pearson Education, 2007.
2. F. Kurose, Keith W.Ross, *"Computer Networking: A Top-Down Approach Featuring the Internet,"* Pearson Education, Third Edition, 2007.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *"Data Communications and Networking,"* Tata McGraw Hill, Fourth Edition, 2007
2. Andrew S. Tanenbaum, *"Computer Networks,"* Fourth Edition, Pearson Education, New Delhi, 1997
3. S. Keshav, *"An Engineering Approach to Computer Networking*," Pearson Education, New Delhi, 2004.

M. Tech. (CN&IS) I-Semester
(14MT20507) INFORMATION SECURITY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITE: A Course on *"Computer Networks"*

COURSE DESCRIPTION:
Introduction to cryptography; message authentication and public key cryptography; Key distribution, user authentication and E-mail security; Internet security, intruders and firewalls

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain advanced knowledge in
- Symmetric and asymmetric encryption algorithms
- Key distribution and message authentication in secure network environment
- Hash algorithms and digital signature techniques
- Multiple access techniques and networking
- Firewall basing and configuration

CO2. Apply the appropriate cryptography scheme & security mechanism for information systems.

UNIT-I: INTRODUCTION TO CRYPTOGRAPHY (Periods:11)
Security Attacks, Security Services, Security Mechanisms, Model for Network Security.
Symmetric Block Encryption- Symmetric Block Encryption Algorithms-DES, Triple-DES, AES, Cipher Block Modes of Operation
UNIT-II: PUBLIC-KEY ENCRYPTION (Periods:11)
Message Authentication-Approaches to Message Authentication, Simple hash function, Secure Hash Functions –SHA-1, SHA-512, Message Authentication Codes and HMAC
Public-Key Cryptography-Public-Key Cryptography Algorithms-RSA, Diffie-Hellman Key Exchange, Digital Signatures, Digital signature standard.
UNIT-III: NETWORK SECURITY APPLICATIONS (Periods:12)
Key Distribution and User Authentication-Kerberos, Key Distribution Using Asymmetric Encryption, X.509 Certificates, Public Key Infrastructure
Electronic Mail Security-Pretty Good Privacy, Key Rings, Multipurpose Internet Mail Extensions, S/MIME - Functionality, Messages and certificate processing.
UNIT-IV: INTERNET SECURITY (Periods:11)
Transport Level Security- Secure Socket Layer and Transport Layer Security.
IP Security-Overview, policy, Encapsulating Security Payload and IKE
Network management security- Concepts of SNMP, SNMPv1 and SNMPv3

UNIT-V: SYSTEM SECURITY **(Periods:12)**

Intruders- Intrusion Techniques, Intrusion Detection, Malicious Software - Types, Viruses, Virus Countermeasures, Worms

Firewalls- Firewall Characteristics, Firewall Basing, Types of Firewalls, Firewall Location and Configurations.

Total Periods:57

TEXTBOOKS:

1. William Stallings, "*Network Security Essentials: Applications and Standards,"* Fourth Edition, New Delhi, Pearson Education, 2011
2. Douglas R.Stinson, "*Cryptography – Theory and Practice,"* Third edition, CRC Press, 2005

REFERENCE BOOKS:

1. William Stallings, "*Cryptography and Network Security,"* Fifth edition, New Delhi, Pearson Education, 2011
2. Eric Maiwald, "*Fundamentals of Network Security"*, First edition, McGraw-Hill, 2003
3. Charlie Kaufman, Radia Perlman, Mike Speciner, "*Network Security, Private communication in a public world,"* Second edition, PHI Learning, 2002

M. Tech (CN&IS) I-Semester
(14MT20508) MOBILE COMPUTING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE: *A Course on* "Computer Networks".

COURSE DESCRIPTION
GSM architectures, Wireless MAC, and CDMA Systems; Mobile IP Layers; Databases, Data Dissemination and Broadcasting Systems; Synchronization in mobile Devices and mobile computing systems; Mobile application languages and operating systems.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain advanced knowledge in
- GSM and CDMA Systems.
- Mobile IP, and Mobile TCP
- Databases and Data Dissemination
- Mobile data Synchronization

CO2. Analyze various methods in data dissemination and broadcasting systems
CO3. Design Mobile File Systems for various Mobile Devices
CO4. Apply appropriate techniques and tools to design and implement mobile applications.

UNIT- I: GSM AND SIMILAR ARCHITECTURES & WIRELESS MAC AND CDMA – BASED COMMUNICATION (Periods:12)
GSM AND SIMILAR ARCHITECTURES: GSM, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services.
WIRELESS MAC AND CDMA – BASED COMMUNICATION: Medium Access control, Introduction to CDMA-based Systems, Spread Spectrum in CDMA Systems, Coding Methods in CDMA
UNIT- II: MOBILE IP NETWORK LAYER & MOBILE TRANSPORT LAYER (Periods:14)
MOBILE IP NETWORK LAYER: IP and Mobile IP Network Layer, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, Dynamic Host Configuration Protocol.
MOBILE TRANSPORT LAYER: Conventional TCP/IP Transport Layer Protocols, Indirect TCP, Snooping TCP, Mobile TCP, WAP Architecture.
UNIT –III:DATABASES AND DATA DISSEMINATION AND BROADCASTING SYSTEMS (Periods:14)
DATABASES: Database Hoarding Techniques, Data Caching, Client-Server Computing and Adaptation, Transaction Models, Query Processing, Data Recovery Process, Issues Relating to Quality Of Service.

DATA DISSEMINATION AND BROADCASTING SYSTEMS: Communication Asymmetry, Classification of Data-Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Techniques.

UNIT – IV:MOBILE SYNCHRONIZATION IN MOBILE COMPUTING SYSTEMS AND MOBILE DEVICES: SERVER AND MANAGEMENT

(Periods:10)

MOBILE SYNCHRONIZATION IN MOBILE COMPUTING SYSTEMS: Synchronization, Synchronization Software for Mobile Devices, Synchronization Protocols, SynML- Synchronization Language for Mobile Computing, Sync4J (Funambol), Synchronized Multimedia Markup Language (SMIL).

MOBILE DEVICES: SERVER AND MANAGEMENT –Mobile Agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems, Security.

UNIT-V MOBILE APPLICATION LANGUAGES- XML, JAVA, J2ME, AND JAVACARD AND MOBILE OPERATING SYSTEMS (Periods:10)

MOBILE APPLICATION LANGUAGES- XML, JAVA, J2ME, AND JAVACARD: Introduction, XML, JAVA, Java 2 Micro Edition (J2ME), JavaCard.

MOBILE OPERATING SYSTEMS: Operating System, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices

Total Periods:60

TEXT BOOKS:

1. Raj Kamal, *"Mobile Computing,"* OXFORD University Press, Second Edition, 2007

REFERENCE BOOKS:

1. Jochen H. Schiller, *"Mobile Communications,"* Pearson Education, Second Edition, 2004
2. Asoke Talukder, Roopa Yavagal, *"Mobile Computing,"* Tata McGraw Hill, Second Edition, 2010

M. Tech (CN&IS) - I Semester
(14MT16301) NETWORK MANAGEMENT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: *Courses* on "Computer Networks" and "Network Security"

COURSE DESCRIPTION:
Principles of Network Management; SNMPv1, SNMPv2, SNMPv3 Network management and Communication; Remote Monitoring and Telecommunication management Network; Broadband and Web based Management

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain Knowledge on SNMP, Telecommunications Networks and remote monitoring.
CO2. Analyze Traffic Management Problems in Network through Remote Monitoring. .
CO3. Apply NMS tools such as JMX Architectures, JIRO platforms in web based Enterprise Management.

UNIT-I: NETWORK MANAGEMENT OVERVIEW AND BASIC FOUNDATIONS (Periods:12)
Network Management Overview-Analogy of Telephone Network Management, Communication Protocols and standards, case histories of Networking and Management, Network Management functions, Network and System Management.
Basic Foundations-Network Management Standards, Network Management Models, Organizational Model, Information Model, Communication Model, Functional Model, ASN.1, Encoding Structure
UNIT-II: SNMPv1 NETWORK MANAGEMENT AND COMMUNICATION MODEL (Periods:12)
SNMPv1-History of SNMP Management, internet organization and standard, SNMP Model, Organization and Information models, Communication and Functional models in SNMPv1
UNIT-III: SNMPv2 & SNMPv3 NETWORK MANAGEMENT (Periods:12)
SNMPv2-Major changes in SNMPv2, System Architecture, and SNMPv2 structure of Management Information, SNMPv2 Management Information Base, and SNMPv2 protocol.
SNMPv3-Key features, SNMPv3 architecture, applications, Management Information Based, User based security model, Access control
UNIT-IV: RMON AND TMN (Periods:10)
Remote Monitoring-Introduction to remote monitoring, RMON Structure of Management Information and Management Information Base, RMON1, RMON2, ATM Remote monitoring and Case study

Telecommunications Management Network-Introduction to TMN, Operations Systems, TMN conceptual model, TMN Architecture, TMN integrated view

UNIT-V: BROAD BAND AND WEB-BASED MANAGEMENT (Periods:12)

Broadband Management- Network and Services, ATM Technology, ATM Network Management, MPLS Network Technology.

Web-based Management-Web Interface to SNMP Management, Embedded Web-based Management, Desktop Management Interface, Web-based Enterprise Management, Java Management extensions, JIRO platform.

Total Periods:58

TEXT BOOKS:

1. Mani Subramanian, *"Network Management: Principles and practice,"* Second Edition, New Delhi: Pearson Education, 2011
2. William Stallings, "*SNMP, SNMPv2, SNMPv3, RMON-1 and 2,*" Third Edition, New Delhi: Pearson Education, 2009

REFERENCE BOOKS:

1. Stephen B Morris, *"Network Management, MIB's and MPL's: Principles, Design and Implementation,"* New Delhi: Pearson Education 2008
2. Mark Burges, *"Principles of Network and System Administration,"* Second Edition, New Delhi: Wiley Dream tech, 2008.
3. Louis A Steinberg , "*Trouble is shooting with SNMP and Analyzing MIB's,"* New Delhi: Tata McGraw Hill, 2006.

M. Tech. (CN & IS) I-Semester
(14MT16302) WIRELESS NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	-	4

PRE-REQUISITE: A Course on *"Computer Networks"*.

COURSE DESCRIPTION:
Cellular and satellite systems, Network Protocols, and traffic theories; Mobile Radio propagation, channel coding and error control; Multiple radio access and multiple division techniques; Adhoc and sensor networks, wireless LAN, Man and PAN

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge in
- Different types of wireless Network Standards
- Radio wave propagation in wireless environment
- Multiple access techniques and networking
- Multicarrier modulation

CO2. Analyze the concepts of routing to design new routing protocols.
CO3. Apply concepts of queuing models to improve the performance of wireless network communication.

UNIT – I: INTRODUCTION, PROBABILITY, STATISTICS, AND TRAFFIC THEORIES (Periods:12)
Introduction-History, Characteristics and Fundamentals of cellular Systems, Cellular System Infrastructure, Satellite Systems, Network Protocols, Sensor Networks, Wireless LANs, MANs and PANs.
Probability, Statistics, and Traffic Theories-Introduction, Basic Probability and Statistics Theories, Traffic Theory, Basic Queuing Systems
UNIT – II: MOBILE RADIO PROPAGATION, CHANNEL CODING AND ERROR CONTROL (Periods:11)
Mobile Radio Propagation-Introduction, Types of Radio Waves, Propagation Mechanisms, Free Space Propagation, Land Propagation, Path Loss, Slow Fading, Fast Fading, Doppler Effect, Delay Spread, Intersymbol Interference, Coherence Bandwidth, Cochannel Interference.
Channel Coding and Error Control- Introduction, Liner Block Codes, Cyclic Codes, Cyclic Redundancy Check, Convolutional Codes, Interleaver, Turbo Codes, ARQ Techniques.
UNIT -III: MULTIPLE RADIO ACCESS, MULTIPLE DIVISION TECHNIQUES FOR TRAFFIC CHANNELS (Periods:13)
Multiple Radio Access- Introduction, Multiple Radio Access Protocols, Contention Based Protocols.
Multiple Division Techniques for Traffic Channels- Introduction, Concepts and Models for Multiple Divisions, Modulation Techniques

Network Protocols- Introduction, TCP/IP Protocol, TCP over Wireless, Internet Protocol Version (IPV6)

UNIT – IV: AD HOC NETWORKS AND SENSOR NETWORKS (Periods:12)

Ad Hoc Networks-Introduction, Characteristics of MANETs, Applications, Routing-Table Driven Routing Protocols, and Source Initiated Routing Protocols, Hybrid Protocols, Vehicular Area Network, Security Issues in Mobile Ad Hoc Networks, and Network Simulators.

Sensor Networks-Introduction, Fixed Wireless Sensor Networks, Wireless Sensor Networks, Sensor Deployment, Network Characteristics, Design Issues in Sensor Networks, Secured Communication.

UNIT – V: WIRELESS LANS, MANS, AND PANS, RECENT ADVANCES (Periods:12)

Wireless LANs, MANs, and PANs-Introduction, Wireless Local Area Networks (WLANs), Enhancement for IEEE 802.11 WLANs, Wireless Metropolitan Area Networks (WMANs) using WiMAX and Mesh Networks, Mesh Networks, Wireless Personal Area Networks (WPANs) and Zigbee, Cognitive Radio

Total Periods:60

TEXT BOOKS:

1. Dharma Prakash Agarwal, Qing-An Zeng, *"Introduction to Wireless & Mobile Systems,"* Cengage Learning, Third edition, 2011.

REFERENCE BOOKS:

1. Theodore S. Rappaport, *"Wireless Communications–Principles and Practice," Second Edition*, PHI, 2002.
2. DavidTse, Pramod Viswanath*, "Fundamentals of Wireless Communications,"* Cambridge University Press, 2006.
3. William Stallings, *"Wireless communications and Networks,"* Pearson education, 2005
4. C. Siva Rama Murthy, B.S. Manoj, *"Ad Hoc Wireless Networks – Architectures and Protocols,"* Pearson Education, Second Edition, 2004.

M Tech (CN&IS) - I Semester
(14MT20503) DATA WAREHOUSING AND DATA MINING
(Elective-1)

Int Marks	Ext Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE: *A course on* "Database Management systems"

COURSE DESCRIPTION:
Introduction to Data Warehouse and data mining; Data preprocessing, mining and associations; Data Classification and prediction; Cluster Analysis; Mining Data streams – Time series, Spatial, Multimedia and text data

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge in:
- Data warehousing and enterprise intelligence in industry and government.
- Data mining algorithms.
- Association Rules, Classification and Prediction and Cluster Analysis.

CO2. Analyze the results generated from the constructed artifact to determine if patterns of clusters were detected in the Data sets.
CO3. Develop solutions to problems related to frequent item sets.
CO4. Apply data mining techniques in mining time series, spatial data, World Wide Web, text and multimedia data

UNIT-I: INTRODUCTION TO DATA WAREHOUSE AND DATA MINING (Periods:10)

Data Warehouse- A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehouse to Data Mining.
Data Mining – Kinds of Data, Data Mining Functionalities, Primitives, Major Issues in Data Mining

UNIT-II: DATA PREPROCESSING, MINING FREQUENT PATTERNS AND ASSOCIATIONS (Periods:10)

Data Preprocessing - Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction.
Mining Frequent Patterns and Associations - Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, Constraint based association mining.

UNIT-III: CLASSIFICATION AND PREDICTION (Periods:09)

Issues regarding classification and prediction, classification by decision tree induction, Bayesian classification, Rule based classification, classification by Back propagation, Prediction, Accuracy and Error Measures.

UNIT-IV: CLUSTER ANALYSIS (Periods:13)

Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods- Partitioning Methods, Hierarchical Methods, Density based Methods, Grid based method, Model based clustering methods, Clustering high dimensional data and Outlier analysis.

UNIT-V: MINING STREAM, TIME SERIES, SPATIAL DATA, MULTIMEDIA, TEXT AND WEB MINING (Periods:12)

Mining Data Streams, Mining Time Series Data, Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

Total Periods:54

TEXT BOOK:

1. Jiawei Han and Micheline Kamber, "*Data Mining: Concepts and Techniques*," Second Edition, Elsevier, 2009

REFERENCE BOOKS:

1. Margaret H Dunham, *Data Mining Introductory and Advanced Topics*," Second Edition, Pearson Education, 2006
2. Amitesh Sinha, "*Data Warehousing*," Thomson Learning, 2007
3. Xingdong Wu, Vipin Kumar, "*The Top Ten Algorithms in Data Mining*," Taylor and Francis Group, 2009

M. Tech (CN&IS) I-Semester
(14MT22504) SOFTWARE SECURITY ENGINEERING
(Elective-1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Courses on "Software Engineering," and "Network Security".

COURSE DESCRIPTION:
Introduction to software security; requirement engineering for secure software; Security principles in Software development life cycle; security and complexity; governance and security

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

CO1. Gain knowledge on security issues in:
- Requirement Engineering
- Architecture and Design
- Coding ,Testing and System Assembling

CO2. Analyze complex software projects to describe security risks and mitigation techniques.

CO3. Acquire skills to solve the different security risks arising at different levels of software development life cycle.

CO4. Contribute to research issues in software security by developing new methodologies.

CO5. Apply appropriate attack patterns and modern tools to analyze the secure software architecture and design

UNIT-I: IMPORTANCE OF SECURITY IN SOFTWARE (Periods:12)

Security a software Issue-Introduction, The problem, Software Assurance and Software Security, Threats to software security, Sources of software insecurity, Benefits of detecting software security defects early, managing secure software development.

What Makes Software Secure-Introduction, Properties of Secure Software, Influencing the security properties of software, Asserting and specifying desired security properties

UNIT-II: REQUIREMENTS ENGINEERING (Periods:10)

Requirements engineering for secure software-Introduction, Misuse and abuse cases, the SQUARE process Model, SQUARE sample outputs, Requirements elicitation, and Requirements prioritization.

UNIT-III: SECURITY PRINCIPLES IN SDLC (Periods:12)

Secure Software Architecture and Design-Introduction, Software Security practices for Architecture and Design, architectural risk analysis, Software security knowledge for Architecture and Design-Security principles, Security guidelines and Attack patterns

Secure coding and Testing-Introduction, Code analysis, Software Security testing, Security testing considerations throughput the SDLC

UNIT-IV: SECURITY AND COMPLEXITY (Periods:10)

System Assembly Challenges-Introduction, Security failures, functional and attacker perspectives for security analysis in web services and identity management, system complexity drivers and security

UNIT-V: GOVERNANCE AND MANAGING (Periods:12)

Governance and Managing for More Secure Software: Introduction, Governance and security, adopting an enterprise software security framework, how much security is enough, Security and project management, Maturity of Practice.

Total Periods:56

TEXTBOOKS:

1. Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, and Nancy R. Mead, *"Security Engineering: A Guide for Project Managers,"* Pearson Education (India), 2009.

REFERENCE BOOKS:

1. Gary McGraw, *"Software Security: Building Security In,"* Addison-Wesley, 2006
2. Mark Dowd, John McDonald, Justin Schuh, *"The Art of Software Security Assessment: Identifying and Preventing Software Vulnerabilities,"* Addison-Wesley, First Edition, 2006.
3. John Viega, Gary McGraw, *"Building Secure Software: How to Avoid Security Problems the Right Way,"* Addison-Wesley, 2001.

M Tech (CN&IS) I-Semester
(14MT16303) DATABASE SECURITY (Elective-1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE*:* *A course* on **"**Database Management Systems"

COURSE DESCRIPTION:
Database and information security architecture and operating systems security; User Administration; Database application security models and virtual private databases; auditing application data and database activities; case studies

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge in
- Information System Security
- Design of Secure Software
- Database System Models and Applications.
- Need for database security architecture.

CO2. Analyze fundamental database security threats, vulnerabilities and associated risks.
CO3. Implement secure User accounts, and VPDs using database management system technologies
CO4. Create database security architecture.

UNIT-I: SECURITY ARCHITECTURE AND OPERATING SYSTEM SECURITY FUNDAMENTALS (Periods:11)
Security Architecture-Introduction, Security, Information Systems, Database Management Systems, Information Security, Information Security Architecture, Database Security, Asset type and their Values, Security Methods.
Operating System Security Fundamentals-Operating System Security Environment, Components, Authentication methods, User administration, Password policies, Vulnerabilities.
UNIT-II: ADMINISTRATION OF USERS AND PROFILES, PASSWORD POLICIES, PRIVILEGES, AND ROLES (Periods:11)
Administration of Users-Introduction, Documentation of user administration, Operating system authentication, Creating users, Creating SQL server users, Removing users, Modifying users, Default users, Remote users, Database links, Linked servers, Remote servers, Practices for administrators and Managers, Best practices.
Profiles, Password Policies, Privileges, and Roles: Defining and Using Profiles, Designing and Implementing Password Policies, Granting and Revoking User Privileges Creating.
UNIT-III: SECURITY MODELS AND VIRTUAL PRIVATE DATABASES (Periods:11)
Database Application Security Models-Introduction, Types of users, Security Models, Application Types, and Application security models.

Virtual Private Databases-Introduction, Overview of VPD, Implementing VPDs, Implementing oracle VPD, Viewing VPD policies, VPD application context using the Data Dictionary and Policy Manager, Implementing Row-and Column level Security with SQL Server and Database Auditing Models

UNIT-IV: DATA AUDITING AND AUDITING DATABASE ACTIVITIES (Periods:12)

Application Data Auditing-Introduction, DML action auditing architecture, Oracle triggers, SQL server triggers, Fine-grained auditing with oracle, DML statement audit trail, auditing application errors with oracle.

Auditing Database Activities-Using oracle database activities, Creating DLL triggers with oracle, Auditing database activities with oracle, Auditing server activity with Microsoft SQL server 2000, Implementing AQL profiler, Security auditing with SQL server

UNIT-V: CASE STUDIES (Periods:10)

Security and Auditing Project Cases: SQL Injection, Develop an Online Database, Taking Care of Payroll, Tracing Town Contracts and Database Changes, Developing a Secured Authorization Repository.

Total Periods:55

TEXTBOOKS:

1. Hassan A. Afyouni, *"Database Security and Auditing: Protecting Data Integrity and Accessibility,"* Cengage Learning, New Delhi, 2006.
2. S. Castano, M. Fugini, G. Martella, P. Samarati, *"Database Security,"* Addison-Wesley, New York, 1994

REFERENCE BOOKS:

1. Ron Ben Natan, *"Implementing Database Security and Auditing,"* U.S.A: Elsevier Digital Press, 2005.
2. Michael Gertz, SushilJajodia, *"Handbook of Database Security: Applications and Trends,"* New York: Springer, 2008.

M. Tech (CN&IS) I-Semester
(14MT16304) SOFTWARE TESTING TECHNIQUES (Elective-1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Courses on "Object Oriented Analysis and Design through UML" and "Software Engineering"

COURSE DESCRIPTION:
Testing fundamentals, flow graphs and path testing; transaction and data flow testing; Domain testing; Logic Based Testing, and graphs matrices; Testing Tools – QTP, JMeter, and LoadRunner

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge on
- Flow graphs and Path testing.
- Paths and states.
- Transaction Flow Testing and Domain Testing.
- Software Testing Tools like Load runner and QTP.

CO2. Design and develop test cases for analyzing the software at different levels.
CO3. Test real time software applications using the automated testing tools like load runner, and QTP.
CO4. Apply the knowledge of modern testing tools for the real world environment.

UNIT-I: INTRODUCTION TO TESTING AND PATH TESTING (Periods:11)
Introduction-Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.
Flow graphs and Path testing-Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.
UNIT-II: TRANSACTION AND DATA FLOW TESTING (Periods:11)
Transaction Flow Testing-Transaction flows, transaction flow testing techniques.
Dataflow Testing-Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing
UNIT-III: DOMAIN TESTING, PATH PRODUCTS AND REGULAR EXPRESSIONS (Periods:12)
Domain Testing-Domains and paths, Nice and ugly domains, domain testing, domains and interfaces testing, domains and testability
Paths, Path products and Regular expressions-Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

UNIT-IV: LOGIC BASED TESTING, STATE GRAPHS, MATRICES AND TRANSITION TESTING (Periods:12)

Logic Based Testing-Overview, decision tables, path expressions, kv charts, specifications, State, State Graphs and Transition testing, state graphs, good and bad state graphs, state testing, Testability tips.

Graph Matrices and Application-Motivational overview, matrix of graph relations, power of a matrix, node reduction algorithm

UNIT-V: TESTING TOOLS (Periods:12)

QTP- Overview, Testing an Application, Synchronizing test cases, check pointing, Testing Database Application. **JMeter**-Overview, HTTP Test. **Load Runner**-Overview, Creating VUser Script using Virtual User Generator and using LoadRunner Controller.

Total Periods:58

TEXT BOOKS:

1. Boris Beizer *"Software Testing techniques,"* Dreamtech, Second Edition, 2008.
2. Dr. K. V. K. K. Prasad *"Software Testing Tools,"* Dreamtech, 2007.

REFERENCE BOOKS:

1. Naresh Chauhan, *"Software Testing – Principles and Practices,"* Oxford University Press, India, 2010.
2. Willaim, E, Perry, *"Effective methods of Software Testing,"* third Edition, Wiley India, 2009.

M. Tech. (CN & IS) - I Semester
(14MT16321) WIRELESS NETWORKS & INFORMATION SECURITY LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	--	--	4	2

PRE-REQUISITES: Courses on "Wireless Networks" and "Information Security"

COURSE DESCRIPTION:

Develop programs for simulating wired and wireless computer network protocols and implement using network simulation tools.

Design and implement programs for Information security algorithms DES, RSA, AES, SHA and DSS using network simulators.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Design wireless networking models and validate new protocols.

CO2. Analyze the typical performance measures of network models.

CO3. Compare and contrast various performance measures of different network models.

CO4. Develop new simulation models of protocols and mechanisms

List of Exercises in *Wireless Networks:*
(Total no. of Lab exercises to be performed: 05)

1. Simulate TCP-SACK (Selective Acknowledgement Protocol) Protocol for Wireless Networks
2. Simulate Pure ALOHA Protocol and Slotted ALOHA Protocol.
3. Simulate Carrier Sense Multiple Access (CSMA) Protocol.
4. Simulate Destination Sequenced Distance Vector (DSDV) Routing Algorithm for AdHoc Networks.
5. Simulate Ad Hoc on Demand Distance Vector (AODV) Routing Algorithm for AdHoc Networks.

List of Exercises in *Information Security:*
(Total no. of Laboratory exercises to be performed: 07)

1. Write a program to encrypt and decrypt given text using DES symmetric key algorithm.
2. Write a program to encrypt and decrypt given text in public key cryptographic system using RSA.
3. Write a program to encrypt and decrypt given text using AES algorithm with 128-bit key.
4. Write a program to implement port monitoring using NMAP.
5. Write a program to generate a Hash code for the given text using SHA-512 algorithm.
6. Create a digital signature for the given doc/pdf file using DSS algorithm.
7. Configure Firewall filters to accept/reject URLs/web content.

M. Tech (CN & IS) – I Semester
(14MT10310) RESEARCH METHODOLOGY
(Common to all M. Tech. Programs)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	--	--	3

PRE-REQUISITES: --

COURSE DESCRIPTION:
Fundamentals of research work - research problem and design; Data collection, Analysis and hypothesis; Statistics in Research; Interpretation and Report Writing.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge on research approaches, research process and data collection.
CO2. Identify and analyze research problem.
CO3. Solve the research problems using statistical methods.
CO4. Carryout literature survey and apply good research methodologies for the development of scientific/ technological knowledge in one or more domains of engineering.
CO5. Learn, select and apply modern engineering tools to complex engineering activities.
CO6. Write effective research reports.

DETAILED SYLLABUS:
UNIT-I: INTRODUCTION TO RESEARCH METHODOLOGY (Periods:07)
Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research.
UNIT-II: RESEARCH PROBLEM AND DESIGN (Periods:09)
Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem. Features of Good Design, Research Design Concepts, Different Research Designs
UNIT-III: DATA COLLECTION, ANALYSIS, AND HYPOTHESIS (Periods:09)
Different Methods of Data Collection, Processing Operations, Types of Analysis, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure
UNIT-IV: STATISTICS IN RESEARCH (Periods:09)
Review of Statistical Techniques- Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry. Normal Distribution, Chi-Square Test as a Test of Goodness of Fit.
UNIT-V: INTERPRETATION AND REPORT WRITING (Periods:06)
Interpretation – Techniques and Precautions. Report Writing – Significance, Stages, Layout. Types of reports, Precautions in Writing Reports.

Total Periods: 40

TEXT BOOK:

1. C.R. Kothari, *Research Methodology: Methods and Techniques*, New Age International Publishers, New Delhi, 2nd Revised Edition, 2004.

REFERENCE BOOKS:

1. Ranjit Kumar, *Research Methodology: A step-by-step guide for beginners*, Sage South Asia, 3rd ed., 2011.
2. R. Panneerselvam, Research Methodology, PHI learning Pvt. Ltd., 2009

M. Tech (CN&IS) II-Semester
(14MT26301) AD HOC WIRELESS NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE: *A Course on* "Wireless Networks"

COURSE DESCRIPTION:
Ad Hoc Wireless Networks and MAC protocols; Routing Protocols and Multicast Routing in Adhoc wireless networks; Transport Layer and Security Protocols; Quality of Service and energy Management in Ad Hoc Wireless Networks.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain advanced knowledge in
- Issues in ad hoc wireless networks
- MAC Protocols
- Routing Protocols
- TCP over ad hoc wireless networks and Security Protocols

CO2. Analyze complex engineering problems critically for conducting research in ad hoc and sensor networks.
CO3. Solve engineering problems with wide range of solutions in ad hoc wireless networks.

UNIT I: AD HOC WIRELESS NETWORKS & MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS (Periods:14)
Ad Hoc Wireless Networks-Introduction, Issues in Ad hoc Wireless Networks, Ad hoc Wireless Internet,
MAC protocols for Ad hoc Wireless Networks-Issues in Designing a MAC Protocol for Ad hoc Wireless Networks, Design Goals for a MAC Protocol for Ad hoc Wireless Networks, Classifications of MAC Protocols, Other MAC Protocols.
UNIT II: ROUTING PROTOCOLS FOR AD HOC WIRELESS NETWORKS & MULTICAST ROUTING IN AD HOC WIRELESS NETWORKS (Periods:12)
Routing Protocols for Ad Hoc Wireless Networks- Issues in Designing a Routing Protocol for Ad hoc Wireless Networks, Classifications of Routing Protocols. Table –Driven Routing Protocols, Destination Sequenced Distance Vector Routing Protocol, On-Demand routing protocols, Dynamic Source routing protocol, Ad Hoc On-Demand Distance Vector Routing Protocol.
Multicast Routing in Ad Hoc Wireless Networks-Introduction, Issues in designing a multicast protocol, operation of multicast routing protocols, classification of multicast routing protocols.
UNIT III: TRANSPORT LAYER AND SECURITY PROTOCOLS FOR AD HOC WIRELESS NETWORKS (Periods:12)
Transport Layer for Ad Hoc Wireless Networks-Issues in Designing a Transport layer protocol for Ad hoc Wireless Networks, Design goals of a Transport layer protocol for Ad hoc Wireless Networks, Classification of

Transport layer solutions, TCP over Ad hoc Wireless Networks, Other Transport layer protocols for Ad hoc Wireless Networks.

Security protocols for Ad hoc Wireless Networks-Security in Ad hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, and Secure Routing in Ad hoc Wireless Networks.

UNIT IV: QUALITY OF SERVICE INAD HOC WIRELESS NETWORKS

(Periods:10)

Quality of Service in Ad Hoc Wireless Networks-Introduction, Issues and challenges in providing QOS in Ad Hoc Wireless Networks, Classification of QoS solutions, MAC Layer solutions, Network layer solutions.

UNIT-V: ENERGY MANAGEMENT IN AD HOC WIRELESS NETWORKS

(Periods:10)

Energy Management in Ad Hoc Wireless Networks-Introduction, Need for energy management in Ad Hoc Wireless Networks, classification of energy management schemes, Battery Management Schemes, Transmission power management schemes, System power management schemes.

Total Periods:58

TEXT BOOKS:

1. C. Siva Ram Murthy, B. S. Manoj, "*Ad hoc Wireless Networks-Architectures and Protocols*," Pearson Education, Second Edition, 2011.
2. *Carlos Corderio, Dharma P.Aggarwal, "Ad Hoc and Sensor Networks – Theory and Applications,"* World Scientific Publications, Cambridge University Press, Second Edition March 2013

REFERENCE BOOKS:

1. C.K.Toh, "*Ad hoc Mobile Wireless Networks*," Pearson Education, New Delhi, 2002.
2. Charles E. Perkins, "*Ad hoc Networking,*" Pearson Education, New Delhi, 2011.

M. Tech (CN&IS) II-Semester
(14MT26302) COMPUTER FORENSICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: *Courses on* "Computer Networks" and "Information Security"

COURSE DESCRIPTION:
Overview of Computer forensics and cyber crime; Evidence collection and data seizure; Data Analysis and validation; Mobile device forensics; Cyber crime, cyber laws and forensic report generation

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain advanced knowledge in
- Computer Forensic Fundamentals and Technologies
- Evidence and Data Capture and Computer Forensic Analysis
- Application of forensics in various areas and Cybercrime and Cyber Laws

CO2. Analyze the strengths and weaknesses of cyber laws in terms of global and Indian context.
CO3. Develop skills to invent forensic tools and to analyze the crime.

UNIT–I: OVERVIEW OF COMPUTER FORENSICS TECHNOLOGY AND CYBERCRIME (Periods:11)
Computer Forensics Fundamentals-Introduction to computer forensics, Use of computer forensics in Law Enforcement, Benefits of professional forensics methodology, Steps taken by computer forensics specialists.
Types of Computer Forensics Technologies-Types of Military computer forensic technology, Types of law enforcement, Computer forensic Technology, Types of Business Computer Forensic Technology
Introduction to Cybercrime: Introduction to Cybercrime, Cybercrime and Information Security, Cybercriminals, Classification of Cybercrimes.
UNIT – II: COMPUTER FORENSICS EVIDENCE AND CAPTURE (Periods:12)
Evidence Collection and Data Seizure: Collect Evidence, Collection Options, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure – Collection and Archiving, Methods of Collection, Controlling Contamination: The Chain of Custody, Evidence Handling and Presentation in Court of Law, Incident and Incident Response, Initial Response and Forensic Duplication, E–Mail Investigations- Exploring the Role of E-Mail in Investigations, Investigating E-Mail Crimes and Violations, Live Data Collection from Systems (Windows &Unix)

UNIT -III: COMPUTER FORENSIC ANALYSIS (Periods:12)

Data Analysis and Validation: Determining what data to collect and analyze, Validating forensic data, Addressing data, hiding techniques, performing remote acquisitions.

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, Mobile Forensic Unit, Processing law enforcement crime, Preparing for a search, Seizing Digital Evidence at the Scene, Storing Digital Evidence

UNIT – IV: FORENSICS IN VARIOUS AREAS (Periods:12)

Cell Phone & Mobile Device Forensics : Understanding Mobile Device Forensics, Acquisition Procedures for Cell Phones and Mobile Devices, Toolkits for Hand-Held device Forensics like EnCase, Device Seizure and PDA Seizure, Forensic Card Reader, Cell Seizure, MOBILedit!, Forensic SIM.

Network Forensics: Overview, Performing Live Acquisitions, Developing Standard Procedure for Network Forensics, Investigating Routers, Network Tools.

UNIT – V: CYBERCRIME IN LEGAL PERSPECTIVE AND FORENSIC REPORT GENERATION (Periods:11)

Cyber Law Basics: Need for Cyber laws, The Indian Context, Cybercrime and the Indian ITA 2000, A Broad View on cybercrime Law scenario in the Asia-Pacific Region.

Importance of Cyber Security- Roles and Responsibilities of Engineers in offering Cybersecurity, Cybercrime Investigation and Litigation, Assurance and Compliance Security Audit.

Report Writing for Investigations: Guidelines for writing Report, Generating Report Findings with Forensics Software Tools.

Total Periods:58

TEXT BOOKS:

1. John R.Vacca, *"Computer Forensics, Computer Crime Investigation,"* First Edition, New Delhi, Firewall Media, 2009
2. Nelson, Amelia Phillips, Christopher Steuart, *"Computer Forensics and Investigations,"* Fourth Edition, Cengage Learning, 2009.

REFERENCE BOOKS:

1. Sunit Belapure, Nina Godbole, *"Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,"*First Edition, Wiley India Pvt Ltd, 2011.
2. Kevin Mandia, Chris Prosise, *"Incident Response and Computer Forensics,"*Second Edition, McGraw-Hill Osborne Media, 2003
3. Eoghan Casey, *"Handbook Computer Crime Investigation's Forensic Tools and Technology,"*First Edition, Academic Press, 2001
4. Peter Stephenson, Keith Gilbert, *"Investigating Computer Related Crime,"*Second Edition, CRC Press, 2004

M. Tech (CN&IS) II-Semester
(14MT26303) INTRUSION DETECTION SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Courses on "Computer Networks" and "Network security"

COURSE DESCRIPTION:
Network security monitoring and intrusion detection systems; Enterprise network Instrumentation; Traffic threat assessment and Network incident response; Network forensics; Intrusion prevention

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain Knowledge on Intrusion detection systems, security monitoring, Network Forensics principles and Intrusion Prevention system (IPS).
CO2. Analyze, detect, identify and mitigate the security attacks from the network traffic.
CO3. Get exposure to IDS and IPS security tools in network security devices.

UNIT-I: NETWORK SECURITY MONITORING REVISITED AND EXTRUSION DETECTION ILLUSTRATED (Periods:12)
Network Security Monitoring Revisited: Defining the security process, Principles, Network security monitoring (NSM) Theory, Techniques and tools. Defensible Network Architecture- Defensible network Monitoring, Controlling, Minimizing and current.
Extrusion Detection Illustrated: Intrusion detection defined, Extrusion detection defined, History of Extrusion detection and Extrusion detection through NSM.

UNIT-II: ENTERPRISE NETWORK INSTRUMENTATION AND LAYER-3 NETWORK ACCESS CONTROL (Periods:10)
Enterprise Network Instrumentation: Common Packet Capture Methods, PCI Tap, Dual port aggregator Tap, Regenerations and SPAN regeneration taps, Matrix switch, Link Aggregator Tap, Distributed traffic collection with PF Dup-To.
Layer 3 Network Access Control: Internal network Design, ISP sink holes, Enterprise sink holes and Internal intrusion containment.

UNIT-III: TRAFFIC THREAT ASSESSMENT (Periods:12)
Traffic Threat Assessment: Assumptions, First cuts, looking for odd traffic, Inspecting individual services through NTP, ISAKMP, ICMP, Secure shell, WhoIs, LDAP, other ports.
Network Incident Response: Preparation for network incident response, Secure CSIRT communication, Intruder Profiles, Incident Detection Methods, Network First Response, Network-Centric General Response and Remediation.

UNIT-IV: NETWORK FORENSICS (Periods:10)

Collecting network traffic as evidence, protecting and preserving network based evidence, Analyzing network based evidence, presenting and defending conclusions.

Traffic Threat Assessment Case Study, Malicious Bots: IRC bots, communication and identification, server and control channels, exploitation and bot admin.

UNIT-V: INTRUSION PREVENTION OVERVIEW (Periods:12)

Intrusion Prevention Overview, Signatures and Actions: Types, Triggers and actions, Operational Tasks: deploying & configuring IPS devices and applications, Monitoring IPS activities, Securing IPS communications, Security in Depth: Defense in depth, internal attack against a Management server and the future of IPS.

Total Periods:56

TEXT BOOKS:

1. Richard Bejtlich, "*Extrusion Detection: Security Monitoring for Internal Intrusions*," First Edition. Pearson Education, New Delhi, 2004.
2. Earl Carter, Jonathan Hogue, "*Intrusion Prevention Fundamentals*," First Edition, Pearson Education, New Delhi, 2002.

REFERENCE BOOKS:

1. Carl Endorf, Eugene Schultz and Jim Mellander, "*Intrusion Detection and Prevention*," McGraw-Hill, 2004
2. Stephen Northcutt, Judy Novak, "*Network Intrusion Detection*," New Riders Publishing, Third Edition, 2002

M. Tech (CN&IS) II-Semester
(14MT20509) VIRTUALIZATION AND CLOUD COMPUTING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: *Courses on* "Distributed Computing" and "Computer Networks"

COURSE DESCRIPTION:
Introduction to Cloud Computing and virtualization; Map reduce programming; Cloud technologies – Amazon web services, Google App Engine, and Microsoft Azure; Scientific and business applications of Cloud

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain Knowledge on the technical foundations of Cloud technology.
CO2. Analyze the Cloud Architectures while developing the internet web applications.
CO3. Solve security issues in cloud applications.
CO4. Get exposure to cloud tools like Microsoft Azure, Google App Engine, and Amazon Web Services.

UNIT- I: VIRTUALIZATION (Periods:13)
VIRTUALIZATION-Introduction to virtualization , Objectives of virtualization, history of virtualization, benefits of virtualized technology, the virtual service desk, related forms of computing, Understanding Hypervisors, Load balancing & Virtualization. Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples-Xen, Para virtualization, VMware, Full Virtualization, Microsoft Hyper-V.
UNIT-II: CLOUD COMPUTING OVERVIEW (Periods:12)
CLOUD COMPUTING OVERVIEW- Cloud computing at a Glance, The Vision of Cloud Computing, Defining a Cloud, A Closer Look, Cloud Computing Reference Model, Characteristics and Benefits, Pros and Cons of cloud, Challenges Ahead; Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies
CLOUD COMPUTING ARCHITECTURE-Cloud Reference Model, Types of Clouds, Economics of the Cloud, Open Challenges.
UNIT- III: DATA INTENSIVE COMPUTING: MAP-REDUCE PROGRAMMING (Periods:10)
Data-Intensive Computing, Technologies for Data-Intensive Computing, Aneka Map Reduce Programming.
UNIT-IV: CLOUD TECHNOLOGIES (Periods:10)
Amazon Web Services-Compute Services, Storage Services, Communication Services, Additional Services, **Google AppEngine** -Architecture and Core Concepts, Application Life-Cycle, **Microsoft Azure-**Azure Core Concepts, SQL Azure, Windows Azure Platform Appliance.

UNIT-V: CLOUD APPLICATIONS (Periods:13)

Scientific Applications, Business and Consumer Applications

ADVANCED TOPICS IN CLOUD COMPUTING-Energy Efficiency in Clouds, Market Based Management of Clouds, InterCloud.

Total Periods: 58

TEXT BOOKS:

1. Raj Kumar Buyya, Christian Vecchiola, S.Thamarai Selvi, *"Mastering Cloud Computing,"* Tata McGraw Hill ,New Delhi,2013
2. Ivanka Menken, Gerard Blokdijk, *"Cloud Computing Specialist Certification Kit – Virtualization, The Art of Service,"* Emereo Pty Ltd, 2009

REFERENCE BOOKS:

1. Michael Miller, *"Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online,"* Que Publishing, Pearson, August 2011.
2. George Reese, *"Cloud Application Architectures Building Applications and Infrastructure in the Cloud,"* O'Reilly Media Released, April 2009.
3. Gautham Shroff, *"Enterprise Cloud Computing: Technology, Architecture, Application,"* Cambridge University Press, 2010.
4. Barrie Sosinky, *"Cloud Computing Bible"*, Wiley Publishing Inc, 2011.

M Tech (CN&IS) II- Semester
(14MT20505) WEB PROGRAMMING

Int Marks	Ext Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Courses on "Programming in C" and "JAVA"

COURSE DESCRIPTION:
Introduction to HTML, Cascaded Style sheets and Java Scripting; Dynamic HTML and XML; PHP and Web Forms; Web Applications using PHP and MYSQL

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge in
- HTML , CSS styling
- Dynamic HTML with Java Script and XML
- PHP dynamic programming and interaction with databases

CO2. Analyze the design problems in HTML Web pages with CSS
CO3. Design a dynamic webpage with HTML, CSS, Java Script, PHP concepts
CO4. Assess the HTML Website using XML Parsers
CO5. Create website of societal context for awareness on social and environmental issues

UNIT – I: INTROUDCTION TO HTML AND CSS (Periods:11)
Hyper Text Markup Language-Basic HTML, the Document Body, Text, Hyper Links, Adding More Formatting, Lists Using Color and Images, Images
More HTML-Tables, Multimedia Objects, Frames, Forms towards Interactivity, The HTML Document Head in detail.
Cascading Style Sheets-Introduction, Using Styles, Defining Styles, Properties and Values in Style Sheets, Formatting Blocks of Information, Layers
UNIT – II: JAVA SCRIPTING (Periods:11)
An Introduction to Java Script-Dynamic HTML, **Java Script-**Basics, Variables, String Manipulation, Mathematical Function, Statements, Operators, Arrays, Functions.
Objects in Java Script-Data and Objects in Java Script, Regular Expressions, Exception Handling, Built in Objects, Cookies, and Events.
UNIT –III: ADVANCED JAVASCRIPTING AND XML (Periods:12)
Dynamic HTML With JavaScript: Data Validation, Opening in a new window, Messages and Confirmations, The Status Bar, Writing to a different frame, Rollover Buttons, Moving Images, A Text Only Menu System, Floating Logos.
XML: Defining Data for Web Applications: Basic XML, Document Type Definition, XML Schema, Document Object Model, Presenting XML, Using XML Parser

UNIT – IV: PREPROCESSOR HYPERTEXT PROGRAMMING

(Periods:14)

An Introduction To PHP: Introducing PHP, Including PHP in a HTML Page, Data Types, Program Control Structures, Arrays, User Defined Functions, Built-in Functions, Regular Expressions, Using files.

Advanced PHP: PHP and Web Forms, **Handling File Uploads**- Uploading files with PHP, Session Handlers: Working with Sessions.

UNIT – V: BUILDING WEB APPLICATIONS WITH PHP AND MYSQL

(Periods:07)

Building Web Applications With PHP And MYSQL-Handling Installation Prerequisites, **Using the mysqli Extension** - Setting Up and Tearing down the Connection, Handling Connection Errors, Retrieving Error Information, Storing Connection Information in a Separate File, Securing Your Connection Information.

Interacting with the Database - Sending a Query to the Database, Parsing Query Results, Determining the Rows Selected and Rows Affected, Working with Prepared Statements, Executing Database Transactions, and Enabling Auto commit Mode, Committing a Transaction, Rolling Back a Transaction.

Total Periods: 56

TEXT BOOKS:

1. Chris Bates, *"Web Programming: Building Internet Applications,"* Third Edition. New Delhi, India: Wiley India Pvt. Ltd., 2009.
2. W Jason Gilmore, *"Beginning PHP and MySQL: From Novice to Professional,"* Fourth Edition, New Delhi, India, Springer India Pvt Ltd., 2011.

REFERENCE BOOKS:

1. Robin Nixon, *"Learning PHP, MySQL, and JavaScript,"* Second Edition, Sebastopol, CA: O'Reilly Media, Inc., 2012.
2. Kevin Tatroe, Peter MacIntyre, and Rasmus Lerdorf, *"Programming PHP,"* Third Edition, Sebastopol, CA: O'Reilly Media, Inc., 2002.
3. Marc Wandschneider, *"Core Web Application Development with PHP and MySQL,"* First Edition, Prentice Hall Professional Technical Reference, 2006

M. Tech (CN&IS) II-Semester
(14MT20506) BIG DATA ANALYTICS (Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE: A *Course on* "Data warehousing and Mining".

COURSE DESCRIPTION:
Data Science and Analytics; unsupervised learning; big data from business perspective; Hadoop Technology and application development, Management, InfoSphere big insights and InfoSphere streams

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. To gain knowledge about the
- Data Science and Unsupervised Learning.
- Big data Characteristics and Methods.
- InfoSphere Big insights and Streams.

CO2. To analyze the need for database systems for storing the large data
CO3. To design and model an effective and sustainable database for better performance using big data tools.
CO4. To use Hadoop tools and Methodologies for modeling large databases and real time applications

UNIT I - INTRODUCTION TO DATA SCIENCE (Periods:11)
Introduction- Introduction of Data Science, Getting started with R-Exploratory Data Analysis, Review of probability and probability distributions, Bayes Rule Supervised Learning, Regression, polynomial regression, local regression and k-nearest neighbors

UNIT II - UNSUPERVISED LEARNING (Periods:12)
Unsupervised Learning- Kernel density estimation, k-means, Naive Bayes, Data and Data Scraping Classification, ranking, logistic regression, Ethics, time series advanced regression, Decision trees, Best practices and feature selection.

UNIT III - BIG DATA FROM DIFFERENT PERSPECTIVES (Periods:11)
Big data from business Perspective-Introduction of big data, Characteristics of big data, Data in the warehouse and data in Hadoop, Importance of Big data, Big data Use cases, Patterns for Big data deployment. Big data from Technology Perspective, History of Hadoop, Components of Hadoop, Application Development in Hadoop, Getting your data in Hadoop, other Hadoop Component

UNIT IV - INFOSPHERE BIG INSIGHTS (Periods:11)
InfoSphere Big Insights-Analytics for Big data at rest, A Hadoop ready Enterprise, Quality file system, Compression, Administrative tooling, Security Enterprise Integration, Improved workload scheduling, Adaptive map reduce, Data discovery and visualization and Machine Analytics.

UNIT V- INFOSPHERE STREAMS (Periods:10)

InfoSphere Streams-Analytics for Big data in motion, InfoSphere Streams Basics working of InfoSphere Streams, Stream processing language, Operators, Stream toolkit, Enterprise class.

Total Periods:55

TEXT BOOKS:

1. Noreen Burlingame and Lars Nielsen, "A Simple Introduction to Data Science," New Street Communications, LLC, Wick ford, Rhode Island**,** 2012
2. Paul Zikopoulos and Chris Eaton, "Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data," The McGraw-Hill Companies, 2012.

REFERENCE BOOKS:

1. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012
2. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.

M. Tech (CN&IS) II-Semester
(14MT26304) DESIGN OF SECURE PROTOCOLS
(ELECTIVE –II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: A *Course on* "Cryptography and Network Security".

COURSE DESCRIPTION:
Pseudorandom Bit generation and algorithm modes; Symmetric and asymmetric cryptography; Authentication protocols and Hash functions; Security implementations

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain advanced knowledge in
- Pseudorandom Bits and Algorithm Modes.
- Basic Cryptography Techniques.
- Authentication Protocols.
- One-way Hash Functions and Security Implementations in Real World.

CO2. Analyze vulnerabilities in any computing system of the real world and identify the cryptographic solutions.
CO3. Design and Develop Cryptographic protocol solutions for various Security Problems in real world
CO4. Create and Select appropriate protocol solution for possible security threats in complex real time systems.

UNIT-I: PSEUDORANDOM BITS AND ALGORITHM MODES (Periods:12)
Introduction, Random Bit Generation, Pseudorandom Bit generation, Statistical Tests, Cryptographically Secure Pseudorandom Bit Generation, Linear Congruential Generators, Linear Feedback Shift Registers, Design and Analysis Of Stream Ciphers, Stream Ciphers Using LFSRs.
Algorithm Modes-Block Replay, Stream Ciphers, Self Synchronizing Stream Ciphers, Synchronous Stream Ciphers and Other Block Cipher, Choosing a Cipher Mode, Interleaving, Block Ciphers Versus Stream Ciphers.
UNIT-II: **BASIC CRYPTOGRAPHY TECHNIQUES (Periods:12)**
Symmetric Techniques-Definition, Substitution Ciphers, Transposition Ciphers, Classical Ciphers, AES, DES, Confidentiality Modes of Operation
Asymmetric Techniques-Introduction, Knapsack Algorithms, Diffie-Hellman Key Exchange Protocol, RSA Cryptosystem, RSA problem, Rabin Cryptosystem, Elgamal Cryptosystem, Security Notations for Public Key Cryptosystems, Combination of Symmetric and Asymmetric Cryptosystems, Key Channel Establishment for public Key Cryptosystem.
UNIT-III: AUTHENTICATION PROTOCOLS (Periods:14)
Basic Authentication Techniques, Password based Authentication; Authenticated Key Exchange Based on Asymmetric Cryptography, Typical Attacks on Authentication Protocols, SSH, Kerberos Protocol, SSL and TLS.

UNIT-IV: ONE-WAY HASH FUNCTIONS (Periods:12)

Background, Snefru, N-Hash, MD5, Secure Hash function (SHA), Ripe-MD, Haval, Other One-Way Hash Functions, One-Way Hash Function using Symmetric Block Algorithms, Using Public–Key Algorithms, Choosing a One-Way Hash Functions, Advanced Attacks on Hash Functions, Message Authentication Codes.

UNIT-V: SECURITY IMPLEMENTAIONS (No. of Periods: 08)

IBM Secret–Key Management Protocol, MITRENET, ISDN, STU-III, Kerberos, KryptoKnight, Sesame, Privacy-Enhanced Mail(PEM), PGP, Smart Cards, Public Key Cryptography Standards(PKCS), Universal Electronic Payment Systems(UEPS), Clipper, Capstone.

Total Periods:58

TEXTBOOKS:

1. Bruce Schneier, "*Applied Cryptography,*" New Delhi: Wiley India Pvt. Ltd, Student Edition, Second Edition, 2012.
2. Wenbo Mao, *"Modern Cryptography – Theory and Practice,"* New Delhi, Pearson Education, First Edition, 2008.

REFERENCE BOOKS:

1. Alfred Jimenez's, Paul C. Van Borscht, Scott A. Vanstone, *"Handbook of Applied Cryptography,"* CRC Press, Special Indian Edition.
2. William Stallings, *"Cryptography and Network Security,"* New Delhi: Pearson Education, Fifth Edition, 2003.
3. Atul Kahate, *"Cryptography and Network Security,"* New Delhi: Tata McGraw Hill, Third Edition, 2013.

M. Tech (CN&IS) II-Semester
(14MT26305) HIGH SPEED NETOWRKS (Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE: *A Course on "Computer Networks"*

COURSE DESCRIPTION:
High-speed networking technologies - (Asynchronous Transfer Mode) ATM, and High speed LANs; Congestion and traffic management; TCP and ATM congestion control; Internet routing; integrated services architecture; QoS in IP networks

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge in:
- ATM, Frame Relay Network architecture.
- Congestion and Traffic management.
- Internet Routing.
- Quality of service in high speed networks.

CO2. Analyze the QoS and performance in high speed networks.
CO3. Design and configure high speed networks.

UNIT-I: HIGH SPEED NETWORKS (Periods:11)
Introduction to TCP/IP suite, Internet protocols, Frame Relay Networks, **Asynchronous transfer mode (ATM) –** ATM Protocol Architecture, ATM logical Connection, ATM Cell , ATM Service Categories and AAL.
High Speed LANs-Fast Ethernet, Gigabit Ethernet, Fiber Channel, Wireless LANs, applications, requirements, Architecture of 802.11.

UNIT-II: CONGESTION AND TRAFFIC MANAGEMENT (Periods:11)
Queuing Analysis, Queuing Models, Single Server Queues, Effects of Congestion, Congestion Control, Traffic Management, Congestion Control in Packet Switching Networks, Frame Relay Congestion Control

UNIT III: TCP AND ATM CONGESTION CONTROL (Periods:12)
TCP Flow control, TCP Congestion Control, Retransmission, Timer Management, Exponential RTO backoff, KARN's Algorithm, Window management, Performance of TCP over ATM
Traffic and Congestion control in ATM–Requirements, Attributes, Traffic Management Frame work, Traffic Control, ABR traffic Management, ABR rate control, RM cell formats, ABR Capacity allocations, GFR traffic management.

UNIT IV: INTERNET ROUTING (Periods:10)
Overview of graph theory and least-cost paths - Elementary concepts of graph theory, shortest path length determination, Interior routing protocols – principles, Distance-vector protocol, Link-state protocol, Exterior routing protocols – Path-vector protocols, Multicasting.

UNIT V: QUALITY OF SERVICE IN IP NETWORKS INTEGRATED AND DIFFERENTIATED SERVICES (Periods:13)

Integrated Services Architecture–Approach, Components, Services, Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ, Random Early Detection, Differentiated Services

Protocols For QoS Support-RSVP, Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms, Multiprotocol Label Switching, Operations, Label Stacking, Protocol details, **RTP –** Protocol Architecture, Data Transfer Protocol, RTCP

Total Periods:57

TEXT BOOK:

1. William Stallings, *"High Speed Networks and Internet,"* Second Edition, Pearson Education, 2012.

REFERENCES:

1. Warland, Pravin Varaiya, *"High performance communication networks,"* Second Edition, Jean Harcourt Asia Pvt. Ltd., 2001.
2. Behrouz A. Forouzan, "*Data communication and Networking*," Fifth Edition, Tata McGraw-Hill, 2013.
3. Abhijit S. Pandya, Ercan Sea, *"ATM Technology for Broad Band Telecommunication Networks,"*CRC Press, New York, 2004.

M. Tech (CN&IS) II-Semester
(14MT26306) TCP/IP PROTOCOLS (Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE: *A Course on* "Computer Networks"

COURSE DESCRIPTION:
Protocol standards and architectural models; IP Addressing, Routing, ARP and RARP; Network Layer Protocols - ICMP and IGMP; Unicast and Multicast Routing Protocols; Transport Layer Protocols- TCP and UDP; Host Configuration and Domain Name System; Remote Login and File Transfer

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge in:
- Protocol standards and architecture and IP Addressing, Routing.
- Network and Transport layer protocols and DNS, TELNET, FTP, E-Mail, NMP.

CO2. Analyze IP Addressing, subnet and masking.
CO3. Develop solutions to IP conflicts and spoofing problems.

UNIT-I: PROTOCOL STANDARDS AND ARCHITECTURAL MODELS AND IP ADDRESSING, ROUTING, ARP AND RARP (Periods:11)
Protocol Standards and Architectural Models-Internet standards, Administration, LANs, Point-to-Point WANs, Switched WANs, Connecting devices, The OSI model, Layers in OSI model, TCP IP model.
IP Addressing, Routing, ARP and RARP-IP versions, IPV4, Classful addressing, other issues, Subnetting, Supernetting, Classless addressing, IPV6, IPV6 addressing, IPV6 protocol, ARP (Address Resolution Protocol), ARP Package, RARP (Reverse Address Resolution Protocol)
UNIT-II: NETWORK LAYER PROTOCOLS (Periods:11)
Internet protocol (IP) - Datagram, Fragmentation, Options, Checksum, IP package. Internet Control Message Protocol (ICMP) - Type, Format, Error reporting, Query, Checksum, ICMP package. Internet Group Management Protocol (IGMP)-Group Management, Messages, Encapsulation, IGMP package.
UNIT-III: UNICAST AND MULTICAST ROUTING PROTOCOLS (Periods:12)
Intra-and-Inter Domain Routing, Distance Vector Routing, RIP (Routing Information Protocol), Link State Routing, OSPF (Open Shortest Path First) protocol, BGP (Border Gateway Protocol), Difference between unicast, multicast and broadcast, Multicast Applications, Multicast Routing, Multicast Link State Routing (MOSPF), Multicast Distance Vector (DVMRP).
UNIT-IV: TRANSPORT LAYER PROTOCOLS (Periods:11)
User datagram protocol (UDP)-Process-to-Process communication, User datagram, Checksum, UDP operation, Use of UDP, Package.

Transmission Control Protocol (TCP) -TCP services, Features, Segment, Connection, Flow and Error Control, Congestion Control, TCP timers, Options, TCP package, Stream Control Transmission Protocol (SCTP) Services, Features, Packet format

UNIT-V: HOST CONFIGURATION, DNS, REMOTE LOGIN, FTP, E-MAIL, NMP (Periods:11)

Host Configuration and Domain Name System-BOOTP (Bootstrap Protocol), DHCP (Dynamic Host Configuration Protocol), Domain Name System (DNS) - Namespace, DNS in the Internet, Resolution, DNS Messages, Types of Records, DDNS, Encapsulation.

Remote Login and File Transfer: TELNET (Terminal Network) , Concept, Network Virtual Terminal (NVT), NVT character set, Embedding, Options, Mode of operation, User Interface, File Transfer protocol (FTP), Trivial File Transfer Protocol (TFTP).

Total Periods:56

TEXTBOOK:

1. Behrouz A Forouzan, "*TCP/IP Protocol Suite,*" Fourth Edition, McGraw-Hill, 2011
2. Douglas E.Comer, "*Internetworking with TCP/IP, Principles, Protocols and Architectures,*" Vol. 1, Sixth Edition, Addison-Wesley Educational Publishers Inc, 2013

REFERENCE BOOKS:

1. Donglas E.Comer, "*Internetworking with TCP/IP Principles, Protocols, and Architecture,*" Fourth Edition, Pearson Education, 2003
2. W. Richard Stevens, "*TCP/IP Illustrated,*" Pearson Education, 2003.
3. James F. Kurose, Keith W. Ross, "*Computer Networking – A Top-Down Approach featuring the internet,*" Fifth Edition, Addison Wesley

M.Tech. (CN&IS) – II Semester
(14MT26321) SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	50	50	--	--	--	2

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of seminar topic; Literature survey; Preparation of technical report and Presentation

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

CO1. Acquire in-depth knowledge in core and allied areas of interest.

CO2. Analyze and synthesize information related to the areas.

CO3. Conceptualize and construct research problems.

CO4. Extract information pertinent to a specific area through literature survey to conduct research.

CO5. Identify the applicability of modern software and tools.

CO6. Contribute positively to multidisciplinary groups in emerging areas with objectivity and rational analysis.

CO7. Plan, organize, prepare and present effective written and oral technical reports.

CO8. Engage in lifelong learning to improve competence.

CO9. Acquire awareness on professional code of conduct in the chosen area.

CO10. Develop independent and reflective learning.

M. Tech (CN&IS) II-Semester
(14MT26322) WEB PROGRAMMING AND CLOUD COMPUTING LABORATORY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	4	2

PRE-REQUISITES: Courses on "Web Programming" and "Cloud Computing"

COURSE DESCRIPTION:

Develop and implement dynamic web applications on contemporary and social issues using HTML, CSS, JS and PHP technologies.
Hands on practice in using Visual Modeling Tools and design real time case studies such as Automated Teller Machine (ATM), Online Ticket Reservation for Railways, A Point-of-Sale (POS) System, A Multi-Threaded Airport Simulation, Hospital Management System, Unified Library Application, and Online Shopping.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain Knowledge on the real time applications of Cloud computing and to design web pages using HTML, CSS and JS.
CO2. Analyze XML files using DTD parser.
CO3. Use Dreamweaver and Notepad++ for designing web pages and generating dynamic content. And Cloud Computing tools Windows Azure, Sales Force, and VMware
CO4. Recognize the need of Cloud Computing, Software Testing and can engage in lifelong learning by incorporating best practices of them
CO5. Develop websites for self-development and for promoting awareness among the community in societal and environmental issues.

Laboratory Exercises:

Web Programming:

1. Create an HTML web page with at least the following features:
   Keywords & description meta tags, title, Page formatting, including a background color *and* picture, a non-default text color, and non-default text and link colors, A horizontal rule, At least three levels of headers, Text formatting, including specifying a non-default font as well as centered, bold, italics, subscript, superscript, and strikeout, A three-level bulleted list and a two-level numbered list, At least two external links, with one a text link and one an image link, Three internal "bookmark" links – that is, a link to further down on the current page, A relative link to an image in a different directory than the directory in which your current HTML page resides, An image with a non-standard-width border in a non-standard color. The image should appear off to the right side of the page, An image map with at least three links, A table that includes at least three rows, two cells in each row, two colspan attributes, and one rowspan attribute. Put a background color on the entire table, a different

background color on one cell, and a background image on one entire row of the table.

2. Create an HTML web page with JavaScript for the following problem:
   Get two input numbers from an HTML form. On submit, call a function to edit them to make sure that they are within the range of 1-100. If not, display an error message and set focus to the field in error. If the entered numbers are valid, add the two numbers together and display the total in an alert box. Pop up a prompt box to get a third number and edit it to make sure it's in the range of 1 to 5. Multiply the original total (from the two input boxes) by this third number. Store the result in a cookie and then automatically open a second page to display the cookie that you saved on the prior page.
3.
   a. Write an XML file which will display the Book information which includes the following:
      1) Title of the book 2) Author Name 3) ISBN number
      4) Publisher name 5) Edition 6) Price
   b. Write a Document Type Definition (DTD) to validate the above XML file. Display the XML file as follows:
      The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose. Note: Give at least for 4 books. It should be valid syntactically. Hint: You can use some xml editors like XML-spy
4. Write PHP Script to demonstrate
   a. String processing in PHP
   b. File uploading
   c. Sessions and Cookies
5. Write PHP Script that takes user input data(Personal Information like registration to a website) in a form and validates it and write the data into the database

Sales Force:

6. Using SalesForce CRM,
   a. Create a Warehouse Application.
   b. Add Relationships to it.
   c. Apply formulas and Validation Rules on the records of a data.
   d. Creation of Dash Boards.
   e. Create an approval process for it and generate reports.

MS-Azure:

7. Create and Configure Virtual Machines using MS-Azure.
8. Create and configure SQL server in an Azure VM
9. Web hosting using MS-Azure.

VMware:

10. Illustrate forms of virtualization on VMware.

M.Tech. (CN&IS) – III & IV Semesters
(14MT36321 & 14MT46321) PROJECT WORK

PRE-REQUISITES: --

COURSE DESCRIPTION:

Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

CO1. Acquire in-depth knowledge in the areas of interest.

CO2. Analyze critically chosen project topic for conducting research.

CO3. Apply knowledge gained through Program, self learning and experience for solution of a given problem efficiently.

CO4. Undertake research confidently in the project domain.

CO5. Use the techniques, skills and modern engineering tools necessary for project work.

CO6. Perform harmonically in multi-disciplinary, multi-cultural groups, and develop a high level of interpersonal skills.

CO7. Manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.

CO8. Develop communication skills, both oral and written for preparing and presenting reports.

CO9. Engage in lifelong learning to improve knowledge and competence continuously.

CO10. Understand professional and ethical responsibility for sustainable development of society.

CO11. Develop independent and reflective learning.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF ECE

COURSE STRUCTURE for M.Tech. (DECS)

I-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT13801	Computer Architectures	4	-	-	4	40	60	100
2.	14MT13802	Digital Communication Techniques	4	-	-	4	40	60	100
3.	14MT13803	Digital System Design	4	-	-	4	40	60	100
4.	14MT13809	Linear Algebra	4	-	-	4	40	60	100
5.	14MT13804	Modern Digital Signal Processing	4	-	-	4	40	60	100
6.		**Elective-I**							
	14MT13805	Computer Networks	4	-	-	4	40	60	100
	14MT13806	Low Power CMOS VLSI Design							
	14MT13807	Embedded System Design							
	14MT13808	Transform Techniques							
7.	14MT10310	Research Methodology	3	-	-	3	40	60	100
8.	14MT13821	Digital System Design Lab.	-	-	4	2	25	50	75
		Total:	**27**	**-**	**4**	**29**	**305**	**470**	**775**

II-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT23801	Display Technologies and Devices	4	-	-	4	40	60	100
2.	14MT23802	Information Theory and Coding Techniques	4	-	-	4	40	60	100
3.	14MT23803	Microcontroller Based System Design	4	-	-	4	40	60	100
4.	14MT23804	Testing and Testability of Digital Systems	4	-	-	4	40	60	100
5.	14MT23805	Wireless Communications	4	-	-	4	40	60	100
6.		**Elective-II**							
	14MT23806	Detection and Estimation of Signals	4	-	-	4	40	60	100
	14MT23807	Neural Networks and Fuzzy Systems							
	14MT23808	Optical Communications and Networks							
	14MT23809	Real Time Systems							
7.	14MT23821	Communications and Signal Processing Lab.	-	-	4	2	25	50	75
8.	14MT23822	Seminar	-	-	-	2	-	50	50
		Total:	**24**	**-**	**4**	**28**	**265**	**460**	**725**

III-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P *		Int.	Ext.	Total
1	14MT33821	Project Work – Phase I	-	-	-	4	40	-	40
Total:			**-**	**-**	**-**	**4**	**40**	**-**	**40**

*Fulltime Project Work

IV-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P *		Int.	Ext.	Total
1	14MT43821	Project Work – Phase II	-	-	-	12	40	120	120
Total:			**-**	**-**	**-**	**12**	**40**	**120**	**160**

*Fulltime Project Work

Total Credits: 73 **Total Marks: 1700**

M. Tech. (DECS)-I Semester
(14MT13801) COMPUTER ARCHITECTURES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Courses on Digital design and Computer Architecture & Organization at UG level.

COURSE DESCRIPTION:
Basic computer architectural concepts; Instructional and thread level parallelism; Memory design; Multiprocessor interconnection networks.

COURSE OUTCOMES:
After completion of the course, students should be able to:
CO1. Demonstrate potential knowledge relating to
- Instruction level Parallelism
- Memory hierarchy design
- Cache coherency
- Multiprocessor Interconnection Networks

CO2. Gain experience by critically analyzing and evaluating metrics for implementing high performance architectures
CO3. Consider architecture related issues and work together to solve engineering problems towards system architecture choice to meet set of performance goals
CO4. Familiarize with available architectures to overcome ever increasing system design complexity to revolutionize system architectures

DETAILED SYLLABUS

UNIT-I: FUNDAMENTALS OF COMPUTER DESIGN (Periods:10)
Technology trends, Trends in cost, Performance-measuring, reporting and summarization. Quantitative principles of computer design.

UNIT-II: INSTRUCTION LEVEL PARALLELISM (Periods:12)
ILP – Concepts and challenges, Compiler techniques for exposing ILP. Branch prediction - static and dynamic. Dynamic Scheduling, Speculation – Hardware speculation, Techniques, Implementation issues. ILP Limitations.

UNIT-III: MULTIPROCESSORS AND THREAD LEVEL PARALLELISM (Periods:12)
Introduction- Taxonomy of Parallel Architectures, Memory Architecture and Communication models, Parallel Processing Challenges. Symmetric and distributed shared memory architectures, Performance issues, Synchronization, Models of memory consistency.

UNIT-IV: MEMORY HIERARCHY DESIGN (Periods:11)
Introduction- Levels in Memory Hierarchy. Optimizations for Cache Performance, Memory Technology and Optimizations – SRAM, DRAM.

Protection- Virtual Memory and Virtual Machines. Design of Memory Hierarchies.

UNIT-V: MULTIPROCESSOR INTERCONNECTION NETWORK (Periods:11)

Interconnection Networks and their Taxonomy, Bus based Dynamic Interconnection Networks, Switch based Interconnection Networks, Static Interconnection Networks, Analysis and Performance Metrics.

Total Periods: 55

TEXT BOOKS:

1. John L. Hennessey and David A. Patterson, "Computer architecture – A quantitative approach", Morgan Kaufmann/Elsevier Publishers, 4th Edition, 2007.
2. Hesham El-Rewini, Mostafa Abd-El-Barr, "Advanced Computer Architecture and Parallel Processing", A John Wiley & Sons, Inc Publication, 2005.

REFERENCE BOOKS:

1. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture: A hardware/software approach", Morgan Kaufmann /Elsevier Publishers, 1999.
2. Kai Hwang and Zhi.Wei Xu, "Scalable Parallel Computing", Tata McGraw Hill, New Delhi, 2003.

M. Tech. (CMS & DECS)-I Semester
(14MT13802) DIGITAL COMMUNICATION TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES:
A Course on Digital Communications at UG Level

COURSE DESCRIPTION:
Representation of band pass signals and systems; Digital modulation techniques; Design of optimum receivers; Generation and detection of spread spectrum signals.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Demonstrate in-depth knowledge in
- Characterization of communication signals and systems.
- Digital modulation techniques
- Communication over AWGN channels
- Optimum receivers
- Spread spectrum techniques

CO2. Analyze numerical and analytical problems critically for conducting research in the field of Digital Communication Systems.

CO3. Solve engineering problems and arrive at optimal solutions pertaining to digital communications.

CO4. Apply appropriate techniques to complex engineering activities in the field of signal processing and communications.

DETAILED SYLLABUS

Review of random Variables and Processes

UNIT–I: CHARACTERIZATION OF COMMUNICATION SIGNALS AND SYSTEMS (Periods:10)

Representation of Band Pass Signals and Systems – Representation of Band-Pass Signals, Representation of Linear Band-Pass System, Response of a Band-Pass System to a Band-Pass Signal. Signal Space Representations – Vector Space Concepts, Signal Space Concepts, Orthogonal Expansion of Signals. Representation of Digitally Modulated Signals – Memory Less Modulation Methods – PAM Signals, Phase Modulated Signals, QAM Signals, Multidimensional Signals, Orthogonal Multidimensional Signals. Spectral Characteristics of Digitally Modulated Signals – Power Spectra of Linearly Modulated Signals.

UNIT–II: DIGITAL MODULATION TECHNIQUES (Periods:11)

Digital Modulation – Factors that Influence the Choice of Digital Modulation, Bandwidth and Power Spectral Density of Digital Signals. Linear Modulation Techniques – BPSK, DPSK, QPSK, OQPSK, ∏/4 QPSK. Constant Envelope Modulation Techniques – MSK, GMSK, Combined Linear and Constant Envelope Modulation Techniques – M-ary PSK, M- ary QAM.

UNIT–III: OPTIMUM RECEIVERS FOR THE ADDITIVE GAUSSIAN NOISE CHANNEL (Periods:10)

Optimum Receiver for Signals Corrupted by AWGN – Correlation Demodulator, Matched Filter Demodulator, the Optimum Detector. Performance of the Optimum Receiver for Memory Less Modulation – Probability of Error for Binary Modulation, M-ary Orthogonal Signals, M-ary PAM, M-ary PSK, QAM. Optimum Receiver for Signals with Random Phase in AWGN Channel – Optimum Receiver for Binary Signals, Optimum Receiver for M-ary Orthogonal Signals.

UNIT–IV: SPREAD SPECTRUM TECHNIQUES (Periods:10)

Introduction, Model of Spread Spectrum Digital Communication System, Direct Sequence Spread Spectrum Signals – Introduction, The Processing Gain and Jamming Margin. Applications of Direct Sequence Spread Spectrum Signals – Anti-jamming Application, Low-Detectability Signal Transmission, Code Division Multiple Access. Generation of PN-Sequences, Frequency-Hopped Spread Spectrum Signals, Other Types of Spread Spectrum Signals.

UNIT–V: DETECTION OF SPREAD SPECTRUM SIGNALS (Periods:09)

Coherent Direct-Sequence Receivers, Coherent Carrier Tracking – Delay-Lock Loop Analysis, Tau-Dither Loop. Non Coherent Carrier Tracking, Non coherent Frequency-Hop Receiver, Acquisition of Spread-Spectrum Signals – Acquisition by Cell-By-Cell Searching. Reduction of Acquisition Time – Acquisition with Matched Filters, Matched filters for PN Sequences, Matched Filters for Frequency-Hopped Signals.

Total periods: 50

TEXT BOOKS:

1. John G. Proakis, "Digital Communications", McGraw Hill, 4th edition, 2001.
2. Theodore S. Rappaport, "Wireless Communications", Pearson Education, 2nd edition, 2002.
3. George R. Cooper & Clare D. McGillem, "Modern Communication and Spread Spectrum", McGraw-Hill Book Company, 1986.

REFERENCE BOOKS:

1. Marvin K. Simon, Jim K Omura, Robert A. Scholtz & Barry K.Levit, "Spread Spectrum Communications", Computer Science Press, 1995.
2. J.Marvin, K.Simon, Sami. M.Hinedi and William C. Lindsey, "Digital Communication Techniques", PHI, 2009.

M. Tech. (DECS)-I Semester
(14MT13803) DIGITAL SYSTEM DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Switching Theory and Logic Design at UG Level

COURSE DESCRIPTION:
Design of digital systems using ROMs, PLAs, CPLDs and FPGAs; Fault diagnosis in combinational and sequential circuits; Fault modeling in programmable logic array.

COURSE OUTCOMES: At the end of the course students will be able to
CO1: Demonstrate in-depth knowledge in
- Design of combinational and sequential circuits
- Identifying various Faults in combinational and sequential circuits
- Test generation algorithms
- Programmable Logic Devices (PLDs)
- Design of complex digital systems using Programmable Logic Arrays

CO2: Analyze complex engineering problems critically for conducting research in the field of digital system design.
CO3: Conceptualize and solve engineering problems to obtain solutions for the design of digital machines.

DETAILED SYLLABUS:

UNIT - I: DESIGN OF DIGITAL SYSTEMS (Periods:12)
ASM charts, Hardware description language and control sequence method, Reduction of state tables, state assignments, Design of Iterative circuits, Design of sequential circuits - using ROMs , PLAs , CPLDs and FPGAs.

UNIT - II: FAULT MODELING & TEST PATTERN GENERATION (Periods:17)
Fault classes and models – Stuck at faults, bridging faults, transition and intermittent faults. Fault diagnosis of Combinational circuits by conventional methods – Path Sensitization technique, Boolean difference method. Kohavi algorithm, D – algorithm, PODEM, Random testing, transition count testing, Signature Analysis and testing for bridging faults.

UNIT - III: FAULT DIAGNOSIS IN SEQUENTIAL CIRCUITS (Periods:10)
Circuit Test Approach, Transition Check Approach - State identification and fault detection experiment, Machine identification, Design of fault detection experiment.

UNIT - IV: PLA MINIMIZATION AND TESTING (Periods:10)
PLA minimization-PLA folding. Fault model in PLA, Test generation and Testable PLA design.

UNIT - V: ASYNCHRONOUS SEQUENTIAL MACHINES (Periods:07)

Fundamental-mode model, The flow table, Reduction of incompletely specified Machines, races, cycles and hazards.

Total Periods: 56

TEXTBOOKS:

1. Charles H. Roth, Jr., "Fundamentals of Logic Design ", Cengage Learning, 5th edition,2004.
2. N. N. Biswas, "Logic Design Theory", PHI, 1993.
3. Miron Abramovici, Melvin Breuer, Arthur Friedman, "Digital Systems Testing and Testable Design", Jaico Publishing House, 2001.

REFRENCES:

1. Samuel C. Lee," Digital Circuits and Logic Design, PHI, 1976.
2. Norman Balabanian, Bradley Carlson, "Digital Logic Design Principles", John Wily&Sons,Inc., 2002.
3. Parag K. Lala," Fault Tolerant and Fault Testable Hardware Design", BS Publications, 1990.

M. Tech. (DECS & CMS) - I Semester
(14MT13809) LINEAR ALGEBRA

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Courses on Mathematics at UG level.

COURSE DESCRIPTION:
Solving linear systems of equations; Abstract structures with underlying mathematics such as vector spaces, linear transforms, inner products, Eigen values and Eigen vectors; Engineering applications of linear algebra.

COURSE OUTCOMES: On successful completion of course the student will be able to

CO1. Demonstrate advanced knowledge in
- solving Linear equations
- finding the bases and dimensions of Vector Spaces
- determining the Linear Transformation between different Vector Spaces .

CO2. Develop skills in
- designing the Dynamical Systems in electrical circuits
- analyzing Discrete time signals
- applying complex Eigen Values in Decoupling systems
- applying concepts of Inner Product Spaces in Fourier Series Analysis.

CO3. Apply Eigen Values and Eigen Vectors in diagonalisation of matrices related to transformations.

DETAILED SYLLABUS:

UNIT – I: VECTORS AND LINEAR EQUATIONS (Periods:09)

System of linear equations, Vector equations, the matrix and vector equations AX=B and AX=0.Solution sets of linear system, Linear combinations, Linear dependence and independence of vectors. Solutions of equations using LU decomposition.

UNIT – II: VECTOR SPACES AND LINEAR TRANSFORMATIONS (Periods:10)

Vector spaces – subspaces, Null and column Spaces of a matrix, Bases, Coordinate systems, Dimension of a Vector Space. Linear transformation, Properties of linear transformations Rank and Nullity, Matrix of linear transformations.

UNIT – III: INNER PRODUCT SPACES (Periods:10)

Inner product, Norm, Inner product space, Othrogonality, Orthogonal sets, Ortho normal basis - Orthogonal projections, Gram-Schmidt orthogonalisation process.

UNIT – IV: EIGEN VALUES AND EIGEN VECTORS (Periods:12)

Eigen Values and Eigen Vectors of a matrices and linear transformations, Eigen values and Eigen vectors of complex matrices. Diagonalisation, Quadratic

forms- Nature, Orthogonality of symmetric matrices. Singular value decomposition (SVD).

UNIT – V: ENGINEERING APPLICATIONS OF LINEAR ALGEBRA (Periods:14)

Applications to Difference equations, Discrete-time signals. Linear Independence in the space signals, Applications to Decoupling a dynamical system , Complex Eigen Values in Decoupling systems, Applications of inner product spaces to Fourier Series Analysis.

Total Periods: 55

TEXT BOOKS :

1. David C. Lay, **Linear Algebra and its applications**, Fourth edition, Pearson education, India. (2014).
2. Jim DeFramza and Dan Gagliardi **Introduction to Linear Algebra with applications,** The McGraw. Hill Companies, India. (2012)

REFERENCES:

1. Gilbert Strang, **Introduction to Linear Algebra**, Fourth edition, South Asian edition, Cambridge Press. (2009).
2. Otto Bretscher, **Linear Algebra with applications**, Third edition, Pearson education, India. (2007)

M. Tech. (DECS)-I Semester
(14MT13804) MODERN DIGITAL SIGNAL PROCESSING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Digital Signal Processing at UG Level

COURSE DESCRIPTION:
Design of digital filter banks; Power spectral estimation; Principles of adaptive filters; Algorithms for error minimization.

COURSE OUTCOMES: On completion of the course, the student will be able to
CO1. Demonstrate in-depth knowledge in
- Filter banks and Wavelets
  - Efficient power Spectral Estimation Techniques.
  - Characteristics of adaptive systems
  - Searching algorithms such as gradient and steepest descent
  - Adaptive algorithms like LMS, RLS and Kalman filtering
  - Non-linear adaptive filtering

CO2. Analyze complex engineering problems critically in digital filter design and the domain of adaptive filtering for conducting research.
CO3. Solve engineering problems for feasible and optimal solutions in the core areas of Multirate signal processing and Adaptive signal processing.
CO4. Contribute positively to scientific research in signal processing, antennas and spectral analysis.

DETAILED SYLLABUS

UNIT I: MULTIRATE FILTER BANKS (Periods:12)
Decimation, Interpolation, Sampling rate conversion by a rational factor I/D, Multistage Implementation of sampling rate conversion. **Digital Filter Banks**: Two-Channel Quadrature-Mirror Filter Bank, Elimination of aliasing, condition for Perfect Reconstruction, Polyphase form of QMF bank, Linear phase FIR QMF bank, IIR QMF bank , Perfect Reconstruction Two-Channel FIR QMF Bank .

UNIT II: POWER SPECTRAL ESTIMATIONS (Periods:12)
Estimation of spectra from finite duration observation of signals, **Non-Parametric Methods**: Bartlett, Welch, Blackmann & Tukey methods. Performance Characteristics of Nonparametric Power Spectrum Estimators, Computational Requirements of Nonparametric Power Spectrum Estimates. **Parametric Methods:** Relation between auto correlation & model parameters, Yule-Walker & Burg Methods, MA & ARMA models for power spectrum estimation.

UNIT III: DEVELOPMENT OF ADAPTIVE FILTER THEORY & SEARCHING THE PERFORMANCE SURFACE (Periods:10)
Introduction to Filtering, Smoothing and Prediction, Linear Optimum Filtering, Problem statement, Principle of Orthogonality - Minimum Mean Square Error, Wiener- Hopf equations, Error Performance - Minimum Mean Square Error.

Searching the Performance Surface: Methods & Ideas of Gradient Search methods, Gradient Searching Algorithm & its Solution, Stability & Rate of convergence - Learning Curves.

UNIT IV: STEEPEST DESCENT ALGORITHMS, LMS ALGORITHM & APPLICATIONS (Periods:10)

Gradient Search by Newton's Method, Method of Steepest Descent, Comparison of Learning Curves.

LMS Algorithm: Overview - LMS Adaptation algorithms, Stability & Performance analysis of LMS Algorithms - LMS Gradient & Stochastic algorithms, Convergence of LMS algorithm.

Applications: Noise cancellation, Cancellation of Echoes in long distance telephone circuits, Adaptive Beam forming.

UNIT V: RLS ALGORITHM AND KALMAN FILTERING (Periods:13)

RLS Algorithm : Matrix Inversion lemma, Exponentially weighted recursive least square algorithm, update recursion for the sum of weighted error squares, convergence analysis of RLS Algorithm, Application of RLS algorithm on Adaptive Equalization.

Kalman Filtering: Introduction, Recursive Mean Square Estimation Random variables, Statement of Kalman filtering problem, The Innovations Process, estimation of the state using the Innovations Process, Filtering, Initial conditions.

Total periods: 57

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital signal processing, principles, Algorithms and applications,* Prentice Hall, 4th Edition, 2007.
2. Simon Haykin, *Adaptive Filter Theory,* PE Asia, 4th Edition, 2002.

REFERENCE BOOKS:

1. Bernard Widrow, Samuel D. Strearns, *Adaptive Signal Processing,* PE, 1985.
2. Emmanuel C Ifeacher Barrie. W. Jervis, "*DSP - A Practical Approach*", Pearson Education, 2nd Edition, 2002.

M. Tech. (CMS) – I Semester
M. Tech. (DECS) – I Semester (Elective-I)
(14MT13805) COMPUTER NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Computer Networks at UG Level

COURSE DESCRIPTION:
Protocols & standards of computer and wireless networks; Advanced network architectures; Upper layers protocols; Network security.

COURSE OUTCOMES:
After completion of the course, students should be able to:

CO1. Demonstrate in-depth knowledge on
- Architectures and functioning of Advanced Wireless LAN and WAN technologies such as Wi-Fi, Wi-Max, Frame Relay, ATM networks etc.
- Protocols like MPLS, RSVP, VOIP associated with modern computer network systems.
- Know the security features associated with modern computer network systems.

CO2. Analyze various design issues for conducting research related to the Internet protocol (IP), Wireless LANs and ATM network technologies prominent in high performance scenario.

CO3. Formulate solutions for engineering problems pertaining to the advanced networking technologies.

CO4. Apply appropriate techniques and tools to complex engineering activities in the field of computer networks.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION TO COMPUTER NETWORKS (Periods:11)
Data communications & Networking for Today's Enterprise, Data Communications, Network Edge, Network core, Internet, OSI, TCP/IP models, Data Link Control Protocols - HDLC, Point to Point Protocol (PPP);

UNIT- II: WIRELESS NETWORKS (Periods:12)
Ethernet, Fast Ethernet, Gigabit Ethernet, WLANS – Merits and topologies, IEEE 802.11 WLAN Standard – Physical Layer, MAC Layer, Frame structure, IEEE 802.11 a, b, g, e and n standards, Applications; Bluetooth & WiMax- features, standards, protocols and utility; Virtual LANs

UNIT- III: ADVANCED NETWORK ARCHITECTURES (Periods:13)
Circuit switching network - SONET/SDH; Virtual Circuit Networks – Frame Relay, ATM - Protocol Architecture, Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Service Categories; Signaling Protocols - MPLS, RSVP; VPN architectures, IP over ATM, Connecting Devices: Repeaters, Bridges, Routers, Gateways.

UNIT- IV: INTERNET TRANSPORT AND APPLICATION PROTOCOLS (Periods:12)

Internet protocol - IPv6, Transport protocols – Connection Oriented protocol TCP, Connectionless protocol UDP; Congestion control in TCP, Socket interface, Domain Name System, Simple Mail Transfer Protocol, WWW and HTTP, Multimedia Applications – RTP, Voice Over IP.

UNIT- V: SECURITY IN COMPUTER NETWORKS (Periods:08)

Simple Network Management Protocol, Network security, Cryptography - Symmetric Key Cryptography, Public Key Cryptography, Firewalls - Packet filtering, Application Gateway, Digital Signature, IP Sec.

Total Periods: 56

TEXT BOOKS:

1. William Stallings, "Data and Computer Communication", 9th edition, Prentice hall, 2010
2. Behrouz A. Forouzan, "Data Communications and Networking", 4th Ed, Tata McGraw-Hill, New Delhi, 2006
3. Jim Kurose, Keith Ross, "Computer Networking: A Top Down Approach", 4th edition, Addison Wesley, July 2007.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum "Computer Networks", 4th Edition, Pearson Education, 2008
2. LEON-GARCIA, INDRA WIDJAJA, "Communication Networks – Fundamental concepts and Key architectures", TMH, 2000

M. Tech. (DECS)-I Semester (Elective-I)
(14MT13806) LOW POWER CMOS VLSI DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on VLSI Design at UG Level.

COURSE DESCRIPTION:
Power dissipation and estimation of CMOS circuits; Design, synthesis and testing of low power circuits; Low power static RAM architectures; Energy recovery techniques; Synthesis of low power circuits.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Demonstrate in-depth knowledge in
- Design of Logic Circuits for High performance and Low Power requirements using CMOS processes.
- Special low power techniques
- Power estimation and analysis
- Low power architecture & Systems.

CO2: Analyze the low power CMOS circuits effects of devices and judge independently the best suited device for fabrication of smart devices for conducting research in ULSI design.

CO3: Solve problems of Low power design challenges, tradeoff between area, speed and power requirements.

CO4: Apply appropriate techniques, resources and tools to engineering activities in low power VLSI circuits.

DETAILED SYLLABUS:

UNIT –I (Periods:05)

Power Dissipation in CMOS VLSI design: Need for low power VLSI chips, Sources of Power dissipation , Power dissipation in MOS & CMOS Devices, Limitations of low Power design.

UNIT –II (Periods:12)

Power Estimation: Modeling of Signals, Signal Probability Calculation, Probabilistic Techniques for Signal activity Estimation, Statistical Techniques, Estimation of Glitching Power, Sensitivity Analysis, Power Estimation using input vector Compaction, Estimation of Maximum Power.

UNIT-III (Periods:13)

Synthesis for Low Power: Behavioral Level Transforms, Logic Level optimization of low power, Circuit level.

Design and Test of Low Voltage CMOS Circuits: Circuit Design Style, Leakage current in Deep Sub micrometer Transistors, Low voltage Circuit Design Techniques, Multiple Supply Voltages.

UNIT-IV **(Periods:10)**

Low Power Static RAM Architectures: Organization of Static RAM, MOS Static RAM Memory Cell, Banked Organization of SRAMs, Reducing Voltage Swing in Bit lines, Reducing Power in Sense Amplifier Circuits.

UNIT-V **(Periods:12)**

Low Energy Computing using Energy Recovery Techniques: Energy Recovery Circuit Design, Designs with partially Reversible logic, Supply Clock Generation.

Software design for low power: Sources of software power dissipation, software power estimation, Software power estimation, Co-design for low power.

Total Periods: 52

TEXT BOOKS:

1. Kaushik Roy, Sharat Prasad, "Low-Power CMOS VLSI Circuit Design" WileyStudent Edition, 2000.

REFERENCE BOOKS:

1. Kiat-Seng Yeo,Samir S.Rofail and Wang-Ling Goh, "CMOS/BiCMOS ULSI: Low power, Low Voltage, "Pearson education, 2002.

M. Tech. (DECS) I Semester (Elective- I)
(14MT13807) EMBEDDED SYSTEM DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Courses on Digital Logic Design and Programming using 'C' language at UG Level

COURSE DESCRIPTION:
Embedded system components, techniques and their choice; Real world interfacing concepts; Development tools and programming concepts.

COURSE OUTCOMES: After completion of the course, students should be able to:

CO1. Demonstrate in-depth knowledge in
- Hardware used in embedded systems
- Software used in embedded systems
- Embedded system-on-chip
- Structural Units in a Processor
- Embedded Programming
- Requirement and specification analysis

CO2. Analyze critically and resolve the issues pertaining to the selection of operating system and system components from the available lot.

CO3. Think laterally and originally, apply independent judgment with intellectual and creative advancements while developing programs for multi-processes in an application.

CO4. Contribute positively in developing solutions with embedded systems for multidisciplinary scientific problems with open mindedness, objectivity and rational approach.

DETAILED SYLLABUS

UNIT- I: AN INTRODUCTION TO EMBEDDED SYSTEMS (Periods:10)

Embedded systems-definition, how are they different, Challenges in Embedded Computing System Design. Processor Embedded into a System, Selection Process, Hardware Units and Devices in a System, Exemplary Embedded Systems, Embedded System-On-Chip (SOC) and use of VLSI Circuit Design Techno logy, Classification of Embedded Systems

UNIT- II: (Periods:12)

Processor Architectures, Memory Organization and Real World Interfacing: Advanced Architectures, Processor and Memory Organization, Performance Metrics, Memory-Types, Maps and Addresses. Processor and Memory Selection

Survey of Software Architectures: Round- Robin, Round- Robin with Interrupts, Function-Queue Scheduling, Real-Time Operating System Architectures, Selecting Architecture.

UNIT- III: PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C, C++ AND JAVA (Periods:11)

Software Programming in Assembly language (ALP) and in High-Level language 'C', C Program Elements- Header, Source Files and Preprocessor Directives, Macros and Functions, Data Types, Data Structures, Modifiers, Statements, Loops and Pointers. Object-Oriented Programming, Embedded Programming in C++, Java

UNIT- IV: PROCESSES AND OPERATING SYSTEMS (Periods:11)

Introduction, Multiple Tasks and Processes, Pre-emptive RTOS, Priority Based Scheduling, Inter process Communication Mechanisms, Evaluating OS Performance, Power Management and Optimization for Processes.

UNIT- V (Periods:11)

Embedded Software Development Tools: Host and Target Machines, Linkers/Locators for Embedded Software, Getting Software into the Target System.

System Design Techniques: Introduction, Design Methodologies, Requirement Analysis, Specifications, System Analysis and Architecture Design.

Total Periods: 55

TEXTBOOKS:

1. Rajkamal, "Embedded systems: Architecture, Programming and Design", TMH, Second Edition, 2008.
2. Wayne wolf, "Computers as a component: principles of embedded computing system design", Morgan Kaufmann Publishers, Second Edition, 2008.
3. David E. Simon, "An embedded software primer", Pearson Education , 2008

REFERENCE BOOKS:

1. Arnold S Burger, "Embedded Systems Design: An Introduction to Processes, Tools, and Techniques", CMP Books
2. Steve Heath, Butterworth Heinenann, "Embedded systems design: Real world design", Newton mass USA 2002.

M. Tech. (DECS & CMS)-I Semester (Elective-I)
(14MT13808) TRANSFORM TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Course on Signal Processing at UG Level.

COURSE DESCRIPTION:
Continuous wavelet transforms; Discrete wavelet transforms; Multi resolution analysis; Wavelet packets; Applications of wavelet transforms.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Multiresolution Analysis
- Continuous wavelets
- Discrete wavelets
- Alternative wavelets & Wavelet packets

CO2. Analyze complex engineering problems critically for conducting research in Signal Processing.
CO3. Solve engineering problems with wide range of solutions in the areas of Biomedical Signal Processing, Image Processing, Radar Signal Processing and Communications.
CO4. Contribute to collaborative multidisciplinary scientific work on Data compression, Noise reduction, Communications, Image and signal Processing.
CO5. Apply appropriate Transform techniques, resources and tools to engineering activities in the fields of Signal Processing and Communications.

DETAILED SYLLABUS
UNIT –I: (Periods:14)
Review of Transforms:
Fourier series and Geometry- Vector space, functions and function spaces. Fourier transform, short-time Fourier transform, Walsh, Hadamard, Haar, Slant, KLT, Hilbert transforms.
Continuous Wavelet Transform:
Introduction, Continuous-Time Wavelets, Definition of the CWT, The CWT as a correlation, Constant Q-Factor Filtering Interpretation and Time-Frequency Resolution, The CWT as an operator, Inverse CWT.
UNIT –II: DISCRETE WAVELET TRANSFORM AND ORTHOGONAL WAVELET DECOMPOSITION (Periods:08)
Introduction, Approximations of vectors in nested linear vector spaces, Example of an MRA-Bases for the Approximation Subspaces and Harr Scaling Function, Bases for the Detail Subspaces and Harr Wavelet, Digital Filter Implementation of the Harr Wavelet Decomposition.

UNIT –III: MRA ORTHONORMAL WAVELETS, AND THEIR RELATIONSHIP TO FILTER BANKS (Periods:12)

Introduction, Formal Definition of an MRA, Construction of a General Orthonormal MRA, A Wavelet basis for MRA, Digital Filtering Interpretation, Examples of Orthogonal Basis Generating Wavelets, Interpreting Orthonormal MRAs for Discrete time signals, Miscellaneous issues Related to PRQMF Filter Banks, Generating Scaling Functions and Wavelets from Filter Coefficients.

UNIT-IV: ALTERNATIVE WAVELET REPRESENTATIONS (Periods:09)

Bi-orthogonal Wavelet Bases, Filtering Relationship for Bi-orthogonal Filters, Examples of Bi-orthogonal Scaling Functions and Wavelets, Two-Dimensional Wavelets, Non-separable Multidimensional Wavelets, Wavelet Packets.

UNIT–V: APPLICATIONS OF WAVELETS (Periods:11)

Wavelet De-noising, Speckle Removal, Edge Detection and Object Isolation, Image Fusion, Object Detection by Wavelet Transforms of Projections, Communication Applications-Scaling Functions as signaling pulses, Discrete Wavelet Multitone Modulation.

Total Periods: 54

TEXT BOOKS:

1. Raghuveer M.Rao and Ajit S.Bopardikar, "*Wavelet Transforms-Introduction to theory and applications"*, Pearson edu, 1998.
2. Soman.K.P, Ramachandran.K.I, Resmi.N.G, "*Insight into Wavelets from theory to Practice"*, PHI, Third Edition, 2010.

REFERENCE BOOKS:

1. R. C. Gonzalez, R. E. Woods, "*Digital Image Processing*," 2nd Edition, Pearson Education, 1992.
2. Jaideva C Goswami, Andrew K.Chan, "*Fundamentals of Wavelets-Theory, Algorithms and Applications*", John Wiley and sons, 1999.
3. C.Sidney Burrus, Ramesh A Gopinath and Haitao Guo, "*Introduction to Wavelets and Wavelet Transforms",* Prentice Hall, 1998.

M. Tech. – I Semester
(14MT10310) RESEARCH METHODOLOGY
(Common to all M. Tech. Programmes)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	--	--	3

PRE-REQUISITES: --

COURSE DESCRIPTION:
Fundamentals of research work - research problem and design; Data collection, Analysis and hypothesis; Statistics in Research; Interpretation and Report Writing.

COURSE OUTCOMES:
On successful completion of course, the student will be able to
CO1. Demonstrate knowledge on research approaches, research process and data collection.
CO2. Identify and analyze research problem.
CO3. Solve the research problems using statistical methods.
CO4. Carryout literature survey and apply good research methodologies for the development of scientific/ technological knowledge in one or more domains of engineering.
CO5. Learn, select and apply modern engineering tools to complex engineering activities.
CO6. Write effective research reports.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO RESEARCH METHODOLOGY (Periods:07)
Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research.

UNIT-II: RESEARCH PROBLEM AND DESIGN (Periods:09)
Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem. Features of Good Design, Research Design Concepts, Different Research Designs.

UNIT-III: DATA COLLECTION, ANALYSIS, AND HYPOTHESIS (Periods:09)
Different Methods of Data Collection, Processing Operations, Types of Analysis, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure.

UNIT-IV: STATISTICS IN RESEARCH (Periods:09)
Review of Statistical Techniques - Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry. Normal Distribution, Chi-Square Test as a Test of Goodness of Fit.

UNIT-V: INTERPRETATION AND REPORT WRITING (Periods:06)
Interpretation – Techniques and Precautions. Report Writing – Significance, Stages, Layout. Types of reports, Precautions in Writing Reports.

Total Periods: 40

TEXT BOOK:

1. C.R. Kothari, *Research Methodology: Methods and Techniques*, New Age International Publishers, New Delhi, 2nd Revised Edition, 2004.

REFERENCE BOOKS:

1. Ranjit Kumar, *Research Methodology: A step-by-step guide for beginners*, Sage South Asia, 3rd ed., 2011.
2. R. Panneerselvam, Research Methodology, PHI learning Pvt. Ltd., 2009

M. Tech. (DECS)-I Semester
(14MT13821) DIGITAL SYSTEM DESIGN LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	4	2

PRE-REQUISITES:
A Course on Digital Design at UG Level

COURSE DESCRIPTION:
Design and simulation of digital circuits; Implementing digital circuits in FPGAs.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1: Demonstrate skills in
- Behavioral system modeling: concurrency and event-driven simulation
- Digital design modeling using various styles (behavioral, structural and dataflow)
- Designing Combinational and sequential circuits
- Verifying the Functionality of Designed circuits using function Simulator
- Checking for critical path time calculation
- Placement and routing in FPGA
- Implement digital designs in FPGA device.

CO2: Conceptualize and solve problems in logic verification and timing calculation of Digital circuits.
CO3: Perform projects efficiently in Digital system design to achieve optimization for high device utilization and performance in industrial needs.
CO4: Acquire research skills in the domain of Digital Systems.
CO5: Create, develop and use modern CAD tools to analyze problems of RTL, Technology schematic, and system implementation.

LIST OF EXPERIMENTS
PART- I: (Design and Simulation Experiments) (12 Slots)
1. Simulation and Verification of Logic Gates. **(1 Slot)**
2. Design and Simulation of Half adder, Serial Binary Adder, Multi Precession Adder, Carry Look Ahead Adder and Full Adder. **(1 Slot)**
3. Simulation and Verification of Decoder, MUXs, Encoder using all Modeling Styles. **(1 Slot)**
4. Modeling of Flip-Flops with Synchronous and Asynchronous reset. **(1 Slot)**
5. Design and Simulation of Counters- Ring Counter, Johnson Counter, and Up- Down Counter, Ripple Counter. **(2 Slots)**
6. Design of a N- bit Register of Serial-in Serial-out, Serial in Parallel out, Parallel in Serial out and Parallel in Parallel Out. **(1 Slot)**

Design of Sequence Detector (Finite State Machine- Mealy and Moore Machines) **(1 Slot)**

7. 4- Bit Multiplier, Divider. (for 4-Bit Operand) **(1 Slot)**
8. Design ALU to Perform – ADD, SUB, AND-OR, 1's and 2's COMPLIMENT, Multiplication, Division. **(2 Slots)**
9. Design of RAM/ROM **(1 Slot)**

PART-II: (Implementation Steps for Experiments in Part-I) **(2 Slots)**

1. Verification of the Functionality of the circuit using function Simulators.
2. Timing Simulator for Critical Path time Calculation.
3. Synthesis of Digital Circuit.
4. Place and Router Techniques for FPGA's like Xilinx, Altera, Cypress, etc.,
5. Implementation of Design using FPGA and CPLD Devices.

Total Time Slots: 14

REQUIRED SOFTWARE TOOLS:

1. Mentor Graphic tools/Cadence tools/ Synopsys's tools.(220 nm Technology and Above)
2. Xilinx ISE 10.1i and above for FPGA/CPLDS.

REFERENCES:

1. John F. Wakerly, "Digital Design: Principles and Practices", Prentice Hall, Third Edition, 2000.
2. Digital System Design Lab Manual

M. Tech. (DECS)-II Semester
(14MT23801) DISPLAY TECHNOLOGIES AND DEVICES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Semiconductor Devices and Circuits at UG Level

COURSE DESCRIPTION:
Principles of display technology; Inorganic display technologies; Measurements of display systems; Characteristics of liquid crystal display, thin film transistor, Active matrix LCD and organic LED.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Demonstrate in-depth knowledge in
- Display Technologies
- Display Measurements
- Liquid Crystal, TFT, AMLCD and OLED.

CO2: Analyze complex engineering problems critically for conducting research in Display devices.

CO3: Solve engineering problems with wide range of solutions in different Display technologies.

CO4: Apply appropriate techniques, resources and tools to engineering activities in Display Technologies.

CO5: Contribute positively to multidisciplinary scientific research in design and development of Display Devices well suited for wide range of applications.

DETAILED SYLLABUS:

UNIT-I: FUNDAMENTALS OF DISPLAY TECHNOLOGY (Periods:09)
Light, Modulation of Light, Human vision and perception for display – Performance of the Human Visual system. Luminescence, Photoluminescence, Cathodoluminescence (CL), Electroluminescence (EL).

UNIT-II: INORGANIC DISPLAY TECHNOLOGY (Periods:12)
Cathode-ray tube (CRT) display, flat-panel display; field emission display (FED), plasma display panel (PDP), semiconductor light-emitting diode (LED) display, micro display and others.

UNIT-III: DISPLAY MEASUREMENTS (Periods:06)
Photometric measurements, Colorimetric Measurements, Display Measurement System.

UNIT-IV: LIQUID CRYSTAL Displays AND TFT (Periods:12)
Liquid Crystal – Liquid Crystal Materials, Liquid Crystal Alignment, Twisted Nematic, In-plane switching, Fringe Filed switching.
Thin film transistors (TFT) – Basic Concepts of Crystallized semiconductor Materials, Disordered Semiconductors, TFT Characteristics.

UNIT-V: AMLCD and OLED (Periods:11)

Active matrix liquid crystal display (AMLCD) - structure of AMLCD, Operating Principles of AMLCD, Manufacturing of AMLCD, AMLCD Electronics, Performance characteristics.

Organic light emission diode (OLED) – Generation of Excited States by Charge Recombination, electrical and optical Characteristics of OLEDs.

Total Periods: 50

TEXT BOOKS:

1. John Wilson and John Hawkes, "Optoelectronics: An Introduction", Prentice Hall, 3rd Edition, 1998.
2. Jiun-Haw Lee, david N.Liu, Shin-Tson Wu,"Introduction to Flat Panel Displays, John Wiley & Sons, 2008.
3. Matthew S.brennesholtz, Edward H.stupp," Projection Displays", John Wiley & Sons, 2008.

REFERENCE BOOKS:

1. Willem den Boer, "Active Matrix Liquid Crystal Displays", Elsevier, 2005.
2. Jan Kalinowski, "Organic Light-Emitting Diodes", Marcel Dekker, 2005.
3. David Armitage, Ian Underwood and Shin-Tson Wu, "Introduction to Microdisplays", John Wiley & Sons Ltd, 2006.
4. Robert L.Myers, "Display Interfaces: Fundamentals and Standards", John Wiley & sons, 2003.

M. Tech. (CMS & DECS)-II Semester
(14MT23802) INFORMATION THEORY AND CODING TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Digital Communications at UG Level

COURSE DESCRIPTION:
Information theory; Channel capacity; Channel coding techniques – Linear block codes, Cyclic codes, Convolutional codes; Reed-Solomon and Turbo codes.

COURSE OUTCOMES: After completion of the course, students should be able to:

CO1. Demonstrate knowledge in
- Various aspects of source and channel coding techniques
- channel capacity
- Performance evaluation of various source coding techniques

CO2. Analyze complex engineering problems critically in the domain of information, source and line encoding.

CO3. Conceptualize and Solve engineering problems for feasible and optimal solutions in the core area of information theory and coding techniques.

CO4. Apply appropriate techniques to complex engineering activities in the field of information and communications.

DETAILED SYLLABUS

UNIT I: INTRODUCTION (Periods:12)

Entropy: Discrete stationary sources, Markov sources, Entropy of a discrete Random variable- Joint, conditional, relative entropy, Mutual Information and conditional mutual information. Chain rules for entropy, relative entropy and mutual information, Differential Entropy - Joint, relative, conditional differential entropy and Mutual information.

Loss less Source coding: Uniquely decodable codes, Instantaneous codes, Kraft's inequality, optimal codes, Huffman code, Shannon's Source Coding Theorem.

UNIT II: CHANNEL CAPACITY (Periods:10)

Capacity computation for some simple channels, Channel Coding Theorem, Fano's inequality and the converse to the Coding Theorem, Equality in the converse to the coding theorem, The joint source Channel Coding Theorem, The Gaussian channels- Capacity calculation for Band limited Gaussian channels, Parallel Gaussian Channels, Capacity of channels with colored Gaussian noise.

UNIT III: CHANNEL CODING-1 (Periods:08)

Linear Block Codes: Introduction to Linear block codes, Generator Matrix, Systematic Linear Block codes, Encoder Implementation of Linear Block Codes, Parity Check Matrix, Syndrome testing, Error Detecting and correcting capability of Linear Block codes, Application of Block codes for error control in data storage Systems.

UNIT IV: CHANNEL CODING-2 (Periods:14)

Cyclic Codes: Algebraic Structure of Cyclic Codes, Binary Cyclic Code Properties, Encoding in Systematic Form, Systematic Encoding with an (n - k)-Stage Shift Register, Error Detection with an (n - k)-Stage Shift Register, Well-Known Block Codes-Hamming Codes, Extended Golay Code, BCH Codes.

Convolutional Codes: Convolution Encoding, Convolutional Encoder Representation, Formulation of the Convolutional Decoding Problem, Properties of Convolutional Codes, Sequential Decoding, Feedback Decoding, Application of Viterbi and sequential decoding.

UNIT V: CHANNEL CODING-3 (Periods:12)

Reed-Solomon Codes- Reed-Solomon Error Probability, Finite Fields, Reed-Solomon Encoding, Reed-Solomon Decoding, Interleaving and Concatenated Codes- Block Interleaving, Convolutional Interleaving, Concatenated Codes. Coding and Interleaving Applied to the Compact Disc Digital Audio System-CIRC Encoding, CIRC Decoding. Turbo Codes- Turbo Code Concepts, Encoding with Recursive Systematic Codes, Feedback Decoder, The MAP Decoding Algorithm.

Total Periods: 56

TEXT BOOKS:

1. Thomas M. Cover and Joy A. Thomas, Elements of Information Theory, John Wiley & Sons, 1 st Edition,1999.
2. Bernard sklar, "Digital Communications – Fundamental and Application", Pearson Education, 2 nd Edition, 2009.

REFERENCES:

1. Robert Gallager, Information Theory and Reliable Communication, John Wiley & Sons,1st Edition,1968.
2. John G. Proakis, "Digital Communications", Mc. Graw Hill Publication, 5th Edition, 2008.
3. SHU LIN and Daniel J. Costello, Jr., "Error Control Coding – Fundamentals and Applications", Prentice Hall, 2nd Edition, 2002.

M. Tech. (DECS)-II Semester
(14MT23803) MICROCONTROLLER BASED SYSTEM DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Computer Architecture, Digital design, Software design, Microprocessors and Interfacing.

COURSE DESCRIPTION:
System design involving microcontrollers –8051, ARM, PIC;

COURSE OUTCOMES: After completion of the course, students should be able to:

CO1. Demonstrate potential knowledge in
- Advanced Microcontrollers architecture and programming
- Features of modern microcontrollers and their usage
- Interfacing with external peripherals

CO2. Gain design experience by critically analyzing modern microcontrollers suitable for a specific application.

CO3. Consider trade-offs in the way hardware and software components of a system work together to solve engineering problems to exhibit a specific behavior, given a set of performance goals and technology.

CO4. Familiarize with available controllers to overcome ever increasing embedded system design complexity combined with reduced time-to-market window to revolutionize embedded system design process.

CO5. Promote multidisciplinary research in the area of embedded systems.

DETAILED SYLLABUS

UNIT- I: 8051/31 MICROCONTROLLERS (Periods:10)

8051 Architecture: Architecture, Memory organization, Addressing modes, Instruction set, Timers, Interrupts, I/O ports, Interfacing I/O Devices, Serial Communication.

8051 Programming: Timer Counter Programming, Serial Communication Programming, Interrupt Programming.

UNIT- II: ARM CONTROLLERS (Periods:11)

ARM Embedded Systems, ARM processor fundamentals- Register organization , Pipeline, Core extension. ARM instruction set- Data processing, Branch, Load-Store, Interrupts & Program Status Register Instructions. Thumb Instruction Set – Register usage, ARM Thumb interworking, Branch, Data processing, Load store instructions, Stack and Software Interrupt.

UNIT- III: PIC MICROCONTROLLER (Periods:08)

Introduction to PIC Controllers - Block diagram of PIC16C74A, PIC16C62A, PIC Development tools. CPU Architecture and Instruction Set- Harvard architecture and Pipelining, Program Memory considerations, Register file structure and Addressing modes, CPU registers, Instruction set , simple operations.

UNIT- IV PIC INTERRUPTS AND TIMERS (Periods:14)

Loop Time, Subroutine, Timer2 and Interrupts: Timer2 use, Interrupt logic, Timer2 Scalar initialization, IntService Interrupt Service Routine, Loop Time Subroutine.

Interrupt Timing And Program Size Considerations: Interrupt Constraints, Improved Interrupt servicing, shortening an Interrupt handler, Critical region.

External Interrupts and Timers: RB0/INT external interrupt input, Timer 0, Compare mode, Capture mode,Timer1/CCP Programmable period scaler,Timer1 external event counter, Timer1 and Sleep Mode, PWM outputs, Port B-Change Interrupts(pins RB7:RB4).

UNIT- V: PIC SYSTEM DESIGN (Periods:12)

I/O Port Expansion - Synchronous Serial Port module, SPI, output and input port expansion, LCD Display. I2C Bus for Peripheral Chip Access – I2C Bus Operation, I2C Bus Subroutines, DAC output, Temperature sensor, Serial EEPROM. Analog to Digital Converter – ADC characteristics, ADC use. UART – Baud rate accuracy, Baud rate selection, UART Data Handling Circuitry, Initialization, Use.

Total Periods: 55

TEXT BOOKS:

1. Muhammad Ali Mazidi, Janice G. Mazidi and Rolin D. McKinlay, 'The 8051 Microcontroller and Embedded Systems' Prentice Hall, 2005.
2. Andrew N Sloss, Dominic Symes, Chris Wright, "ARM Systems Developers Guide: Designing and Optimizing System Software", Morgan Kaufmann Publishers, 2004.
3. John B Peatman, "Design with PIC Microcontrollers", Pearson Education, I edition, 1998.

REFERENCE BOOKS:

1. Myke Predko, "Programming and customizing the 8051 Microcontroller", Tata McGraw Hill, 2001.
2. Kenneth J Ayala, "The 8051 Microcontroller: Architecture, Programming and Applications", Thomson Publications, 1991.
3. Muhammad Ali Mazidi, Rolin D. Mckinlay, Danny Causey ` PIC Microcontroller and Embedded Systems using Assembly and C for PIC18', Pearson Education 2008.
4. John Iovine, 'PIC Microcontroller Project Book ', McGraw Hill, 2000

M. Tech. (DECS)-II Semester
(14MT23804) TESTING AND TESTABILITY OF DIGITAL SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Digital Logic Design at UG Level.

COURSE DESCRIPTION:
Fault modeling; Test strategies for digital circuits; Design for testability; Testing techniques; Fault diagnosis.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Demonstrate in-depth knowledge in
- Fault Modeling
- Test Generation
- Design for Testability
- BIST
- Fault Diagnosis.

CO2: Analyze complex engineering problems critically for conducting research in Testing of Circuits.

CO3: Solve engineering problems with wide range of solutions in different Test Architectures.

CO4: Apply appropriate techniques, resources and tools to engineering activities in Design for Testability.

CO5: Contribute positively to multidisciplinary scientific research in design and development of Fault Diagnosis well suited for wide range of applications.

DETAILED SYLLABUS:

UNIT I: BASICS OF TESTING AND FAULT MODELLING (Periods:10)
Introduction to Testing - Faults in digital circuits - Modeling of faults - Logical Fault Models - Fault detection - Fault location - Fault dominance - Logic Simulation - Types of simulation - Delay models - Gate level Event-driven simulation.

UNIT II: TEST GENERATION FOR COMBINATIONAL AND SEQUENTIAL CIRCUITS (Periods:08)
Test generation for combinational logic circuits - Testable combinational logic circuit design - Test generation for sequential circuits - design of testable sequential circuits.

UNIT III: DESIGN FOR TESTABILITY (Periods:11)
Design for Testability - Ad-hoc design for testability techniques- Generic scan based design - Classical scan based design -System level DFT approaches.

UNIT IV: SELF-TEST AND TEST ALGORITHMS (Periods:13)

Built-In Self Test - Test pattern generation for BIST - Circular BIST - BIST Architectures - Testable Memory Design - Test algorithms - Test generation for Embedded RAMs.

UNIT V: FAULT DIAGNOSIS (Periods:10)

Logic Level Diagnosis - Diagnosis by UUT reduction - Fault Diagnosis for Combinational Circuits -Self-checking design - System Level Diagnosis.

Total Periods: 52

TEXT BOOKS:

1. M. Abramovici, M.A. Breuer and A.D. Friedman, "Digital Systems and Testable Design", Jaico Publishing House, 2002.
2. P.K. Lala, "Digital Circuit Testing and Testability", Academic Press, 2002.
3. A.L. Crouch, "Design Test for Digital IC's and Embedded Core Systems", Prentice Hall International, 2002.

REFERENCE BOOKS:

1. M.L. Bushnell and V.D. Agrawal, "Essentials of Electronic Testing for Digital, Memory and MixedSignal VLSI Circuits", Kluwer Academic Publishers, 2002.

M. Tech. (CMS & DECS)-II Semester
(14MT23805) WIRELESS COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Digital Communications at UG Level.

COURSE DESCRIPTION:
Introduction to cellular wireless communication systems; Radio propagation in mobile environment; Equalization and Diversity techniques; Multiple access techniques; Introduction to wireless networking; Multicarrier modulation techniques.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Cellular systems and wireless standards
- Radio wave propagation in wireless environment
- Equalization and diversity techniques
- Multiple access techniques and networking
- Multicarrier modulation

CO2. Analyze complex engineering problems critically for conducting research in wireless systems.
CO3. Solve engineering problems with wide range of solutions in wireless communications.
CO4. Apply appropriate techniques to engineering activities in the field of wireless communications.

DETAILED SYLLABUS
UNIT – I: INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS AND CELLULAR CONCEPT (Periods:11)
Evolution of Mobile Radio Communication Systems, Examples of Wireless Communication Systems, 1G, 2G, 2.5G, and 3G Wireless Cellular Networks and Standards, Frequency Reuse Concept, Channel Assignment Strategies, Interference and System Capacity, Trunking and Grade of Service, Improving Coverage and Capacity in Cellular Systems-cell splitting and sectoring. Problem solving.
UNIT – II: MOBILE RADIO PROPAGATION (Periods:15)
Large Scale Path Loss: Introduction, Free Space Propagation Model, Relating Power to Electric field, Propagation Mechanisms – Reflection, Diffraction, and Scattering. Practical Budget Design using Path Loss Models, Outdoor and Indoor Propagation Models. Problem solving.
Small Scale Fading and Multipath: Small Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small Scale Multipath Measurements, Parameters of Mobile Channels, Types of Small Scale Fading

(all variations*),* Statistical Models – Clarke's Model for Flat Fading, and Jake's Model. Problem solving.

UNIT -III: EQUALIZATION & DIVERSITY TECHNIQUES (Periods:11)

Equalization: Introduction, Survey of Equalization Techniques, Linear and Non-linear Equalizers – Linear Transversal Equalizer, Decision Feedback Equalizer (DFE). Algorithms for Adaptive Equalization – Zero Forcing, LMS, and RLS. Problem solving.

Diversity Techniques: Realization of Independent Fading Paths, Receiver Diversity – System Model, Selection Combining, Threshold Combining, Maximal Ratio Combining, and Equal Gain Combining, Rake receiver. Transmit Diversity–Channel known at Transmitter, Channel unknown at Transmitter – the Alamouti Scheme, analysis.

UNIT – IV: MULTIPLE ACCESS TECHNIQUES & NETWORKING (Periods:12)

Introduction to Multiple Access: FDMA, TDMA, CDMA, SDMA, Packet Radio - Pure ALOHA, Slotted ALOHA, CSMA, and Reservation protocols. Capacity of Cellular Systems- Cellular CDMA. Problem Solving.

Introduction to Wireless Networking: Introduction to Wireless Networks, Differences between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel Signaling.

UNIT – V: MULTICARRIER MODULATION (Periods:08)

Data Transmission using Multiple Carriers, Multicarrier Modulation with Overlapping Subchannels, Discrete Implementation of Multicarrier Modulation – DFT and its properties, The Cyclic Prefix, Orthogonal Frequency Division Multiplexing (OFDM), Matrix Representation of OFDM, Vector Coding. Challenges in Multicarrier Systems. Problem solving.

Total periods: 56

TEXT BOOKS:

1. T. S. Rappaport, "Wireless Communications, Principles and Practice," Prentice Hall, 2nd Edition, 2002.
2. Andrea Goldsmith, "Wireless Communications," Cambridge University Press, 2005.

REFERENCE BOOKS:

1. David Tse, PramodViswanath, "Fundamentals of Wireless Communications," Cambridge University Press, 2006.
2. Dr. Kamilo Feher, "Wireless Digital Communications," Prentice Hall, 1995.

M. Tech. (CMS)-II Semester
M. Tech. (DECS)-II Semester (Elective-II)
(14MT23806) DETECTION AND ESTIMATION OF SIGNALS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Probability theory and Stochastic Processes at UG Level

COURSE DESCRIPTION:
Detection criteria for single and multiple observations; Estimation techniques; Properties of estimators; Estimation of parameters.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Different decision criteria
- Estimation techniques and their properties
- Selection of an efficient estimator for the given specifications.
- Design of Kalman and Matched filters
- Statistical estimation of parameters

CO2. Analyze complex engineering problems critically for conducting research in the field of signal detection and estimation.
CO3. Conceptualize and solve engineering problems to obtain solutions for the design of optimum receivers.
CO4. Apply appropriate techniques to engineering activities in the field of Communications.

DETAILED SYLLABUS

UNIT – I: DETECTION THEORY (Periods:12)
Binary Decisions: Single observation **–** Maximum-likelihood decision criterion, Neyman-Pearson criterion, Receiver operating characteristics, Probability-of-error criterion, Bayes risk criterion, Min-max criterion. Problem solving.

UNIT–II: BINARY DECISIONS: MULTIPLE OBSERVATIONS (Periods:11)
Vector observations, the general Gaussian Problem, Waveform Observation in Additive Gaussian Noise, The Integrating Optimum Receiver, Matched Filter Receiver, Problem solving.

UNIT - III: ESTIMATION THEORY (Periods:12)
Maximum-likelihood estimation, Bayes estimation criterion - Mean Square Error Criterion, Uniform Cost Function, Absolute-Value Cost Function. Linear minimum-Variance and Least Squares Method, Estimation in the presence of Gaussian noise - Linear observation, Non-linear estimation. Problem solving.

UNIT – IV: PROPERTIES OF ESTIMATORS (Periods:08)
Bias, Efficiency, Cramer-Rao bound, Asymptotic properties, Sensitivity and error analysis.

UNIT–V: STATE ESTIMATION AND STATISTICAL ESTIMATION OF PARAMETERS (Periods:11)

State Estimation: Prediction, Kalman filter, Problem solving.

Statistical Estimation of Parameters: Concept of sufficient statistics, Exponential families of Distributions, Exponential families and Maximum likelihood estimation, uniformly minimum-variance unbiased estimation.

Total periods: 54

TEXT BOOKS:

1. James L.Melsa & David L.Cohn, "Decision and Estimation Theory", McGraw Hill, 1978.
2. Steven M. Kay, "Fundamentals of Statistical Signal Processing Vol. 1: Estimation Theory, Prentice Hall, 1993, Vol. 2: Detection Theory", Prentice Hall Inc., 1998.

REFERENCE BOOKS:

1. Harry L. Van Trees, "Detection, Estimation and Modulation Theory", Part 1, John Wiley & Sons Inc. 1968.
2. Jerry M. Mendel, "Lessons in Estimation Theory for Signal Processing, Communication and Control", Prentice Hall Inc., 1995.
3. Sophocles J.Orfanidis, "Optimum Signal Processing", McGraw Hill, 2nd edition, 1988.

M. Tech. (DECS)-II Semester (Elective-II)
(14MT23807) NEURAL NETWORKS AND FUZZY SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Courses on Digital Electronics and Communication Systems at UG level.

COURSE DESPCRIPTION:
Concepts of Artificial Neural Networks; Classification of neural network; Implementation and applications of neural networks; Concepts of fuzzy logic systems; Design of fuzzy logic systems; Applications of neuro-fuzzy systems.

COURSE OUTCOMES:
On successful completion of the course, the student will be able to
CO1. Demonstrate in depth knowledge on Neural networks and Fuzzy Systems.
CO2. Design and implement neural networks and neuro-fuzzy systems for particular problem.
CO3. Apply and evaluate Neural networks and Fuzzy Systems in communication engineering.

DETAILED SYLLABUS

UNIT-I: FUNDAMENTAL CONCEPTS OF ANN (Periods:11)
Historical development of Neural Networks, Biological neuron, Artificial neuron, Activation functions in ANN, Architectures of ANN, McCulloch-Pitts neuron model, Supervised and unsupervised learning, learning rules: Hebbian, Perceptron, Winner-takes-all, Out-star. Concept of linear separability.

UNIT-II: FEED FORWARD AND FEEDBACK ANN (Periods:14)
Back propagation NN: Introduction, delta learning rule, training algorithm. ADALINE architecture, LMS algorithm, Self Organizing Feature Maps(SOFM): topology, training algorithm. Learning Vector Quantization(LVQ): architecture, training algorithm. Discrete-time Hopfield Networks: architecture, training algorithm. Full Counter Propagation Networks: architecture, training algorithm, Basic concepts of associative memory: auto and hetero associative memory.

UNIT-III: HARDWARE IMPLEMENTATION AND APPLICATIONS OF ANN (Periods:10)
Neurocomputing hardware requirements, digital and analog electronic neurocomputing circuits, integrated circuit synaptic connections: voltage controlled Weights, analog storage of adjustable weights, digitally programmable weight, learning weight implementation.
Applications: Adaptive noise cancellation, Real time data compression.

UNIT-IV: FUZZY LOGIC SYSTEMS (Periods:12)
Crisp sets, fuzzy sets, operations on fuzzy sets, fuzzy relations and compositions. linguistic variables, types of membership functions, block diagram of fuzzy logic system, fuzzification, fuzzy rule base, fuzzy reasoning, defuzzification methods: centroid, weighted average method, center of sums.

UNIT-V: NEURO– FUZZY MODELING AND APPLICATIONS (Periods:08)

Introduction to Neuro-Fuzzy systems, Adaptive Neuro Fuzzy Inference System (ANFIS): architecture, hybrid learning algorithm, ANFIS as universal approximator.

Applications: Printed character recognition, Channel equalization.

Total Period: 55

TEXT BOOKS:

1. Jacek M. Zurada, "Introduction to Artifical Neural Systems", JAICO Publishing House, 2006.
2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", 3rd edition, Wiley India Pvt. Ltd., 2011.
3. Jyh-Shing Roger Jang, Chen-Tsai Sun and Eiji Mizutani, "Neuro-Fuzzy and Softcomputing – A Computational Approach to Learning and Machine Intelligence", Prentice Hall, 1977.

REFERENCE:

1. S.N.Sivanandam, S.Sumathi,S. N. Deepa, "Introduction to Neural Networks using MATLAB 6.0", 1st edition, Tata McGraw-Hill, 2006
2. Simon Haykin, "Neural Networks - A Comprehensive Foundation", Pearson Education, 2001.
3. Laurene Fausett, "Fundamentals of Neural Networks", Pearson Education, 2004.

M. Tech. (CMS)-I Semester
M. Tech. (DECS)-II Semester (Elective-II)
(14MT23808) OPTICAL COMMUNICATIONS AND NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Optical Communications at UG Level.

COURSE DESCRIPTION:
Characteristics of fiber materials; Optical cables design and connectors; Fiber optic components; Modulation and demodulation of optical signals; Optical networks.

COURSE OUTCOMES:
At the end of the course, the students will be able to
CO1. Demonstrate Knowledge in
- Linear and Non-linear Characteristics of Optical fiber.
- Fiber design considerations.
- Minimization of Losses in Cable design.
- Understanding the operation of advanced fiber optic components
- Modulation and demodulation techniques
- Access networks

CO2. Analyze complex engineering problems critically in the domain of optical communication for conducting research.
CO3. Formulate solutions to problems related to optical communication to meet societal and industrial needs.
CO4. Apply appropriate techniques to complex engineering activities in the field of communication networks.

DETAILED SYLLABUS
UNIT I: INTRODUCTION (Periods:11)
Evolution of fiber types, guiding properties of fibers, cross talk between fibers, coupled modes and mode mixing, dispersion properties of fibers, nonlinear effects of optical fibers- SRS, SBS, intensity dependent refractive index. Characterizations of materials for fibers, fiber preform preparation- Soot deposition, MCVD. Fiber drawing and control, roles of coating and jacketing.
UNIT II: OPTICAL CABLE DESIGN (Periods:10)
Fiber design considerations-Fiber diameter, Cladding thickness, Low and high bit rate systems. Design objectives and cable structures, Fiber splicing- fiber end preparation, single and array splices, measurement of splicing effects. Optical fiber connectors-The role of connectors, Connector alignment techniques.
UNIT-III: FIBER OPTIC COMPONENTS FOR COMMUNICATION AND NETWORKING (Periods:14)
Couplers, Isolators and Circulators, Multiplexers & filters- Bragg Gratings, Fabry-Perot Filters, Mach-Zehnder Interferometers, Arrayed Waveguide

Grating, Acousto-Optic Tunable Filter, High Channel Count Multiplexer Architectures. Optical Amplifiers- Erbium Doped Fiber amplifiers, Raman amplifiers, Transmitters- LED, Lasers, Direct and External Modulation, Detectors- Photo detectors. Optical Switches – Large Optical Switches. Wavelength Converters – Optoelectronic Approach, Optical gating.

UNIT-IV: MODULATION AND DEMODULATION (Periods:8)

Signal formats for Modulation, Subcarrier Modulation and Multiplexing, Optical Modulations – Duo binary, Single Side Band and Multilevel Schemes, Demodulation- Ideal and Practical receivers, Bit Error Rates, Coherent Detection, Timing Recovery and Equalization, Reed-Solomon Codes for Error Detection and Correction.

UNIT-V: OPTICAL NETWORKS (Periods:10)

Access Networks - architecture overview, Enhanced HFC, Fiber to the curb (FTTC). Photonic packet switching - OTDM, Synchronization, OTDM test beds. Deployment considerations- Designing the transmission layer using SDM, TDM, WDM, Unidirectional versus Bidirectional WDM systems.

Total Periods: 53

TEXT BOOKS:

1. S.E.Miller, A.G.Chynoweth, "*Optical Fiber Telecommunication",* 1979
2. Rajiv Ramaswamy, Kumar N. Sivaranjan and Galen H.Sasaki,"*Optical Networks* ", Elsevier, 3rd edition,2010.

REFERENCE BOOKS:

1. Govind P.Agarwal "Fiber – Optic Communication Systems", Wiley India, 3rd edition, 2002.
2. Gerd Kaiser, "*Optical Fiber Communication"*, McGraw Hill,4th edition,2008.
3. John. M. Senior, "*Optical fiber communications: Principles and Practice",* Pearson, 3rd edition, 2010.

M. Tech. (DECS)-II Semester (Elective-II)
(14MT23809) REAL TIME SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Digital system design, Operating systems and embedded systems.

COURSE DESCRIPTION:
Real time system reference model; Real time scheduling approaches; Fault tolerant real time systems; Real time operating system concepts; Commercial RTOS.

COURSE OUTCOMES:
After completion of the course, students should be able to:
CO1. Demonstrate potential knowledge in
- Characterizing Real Time Systems
- Various Scheduling approaches
- Fault tolerant techniques
- Real Time Operating System Services

CO2. Gain design experience by critically analyzing various Operating Systems using contemporary bench marks
CO3. Consider trade-offs in Real Time System designing to solve engineering problems to exhibit specific behavior, given a set of performance goals and technology
CO4. Familiarize with fault tolerant and scheduling techniques to overcome ever increasing embedded system design complexity combined with reduced time-to-market window to revolutionize embedded system design process

DETAILED SYLLABUS

UNIT-I: REAL TIME SYSTEMS (Periods:10)
Hard Vs Soft Real Time Systems, a Reference Model of Real Time Systems- Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency. Functional Parameters, Resource Parameters of Jobs and Parameters of Resources, Scheduling hierarchy.

UNIT-II: APPROACHES TO REAL TIME SCHEDULING (Periods:10)
Clock Driven, Weighted Round Robin, Priority Driven, Dynamic Vs Static Systems, Effective Release Times and Dead Lines, Optimality and Non-optimality of EDF and LST algorithms, Challenges in Validating Timing Constraints in Priority Driven Systems, Offline Vs Online Scheduling.

UNIT-III (Periods:12)
Scheduling Real Time Tasks in Multiprocessor and Distributed Systems: Multiprocessor task allocation, Dynamic allocation of tasks, Fault tolerant scheduling of tasks, Clocks in distributed Real Time Systems.

Fault Tolerance Techniques: Introduction, Failures- Causes, Types, Detection. Fault and Error Containment, Redundancy- Hardware, Software, Time. Integrated Failure Handling.

UNIT-IV: OPERATING SYSTEMS (Periods:11)

Overview- Threads and Tasks, the Kernel. Time Services and Scheduling Mechanisms, Basic Operating System Functions- Communication and Synchronization, Event Notification and Software Interrupt Memory Management, I/O and Networking. Processor Reserves and Resource Kernel, Capabilities of Commercial Real Time Operating Systems.

UNIT-V: COMMERCIAL REAL TIME OPERATING SYSTEMS (Periods:12)

UNIX as RTOS - non preemptive kernel, Dynamic Priority levels and deficiencies. UNIX based Real Time Operating Systems - Extension to UNIX kernel, Host Target Approach, Preemption Point Approach, Self host systems. Windows as RTOS- features of Windows NT, Shortcomings, Windows NT vs UNIX. POSIX - Open software, Genesis of POSIX, Overview of POSIX, Real Time POSIX standard. Survey of Contemporary Real Time Operating Systems- PSOS, VRTX, VXworks, QNX, µC/OS-II, RT Linux, Lynx, Windows CE. Bench-marking Real Time Systems.

Total Periods: 55

TEXT BOOKS:

1. Jane W.S. Liu, "Real Time Systems", Pearson Education, I Edition, April 2000.
2. C. M. Krishna, Kang G Shin, "Real Time Systems", MCgraw-Hill Series, Dec. 1996.
3. Rajib Mall, "Real Time Systems-Theory and Practice", Pearson Education India, I Edition, Nov.2012.

REFERENCE BOOKS:

1. Phillip A. Laplante and Seppo J. Ovaska, "Real-Time Systems Design and Analysis: Tools for the Practitioner", Wiley-IEEE Press, 4 edition, Nov. 2011.
2. Hermann Kopetz, "Real-Time Systems: Design Principles for Distributed Embedded Applications ", Springer; 2nd Edition, 2011.

M. Tech. (DECS)-II Semester
(14MT23821) COMMUNICATIONS AND SIGNAL PROCESSING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	--	--	4	2

PRE-REQUISITES:
Simulation Lab at UG Level

COURSE DESCRIPTION:
Design of FIR and IIR filters; Equalization of multi path channel; Generation of PN sequences; Performance evaluation of QPSK modulation scheme; Image smoothening and sharpening techniques.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate skills in
- The generation of Maximal and Gold Sequences
- Design of FIR and IIR filters
- Evaluation of QPSK System
- Equalization of multipath channel using RLS and LMS Algorithms
- The Simulation of Rayleigh fading Channel using Jake's Model
- Performing image Smoothening and Sharpening
- Developing Color image in various color models for conducting research in the field of Communications and Signal Processing.

CO2. Solve engineering problems for feasible and optimal solutions in the core areas of Communication and Signal Processing.
CO3. Acquire research skills in the domains of Communications and Signal processing.
CO4. Use MATLAB Toolboxes to complex engineering activities in the domains of communication and signal procesing.
CO5. Contribute to multidisciplinary groups in communications and signal processing with objectivity and rational analysis.

LIST OF EXPERIMENTS:
1. Design and Simulation of FIR Filter Using any Windowing Technique. **(1 time slot)**
2. Design of IIR Filters from Analog Filters. **(1 time slot)**
3. Generation of Maximal Sequences and Gold Sequences. **(2 time slots)**
4. Performance Evaluation of QPSK System over AWGN Channel. **(1 time slot)**
5. Equalization of Multipath Channel using LMS or RLS Algorithms. **(1 time slot)**
6. Simulation of Rayleigh Fading Channel Using Either Clarke's Model or Jake's Model for different Doppler Spreads (Ex. 50 Hz and 100 Hz). **(2 time slots)**
7. Performance Evaluation of RAKE Receiver over Slow Fading Channel. **(2 time slots)**

8. Performance Evaluation of QPSK System over Rayleigh Fading Channel. **(2 time slots)**
9. Smoothening & Sharpening of a given image. **(1 time slot)**
10. Color image in various color models. **(1 time slot)**

TOOLS REQUIRED:

MATLAB with Communication, Signal and image Processing Tool Boxes.

REFERENCES:

1. Communications and Signal Processing Lab Manual of the Department.
2. W.H. Tranter, K. Sam Shanmugham, T.S. Rappaport, and K.L. Kosbar, "Principles of Communication System Simulation with Wireless Applications," Pearson, 2004.
3. J.G. Proakis, and M. Salehi, "Contemporary Communication Systems using MATLAB and Simulink ," Cengage learning, 2nd Edition, 2004.
4. R.C. Gonzalez, R. E. Woods, Steven L.Eddins, "Digital Image Processing using MATLAB, Gatesmark Publishing, 2 nd Edition, 2009

M. Tech. (DECS) – II Semester
(14MT23822) SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	50	50	--	--	--	2

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of seminar topic; Literature survey; Preparation of technical report and Presentation.

COURSE OUTCOMES:
On successful completion of the course, the student will be able to

CO1. Demonstrate capacity to identify an advanced topic for seminar in core and allied areas.

CO2. Extract information pertinent to the topic through literature survey.

CO3. Comprehend extracted information through analysis and synthesis critically.

CO4. Plan, organize, prepare and present effective written and oral technical report on the topic.

CO5. Adapt to independent and reflective learning for sustainable professional growth.

M. Tech. (DECS) – III & IV Semesters
(14MT33821 & 14MT43821) PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
80	120	200	--	--	--	16

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation.

COURSE OUTCOMES:
On successful completion of the course, the student will be able to

CO1. Demonstrate capacity to identify an advanced topic for project work in core and allied areas.

CO2. Gather information related to the topic through literature survey.

CO3. Comprehend gathered information through critical analysis and synthesis.

CO4. Solve engineering problems pertinent to the chosen topic for feasible solutions.

CO5. Use the techniques, skills and modern engineering tools necessary for project work.

CO6. Do time and cost analysis on the project.

CO7. Plan, prepare and present effective written and oral technical report on the topic.

CO8. Adapt to independent and reflective learning for sustainable professional growth.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF ECE

COURSE STRUCTURE for M.Tech. (VLSI)

I – SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT15701	Analog IC Design	4	-	-	4	40	60	100
2.	14MT15702	Computational Techniques in Microelectronics	4	-	-	4	40	60	100
3.	14MT15703	Device Modeling	4	-	-	4	40	60	100
4.	14MT15704	Digital IC Design	4	-	-	4	40	60	100
5.	14MT15705	IC Fabrication	4	-	-	4	40	60	100
6.		**Elective-I**							
	14MT15706	Advanced Digital Signal Processing	4	-	-	4	40	60	100
	14MT15707	FPGA Applications							
	14MT15708	Low Voltage Analog Circuit Design							
	14MT15709	ULSI Technology							
7.	14MT10310	Research Methodology	3	-	-	3	40	60	100
8.	14MT15721	Analog and Digital IC Design Lab.	-	-	4	2	25	50	75
		Total:	**27**	**-**	**4**	**29**	**305**	**470**	**775**

II-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT25701	Physical Design Automation	4	-	-	4	40	60	100
2.	14MT25702	Low Power VLSI Design	4	-	-	4	40	60	100
3.	14MT25703	Mixed Signal Design	4	-	-	4	40	60	100
4.	14MT25704	RF IC Design	4	-	-	4	40	60	100
5.	14MT25705	Testing and Testability	4	-	-	4	40	60	100
6.		**Elective-II**							
	14MT25706	ASIC Design	4	-	-	4	40	60	100
	14MT25707	Co-Design							
	14MT25708	DSP Processors							
	14MT25709	Wireless Sensor Networks							
7.	14MT25721	Mixed Signal Lab.	-	-	4	2	25	50	75
8.	14MT25722	Seminar	-	-	-	2	-	50	50
		Total:	**24**	**-**	**4**	**28**	**265**	**460**	**725**

III-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P*		Int.	Ext.	Total
1	14MT35721	Project Work – Phase I	-	-	-	4	40	-	40
		Total:	**-**	**-**	**-**	**4**	**40**	**-**	**40**

*Fulltime Project Work

IV-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P*		Int.	Ext.	Total
1	14MT45721	Project Work – Phase II	-	-	-	12	40	120	120
		Total:	**-**	**-**	**-**	12	**40**	**120**	**160**

*Fulltime Project Work

Total Credits: 73 **Total Marks: 1700**

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

M. Tech. (VLSI)-I Semester
(14MT15701) ANALOG IC DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Courses on Semiconductor Devices and Circuits and Linear IC Applications at UG Level

COURSE DESCRIPTION:
Device physics; Characteristics of amplifiers; Feedback circuits and operational amplifiers; Stability and frequency compensation of operational amplifiers; Switched capacitor circuits.

COURSE OUTCOMES: On completion of course, the student will be able to

CO1. Demonstrate advanced knowledge in
- Current Mirrors
- Effect of Loading in Feedback Circuits
- One stage operational Amplifiers
- Switched-Capacitor Circuits

CO2. Analyze complex engineering problems critically in the domain of analog IC design for conducting research.

CO3. Solve engineering problems for feasible and optimal solutions in the core area of analog ICs.

CO4. Apply appropriate techniques to engineering problems in the filed of analog IC design.

DETAILED SYLLABUS

UNIT- I:

Basic MOS Device Physics: (Periods:14)

General Considerations, MOS I/V Characteristics, Second-Order Effects, MOS Device Models.

Single Stage Amplifiers:

Common-Source Stage, Source follower, Common Gate Stage, Cascode Stage, Differential Amplifiers and Current Mirrors.

UNIT- II: FREQUENCY RESPONSE AND NOISE CHARACTERISTICS OF AMPLIFIERS (Periods:07)

Frequency Response-General Considerations, Common-Source Stage, Source follower, Common Gate Stage, Cascode Stage, Differential pair. Noise-Statistical Characteristics of Noise, Noise in Single Stage Amplifiers, Noise in Differential Pairs.

UNIT- III: FEEDBACK CIRCUITS AND OPERATIONAL AMPLIFIERS (Periods:12)

Feedback Circuits - General considerations, Feedback Topologies, effect of loading, Effect of Feedback on Noise.

Operational Amplifiers - General considerations, One-stage Op Amps, Two - stage Op Amps, Gain boosting, Input range limitations, slew rate, power supply rejection, Noise in Op Amps.

UNIT- IV:

Stability and Frequency Compensation: (Periods:08)

General considerations, Multipole Systems, Phase Margin, Frequency Compensation, Compensation of Two-Stage Op Amps, Other Compensation Techniques.

Bandgap References:

Supply-Independent Biasing, Temperature-independent References, PTAT Current Generation, Constant - Gm Biasing, Speed and Noise Issues.

UNIT-V: INTRODUCTION TO SWITCHED–CAPACITOR CIRCUITS

(Periods:09)

General Considerations, Sampling Switches, Switched-Capacitor Amplifiers, Switched-Capacitor Integrator, Switched-Capacitors Common-Mode Feedback.

Total Periods: 51

TEXT BOOKS:

1. Behzad Razavi, "Design of Analog CMOS Integrated Circuit", Tata-McGraw-Hill, 2002.

REFERENCE BOOKS:

1. D.A. John & Ken Martin, "Analog Integrated Circuit Design", John Wiley, 1997.
2. Philip Allen & Douglas Holberg, "CMOS Analog Circuit Design", Oxford University Press, 2002.

M. Tech. (VLSI)-I Semester
(14MT15702) COMPUTATIONAL TECHNIQUES FOR MICROELECTRONICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Mathematics at UG Level.

COURSE DESCRIPTION:
Computational techniques for linear and non-linear systems; Initial and final value problems; Finite volume method based on differential equations; Error estimation and refinement algorithms; Performance and yield estimation algorithms.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Demonstrate in-depth knowledge in
- Computation Tools.
- FDM, FEM, FVM.
- Grid Generation.
- Refinement Algorithms.
- Errors in Meshing.
- Application to device and process simulation.

CO2: Analyze the errors of Computational tools and judge independently the best suited Tool for fast Computation of simulation for conducting research in CAD Tools design.

CO3: Solve problems of Meshing, Grid Generation to improve speed and accuracy of CAD Tools.

CO4: Apply appropriate techniques, resources and tools to engineering activities to obtain fast and accurate designs.

CO5: Contribute positively to multidisciplinary scientific research in design and development of CAD Tools suited for wide range of applications.

DETAILED SYLLABUS:

UNIT I: BASIC COMPUTATION TOOLS (Periods:14)
Linear systems and matrices – matrix formalities, condition of matrix systems, techniques for matrix solution, mixed boundary condition. Nonlinear Systems – scalar equations, matrix equations. Approximation, interpolation, curve fitting, Numerical Integration.

UNIT II: COMPUTATIONAL TOOLS FOR APPLICATIONS (Periods:09)
Finite difference techniques, Initial Value problems, Energy Methods and Minimization, finite Element methods, dynamic methods in applied mechanics.

UNIT III: ADVANCED COMPUTATIONAL TOOLS (Periods:08)
Method of characteristics – classification of partial Differential equations, Investigations in Engineering, Finite volume methods – Direct Analysis.

UNIT IV: GRID GENERATION AND ERROR ESTIMATES (Periods:10)
Grid generation, Triangulation, errors and mesh Selection, Refinement Algorithms, Mesh Redistribution, Moving Grids.

UNIT V: APPLICATIONS TO DEVICE AND PROCESS SIMULATION (Periods:11)
Applications to device and process simulation, Layout algorithms, Yield estimation algorithms, Symbolic analysis and Synthesis of Analog ICs.

Total periods: 52

TEXT BOOKS:

1. Herbert Koenig,"Modern Computational methods", CRC Press, 1988.
2. Graham F.carey, " Computational Grids: generations, adaptation & Solution Strategies", CRC Press, 1997.
3. Naveed A. Sherwani,"Algorithms for VLSI Physical Design Automation", Kluwer Academic Publishers, 1993.algorithms

REFERENCE BOOKS:

1. L.Pallage, R.Rohrer And C.Visweswaraiah, "Electronic Circuit and System Simulation Methods", McGraw Hill, 1995.

M. Tech. (VLSI)-I Semester
(14MT15703) DEVICE MODELING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Semiconductor Devices and Circuits at UG Level

COURSE DESCRIPTION:
Device physics; Short channel effects; Static and dynamic behavior of MOS transistor; Small and large signal modeling of MOS transistor at various frequencies.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1: Demonstrate in-depth knowledge in
- Static and Dynamic Characteristics
- Threshold Variations
- Effects of MOS Layers
- Modeling at low and High Frequencies.

CO2: Analyze complex engineering problems critically for conducting research in MOS device structures.
CO3: Solve engineering problems with wide range of solutions in different MOSFET technologies.
CO4: Apply appropriate techniques, resources and tools to engineering activities in modeling MOS structures.

DETAILED SYLLABUS:

UNIT-I: BASIC DEVICE PHYSICS-I (Periods:12)

Two Terminal MOS Structure: Flat-band voltage, Potential balance & charge balance, Effect of Gate-substrate voltage on surface condition, Inversion, Small signal capacitance; C-V Characteristics.

Three Terminal MOS Structure: Contacting the inversion layer, Body effect, Regions of inversion, Pinch-off voltage.

UNIT-II: BASIC DEVICE PHYSICS-II (Periods:14)

Four Terminal MOS Transistor: Transistor regions of operation, general charge sheet models, regions of inversion in terms of terminal voltage, strong inversion, weak inversion, moderate inversion, interpolation models, effective mobility, temperature effects, breakdown p-channel MOS FET, enhancement and depletion type, model parameter values, model accuracy .

UNIT-III: (Periods:14)

MOS Transistor with Ion-Implanted Channels: Enhancement of nMOS, Depletion nMOS, Enhancement pMOS.

Small dimension effects: Channel length modulation, barrier lowering, two dimensional charge sharing and threshold voltage, punch-through, carrier velocity saturation, hot carrier effects, scaling, effects of surface and drain series resistance, effects due to thin oxides and high doping. Sub threshold regions, Short channel effects.

UNIT-IV: MOS TRANSISTOR IN DYNAMIC OPERATION (Periods:06)

Large Signal modeling: Quasi static operation, Terminal currents in Quasi static operation, Evaluation of Charges in Quasi static operation, Transit time under DC conditions, Limitations of Quasi static Model, Non Quasi static Analysis.

UNIT-V: SMALL SIGNAL MODELING FOR LOW, MEDIUM AND HIGH FREQUENCIES (Periods:08)

low, Medium frequency small signal model for the intrinsic part, Small signal model for Extrinsic Part, A complete Quasi static Model, Y-Parameter models, Non Quasi static Models.

Total Periods: 54

TEXT BOOK:

1. Y. Tsividis, "Operations and Modeling of the MOS Transistor", 2nd edition, Oxford university Press.

REFERENCE BOOKS:

1. Trond Ytterdal, Yuhua Cheng &Tor A. Fjeldly "Device Modeling for Analog and RF CMOS Circuit Design" Wiley Publication, 2003.
2. Donald A Neamen & Dhrubes Biswas "Semiconductor Physics and Devices" Special Indian Edition, 2012.

M. Tech. (VLSI)-I Semester
(14MT15704) DIGITAL IC DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Digital IC Applications and VLSI Design at UG Level.

COURSE DESCRIPTION:
Design styles and characteristics of CMOS digital circuits; Transistor sizing and memory design; Design strategies; Layout design rules; Design of sub-systems.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1: Demonstrate advanced knowledge in
- Static and dynamic characteristics of CMOS.
- Alternative CMOS Logics
- Transistor sizing
- Adders Design
- Design rules to develop layouts
- Estimation of Delay and Power

CO2: Analyze complex engineering problems critically in the domain of CMOS Digital Integrated Circuits for conducting research.
CO3: Solve engineering problems for feasible and optimal solutions in the core area of CMOS Digital ICs.
CO4: Apply the CMOS Digital IC concepts for usage of modern CAD tools and their Limitations.

DETAILED SYLLABUS:

UNIT I: CMOS INVERTERS CHARACTERSTICS AND DESIGN STYLES (Periods:09)
Static and Dynamic characteristics, Static and Dynamic CMOS design- Domino and NORA logic - Combinational and Sequential circuits.

UNIT II: **HIGH SPEED NETWORK AND MEMORY DESIGN (Periods:09)**
Methods of Logical Effort for transistor sizing -Power consumption in CMOS Gates, Low power CMOS design. CMOS Memory design – SRAM, DRAM.

UNIT III: **DESIGN METHODOLOGY AND TOOLS (Periods:10)**
Introduction, Structured Design Strategies, Design Methods, Design Flows, Design Economics, Data Sheets and Documentation.

UNIT IV: **LAYOUT DESIGN RULES (Periods:11)**
Need for Design Rules, Mead Conway Design Rules for the Silicon Gate NMOS Process, CMOS Based Design Rules, Simple Layout Examples, Sheet Resistance, Area Capacitance, Wire Capacitance, Drive Large Capacitive Load**.**

UNIT V: **SUBSYSTEM DESIGN PROCESS** **(Periods:11)**

General arrangement of 4-bit Arithmetic Processor, Design of 4-bit shifter, Design of ALU sub-system, Implementing ALU functions with an adder, Multipliers, modified Booth's algorithm.

TEXT BOOKS:

1. Eugene D Fabricus, "Introduction to VLSI Design, "McGraw Hill International Edition, 1990.
2. Kamran Eshranghian, Douglas A.Puknell and Sholh Eshranghian"Essential of VLSI Circuits and Systems", PHI , 1st edition, 2005.
3. Neil H. E. Weste, David Money Harris,"CMOS VLSI Design-A Circuit and Systems Perspective", Pearson 4th Edition,2011.

REFERENCE BOOKS:

1. John P.Uyemura, "Introduction to VLSI Circuits and Systems", Wiley Edition, 2002.
2. Sung-Mo Kang & Yusuf Leblebici, "CMOS Digital Integrated Circuits - Analysis & Design", McGraw Hill, 2nd edition, 1999.
3. Jan M Rabaey, "Digital Integrated Circuits-A Design Perspective", Prentice Hall, 1st edition, 1997.

M.Tech. (VLSI) - I Semester
(14MT15705) IC FABRICATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Engineering Physics, VLSI Design at UG Level

COURSE DESCRIPTION:
Fabrication process – Crystal growth, Wafer preparation, Epitaxial growth, Oxidation, Lithography, Etching, Deposition, Diffusion, Ion Implantation, Metallization and Packaging of VLSI Devices.

COURSE OUTCOMES
On completion of the course, the students will be able to

CO1. Demonstrate in-depth knowledge in
- Wafer preparation.
- Lithography and Etching.
- Diffusion process.
- Assembly Techniques and Packaging.

CO2. Analyze IC fabrication methodologies and evaluate component effects on IC design for VLSI and ULSI domain.

CO3. Solve engineering problems by proposing potential solutions leading to better IC chip designs.

DETAILED SYLLABUS

UNIT-I: CRYSTAL GROWTH, WAFER PREPARATION, EPITAXY AND OXIDATION. (Periods:12)

Clean room and safety requirements, Electronic grade silicon – Basic steps in IC fabrication-crystal plane and orientation – Defects in the lattice –Czochralski crystal growing – silicon shaping – Processing consideration – Vapour phase epitaxy –Liquid phase epitaxy-selective epitaxy- Molecular beam epitaxy - Epitaxial Evaluation – Growth mechanism and kinetics – Thin oxides – Oxidation Techniques and systems – Oxide properties – Redistribution of dopants at interface – Oxidation of polysilicon – Oxidation induced effects.

UNIT-II: LITHOGRAPHY AND RELATIVE PLASMA ETCHING (Periods:10)

Mask Making – Optical lithography – Electron lithography – X-ray lithography – Ion lithography – Plasma properties– Feature size control and Anisotropie Etch mechanism – Lift off Techniques – Plasma reactor – Fl2 &Cl2 based etching – Relative plasma etching Techniques and Equipments.

UNIT-III: DEPOSITION, DIFFUSION, ION IMPLANTATION (Periods:10)

Deposition process – polisilicon - plasma assisted deposition – models of diffusion in solids – Fick's one dimensional diffusion equation – Atomic diffusion mechanism – measurement techniques – Range theory – Carrier recovery due

to annealing - Implantation equipment – Annealing Shalloe junction – high energy implantation – Physical vapour deposition – patterning.

UNIT- IV: METALLIZATION (Periods:10)

Metallization applications – metallization choices – Patterning – Metallization problems – New role of metallization-metallization systems – sputtering – problems associated with Al – Cu interconnect – Comparison of RC delay of Polysilicon, Al.

UNIT-V: ANALYTICAL, ASSEMBLY TECHNIQUES & PACKAGING OF VLSI DEVICES (Periods:10)

Analytical beams – Beams specimen interaction – Chemical methods – package types – baking design considerations – VLSI assembly technology – Package Fabrication Technology.

Total periods: 52

TEXT BOOKS

1. S.M.Sze "VLSI Technology", Tata Mcgraw Hill, 2nd edition, 1988.

REFERENCES BOOKS

1. Sorab. K. Gandhi "VLSI Fabrication and Principles", John wiley and sons, 1983.
2. Amar Mukherjee "Introduction to NMOS & CMOS VLSI system Design", Prentice Hall, 1986.
3. Mccanny and J.C.White "VLSI Technology and design", Academic Press, 1987.
4. Dasgupta "VLSI Technology", Pearson Education Pvt Ltd 2001.

M. Tech. (VLSI) - I Semester (Elective-I)
M. Tech. (CMS) - I Semester
(14MT15706) ADVANCED DIGITAL SIGNAL PROCESSING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Courses on Digital Signal Processing at UG level.

COURSE DESCRIPTION:
Design of digital filter banks; Power spectral estimation; Digital signal processing algorithms; DSP applications.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Filter banks and Wavelets
- Efficient power Spectral Estimation Techniques.
- Adaptive filters.
- Applications of Multirate signal processing

CO2. Analyze complex engineering problems critically for conducting research in Adaptive filter design.
CO3. Solve engineering problems by designing computationally efficient DSP algorithms for feasible and optimal solutions in digital signal processing field.
CO4. Contribute to scientific research in signal processing and inter disciplinary areas like cellular mobile communications, multirate signal processing and spectral analysis.

DETAILED SYLLABUS:

UNIT I: MULTIRATE FILTER BANKS (Periods:12)
Decimation, Interpolation, Sampling rate conversion by a rational factor I/D, Multistage Implementation of sampling rate conversion. **Digital Filter Banks**: Two-Channel Quadrature-Mirror Filter Bank, Elimination of aliasing, condition for Perfect Reconstruction, Polyphase form of QMF bank, Linear phase FIR QMF bank, IIR QMF bank , Perfect Reconstruction Two-Channel FIR QMF Bank .

UNIT II: POWER SPECTRAL ESTIMATIONS (Periods:11)
Estimation of spectra from finite duration observation of signals, **Non-Parametric Methods**: Bartlett, Welch, Blackmann & Tukey methods. Performance Characteristics of Nonparametric Power Spectrum Estimators, Computational Requirements of Nonparametric Power Spectrum Estimates.

UNIT III: PARAMETRIC METHODS OF POWER SPECTRAL ESTIMATION (Periods:11)
Autocorrelation & Its Properties, Relation between auto correlation & model parameters, Yule-Walker & Burg Methods, MA & ARMA models for power spectrum estimation.

UNIT IV: DSP ALGORITHMS (Periods:10)

Fast DFT algorithms based on Index mapping, Sliding Discrete Fourier Transform, DFT Computation Over a narrow Frequency Band, Split Radix FFT, Linear filtering approach to Computation of DFT using Chirp Z-Transform.

UNITV: APPLICATIONS OF DIGITAL SIGNAL PROCESSING (Periods:11)

Digital cellular mobile telephony, Adaptive telephone echo cancellation, High quality A/D conversion for digital Audio, Efficient D/A conversion in compact hi-fi systems, Acquisition of high quality data, Multirate narrow band digital filtering, High resolution narrowband spectral analysis.

Total periods: 55

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital signal processing, principles, Algorithms and applications,* Prentice Hall, 4th Edition, 2007.
2. Sanjit K Mitra, "*Digital signal processing, A computer base approach",* McGraw-Hill Higher Education, 4th Edition, 2011.

REFERENCE BOOKS:

1. Emmanuel C Ifeacher Barrie. W. Jervis, "*DSP-A Practical Approach*", Pearson Education, 2nd Edition, 2002.
2. A.V. Oppenheim and R.W. Schaffer, "*Discrete Time Signal Processing",* PHI, 2nd Edition, 2006.

M. Tech. (VLSI)-I Semester (Elective-I)
(14MT15707) FPGA APPLICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Course on VLSI Design at UG Level

COURSE DESCRIPTION:
Families of Field Programmable Gate Arrays; Embedded processors using FPGA; Applications of FPGAs - Motor control, FIR and IIR filters.

COURSE OUTCOMES: On completion of the course, student will be able to
CO1. Demonstrate in-depth knowledge in
- FPGAs Design & Architecture.
- Motor Control with FPGAs.
- FIR and IIR Digital Filter implementation with FPGAs.
- FPGA Fabric Immersed Processors.

CO2. Analyze complex engineering problems critically in Programmable digital systems.
CO3. Develop skills to solve the problems in placement and routing of FPGAs.
CO4. Apply appropriate techniques to engineering problems in the design of FPGAs.

DETAILED SYLLABUS

UNIT- I:
Introduction to Field Programmable Gate Arrays (FPGA): (Periods:10)
Evolution of Programmable Devices, About FPGAs, Applications of FPGAs. Programming Technologies in FPGAs.
Xillinx and Actel FPGAs:
Xilinx FPGAs –XC2000, XC3000 and XC4000.Actel FPGAs – Actel ACT-1 and Actel ACT-2. Altera FPGAs, Plessey FPGA, Advanced Micro Devices (AMD) FPGA. FPGA Design Flow. Technology Mapping for FPGAs-Logic Synthesis and Lookup Table Technology Mapping.

UNIT- II: FPGA-BASED EMBEDDED PROCESSOR (Periods:07)
Hardware–Software Task Partitioning, FPGA Fabric Immersed Processors, Interfacing Memory to the Processor, Interfacing Processor with Peripherals, Design Re-use Using On-chip Bus Interface, Creating a Customized Microcontroller.

UNIT- III: MOTOR CONTROL USING FPGA (Periods:09)
Introduction to Motor Drives, Digital Block Diagram for Robot Axis Control-Position Loop, Speed Loop and Power Module. Case Studies for Motor Control-Stepper Motor Controller, Permanent Magnet DC Motor, Brushless DC Motor and Permanent Magnet Rotor (PMR). Prototyping Using FPGAs.

UNIT- IV: FIR DIGITAL FILTERS USING FPGA (Periods:14)

Digital Filters, FIR Filter-FIR Filter with Transposed Structure, Symmetry in FIR Filters and Linear-phase FIR Filters. Designing FIR Filters-Direct Window Design Method and Equiripple Design Method. Constant Coefficient FIR Design-Direct FIR Design, FIR Filter with Transposed Structure and FIR Filters Using Distributed Arithmetic.

UNIT- V: IIR DIGITAL FILTERS USING FPGA (Periods:10)

Introduction to IIR, IIR Digital Filter, IIR Coefficient Computation, IIR Filter Implementation-

Finite wordlength effects and Optimization of the Filter Gain Factor. Fast IIR Filter-Time domain Interleaving and Clustered and Scattered Look-Ahead Pipelining.IIR Decimator Design and Parallel Processing.

Total periods:50

TEXT BOOKS:

1. S.Brown, R.Francis, J.Rose, Z.Vransic, "Field Programmable Gate Array", Kluwer Publication, 1992.
2. Rahul Dubey, "Introduction to Embedded System Design Using Field Programmable Gate Arrays", Springer, 2009.
3. Uwe Meyer-Baese, "Digital Signal Processing with Field Programmable Gate Arrays", Springer Series, 3rd Edition, 2007.

REFERENCE BOOKS:

1. S.Trimberger, Edr., "Field Programmable Gate Array Technology", Kluwer Academic Publications, 1994.

M. Tech. (VLSI)-I Semester (Elective-I)
(14MT15708) LOW VOLTAGE ANALOG CIRCUIT DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on VLSI Design at UG Level.

COURSE DESCRIPTION:
Basic methods for low voltage design; FGMOS devices and their applications; Low power SOC design; RF CMOS circuits – Considerations and design of receiver components.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1: Demonstrate in-depth knowledge in
- Low Voltage Techniques.
- FGMOS Device and Design Techniques.
- Light Weight Embedded Systems.
- Low Power SOC Design.
- Analog RF CMOS Circuits
- Low power architecture & Systems.

CO2: Analyze the low Voltage effects of devices and judge independently the best suited device for fabrication of smart devices for conducting research in ULSI design.
CO3: Solve problems of Low Voltage design challenges, tradeoff between area, speed and power requirements.
CO4: Apply appropriate techniques, resources and tools to engineering activities in low voltage VLSI circuits.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO LOW VOLTAGE DESIGN (Periods:09)
Low-voltage analog circuit design challenges, Design for Low power, Low Power Circuit technologies, Techniques for Leakage Power Reduction, Dynamic Voltage Scaling.

UNIT II: FGMOS, CIRCUIT APPLICATIONS AND DESIGN TECHNIQUES (Periods:09)
The FGMOS Device, Designing with FGMOS, Minimum Input Capacitance, Initial Design ideas, Circuit Applications and design Techniques.

UNIT III: DESIGN FOR LOW POWER (Periods:12)
Lightweight Embedded Systems, Low-Power Design of Systems on Chip, Implementation- Level Impact on Low Power Design, accurate Power

estimation of combinational CMOS digital Circuits, Clock Powered CMOS for Energy-Efficient Computing.

UNIT IV: ANALOG RF CMOS CIRCUITS – I (Periods:12)

Power Considerations – sources of power Dissipation, Limits in Power dissipation, V_{DD} Downscaling, Front-End Challenges, Superheterodyne architecture

UNIT V: ANALOG RF CMOS CIRCUITS – II (Periods:13)

Technology Structural Alternatives, schematic Design Techniques for power saving in RF, RF Amplifier Design, Mixer Design, PLL Design.

Total Periods: 55

TEXT BOOKS:

1. Vojin G.Oklobdzija,"Digital Design and Fabrication", CRC Press, 2nd edition, 2008.
2. Unai Alvarado, Guillermo Bistue and Inigo Adin, "Low Power RF Circuit Design in standard CMOS Technology", Springer, 2011.

REFERENCE BOOKS:

1. Dr Esther Rodriguez-Villegas,"Low Power and Low Voltage Circuit Design with the FGMOS Transistor", the Institution of Engineering and Technology, 2006.
2. Shouri Chatterjee, Kong Pang Pun, et al, "Analog Circuit Design Techniques at 0.5V", Springer, 2007.

M. Tech. (VLSI)-I Semester (Elective-I)
(14MT15709) ULSI TECHNOLOGY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on VLSI Design at UG Level

COURSE DESCRIPTION:
Cleanroom and wafer-cleaning technology; Fabrication technologies; Device considerations; Assembly, packaging and reliability issues.

COURSE OUTCOMES:
On successful completion of the course the students will be able to
CO1: Demonstrate basic knowledge in ULSI Technology.
CO2: Analyze complex engineering problems critically for conducting research in ULSI Devices.
CO3: Solve engineering problems with wide range of solutions in ULSI.

DETAILED SYLLABUS

UNIT –I: (Periods:10)

Cleanroom technology- Introduction, cleanroom classification, cleanroom design concept, cleanroom installation, cleanroom operation, automation, related facility systems.

Wafer-cleaning technology- Introduction, basic concepts of wafer cleaning, Wet-cleaning technology, Dry-cleaning technology. ULSI Process Technology.

UNIT –II: (Periods:16)

Epitaxy- Introduction, Fundamental Aspects of Epitaxy, Conventional Si Epitaxy, Low temperature Epitaxy of Si, Selective Epitaxial Growth of Si, Characterization of Epitaxial films.

Conventional and Rapid Thermal Processes- Introduction, Requirements for Thermal Processes, Rapid Thermal Processing.

Dielectric and Polysilicon Film Deposition- Introduction, Deposition Processes, APCVD and LPCVD Silicon Oxides, LPCVD Silicon Nitrides, LPCVD Polysilicon Films, Plasma Assisted Depositions, Other Deposition Methods, Applications of Deposited Polysilicon, Silicon Oxide and Silicon Nitride Films.

UNIT –III: (Periods:15)

Lithography- Introduction, Optical Lithography, Electron Lithography, X-Ray Lithography, Ion Lithography.

Etching- Introduction, Low-Pressure Gas Discharge, Etch Mechanisms, Selectivity and Profile Control, Reactive Plasma Etching Techniques and Equipment, Plasma Processing Processes, Diagnostics, End Point Control and Damage, Wet Chemical Etching. **Metallization**- Metal Deposition Techniques, Silicide Process, CVD Tungsten Plug and Other Plug Processes, Multilevel Metallization, Metallization Reliability.

UNIT-IV: (Periods:06)

Process integration- Introduction, Basic Process Modules and Device Considerations for ULSI, CMOS Technology, Bipolar Technology, BiCMOS Technology, MOS Memory Technology, Process Integration Considerations in ULSI Fabrication Technology.

UNIT–V: (Periods:07)

Assembly and Packaging-Introduction, package types, ULSI Assembly Technologies, Package Fabrication Technologies, Package Design Considerations, Special Package Considerations, Other ULSI Packages.

Reliability- Introduction, Hot Carrier Injection, Electromigration, Stress Migration, Oxide Breakdown, Effect of Scaling on Device Reliability, Relations between DC and AC Lifetimes, Some Recent ULSI Reliability Concerns, Mathematics of Failure Distribution.

Total periods: 58

TEXT BOOKS:

1. C.Y.Chang, S.M.Sze,ULSI Technology, McGraw-Hill,2000.
2. Chih-Hang Tung, George T.T.Sheng, Chih-Yuan Lu, ULSI Semiconductor Process Technology Atlas, John Wiley & Sons, 2003.

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M. Tech. – I Semester
(14MT10310) RESEARCH METHODOLOGY
(Common to all M. Tech. Programmes)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	--	--	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Fundamentals of research work - research problem and design; Data collection, Analysis and hypothesis; Statistics in Research; Interpretation and Report Writing.

COURSE OUTCOMES:

On successful completion of course, the student will be able to

CO1. Demonstrate knowledge on research approaches, research process and data collection.

CO2. Identify and analyze research problem.

CO3. Solve the research problems using statistical methods.

CO4. Carryout literature survey and apply good research methodologies for the development of scientific/ technological knowledge in one or more domains of engineering.

CO5. Learn, select and apply modern engineering tools to complex engineering activities.

CO6. Write effective research reports.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO RESEARCH METHODOLOGY (Periods:07)

Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research.

UNIT-II: RESEARCH PROBLEM AND DESIGN (Periods:09)

Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem. Features of Good Design, Research Design Concepts, Different Research Designs.

UNIT-III: DATA COLLECTION, ANALYSIS, AND HYPOTHESIS (Periods:09)

Different Methods of Data Collection, Processing Operations, Types of Analysis, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure.

UNIT-IV: STATISTICS IN RESEARCH (Periods:09)

Review of Statistical Techniques - Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry. Normal Distribution, Chi-Square Test as a Test of Goodness of Fit.

UNIT-V: INTERPRETATION AND REPORT WRITING (Periods:06)

Interpretation – Techniques and Precautions. Report Writing – Significance, Stages, Layout. Types of reports, Precautions in Writing Reports.

Total Periods: 40

TEXT BOOK:

1. C.R. Kothari, *Research Methodology: Methods and Techniques*, New Age International Publishers, New Delhi, 2nd Revised Edition, 2004.

REFERENCE BOOKS:

1. Ranjit Kumar, *Research Methodology: A step-by-step guide for beginners*, Sage South Asia, 3rd ed., 2011.
2. R. Panneerselvam, Research Methodology, PHI learning Pvt. Ltd., 2009

M. Tech. (VLSI)-I Semester
(14MT15721) ANALOG AND DIGITAL IC DESIGN LABORATORY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	4	2

PRE-REQUISITES:

A Course on Digital IC Design and Applications at UG Level.

COURSE DESCRIPTION:
Simulation, synthesis and implementation of digital circuits using HDLs; Modeling and simulation of analog circuits using SPICE.

COURSE OUTCOMES:
On successful completion of the course the students will be able to
CO1: Demonstrate skills in
- SPICE Coding and verification of analog circuits.
- Behavioral system modeling: concurrency and event-driven simulation.
- Digital design modeling using various styles (behavioral, structural and dataflow)
- Designing Combinational and sequential circuits
- Verifying the Functionality of Designed circuits using function Simulator
- Checking for critical path time calculation
- Placement and routing in FPGA
- Implement digital designs on FPGA device for conducting research in the field of Digital Circuits.

CO2: Conceptualize and solve problems in logic verification and timing calculation of Digital circuits.
CO3: Acquire research skills in the domain of Digital Systems.
CO4: Create, develop and use modern CAD tools to analyze problems of RTL, Technology schematic, and system implementation.
CO5: Contribute positively to multidisciplinary scientific research in design and development of Integrated Circuits suited for wide range of applications.
CO6: Perform experiments efficiently in Digital system design to achieve optimization for high device utilization and performance in industrial needs.

DETAILED SYLLABUS:
Modeling and simulation of Analog Circuits using SPICE

1. **Part – I: (4 slots)**
   Design and verification of Current Mirror Circuits, Differential Amplifiers, Internal Circuit of OP-AMP, Switched Capacitor Integrator.

Modeling and Functional Simulation of the following digital circuits (with XilinX tools) using VHDL/Verilog Hardware Description Languages

2. **Part-II:** **(4 slots)**
Combinational Logic - Logic Gates, Adders, Encoders, decoders, Multiplexer, Demultiplexer, Comparator, Multipliers, ALU, MAC.

3. **Part – III:** **(4 slots)**
Sequential Logic – Flip-Flops, Registers, Ripple Counters, Synchronous Counters, Shift Registers (serial-to-parallel, parallel-to-serial). Memories and State Machines - Read Only Memory (ROM), Random Access Memory (RAM), Mealy State Machine, Moore State Machine, Instruction Fetch, Instruction Decode.

4. **Part-IV:** **(2 slots)**
FPGA System Design - Demonstration of FPGA and CPLD Boards, Demonstration of Digital design using FPGAs and CPLDs. Implementation on FPGA/CPLD.

Total Slots: 14

REQUIRED SOFTWARE TOOL:

1. Xilinx10.1 ISE and Above for FPGA/CPLDs.

REFERENCE BOOKS:

1. John F. Wakerly, "Digital Design: Principles and Practices", Prentice Hall, Third Edition, 2000.
2. Analog and Digital Design Lab manual.

M. Tech. (VLSI)-II Semester
(14MT25701) PHYSICAL DESIGN AUTOMATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES:
A Course on VLSI Design and Digital IC Design at UG Level

COURSE DESCRIPTION:
Basics of VLSI design; Layout optimization; Simulation and synthesis; Physical design of FPGAs and MCMs.

COURSE OUTCOMES:
On successful completion of the course the students will be able to

CO1. Demonstrate advanced knowledge in
- Algorithmic graph theory
- Tractable and Intractable problems
- Layout compaction such as floor planning, placement and routing
- Binary-Decision diagrams
- Simulation and Synthesis in High level abstraction
- FPGA and MCM technologies

CO2. Analyze complex engineering problems critically in the domain of High-level Synthesis for conducting research.

CO3. Formulate feasible and optimal solutions to solve engineering problems in VLSI Design automation.

CO4. Use EDA tools to apply appropriate algorithms for effective physical design automation.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO VLSI DESIGN METHODOLOGIES (Periods:10)

Introduction to VLSI Design automation tools, Introduction to algorithmic graph theory, Computational Complexity, Tractable and Intractable problems, Combinational optimization.

UNIT-II: LAYOUT COMPACTION (Periods:12)

Design rules, problem formulation, algorithms for constraint graph compaction, placement & partitioning algorithms. Floor planning concepts- shape functions and floor plan sizing, types of routing problems

UNIT -III: SIMULATION AND SYNTHESIS (Periods:10)

Gate Level Modeling and Simulation, Switch Level Modeling and Simulation Basic issues and Terminology, Binary-Decision diagrams, Two-Level logic Synthesis

UNIT -IV: HIGH LEVEL SYNTHESIS (Periods:10)

Hardware modeling, internal representation of the input algorithm, allocation, assignment and scheduling algorithms, ASAP scheduling, Mobility based scheduling, list scheduling & force-directed scheduling.

UNIT -V: PHYSICAL DESIGN AUTOMATION OF FPGAs & MCMs (Periods:12)

FPGA technologies, Physical Design cycle for FPGAs, partitioning and Routing for segmented and staggered Models, MCM technologies, MCM physical design cycle, Partitioning, Placement- Chip Array based and Full Custom Approaches, Routing, Maze routing, Multiple stage routing, Routing and Programmable MCMs.

Total periods: 54

TEXTBOOKS:

1. S.H.Gerez, "Algorithms for VLSI Design Automation", John Wiley & Sons Pvt. Ltd, 2nd Edition 1999.
2. Naveed Sherwani, "Algorithms for VLSI Physical Design Automation", Springer International Edition, 3rd edition, 2005.

REFERENCE BOOKS:

1. Hill & Peterson, "Computer Aided Logical Design with Emphasis on VLSI", John wiley & Sons Pvt. Ltd, 4th edition, 1993.
2. Wayne Wolf, "Modern VLSI Design Systems on silicon", Pearson Education Asia, 2nd Edition, 1998.

M. Tech. (VLSI) - II Semester
(14MT25702) LOW POWER VLSI DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on VLSI Design at UG Level

COURSE DESCRIPTION:
Concepts of low power design; CMOS and Bi-CMOS processes; Device behavior and modeling; Design of low voltage and low power digital circuits; Special techniques for low power design.

COURSE OUTCOMES:
On successful completion of the course the students will be able to
CO1: Demonstrate in-depth knowledge in
- Limitations of Low Power Design.
- SOI Technology.
- BiCMOS Processes.
- MOSFET and BJT Behavior and Modeling.
- BiCMOS Logic Gates Design.
- Special low power techniques.

CO2: Analyze the low power BiCMOS circuits, the effects of devices and judge independently the best suited device for fabrication of smart devices for conducting research in ULSI design.
CO3: Solve problems of Low power design challenges, tradeoff between area, speed and power requirements.
CO4: Apply appropriate techniques, resources and tools to engineering activities in low power VLSI circuits.

DETAILED SYLLABUS:

UNIT –I (Periods:12)

Low Power Design, an Over View: introduction to low- voltage low power design, limitations, Silicon-on-Insulator.
MOS/BiCMOS Processes: Bi-CMOS processes, Integration and Isolation considerations, Integrated Analog/Digital CMOS Process.

UNIT –II: LOW-VOLTAGE/LOW POWER CMOS/ BICMOS PROCESSES (Periods:09)

Deep submicron processes, SOI CMOS, lateral BJT on SOI, future trends and directions of CMOS/Bi-CMOS processes.

UNIT-III: DEVICE BEHAVIOR AND MODELING (Periods:11)

Advanced MOSFET models, limitations of MOSFET models, Bipolar models. Analytical and Experimental characterization of sub-half micron MOS devices, MOSFET in a Hybrid mode environment.

UNIT-IV **(Periods:11)**

CMOS and Bi-CMOS Logic Gates: Conventional CMOS and Bi-CMOS logic gates, Performance Evaluation

Low-Voltage Low-Power Logic Circuits: Comparison of advanced Bi-CMOS Digital circuits. ESD-free Bi-CMOS, Digital circuit operation and comparative Evaluation.

UNIT-V **(Periods:11)**

Low Power Latches and Flip Flops: Evolution of Latches and Flip flops-quality measures for latches and Flip flops, Design perspective.

Special Techniques: Power Reduction in Clock Networks, CMOS Floating Node,Low Power Bus, Delay Balancing, Low Power Techniques for SRAM.

Total Periods: 54

TEXT BOOKS:

1. Yeo Rofail/ Gohl (3 Authors), "CMOS/BiCMOS ULSI low voltage, low power", Pearson Education Asia 1st Indian reprint, 2002.
2. Gary K. Yeap, "Practical Low Power Digital VLSI Design", KAP, 2002.

REFERENCE BOOKS:

1. Douglas A.Pucknell & Kamran Eshraghian, "Basic VLSI Design", PHI, 3rd edition.
2. J.Rabaey, "Digital Integrated circuits", PH, 1996.

M. Tech. (VLSI)-II Semester
(14MT25703) MIXED SIGNAL DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Analog Design at UG Level

COURSE DESCRIPTION:
Switched capacitor circuits - analysis and application; Design and characterization of Phase locked loops; Data converters – types and design for different sampling rates.

This course deals with Mixed Signal circuits like Switched Capacitors, PLL, Data Converters, etc. It also deals with design and analysis of Biquad Filters, A/D and D/A converters for different sampling rates.

COURSE OUTCOMES:
On successful completion of the course the students will be able to
CO1: Demonstrate in-depth knowledge in
- Switched Capacitor Circuits
- PLL
- Data Converters – ADC and DAC

CO2: Analyze complex engineering problems critically for conducting research in Data Converters for Communication Systems.
CO3: Solve engineering problems with wide range of solutions to increase Data Rate of ADC and DAC.
CO4:Apply appropriate techniques, resources and tools to engineering activities in development of Data Converters.
CO5: Contribute positively to multidisciplinary scientific research in design and development of Mixed Integrated Circuits suited for wide range of applications.

DETAILED SYLLABUS:
UNIT -I: SWITCHED CAPACITOR CIRCUITS (Periods:14)
Introduction to Switched Capacitor circuits- basic building blocks, Operation and Analysis, Non-ideal effects in switched capacitor circuits, Switched capacitor integrators first order filters, Switch sharing, Biquad filters.

UNIT -II: PHASED LOCK LOOP (PLL) (Periods:08)
Basic PLL topology, Dynamics of simple PLL, Charge pump PLLs-Lock acquisition, Phase/Frequency detector and charge pump, Basic charge pump PLL, Non-ideal effects in PLLs-PFD/CP non-idealities, Jitter in PLLs, Delay locked loops, applications.

UNIT -III: DATA CONVERTER FUNDAMENTALS (Periods:12)

DC and dynamic specifications, Quantization noise, Nyquist rate D/A converters- Decoder based Converters, Binary-Scaled converters, Thermometer-code converters, Hybrid converters.

UNIT -IV: NYQUIST RATE A/D CONVERTERS (Periods:08)

Successive approximation converters, Flash converter, Two-step A/D converters, Interpolating A/D Converters, Folding A/D converters, Pipelined A/D converters, Time-Interleaved Converters.

UNIT -V: OVERSAMPLING CONVERTERS (Periods:09)

Noise shaping modulators, Decimating filters and interpolating filters, Higher order modulators, Delta sigma modulators with multibit quantizers, Delta sigma D/A.

Total Periods: 51

TEXT BOOKS:

1. Behzad Razavi, "Design of Analog CMOS Integrated Circuits", TMH Edition, 2002.
2. Philip E. Allen and Douglas R. Holberg, "CMOS Analog Circuit Design", Oxford University Press, International 2nd Edition/Indian Edition, 2010.
3. David A. Johns,Ken Martin, "Analog Integrated Circuit Design", Wiley Student Edition, 2013.

REFERENCE BOOKS:

1. Rudy Van De Plassche, "CMOS Integrated Analog-to-Digital and Digital-to-Analog converters", Kluwer Academic Publishers, 2003
2. Richard Schreier, "Understanding Delta-Sigma Data converters", Wiley Interscience, 2005.
3. R. Jacob Baker, "CMOS Mixed-Signal Circuit Design", Wiley Interscience, 2009.

M. Tech. (VLSI)-II Semester
(14MT25704) RF IC DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Analog IC Design at UG Level/PG Level

COURSE DESCRIPTION:
Concepts of RF circuits; Transceiver architectures; Low noise amplifier and mixers; Oscillators; Phased locked loop and power amplifier.

COURSE OUTCOMES:
On successful completion of the course the students will be able to
CO1: Demonstrate in-depth knowledge in Radio Frequency Integrated Circuits.
CO2: Analyze complex engineering problems critically for conducting research in RF systems.
CO3: Solve engineering problems with wide range of solutions in Radio Frequency Integrated circuits.
CO4: Apply appropriate techniques to engineering activities in the field of RFIC Design.

DETAILED SYLLABUS

UNIT – I: BASIC CONCEPTS IN RF DESIGN (Periods:07)
Introduction to RF Design, Units in RF design, Time Variance and Nonlinearity, Effects of nonlinearity, random processes and Noise, Definitions of sensitivity and dynamic range, Passive impedance transformation, Scattering parameters.

UNIT – II: TRANSCEIVER ARCHITECTURES (Periods:14)
General considerations, Receiver Architectures-Basic Heterodyne receivers, Modern heterodyne receivers, Direct conversion receivers, Image-Reject receivers, Low-IF receivers. Transmitter Architectures-Direct Conversion transmitters, Modern direct conversion Transmitters, Heterodyne Transmitters, Other Transmitter Architectures.

UNIT -III: LNA AND MIXERS (Periods:11)
General considerations, Problem of input matching, Low Noise Amplifiers design in various topologies, Gain Switching, Band Switching, Mixers-General considerations, Passive down conversion mixers, Active down conversion mixers, Up conversion mixers.

UNIT – IV: OSCILLATORS (Periods:10)
Performance parameters, Basic principles, Cross coupled oscillator, Three point oscillators, Voltage Controlled Oscillators, LC VCOs with wide tuning range, phase noise, Mathematical model of VCOS,Quadrature Oscillators.

UNIT – V: PLL AND POWER AMPLIFIER (Periods:13)

PLLS-Phase detector, Type-I PLLs, Type-II PLLs, PFD/CP Nonidealities, Phase noise in PLLs, Loop Bandwidth. Power Amplifiers-General considerations, Classification of power amplifiers, High- Efficiency power amplifiers, Cascode output stages, Large signal impedance matching, Linearization techniques.

Total periods: 55

TEXT BOOKS:

1. B.Razavi, "RF Microelectronics", Prentice-Hall PTR, 2nd Edition, 1998.

REFERENCE BOOKS:

1. T.H.Lee, "The Design of CMOS Radio-Frequency Integrated Circuits", Cambridge University Press, 2nd, 1998.
2. R.Jacob Baker, Harry W.Li, D.E. Boyce, "CMOS Circuit Design, Layout and Simulation", Prentice-Hall of India, 1998.

M. Tech. (VLSI)-II Semester
(14MT25705) TESTING AND TESTABILITY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:

A Course on Digital Logic Design at UG Level

COURSE DESCRIPTION:
Design for testability; Fault modeling and simulation; Test analysis for digital circuits; Design strategies for testability.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1: Demonstrate advanced knowledge in
- The basic faults that occur in digital systems
- Testing of stuck at faults for digital circuits
- Design for testability

CO2: Analyze testing issues in the field of digital system design critically for conducting research.
CO3: Solve engineering problems by modeling different faults for fault free simulation in digital circuits.
CO4: Apply appropriate research methodologies and techniques to develop new testing strategies for digital and mixed signal circuits and systems.

DETAILED SYLLABUS:

UNIT – I: INTRODUTION TO TEST AND DESIGN FOR TESTABILITY (Periods:13)
Modeling- Modeling Digital Circuits at Logic Level, Register Level and Structural Models. Level of Modeling, Logic Simulation- Types of Simulation, Delay Models, Element Evaluation, Hazard Detection, Gate Level Event Driven Simulation.

UNIT – II: FAULT MODELLING (Periods:09)
Logic Fault Models, Fault Detection and Redundancy, Fault Equivalence and Fault Location, Fault Dominance, The Single Stuck-Fault Model, The Multiple Stuck-Fault Model.

UNIT-III: FAULT SIMULATION (Periods:07)
Applications, General Fault Simulation Techniques, Fault Simulation for Combinational Circuits, Fault Sampling.

UNIT -IV: TESTING FOR SINGLE STUCK FAULTS (Periods:12)
ATG for SSSFs in Combinational Circuits and Sequential Circuits, Testing for bridging faults, Functional Testing With Specific Fault Models, Vector

Simulation- ATPG Vectors, Formats Compaction and Compression, Selecting ATPG Tool.

UNIT – V: DESIGN FOR TESTABILITY (Periods:11)

Testability Trade Offs, Techniques, Scan Architectures and Testing, Controllability and Observability by means of Scan Registers, Generic Scan-Based Designs, Full Serial Integrated Scan, Storage Cells for Scan Designs, Board-Level and System-Level DFT Approaches, Boundary Scans Standards, Compression Techniques, Different Techniques, Syndrome Testing and Signature Analysis.

Total periods: 52

TEXT BOOKS:

1. MironAbramovici, Melvin A. Breur, Arthur D.Friedman, *"Digital Systems Testing and Testable Design"*, Jaico Publishing House, First edition, 2001.
2. Alfred Crouch, *"Design for Test for Digital ICs & Embedded Core Systems"*, Prentice Hall, First edition, 1999.

REFERENCE BOOKS:

1. Robert J.Feugate, Jr., Steven M.Mentyn, *"Introduction to VLSI Testing"*, Prentice Hall, 1998.

M. Tech. (VLSI)-II Semester (Elective-II)
(14MT25706) ASIC DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on VLSI Design at UG Level

COURSE DESCRIPTION:
ASIC design categories; Design issues, characteristics, design techniques, synthesis, testing and physical design flow of ASIC.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1: Demonstrate in-depth knowledge in
- ASIC Design Styles.
- ASICs Design Issues.
- ASICs Design Techniques.
- ASIC Construction.

CO2: Analyze the characteristics and Performance of ASICs and judge independently the best suited device for fabrication of smart devices for conducting research in ASIC design.
CO3: Solve problems of Design issues, simulation and Testing of ASICs.
CO4: Apply appropriate techniques, resources and tools to engineering activities for appropriate Solution to develop ASICs.

DETAILED SYLLABUS:

UNIT-I (Periods:11)

ASIC DESIGN STYLES: Introduction – categories-Gate arrays-Standard cells-Cell based ASICs-Mixed mode and analogue ASICs – PLDs.

ASICS– PROGRAMMABLE LOGIC DEVICES: Overview – PAL –based PLDs: Structures; PAL Characteristics – FPGAs: Introduction, selected families – design outline.

UNIT-II (Periods:11)

ASICS –DESIGN ISSUES: Design methodologies and design tools – design for testability – economies.

ASICS CHARACTERISTICS AND PERFORMANCE: design styles, gate arrays, standard cell -based ASICs, Mixed mode and analogue ASICs.

UNIT-III: ASICS-DESIGN TECHNIQUES (Periods:08)

Overview- Design flow and methodology- Hardware description languages-simulation and checking-commercial design tools- FPGA Design tools: XILINX, ALTERA.

UNIT-IV (Periods:13)

LOGIC SYNTHESIS, SIMULATION AND TESTING: Verilog and logic synthesis -VHDL and logic synthesis - types of simulation -boundary scan test-fault simulation- automatic test pattern generation.

ASIC CONSTRUCTION: Floor planning, placement and routing system partition.

UNIT-V: FPGA PARTITIONING (Periods:10)

Partitioning Methods-Floor Planning- Placement- Physical Design Flow-Global Routing-Detailed Routing –Special Routing-Circuit Extraction-DRC.

Total Periods: 53

TEXT BOOKS:

1. L.J.Herbst, "Integrated circuit engineering", OXFORD SCIENCE Publications, 1996.

REFERENCE BOOKS:

1. M.J.S.Smith, "Application - Specific integrated circuits", Addison-Wesley Longman Inc 1997.

M. Tech. (VLSI)-II Semester (Elective-II)
(14MT25707) CO – DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Courses on Computer Architecture, Digital Design, Software Design, and Embedded Systems.

COURSE DESCRIPTION:
Co-design issues and algorithms; Prototyping and emulation; Target architectures; Compilation techniques; High level design specification and verification; Language support for co-simulation; Co-design system models – Lycos and Cosyma.

COURSE OUTCOMES: After completion of the course, students should be able to:

CO1. Demonstrate potential knowledge in
- Various design steps starting from system specifications to hardware/software implementation
- Process optimization techniques while considering various design decisions.

CO2. Gain design experience by critically analyzing case studies using contemporary high-level Methods

CO3. Consider trade-offs in the way hardware and software components of a system work together to solve engineering problems to exhibit a specific behavior, given a set of performance goals and technology

CO4. Familiarize with tools to overcome ever increasing embedded system design complexity combined with reduced time-to-market window to revolutionize embedded system design process

DETAILED SYLLABUS

UNIT- I **(Periods:13)**

CO- Design Issues: Co-design Models, Architectures, Languages, a Generic Co-design Methodology

Co-Synthesis Algorithms: Architectural Models, Hardware/Software Partitioning, Distributed System Co-Synthesis

UNIT- II **(Periods:08)**

Prototyping and Emulation: Prototyping and emulation techniques, prototyping and emulation environments, future developments in emulation and prototyping

Target Architectures- I: Architecture Specialization techniques, System Communication infrastructure

UNIT-III: TARGET ARCHITECTURES – II **(Periods:07)**

Target Architecture and Application System classes, Architecture for control dominated systems- 8051. Architectures for High performance control, Architecture for Data dominated systems- ADSP21060, TMS320C. Mixed Systems and Less Specialized Systems

UNIT-IV **(Periods:14)**

Compilation Techniques and Tools for Embedded Processor Architectures: Modern embedded architectures, embedded software development needs, compilation technologies, Practical consideration in a compiler development environment

Design Specification and Verification: Design , co-design, the co-design computational model, concurrency , coordinating concurrent computations, interfacing components, Verification- Design verification and implementation verification, verification tools and interface verification.

UNIT-V **(Periods:13)**

Languages for System- Level Specification and Design: System Level Specification, Design Representation for System Level Synthesis, System Level Specification Languages, Heterogeneous Specifications and Multi Language Co-simulation- Concepts for Multi-language design , Co-simulation models.

The Cosyma Systems: Overview, Architecture- design flow and user interaction. Partitioning, Synthesis

Lycos System: Introduction, Partitioning and Design Space Exploration

Total Periods: 55

Text Book:

1. Jorgen Staunstrup, Wayne Wolf, "Hardware / software co- design Principles and Practice", Springer, 2009.

Reference Book:

1. Felice Balarine, "Hardware-Software Co-Design of Embedded Systems: The Polis Approach", Springer, 1991.

M. Tech. (VLSI)-II Semester (Elective-II)
(14MT25708) DSP PROCESSORS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Digital Signal Processing at UG Level

COURSE DESCRIPTION:
Principles of digital signal processing; Digital signal processors - architectures and capabilities; Programmable DSPs; Analog families of DSPs; Interfacing of external devices.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1: Demonstrate in-depth knowledge in
- Architectures of Programmable DSP Devices
- Analog Device Families
- Interfacing Memory and I/O Peripherals to Programmable DSP Devices.

CO2: Analyze complex engineering problems critically for conducting research in DSP Processors.
CO3: Solve engineering problems with wide range of solutions in Digital Signal Processing.
CO4: Apply appropriate techniques, resources and tools to engineering activities in Digital Signal Processing.

DETAILED SYLLABUS:
UNIT –I: INTRODUCTION TO DIGITAL SIGNAL PROCESSING **(Periods:15)**

Introduction, A Digital signal processing system, the sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.
Computational Accuracy in DSP Implementations - Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT –II: ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES (Periods:08)

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT -III: PROGRAMMABLE DIGITAL SIGNAL PROCESSORS

(Periods:10)

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSP Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT –IV: ANALOG DEVICES FAMILY OF DSP DEVICES (Periods:11)

Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor - The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT –V: INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES (Periods:07)

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

Total Periods: 51

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan, "Digital Signal Processing", Thomson Publications, 2004.
2. K Padmanabhan, R.Vijayarajeswaran, Ananthi. S, "A Practical Approach To Digital Signal Processing", New Age International, 2006/2009.
3. Woon-Seng Gan, Sen M. Kuo, "Embedded Signal Processing with the Micro Signal Architecture", Wiley-IEEE Press, 2007.

REFERENCE BOOKS:

1. B. Venkataramani and M. Bhaskar, "Digital Signal Processors, Architecture, Programming and Applications", TMH, 2002.
2. Jonatham Stein, "Digital Signal Processing" , John Wiley, 2005.
3. Lapsley et al, "DSP Processor Fundamentals, Architectures & Features", S. Chand & Co, 2000.

M. Tech. (CMS & VLSI)-II Semester (Elective-II)
(14MT25709) WIRELESS SENSOR NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Wireless Communications at UG Level

COURSE DESCRIPTION:
Concepts of wireless sensor networks; Physical, Network, Transport and Application layers.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Wireless Sensor Networks
- Physical layer
- Data link layer
- Network layer
- Transport layer

CO2. Analyze and design complex problems critically in the domains of Wireless Communications and Wireless sensor Networks for conducting research.
CO3. Apply appropriate techniques to for the development of scientific knowledge in Wireless Sensor Networks.
CO4. Demonstrate knowledge and understanding of wireless sensor networks and apply the same in practice.

DETAILED SYLLABUS
UNIT – I: INTRODUCTION TO WIRELESS SENSOR NETWORKS (Periods:11)
Challenges for wireless sensor networks, Comparison of sensor network with ad hoc network, Single node architecture - Hardware components, energy consumption of sensor nodes. Network architecture: Sensor network scenarios- types of sources and sinks, single hop versus multi-hop networks, multiple sinks and sources. Design principles for wireless sensor networks.

UNIT – II: PHYSICAL LAYER (Periods:11)
Introduction, wireless channel and communication fundamentals – frequency allocation, modulation and demodulation, wave propagation effects and noise, channels models, spread spectrum communication, packet transmission and synchronization, quality of wireless channels and measures for improvement. Physical layer and transceiver design consideration in wireless sensor networks-Energy usage profile, choice of modulation, Power Management.

UNIT -III: DATA LINK LAYER (Periods:16)
MAC protocols: fundamentals of wireless MAC protocols - Requirements and design constraints for wireless MAC protocols, Important classes of MAC

protocols, MAC protocols for wireless sensor networks. Low duty cycle protocols and wakeup concepts - Sparse topology and energy management (STEM), S-MAC, Wakeup radio concepts. Contention-based protocols - CSMA protocols, PAMAS. Schedule-based protocols - SMAC, BMAC, Traffic-adaptive medium access protocol (TRAMA). Link Layer protocols – fundamentals task and requirements, error control - Causes and characteristics of transmission errors, ARQ techniques, FEC techniques, Hybrid schemes, Power control,

UNIT – IV: NETWORK LAYER (Periods:10)

Gossiping and agent-based uni-cast forwarding - Basic idea, Randomized forwarding. Energy-efficient unicast, Broadcast and multicast - Source-based tree protocols, Shared, core-based tree protocols, Mesh-based protocols. geographic routing - Basics of position-based routing, Geocasting. Mobile nodes - Mobile sinks, Mobile data collectors, Mobile regions. Data centric and content-based networking - Introduction, Data-centric routing, Data aggregation.

UNIT – V: TRANSPORT LAYER (Periods:09)

The transport layer and QoS in wireless sensor networks - Quality of service/reliability, Transport protocols. Coverage and deployment - Sensing models, Coverage measures, Uniform random deployments: Poisson point processes, Coverage of random deployments: Boolean sensing model, general sensing model, Coverage determination, Coverage of grid deployments. Reliable data transport, Single packet delivery - Using a single path, Multiple paths, Multiple receivers. Congestion control and rate control - Congestion situations in sensor networks, Mechanisms for congestion detection and handling, Protocols with rate control, The CODA congestion-control framework.

Total periods: 57

TEXT BOOKS:

1. Holger Karl, Andreas willig "Protocol and Architecture for Wireless Sensor Networks", John wiley publication, Oct 2007.

REFERENCE BOOKS:

1. Feng zhao, Leonidas guibas, Elsivier , "Wireless Sensor Networks: an information processing approach –publication, 2004.
2. Edgar H .Callaway, First Edition,"Wireless Sensor Networks : Architecture and protocol", CRC press 2003.
3. C.S.Raghavendra Krishna, M.Sivalingam and Tarib znati, "Wireless Sensor Networks", Springer publication, 2006.

M.Tech (VLSI) – II Semester
(14MT25721) MIXED SIGNAL LABORATORY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	4	2

PREREQUISITE:
A course on Circuit Level Design and Layouts

COURSE DESCRIPTION:
Design and verification of analog and mixed signal circuits.

COURSE OUTCOMES:
After the completion of the course, the student will be able to

CO1: Discriminate HDL Languages to model FPGA/ASIC design.

CO2: Conceptualize and solve problems in functional verification, timing and Power Analysis of Digital circuits.

CO3: Develop Skills to solve problems of layout design and build solutions for optimizing design for area, power and speed.

CO4: Conduct experiments for modeling devices suited for various communications.

CO5: Able to use CAD Tools to arrive at a optimized solution for mixed signal design.

CO6: Contribute positively to multidisciplinary scientific research in design and development of Mixed/Analog Integrated Circuits to solve problems arising in Integrated circuit Technology.

CO7: Perform projects efficiently in Digital system design to achieve optimization for high device utilization and performance in industrial needs.

DETAILED SYLLABUS:

Mentor Graphic tools / Cadence tools / Synopsis tools

1. **Backend Design (8 Slots)**

   Schematic Entry, Simulation, Layout, DRC, PEX, Post Layout Simulation of CMOS Logic Gates, Combinational Circuits (Adders, Encoders, Decoders, Multiplexers, Demultiplexers, etc), Sequential Circuits(Flip Flops, Registers, counters), Biquad Filter, PLL and ADC/DAC.

2. Frontend/Semicustom Design (4 Slots)

HDL Design Entry, Logic Simulation, RTL Logic Synthesis, Post Synthesis Timing
Simulation, Place & Route, Design for Testability, Static Timing Analysis, Power
Analysis of Combinational and Sequential Circuits (Application Oriented designs – Traffic Light Controller, FSM based Control applications, etc).

Total Slots: 12

Required Software Tools:

1. Mentor Graphic tools / Cadence tools / Synopsis tools. (220 nm Technology and Above)
2. Xilinx ISE 10.1i and Above for FPGA/CPLDS.

REFERENCE BOOKS:

1. Mixed Signal Laboratory Manual

M. Tech. (VLSI) – II Semester
(14MT25722) SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	50	50	--	--	--	2

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of seminar topic; Literature survey; Preparation of technical report and Presentation.

COURSE OUTCOMES:
On successful completion of the course, the student will be able to

CO1. Demonstrate capacity to identify an advanced topic for seminar in core and allied areas.

CO2. Extract information pertinent to the topic through literature survey.

CO3. Comprehend extracted information through analysis and synthesis critically.

CO4. Plan, organize, prepare and present effective written and oral technical report on the topic.

CO5. Adapt to independent and reflective learning for sustainable professional growth.

M. Tech. (VLSI) – III & IV Semesters
(14MT35721 & 14MT45721) PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
80	120	200	--	--	--	16

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation.

COURSE OUTCOMES:

On successful completion of the course, the student will be able to

CO1. Demonstrate capacity to identify an advanced topic for project work in core and allied areas.

CO2. Gather information related to the topic through literature survey.

CO3. Comprehend gathered information through critical analysis and synthesis.

CO4. Solve engineering problems pertinent to the chosen topic for feasible solutions.

CO5. Use the techniques, skills and modern engineering tools necessary for project work.

CO6. Do time and cost analysis on the project.

CO7. Plan, prepare and present effective written and oral technical report on the topic.

CO8. Adapt to independent and reflective learning for sustainable professional growth.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF ECE

COURSE STRUCTURE for M.Tech. (CMS)

I – SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT15706	Advanced Digital Signal Processing	4	-	-	4	40	60	100
2.	14MT13802	Digital Communication Techniques	4	-	-	4	40	60	100
3.	14MT13805	Computer Networks	4	-	-	4	40	60	100
4.	14MT13809	Linear Algebra	4	-	-	4	40	60	100
5.	14MT23808	Optical Communications and Networks	4	-	-	4	40	60	100
6.		**Elective-I**							
	14MT16101	RF Circuit Design	4	-	-	4	40	60	100
	14MT16102	Satellite Communications							
	14MT16103	Speech Processing							
	14MT13808	Transform Techniques							
7.	14MT10310	Research Methodology	3	-	-	3	40	60	100
8.	14MT16121	Communications Lab. - I	-	-	4	2	25	50	75
		Total:	**27**	**-**	**4**	**29**	**305**	**470**	**775**

II-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT26101	Adaptive Signal Processing	4	-	-	4	40	60	100
2.	14MT23806	Detection and Estimation of Signals	4	-	-	4	40	60	100
3.	14MT23802	Information Theory and Coding Techniques	4	-	-	4	40	60	100
4.	14MT26102	Software Defined Radio	4	-	-	4	40	60	100
5.	14MT23805	Wireless Communications	4	-	-	4	40	60	100
6.		**Elective-II**							
	14MT26103	EMI/ EMC	4	-	-	4	40	60	100
	14MT26104	Radar Signal Processing							
	14MT26105	Telemetry and Telecontrol							
	14MT25709	Wireless Sensor Networks							
7.	14MT26121	Communications Lab. - II	-	-	4	2	25	50	75
8.	14MT26122	Seminar	-	-	-	2	-	50	50
		Total:	**24**	**-**	**4**	**28**	**265**	**460**	**725**

III-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P*		Int.	Ext.	Total
1	14MT36121	Project Work – Phase I	-	-	-	4	40	-	40
		Total:	**-**	**-**	**-**	4	**40**	**-**	**40**

*Fulltime Project Work

IV-Semester

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P*		Int.	Ext.	Total
1	14MT46121	Project Work – Phase II	-	-	-	12	40	120	120
		Total:	**-**	**-**	**-**	12	**40**	**120**	**160**

*Fulltime Project Work

Total Credits: 73 **Total Marks: 1700**

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

M. Tech. (VLSI) - I Semester (Elective-I)
M. Tech. (CMS) - I Semester
(14MT15706) ADVANCED DIGITAL SIGNAL PROCESSING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Courses on Digital Signal Processing at UG level.

COURSE DESCRIPTION:
Design of digital filter banks; Power spectral estimation; Digital signal processing algorithms; DSP applications.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Filter banks and Wavelets
- Efficient power Spectral Estimation Techniques.
- Adaptive filters.
- Applications of Multirate signal processing

CO2. Analyze complex engineering problems critically for conducting research in Adaptive filter design.
CO3. Solve engineering problems by designing computationally efficient DSP algorithms for feasible and optimal solutions in digital signal processing field.
CO4. Contribute to scientific research in signal processing and inter disciplinary areas like cellular mobile communications, multirate signal processing and spectral analysis.

DETAILED SYLLABUS:

UNIT I: MULTIRATE FILTER BANKS (Periods:12)
Decimation, Interpolation, Sampling rate conversion by a rational factor I/D, Multistage Implementation of sampling rate conversion. **Digital Filter Banks**: Two-Channel Quadrature-Mirror Filter Bank, Elimination of aliasing, condition for Perfect Reconstruction, Polyphase form of QMF bank, Linear phase FIR QMF bank, IIR QMF bank , Perfect Reconstruction Two-Channel FIR QMF Bank .

UNIT II: POWER SPECTRAL ESTIMATIONS (Periods:11)
Estimation of spectra from finite duration observation of signals, **Non-Parametric Methods**: Bartlett, Welch, Blackmann & Tukey methods. Performance Characteristics of Nonparametric Power Spectrum Estimators, Computational Requirements of Nonparametric Power Spectrum Estimates.

UNIT III: PARAMETRIC METHODS OF POWER SPECTRAL ESTIMATION (Periods:11)
Autocorrelation & Its Properties, Relation between auto correlation & model parameters, Yule-Walker & Burg Methods, MA & ARMA models for power spectrum estimation.

UNIT IV: DSP ALGORITHMS (Periods:10)

Fast DFT algorithms based on Index mapping, Sliding Discrete Fourier Transform, DFT Computation Over a narrow Frequency Band, Split Radix FFT, Linear filtering approach to Computation of DFT using Chirp Z-Transform.

UNITV: APPLICATIONS OF DIGITAL SIGNAL PROCESSING (Periods:11)

Digital cellular mobile telephony, Adaptive telephone echo cancellation, High quality A/D conversion for digital Audio, Efficient D/A conversion in compact hi-fi systems, Acquisition of high quality data, Multirate narrow band digital filtering, High resolution narrowband spectral analysis.

Total periods: 55

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital signal processing, principles, Algorithms and applications,* Prentice Hall, 4th Edition, 2007.
2. Sanjit K Mitra, "*Digital signal processing, A computer base approach",* McGraw-Hill Higher Education, 4th Edition, 2011.

REFERENCE BOOKS:

1. Emmanuel C Ifeacher Barrie. W. Jervis, "*DSP-A Practical Approach*", Pearson Education, 2nd Edition, 2002.
2. A.V. Oppenheim and R.W. Schaffer, "*Discrete Time Signal Processing",* PHI, 2nd Edition, 2006.

M. Tech. (CMS & DECS)-I Semester
(14MT13802) DIGITAL COMMUNICATION TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES: A Course on Digital Communications at UG Level

COURSE DESCRIPTION:

Representation of band pass signals and systems; Digital modulation techniques; Design of optimum receivers; Generation and detection of spread spectrum signals.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Demonstrate n-depth knowledge in

- Characterization of communication signals and systems.
- Digital modulation techniques
- Communication over AWGN channels
- Optimum receivers
- Spread spectrum techniques

CO2: Analyze numerical and analytical problems critically for conducting research in the field of Digital Communication Systems.

CO3: Solve engineering problems and arrive at optimal solutions pertaining to digital communications.

CO4: Apply appropriate techniques to complex engineering activities in the field of signal processing and communications.

DETAILED SYLLABUS

Review of random Variables and Processes

UNIT–I: CHARACTERIZATION OF COMMUNICATION SIGNALS AND SYSTEMS (Periods:10)

Representation of Band Pass Signals and Systems – Representation of Band-Pass Signals, Representation of Linear Band-Pass System, Response of a Band-Pass System to a Band-Pass Signal. Signal Space Representations – Vector Space Concepts, Signal Space Concepts, Orthogonal Expansion of Signals. Representation of Digitally Modulated Signals – Memory Less Modulation Methods – PAM Signals, Phase Modulated Signals, QAM Signals, Multidimensional Signals, Orthogonal Multidimensional Signals. Spectral Characteristics of Digitally Modulated Signals – Power Spectra of Linearly Modulated Signals.

UNIT–II: DIGITAL MODULATION TECHNIQUES (Periods:11)

Digital Modulation – Factors that Influence the Choice of Digital Modulation, Bandwidth and Power Spectral Density of Digital Signals. Linear Modulation Techniques – BPSK, DPSK, QPSK, OQPSK, ∏/4 QPSK. Constant Envelope Modulation Techniques – MSK, GMSK, Combined Linear and Constant Envelope Modulation Techniques – M-ary PSK, M- ary QAM.

UNIT–III: OPTIMUM RECEIVERS FOR THE ADDITIVE GAUSSIAN NOISE CHANNEL (Periods:10)

Optimum Receiver for Signals Corrupted by AWGN – Correlation Demodulator, Matched Filter Demodulator, the Optimum Detector. Performance of the Optimum Receiver for Memory Less Modulation – Probability of Error for Binary Modulation, M-ary Orthogonal Signals, M-ary PAM, M-ary PSK, QAM. Optimum Receiver for Signals with Random Phase in AWGN Channel – Optimum Receiver for Binary Signals, Optimum Receiver for M-ary Orthogonal Signals.

UNIT–IV: SPREAD SPECTRUM TECHNIQUES (Periods:10)

Introduction, Model of Spread Spectrum Digital Communication System, Direct Sequence Spread Spectrum Signals – Introduction, The Processing Gain and Jamming Margin. Applications of Direct Sequence Spread Spectrum Signals – Anti-jamming Application, Low-Detectability Signal Transmission, Code Division Multiple Access. Generation of PN-Sequences, Frequency-Hopped Spread Spectrum Signals, Other Types of Spread Spectrum Signals.

UNIT–V: DETECTION OF SPREAD SPECTRUM SIGNALS (Periods:09)

Coherent Direct-Sequence Receivers, Coherent Carrier Tracking – Delay-Lock Loop Analysis, Tau-Dither Loop. Non Coherent Carrier Tracking, Non coherent Frequency-Hop Receiver, Acquisition of Spread-Spectrum Signals – Acquisition by Cell-By-Cell Searching. Reduction of Acquisition Time – Acquisition with Matched Filters, Matched filters for PN Sequences, Matched Filters for Frequency-Hopped Signals.

Total periods: 50

TEXT BOOKS:

1. John G. Proakis, "Digital Communications", McGraw Hill, 4th edition, 2001.
2. Theodore S. Rappaport, "Wireless Communications", Pearson Education, 2nd edition, 2002.
3. George R. Cooper & Clare D. McGillem, "Modern Communication and Spread Spectrum", McGraw-Hill Book Company, 1986.

REFERENCE BOOKS:

1. Marvin K. Simon, Jim K Omura, Robert A. Scholtz & Barry K.Levit, "Spread Spectrum Communications", Computer Science Press, 1995.
2. J.Marvin, K.Simon, Sami. M.Hinedi and William C. Lindsey, "Digital Communication Techniques", PHI, 2009.

M. Tech. (CMS) – I Semester
M. Tech. (DECS) – I Semester (Elective-I)
(14MT13805) COMPUTER NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Computer Networks at UG Level

COURSE DESCRIPTION:
Protocols & standards of computer and wireless networks; Advanced network architectures; Upper layers protocols; Network security.

COURSE OUTCOMES: After completion of the course, students should be able to:

CO 1. Demonstrate in-depth knowledge on
   a. Architectures and functioning of Advanced Wireless LAN and WAN technologies such as Wi-Fi, Wi-Max, Frame Relay, ATM networks etc.
   b. Protocols like MPLS, RSVP, VOIP associated with modern computer network systems.
   c. Know the security features associated with modern computer network systems.

CO 2. Analyze various design issues for conducting research related to the Internet protocol (IP), Wireless LANs and ATM network technologies prominent in high performance scenario.

CO 3. Formulate solutions for engineering problems pertaining to the advanced networking technologies.

CO 4. Apply appropriate techniques and tools to complex engineering activities in the field of computer networks.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION TO COMPUTER NETWORKS (Periods:11)
Data communications & Networking for Today's Enterprise, Data Communications, Network Edge, Network core, Internet, OSI, TCP/IP models, Data Link Control Protocols - HDLC, Point to Point Protocol (PPP);

UNIT- II: WIRELESS NETWORKS (Periods:12)
Ethernet, Fast Ethernet, Gigabit Ethernet, WLANS – Merits and topologies, IEEE 802.11 WLAN Standard – Physical Layer, MAC Layer, Frame structure, IEEE 802.11 a, b, g, e and n standards, Applications; Bluetooth & WiMax- features, standards, protocols and utility; Virtual LANs

UNIT- III: ADVANCED NETWORK ARCHITECTURES (Periods:13)
Circuit switching network - SONET/SDH; Virtual Circuit Networks – Frame Relay, ATM - Protocol Architecture, Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Service Categories; Signaling Protocols - MPLS,

RSVP; VPN architectures, IP over ATM, Connecting Devices: Repeaters, Bridges, Routers, Gateways.

UNIT- IV: INTERNET TRANSPORT AND APPLICATION PROTOCOLS (Periods:12)

Internet protocol - IPv6, Transport protocols – Connection Oriented protocol TCP, Connectionless protocol UDP; Congestion control in TCP, Socket interface, Domain Name System, Simple Mail Transfer Protocol, WWW and HTTP, Multimedia Applications – RTP, Voice Over IP.

UNIT- V: SECURITY IN COMPUTER NETWORKS (Periods:08)

Simple Network Management Protocol, Network security, Cryptography - Symmetric Key Cryptography, Public Key Cryptography, Firewalls - Packet filtering, Application Gateway, Digital Signature, IP Sec.

Total Periods: 56

TEXT BOOKS:

1. William Stallings, "Data and Computer Communication", 9th edition, Prentice hall, 2010
2. Behrouz A. Forouzan, "Data Communications and Networking", 4th Ed, Tata McGraw-Hill, New Delhi, 2006
3. Jim Kurose, Keith Ross, "Computer Networking: A Top Down Approach", 4th edition, Addison Wesley, July 2007.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum "Computer Networks", 4th Edition, Pearson Education, 2008
2. LEON-GARCIA, INDRA WIDJAJA, "Communication Networks – Fundamental concepts and Key architectures", TMH, 2000

M. Tech. (DECS & CMS) - I Semester
(14MT13809) LINEAR ALGEBRA

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Courses on Mathematics at UG level.

COURSE DESCRIPTION:
Solving linear systems of equations; Abstract structures with underlying mathematics such as vector spaces, linear transforms, inner products, Eigen values and Eigen vectors; Engineering applications of linear algebra.

COURSE OUTCOMES:
On successful completion of course the student will be able to

CO1. Demonstrate advanced knowledge in
- (a) solving Linear equations
- (b) finding the bases and dimensions of Vector Spaces
- (c) determining the Linear Transformation between different Vector Spaces .

CO2. Develop skills in
- (a) designing the Dynamical Systems in electrical circuits
- (b) analyzing Discrete time signals
- (c) applying complex Eigen Values in Decoupling systems
- (d) applying concepts of Inner Product Spaces in Fourier Series Analysis.

CO3. Apply Eigen Values and Eigen Vectors in diagonalisation of matrices related to transformations.

DETAILED SYLLABUS:

UNIT – I : VECTORS AND LINEAR EQUATIONS (Periods:09)
System of linear equations, Vector equations, The matrix and vector equations AX=B and AX=0.Solution sets of linear system, Linear combinations, Linear dependence and independence of vectors. Solutions of equations using LU decomposition.

UNIT–II: VECTOR SPACES AND LINEAR TRANSFORMATIONS (Periods:10)
Vector spaces – subspaces, Null and column Spaces of a matrix ,Bases, Coordinate systems, Dimension of a Vector Space .Linear transformation, Properties of linear transformations Rank and Nullity ,Matrix of linear transformations.

UNIT – III: INNER PRODUCT SPACES (Periods:10)
Inner product, Norm, Inner product space, Othrogonality , Orthogonal sets, Ortho normal basis - Orthogonal projections ,Gram-Schmidt orthogonalisation process.

UNIT – IV: EIGEN VALUES AND EIGEN VECTORS (Periods:12)

Eigen Values and Eigen Vectors of a matrices and linear transformations, Eigen values and Eigen vectors of complex matrices. Diagonalisation, Quadratic forms- Nature , Orthogonality of symmetric matrices. Singular value decomposition (SVD).

UNIT – V: ENGINEERING APPLICATIONS OF LINEAR ALGEBRA (Periods:14)

Applications to Difference equations, Discrete-time signals. Linear Independence in the space signals, Applications to Decoupling a dynamical system , Complex Eigen Values in Decoupling systems, Applications of inner product spaces to Fourier Series Analysis.

Total periods : 55

TEXT BOOKS :

1. David C. Lay, **Linear Algebra and its applications**, Fourth edition, Pearson education, India. (2014).
2. Jim DeFramza and Dan Gagliardi **Introduction to Linear Algebra with applications,** The McGraw. Hill Companies, India. (2012)

REFERENCES:

1. Gilbert Strang, **Introduction to Linear Algebra**, Fourth edition, South Asian edition, Cambridge Press. (2009).
2. Otto Bretscher , **Linear Algebra with applications**, Third edition, Pearson education, India. (2007)

M. Tech. (CMS)-I Semester
M. Tech. (DECS)-II Semester (Elective-II)
(14MT23808) OPTICAL COMMUNICATIONS AND NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Optical Communications at UG Level.

COURSE DESCRIPTION:
Characteristics of fiber materials; Optical cables design and connectors; Fiber optic components; Modulation and demodulation of optical signals; Optical networks.

COURSE OUTCOMES:
At the end of the course, the students will be able to
CO1. Demonstrate Knowledge in
- Linear and Non-linear Characteristics of Optical fiber.
- Fiber design considerations.
- Minimization of Losses in Cable design.
- Understanding the operation of advanced fiber optic components
- Modulation and demodulation techniques
- Access networks

CO2. Analyze complex engineering problems critically in the domain of optical communication for conducting research.
CO3. Formulate solutions to problems related to optical communication to meet societal and industrial needs.
CO4. Apply appropriate techniques to complex engineering activities in the field of communication networks.

DETAILED SYLLABUS

UNIT I: INTRODUCTION (Periods:11)
Evolution of fiber types, guiding properties of fibers, cross talk between fibers, coupled modes and mode mixing, dispersion properties of fibers, nonlinear effects of optical fibers- SRS, SBS, intensity dependent refractive index. Characterizations of materials for fibers, fiber preform preparation- Soot deposition, MCVD. Fiber drawing and control, roles of coating and jacketing.

UNIT II: OPTICAL CABLE DESIGN (Periods:10)
Fiber design considerations-Fiber diameter, Cladding thickness, Low and high bit rate systems. Design objectives and cable structures, Fiber splicing- fiber end preparation, single and array splices, measurement of splicing effects. Optical fiber connectors-The role of connectors, Connector alignment techniques.

UNIT-III: FIBER OPTIC COMPONENTS FOR COMMUNICATION AND NETWORKING (Periods:14)

Couplers, Isolators and Circulators, Multiplexers & filters- Bragg Gratings, Fabry-Perot Filters, Mach-Zehnder Interferometers, Arrayed Waveguide Grating, Acousto-Optic Tunable Filter, High Channel Count Multiplexer Architectures. Optical Amplifiers- Erbium Doped Fiber amplifiers, Raman amplifiers, Transmitters- LED, Lasers, Direct and External Modulation, Detectors- Photo detectors. Optical Switches – Large Optical Switches. Wavelength Converters – Optoelectronic Approach, Optical gating.

UNIT-IV: MODULATION AND DEMODULATION (Periods:08)

Signal formats for Modulation, Subcarrier Modulation and Multiplexing, Optical Modulations – Duo binary, Single Side Band and Multilevel Schemes, Demodulation- Ideal and Practical receivers, Bit Error Rates, Coherent Detection, Timing Recovery and Equalization, Reed-Solomon Codes for Error Detection and Correction.

UNIT-V: OPTICAL NETWORKS (Periods:10)

Access Networks - architecture overview, Enhanced HFC, Fiber to the curb (FTTC). Photonic packet switching - OTDM, Synchronization, OTDM test beds. Deployment considerations- Designing the transmission layer using SDM, TDM, WDM, Unidirectional versus Bidirectional WDM systems.

Total Periods: 53

TEXT BOOKS:

1. S.E.Miller, A.G.Chynoweth, "*Optical Fiber Telecommunication",* 1979
2. Rajiv Ramaswamy, Kumar N. Sivaranjan and Galen H.Sasaki,"*Optical Networks* ", Elsevier, 3rd edition,2010.

REFERENCE BOOKS:

1. Govind P.Agarwal "Fiber – Optic Communication Systems", Wiley India, 3rd edition, 2002.
2. Gerd Kaiser, "*Optical Fiber Communication"*, McGraw Hill, 4th edition, 2008.
3. John. M. Senior, "*Optical fiber communications: Principles and Practice",* Pearson, 3rd edition, 2010.

M. Tech. (CMS)-I Semester (Elective-I)
(14MT16101) RF CIRCUIT DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Concept of Basic Electronics and Wave Theory at UG level

COURSE DESCRIPTION:
Radio frequency electronics; Transmission lines; RF passive and active components; RF transistor amplifiers and oscillators.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- RF Electronics
- Transmission line analysis
- Matching and biasing networks
- RF Passive and Active components
- RF Transistor amplifier design
- Oscillators and RF Mixers.

CO2. Analyze complex problems critically in the domains of RF field, RF Passive and Active components as well as a smart antenna techniques for better spectrum exploitation for conducting research.
CO3. Solve engineering problems to arrive at optimal solutions in compliance with public health and safety, cultural, societal and environmental factors in the core areas of RF Circuit design.
CO4. Apply appropriate techniques to for the development of scientific knowledge in wireless communication Systems and allied areas.

DETAILED SYLLABUS

UNIT – I: INTRODUCTION TO RF ELECTRONICS (Periods:10)
The Electromagnetic Spectrum, units and Physical Constants, Microwave bands, RF behavior of Passive components: Tuned resonant circuits, Vectors, Inductors and Capacitors. Voltage and Current in capacitor circuits, Tuned RF/IF Transformers.

UNIT – II: TRANSMISSION LINE ANALYSIS (Periods:14)
Examples of transmission lines, Transmission line equations and Biasing: Kirchoffs Voltage and current law representation, Traveling voltage and current waves, General Impedance definition, lossless transmission line model. Micro Strip Transmission Lines, Special Termination Conditions, sourced and Loaded Transmission Lines. **Single and Multiport Networks**: The Smith Chart, Interconnectivity networks, Network properties and Applications, Scattering Parameters.

UNIT -III: MATCHING AND BIASING NETWORKS (Periods:13)

Impedance matching using discrete components, Micro strip line matching networks, Amplifier classes of Operation and Biasing networks.

RF Passive and Active Components: Filter Basics, Lumped filter design, Distributed Filter Design, Diplexer Filters, Crystal and Saw filters, Active Filters, Tunable filters. Power Combiners / Dividers: Directional Couplers, Hybrid Couplers, Isolators. RF Diodes: BJTs, FETs, HEMTs and Models.

UNIT – IV: RF TRANSISTOR AMPLIFIER DESIGN (Periods:09)

Characteristics of Amplifiers, Amplifier Circuit Configurations, Amplifier Matching Basics, Distortion and noise products, Stability Considerations, Small Signal amplifier design, Power amplifier design, MMIC amplifiers, Broadband High Power multistage amplifiers, Low noise amplifiers, VGA Amplifiers.

UNIT – V: OSCILLATORS (Periods:11)

Oscillator basics, Low phase noise oscillator design, High frequency Oscillator configuration, LC Oscillators, VCOs, Crystal Oscillators, PLL Synthesizer, and Direct Digital Synthesizer.

RF Mixers: Basic characteristics of a mixer, Active mixers, Image Reject and Harmonic mixers, Frequency domain considerations.

Total periods: 57

TEXT BOOKS:

1. Reinhold Ludwing, Pavel Bretchko, "RF Circuit design: Theory and applications", Pearson Education Asia Publication, New Delhi 2001.
2. Devendra K. Misra, "Radio Frequency and Microwave Communication Circuits – Analysis and Design", Wiley Student Edition, John Wiley & Sons, 2nd edition, July 2004.

REFERENCE BOOKS:

1. Mathew M.Radmangh, "Radio frequency and microwave electronics", PE Asia Publication, 2001.
2. Christopher Bowick, Cheryl Aljuni and John Biyler, "RF Circuit Design", Elsevier Science, 2008.
3. Joseph Carr, "Secrets of RF Design", Tata McGraw Hill Publications, 3rd Edition, 2004.

M. Tech. (CMS)-I Semester (Elective-I)
(14MT16102) SATELLITE COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITES: A course on 'Digital Communications' at UG level.

COURSE DESCRIPTION:
Orbital mechanics and satellite sub-systems; Non-geostationary satellite systems; Demand assignment multiple access techniques and packet communications; Spread spectrum communications; Satellite applications.

COURSE OUTCOMES:
After completion of this course, student will be able to:
CO1. Demonstrate advanced knowledge in
- Satellite Orbits and Sub-Systems
- NGSO Constellation Designs
- DAMA Interfaces
- Satellite Packet Communications and ALOHA systems
- Spread spectrum Communications
- Satellite Applications such as VSAT, MSAT, Direct Broadcast Satellite Television.

CO2. Investigate and analyze complex engineering problems critically for conducting research in satellite systems.
CO3. Solve engineering problems with feasible and economical solutions in satellite communications.
CO4. Apply appropriate techniques to engineering activities in the field of satellite communications.
CO5. Follow ethical code of conduct in the field of satellite communications as per the regulations of International Telecommunications Union (ITU).

DETAILED SYLLABUS

UNIT–I: SATELLITE ORBITS AND SUBSYSTEMS (Periods:11)
Overview of Satellite Communications- Brief history, Orbital Mechanics, Look Angles determination, Orbital perturbations, Apogee- Perigee heights. Geo-stationary orbits- launching orbits, launch vehicles. Satellite Sub-Systems- Attitude and Orbit Control system, TT&C subsystem, Power systems, Communication subsystems, Satellite Antenna Equipment.

UNIT– II: LOW EARTH ORBIT AND NON-GEOSTATIONARY SATELLITE SYSTEMS (Periods:10)
Introduction-Orbit Considerations, Equatorial Orbits, Inclined Orbits, Elliptical Orbits, Molniya Orbit. Coverage and Frequency Considerations- General Aspects, Frequency band, Elevation Angle Considerations, Number of Beams Per Coverage, Off-Axis Scanning, Determination of Optimum Orbital Altitude, Projected NGSO System Customer Service Base. Delay and Throughput Considerations, System considerations- Incremental Growth, Interim

Operations, Replenishment Options. Operational NGSO Constellation Designs- Ellipse, Global star, New ICO, Iridium, Orbcomn, Sky bridge, Teledesic.

UNIT–III:EFFICIENT TECHNIQUES & SATELLITE PACKET COMMUNICATIONS (Periods:11)

Demand Assignment Multiple Access and Digital Speech Interpolation: The ERLANG B Formula, Types of Demand Assignments, DAMA Characteristics, Real-Time Frame Reconfiguration- Frame and Burst Structures for DA-TDMA. DAMA Interfaces, SCPC-DAMA, SPADE, Digital Speech Interpolation.

Satellite Packet Communications: Preliminaries, Message Transmission by FDMA-The M/G/1 Queue, Message Transmission by TDMA, Pure ALOHA-Satellite Packet Switching, Slotted ALOHA, Packet Reservation, Tree Algorithm.

UNIT– IV: SATELLITE SPREAD SPECTRUM COMMUNICATIONS (Periods:12)

Direct Sequence Spread Spectrum Systems- PN Sequence, Error Rate Performance in Uniform Jamming, Error Rate Performance in Pulsed Jamming. Direct Sequence Code Division Multiple Access- Sequence Synchronous DS-CDMA, Sequence Asynchronous DS-CDMA, Random Access DS-CDMA. Frequency HOP Spread Spectrum Systems-Frequency HOP Code Division Multiple Access. DS Acquisition and Synchronization, FH Acquisition and Synchronization, Satellite on Board Processing.

UNIT –V: SATELLITE APPLICATIONS (Periods:11)

Very Small Aperture Terminal Networks: VSAT Technologies, Network Configurations, Multi-access and Networking, Network Error Control.

Mobile Satellite Networks: Operating Environment, MSAT Network Concept, CDMA MSAT Network, Statistics of Mobile Propagation.

Direct Broadcast Satellite Television and Radio

C-Band and Ku-Band Home Satellite TV, Digital DBS TV, DBS-TV System Design, DBS-TV Link Budget, Error Control in Digital DBS-TV, Master Control Station and Uplink, Installation of DBS-TV Antennas, Satellite Radio Broadcasting. **Total periods: 55**

TEXT BOOKS:

1. Timothy Pratt, Charles Bostian, Jeremy Allnutt, *Satellite Communications,* John Wiley & Sons, 2nd Edition, 2003.
2. Tri T. Ha, *Digital Satellite Communications,* McGraw-Hill, 2nd Edition, 1999.

REFERENCE BOOKS:

1. Dennis Roddy, *Satellite Communications,* Tata McGraw-Hill Education Private Limited, 4th Edition, 2009.
2. Wilbur L. Pritchard, H.G. Suyderhoud, Robert A.Nelson, *Satellite Communication Systems Engineering*, 2nd Edition, Pearson Publications, 2008.

M. Tech. (CMS)-I Semester (Elective-I)
(14MT16103) SPEECH PROCESSING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Courses on Signals & Systems and Digital Signal Processing in UG

COURSE DESCRIPTION:

Acoustic theory of speech production; Models for speech signals and speech processing systems; Mathematical analysis of speech signals - homomorphic and LPC models; Speech and speaker recognition systems.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1. Demonstrate advanced knowledge in
- Digital model representation of speech signal
- LPC analysis
- Homomorphic models.

CO2. Analyze complex engineering problems critically for conducting research in speech signal processing.

CO3. Solve engineering problems using an efficient algorithms for feasible and optimal solutions in Speech signal processing field.

CO4. Apply speech and speaker verification techniques to complex engineering activities in the field of speech processing.

DETAILED SYLLABUS:

UNIT-I: DIGITAL MODEL FOR THE SPEECH SIGNAL (Periods:13)

The process of speech production - the mechanism of speech production, acoustic phonetics. The Acoustic theory of speech production- sound propagation, uniform lossless tubes, Effect of losses in the vocal tract, Effect of radiation at the lips, Vocal tract transfer functions for vowels, the effect of nasal coupling, Excitation of sound in the vocal tract. Digital model for speech signals.

UNIT - II : TIME DOMAIN MODELS FOR SPEECH PROCESSING (Periods:10)

Introduction, Window considerations, Short time energy and average magnitude, Short time average zero crossing rate, Speech vs silence discrimination using Average energy and zero crossing, Pitch period estimation using parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Pitch period estimation using the autocorrelation function.

UNIT-III: HOMOMORPHIC SPEECH PROCESSING (Periods:09)

Homomorphic systems for convolution – properties of the complex Cepstrum, computational considerations. The complex Cepstrum of speech, pitch detection, formant estimation, Homomorphic vocoder.

UNIT-IV : LINEAR PREDICTIVE CODING OF SPEECH (Periods:12)

Basic principles of linear predictive analysis – Auto correlation method, The covariance method. Computation of the gain for the model, solution of LPC Equations – Cholesky Decomposition solution for the covariance method. Durbin's Recursive solution for the autocorrelation equations. Comparison between methods of solutions of LPC analysis equations. Applications of LPC parameters – Pitch detection using LPC parameters, Formant analysis using LPC parameters.

UNIT-V: SPEECH AND SPEAKER RECOGNITION SYSTEMS (Periods:08)

Speaker recognition system-speaker verification system, speaker identification systems.

Speech recognition system- isolated digit recognition system, continuous digit recognition system, LPC distance measure.

Total periods: 52

TEXT BOOKS:

1. L R Rabiner and SW Schafer, " *Digital processing of speech signal*s", pearson education, 2006.
2. LR Rabiner ,BH Juang, B Yegnanarayana, " *Fundamentals of Speech Recognition*", pearson Education, 1993.

REFERENCE BOOKS:

1. Thomas F Quateri, "*Discrete time speech signal processing*", pearson edition, 2006.
2. Ben Gold & Nelson Morgan, "*Speech & audio signal processing*", wiley, 2006.
3. Douglas o shaughnessy , " *Speech Communications*", 2nd Edition , Oxford university press, 2000.

M. Tech. (DECS & CMS)-I Semester (Elective-I)
(14MT13808) TRANSFORM TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Course on Signal Processing at UG Level.

COURSE DESCRIPTION:
Continuous wavelet transforms; Discrete wavelet transforms; Multi resolution analysis; Wavelet packets; Applications of wavelet transforms.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Multiresolution Analysis
- Continuous wavelets
- Discrete wavelets
- Alternative wavelets & Wavelet packets

CO2. Analyze complex engineering problems critically for conducting research in Signal Processing.
CO3. Solve engineering problems with wide range of solutions in the areas of Biomedical Signal Processing, Image Processing, Radar Signal Processing and Communications.
CO4. Contribute to collaborative multidisciplinary scientific work on Data compression, Noise reduction, Communications, Image and signal Processing.
CO5. Apply appropriate Transform techniques, resources and tools to engineering activities in the fields of Signal Processing and Communications.

DETAILED SYLLABUS

UNIT –I: (Periods:14)

Review of Transforms:
Fourier series and Geometry- Vector space, functions and function spaces. Fourier transform, short-time Fourier transform, Walsh, Hadamard, Haar, Slant, KLT, Hilbert transforms.

Continuous Wavelet Transform:
Introduction, Continuous-Time Wavelets, Definition of the CWT, The CWT as a correlation, Constant Q-Factor Filtering Interpretation and Time-Frequency Resolution, The CWT as an operator, Inverse CWT.

UNIT –II: DISCRETE WAVELET TRANSFORM AND ORTHOGONAL WAVELET DECOMPOSITION (Periods:08)

Introduction, Approximations of vectors in nested linear vector spaces, Example of an MRA-Bases for the Approximation Subspaces and Harr Scaling Function, Bases for the Detail Subspaces and Harr Wavelet, Digital Filter Implementation of the Harr Wavelet Decomposition.

UNIT–III: MRA ORTHONORMAL WAVELETS, AND THEIR RELATIONSHIP TO FILTER BANKS (Periods:12)

Introduction, Formal Definition of an MRA, Construction of a General Orthonormal MRA, A Wavelet basis for MRA, Digital Filtering Interpretation, Examples of Orthogonal Basis Generating Wavelets, Interpreting Orthonormal MRAs for Discrete time signals, Miscellaneous issues Related to PRQMF Filter Banks, Generating Scaling Functions and Wavelets from Filter Coefficients.

UNIT-IV: ALTERNATIVE WAVELET REPRESENTATIONS (Periods:09)

Bi-orthogonal Wavelet Bases, Filtering Relationship for Bi-orthogonal Filters, Examples of Bi-orthogonal Scaling Functions and Wavelets, Two-Dimensional Wavelets, Non-separable Multidimensional Wavelets, Wavelet Packets.

UNIT–V: APPLICATIONS OF WAVELETS (Periods:11)

Wavelet De-noising, Speckle Removal, Edge Detection and Object Isolation, Image Fusion, Object Detection by Wavelet Transforms of Projections, Communication Applications-Scaling Functions as signaling pulses, Discrete Wavelet Multitone Modulation.

Total Periods: 54

TEXT BOOKS:

1. Raghuveer M.Rao and Ajit S.Bopardikar, "*Wavelet Transforms-Introduction to theory and applications"*, Pearson edu, 1998.
2. Soman.K.P, Ramachandran.K.I, Resmi.N.G, "*Insight into Wavelets from theory to Practice"*, PHI, Third Edition, 2010.

REFERENCE BOOKS:

1. R. C. Gonzalez, R. E. Woods, "*Digital Image Processing*," 2nd Edition, Pearson Education, 1992.
2. Jaideva C Goswami, Andrew K.Chan, "*Fundamentals of Wavelets-Theory, Algorithms and Applications*", John Wiley and sons, 1999.
3. C.Sidney Burrus, Ramesh A Gopinath and Haitao Guo, "*Introduction to Wavelets and Wavelet Transforms",* Prentice Hall, 1998.

M. Tech. – I Semester
(14MT10310) RESEARCH METHODOLOGY
(Common to all M. Tech. Programmes)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	--	--	3

PRE-REQUISITES: --

COURSE DESCRIPTION:
Fundamentals of research work - research problem and design; Data collection, Analysis and hypothesis; Statistics in Research; Interpretation and Report Writing.

COURSE OUTCOMES:
On successful completion of course, the student will be able to
CO1. Demonstrate knowledge on research approaches, research process and data collection.
CO2. Identify and analyze research problem.
CO3. Solve the research problems using statistical methods.
CO4. Carryout literature survey and apply good research methodologies for the development of scientific/technological knowledge in one or more domains of engineering.
CO5. Learn, select and apply modern engineering tools to complex engineering activities.
CO6. Write effective research reports.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO RESEARCH METHODOLOGY (Periods:07)
Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research.

UNIT-II: RESEARCH PROBLEM AND DESIGN (Periods:09)
Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem. Features of Good Design, Research Design Concepts, Different Research Designs.

UNIT-III: DATA COLLECTION, ANALYSIS, AND HYPOTHESIS (Periods:09)
Different Methods of Data Collection, Processing Operations, Types of Analysis, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure.

UNIT-IV: STATISTICS IN RESEARCH (Periods:09)
Review of Statistical Techniques - Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry. Normal Distribution, Chi-Square Test as a Test of Goodness of Fit.

UNIT-V: INTERPRETATION AND REPORT WRITING (Periods:06)
Interpretation – Techniques and Precautions. Report Writing – Significance, Stages, Layout. Types of reports, Precautions in Writing Reports.

Total Periods: 40

TEXT BOOK:

1) C.R. Kothari, *Research Methodology: Methods and Techniques*, New Age International Publishers, New Delhi, 2nd Revised Edition, 2004.

REFERENCE BOOKS:

1) Ranjit Kumar, *Research Methodology: A step-by-step guide for beginners*, Sage South Asia, 3rd ed., 2011.
2) R. Panneerselvam, Research Methodology, PHI learning Pvt. Ltd., 2009

M. Tech. (CMS) - I SEMESTER
(14MT16121) COMMUNICATIONS LAB - I

Int. Marks	Ext. Marks	Max. Marks	L	T	P	C
25	50	75	-	-	4	2

PRE-REQUISITES: Simulation Lab at UG Level

COURSE DESCRIPTION:
Design and simulation of communication systems - Baseband Communication Systems with Optimum terminal filters, QPSK communication system for AWGN channel, Base Band Direct Sequence Spread Spectrum (DS/SS) System; Generation of different density and distribution functions; Generation of maximal and Gold code sequences.

COURSE OUTCOMES:
At the end of the course, students will be able to
CO1. Demonstrate skills in
- The generation of Maximal and Gold Sequences & verification of their properties.
- Design of Communication system for Band limited Channels: Signal Design for Zero ISI.
- Evaluation of QPSK over AWGN Channel, 16MPSK, 16QAM.
- The Simulation of Code matched filter in Spread Spectrum Communication System.
- Design of Baseband Communication Systems with Optimum terminal filters.
- The Simulation of Base Band Direct Sequence Spread Spectrum (DS/SS) System.

CO2. Analyze complex engineering problems critically for conducting research in the field of Communications.
CO3. Solve engineering problems for feasible and optimal solutions in the core area of Communication.
CO4. Use MATLAB Toolboxes to complex engineering activities in the domain of communication.
CO6. Demonstrate Knowledge and understanding of Engineering Principles to execute the Projects effectively in the field of communications.

List of experiments:

1. Generation of discrete time Independent, Identically Distributed (i.i.d) random processes with different distributions (Bernoulli, Binomial, Geometric, Poisson, Uniform, Gaussian, Exponential, Laplacian, Rayleigh, Rician).(2 time slots)
2. Communication system Design for Band limited Channels: Signal Design for Zero ISI.(2 time slots)
3. Design of Baseband Communication Systems with Optimum terminal filters.(2 time slots)

4. Simulation & performance evaluation of QPSK communication system for AWGN channel.(1 time slot)
5. Simulation of maximal sequences of any length & verification of their properties.(1 time slot)
6. Generation of Gold Codes & verification of auto-correlation & cross correlation properties.(1 time slot)
7. Design and simulation of code matched filter in spread spectrum communication system.(2 time slots)
8. Comparison of 16-MPSK and 16-QAM.(1 time slot)
9. Design and Simulation of Base Band Direct Sequence Spread Spectrum (DS/SS) System.(2 time slots)

Tools:
Numerical Computing Environments – GNU Octave or MATLAB or any other equivalent tool.

REFERENCE BOOKS:

1. W.H. Tranter, K. Sam Shanmugham, T.S. Rappaport, and K.L. Kosbar, *Principles of Communication System Simulation with Wireless Applications,* Pearson, 2004.
2. J.G. Proakis, and M. Salehi, *Contemporary Communication Systems using MATLAB,*Bookware Companion Series, 2006.
3. John G. Proakis, "DIGITAL COMMUNICATIONS", McGraw Hill, 4th edition, 2001.

M. Tech. (CMS)-II Semester
(14MT26101) ADAPTIVE SIGNAL PROCESSING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Signal Processing at UG Level

COURSE DESCRIPTION:
Adaptive systems; Steepest descent algorithms; Least mean square algorithms; Kalman filtering; Recursive filtering.

COURSE OUTCOMES:
On completion of the course, the student will be able to
CO1. Demonstrate in-depth knowledge in
- Required mathematical frame work
- Characteristics of adaptive systems
- Searching algorithms such as gradient and steepest descent
- Adaptive algorithms like LMS, RLS and Kalman filtering
- Non-linear adaptive filtering, Ordered-recursive adaptive filters

CO2. Analyze complex engineering problems critically in the domain of adaptive filtering for conducting research.
CO3. Solve engineering problems for feasible and optimal solutions in the core area of adaptive signal processing.
CO4. Contribute positively to multidisciplinary scientific research in signal processing with objectivity and rational analysis.

DETAILED SYLLABUS

UNIT - I: INTRODUCTION TO ADAPTIVE SYSTEMS & DEVELOPMENT OF ADAPTIVE FILTER THEORY (Periods:10)

Definitions, Characteristics, Applications, Examples of an Adaptive System. The Adaptive Linear Combiner - Description, Weight Vectors, Desired Response Performance function, Gradient & Mean Square Error. Introduction to Filtering, Smoothing and Prediction, Linear Optimum Filtering, Problem statement, Principle of Orthogonality - Minimum Mean Square Error, Wiener- Hopf equations, Error Performance - Minimum Mean Square Error

UNIT – II: SEARCHING THE PERFORMANCE SURFACE & STEEPEST DESCENT ALGORITHMS: (Periods:08)

Searching the Performance Surface**-** Methods & Ideas of Gradient Search methods, Gradient Searching Algorithm & its Solution, Stability & Rate of convergence - Learning Curves

Gradient Search by Newton's Method, Method of Steepest Descent, Comparison of Learning Curves

UNIT III: LMS AND RLS ALGORITHMS (Periods:13)

LMS Algorithm**-**Overview, LMS Adaptation algorithms, Stability & Performance analysis of LMS Algorithms, LMS Gradient & Stochastic algorithms, Convergence of LMS algorithm. Applications**-**Noise cancellation, Cancellation of

Echoes in long distance telephone circuits, Adaptive Beam forming. RLS Algorithm **-** Matrix Inversion lemma, exponentially weighted recursive least square algorithm, update recursion for the sum of weighted error squares, convergence analysis of RLS Algorithm, Application of RLS algorithm on Adaptive Equalization.

UNIT - IV: KALMAN FILTERING AND NON LINEAR ADAPTIVE FILTERING (Periods:12)

Kalman Filtering**-**Introduction, Recursive Mean Square Estimation Random variables, Statement of Kalman filtering problem, The Innovations Process, estimation of the state using the Innovations Process, Filtering, Initial conditions, Variants of Kalman filtering.

NON LINEAR ADAPTIVE FILTERING

Theoretical and Practical considerations of Blind Deconvolution, Buss Gang Algorithm for blind Equalization.

UNIT V: ORDER-RECURSIVE ADAPTIVE FILTERS (Periods:12)

Gradient-Adaptive Lattice Filter, order-recursive adaptive filters using least square estimation, adaptive forward linear prediction, adaptive backward linear prediction, conversion factor, l east-square lattice predictor, angle normalized estimation errors, first order state space models for lattice filtering, QR-Decomposition-Based Least-Squares Lattice Filters, Recursive Least-Squares lattice Filters Using a Posteriori Estimation Errors.

Total periods: 55

TEXT BOOKS:

1. Bernard Widrow, Samuel D. Strearns, *Adaptive Signal Processing,* PE, 1985.
2. Simon Haykin, *Adaptive Filter Theory,* 4th Edition, PE Asia, 2002.

REFERENCE BOOKS:

1. Alexander D Poularikas & Zayed M Ramadan, CRC, *Adaptive Filtering Primer with MATLAB,* Taylor & Francis group.
2. Sophocles. J. Orfamadis, *Optimum signal processing: An introduction,* 2nd Edition, McGraw-Hill, Newyork, 1988.

M. Tech. (CMS)-II Semester
M. Tech. (DECS)-II Semester (Elective-II)
(14MT23806) DETECTION AND ESTIMATION OF SIGNALS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Probability theory and Stochastic Processes at UG Level

COURSE DESCRIPTION:
Detection criteria for single and multiple observations; Estimation techniques; Properties of estimators; Estimation of parameters.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Different decision criteria
- Estimation techniques and their properties
- Selection of an efficient estimator for the given specifications.
- Design of Kalman and Matched filters
- Statistical estimation of parameters

CO2 Analyze complex engineering problems critically for conducting research in the field of signal detection and estimation.
CO3 Conceptualize and solve engineering problems to obtain solutions for the design of optimum receivers.
CO4 Apply appropriate techniques to engineering activities in the field of Communications.

DETAILED SYLLABUS

UNIT – I: DETECTION THEORY (Periods:12)
Binary Decisions: Single observation **–** Maximum-likelihood decision criterion, Neyman-Pearson criterion, Receiver operating characteristics, Probability-of-error criterion, Bayes risk criterion, Min-max criterion. Problem solving.

UNIT–II: BINARY DECISIONS: MULTIPLE OBSERVATIONS (Periods:11)
Vector observations, the general Gaussian Problem, Waveform Observation in Additive Gaussian Noise, The Integrating Optimum Receiver, Matched Filter Receiver, Problem solving.

UNIT - III: ESTIMATION THEORY (Periods:12)
Maximum-likelihood estimation, Bayes estimation criterion - Mean Square Error Criterion, Uniform Cost Function, Absolute-Value Cost Function. Linear minimum-Variance and Least Squares Method, Estimation in the presence of Gaussian noise - Linear observation, Non-linear estimation. Problem solving.

UNIT – IV: PROPERTIES OF ESTIMATORS (Periods:08)
Bias, Efficiency, Cramer-Rao bound, Asymptotic properties, Sensitivity and error analysis.

UNIT–V: STATE ESTIMATION AND STATISTICAL ESTIMATION OF PARAMETERS (Periods:11)

State Estimation: Prediction, Kalman filter, Problem solving.

Statistical Estimation of Parameters: Concept of sufficient statistics, Exponential families of Distributions, Exponential families and Maximum likelihood estimation, uniformly minimum-variance unbiased estimation.

Total periods: 54

TEXT BOOKS:

1. James L.Melsa & David L.Cohn, "Decision and Estimation Theory", McGraw Hill, 1978.
2. Steven M. Kay, "Fundamentals of Statistical Signal Processing Vol. 1: Estimation Theory, Prentice Hall, 1993, Vol. 2: Detection Theory", Prentice Hall Inc., 1998.

REFERENCE BOOKS:

1. Harry L. Van Trees, "Detection, Estimation and Modulation Theory", Part 1, John Wiley & Sons Inc. 1968.
2. Jerry M. Mendel, "Lessons in Estimation Theory for Signal Processing, Communication and Control", Prentice Hall Inc., 1995.
3. Sophocles J.Orfanidis, "Optimum Signal Processing", McGraw Hill, 2nd edition, 1988.

M. Tech. (CMS & DECS)-II Semester
(14MT23802) INFORMATION THEORY AND CODING TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Digital Communications at UG Level

COURSE DESCRIPTION:
Information theory; Channel capacity; Channel coding techniques – Linear block codes, Cyclic codes, Convolutional codes; Reed-Solomon and Turbo codes.

COURSE OUTCOMES:
After completion of the course, students should be able to:
CO1. Demonstrate knowledge in
- Various aspects of source and channel coding techniques
- channel capacity
- Performance evaluation of various source coding techniques

CO2. Analyze complex engineering problems critically in the domain of information, source and line encoding.
CO3. Conceptualize and Solve engineering problems for feasible and optimal solutions in the core area of information theory and coding techniques.
CO4. Apply appropriate techniques to complex engineering activities in the field of information and communications.

DETAILED SYLLABUS

UNIT I: INTRODUCTION (Periods:12)

Entropy: Discrete stationary sources, Markov sources, Entropy of a discrete Random variable- Joint, conditional, relative entropy, Mutual Information and conditional mutual information. Chain rules for entropy, relative entropy and mutual information, Differential Entropy - Joint, relative, conditional differential entropy and Mutual information.

Loss less Source coding: Uniquely decodable codes, Instantaneous codes, Kraft's inequality, optimal codes, Huffman code, Shannon's Source Coding Theorem.

UNIT II: CHANNEL CAPACITY (Periods:10)

Capacity computation for some simple channels, Channel Coding Theorem, Fano's inequality and the converse to the Coding Theorem, Equality in the converse to the coding theorem, The joint source Channel Coding Theorem, The Gaussian channels- Capacity calculation for Band limited Gaussian channels, Parallel Gaussian Channels, Capacity of channels with colored Gaussian noise.

UNIT III: CHANNEL CODING-1 (Periods:08)

Linear Block Codes: Introduction to Linear block codes, Generator Matrix, Systematic Linear Block codes, Encoder Implementation of Linear Block

Codes, Parity Check Matrix, Syndrome testing, Error Detecting and correcting capability of Linear Block codes, Application of Block codes for error control in data storage Systems.

UNIT IV: CHANNEL CODING-2 (Periods:14)

Cyclic Codes: Algebraic Structure of Cyclic Codes, Binary Cyclic Code Properties, Encoding in Systematic Form, Systematic Encoding with an (n - k)-Stage Shift Register, Error Detection with an (n - k)-Stage Shift Register, Well-Known Block Codes-Hamming Codes, Extended Golay Code, BCH Codes.

Convolutional Codes: Convolution Encoding, Convolutional Encoder Representation, Formulation of the Convolutional Decoding Problem, Properties of Convolutional Codes, Sequential Decoding, Feedback Decoding, Application of Viterbi and sequential decoding.

UNIT V: CHANNEL CODING-3 (Periods:12)

Reed-Solomon Codes- Reed-Solomon Error Probability, Finite Fields, Reed-Solomon Encoding, Reed-Solomon Decoding, Interleaving and Concatenated Codes- Block Interleaving, Convolutional Interleaving, Concatenated Codes. Coding and Interleaving Applied to the Compact Disc Digital Audio System-CIRC Encoding, CIRC Decoding. Turbo Codes- Turbo Code Concepts, Encoding with Recursive Systematic Codes, Feedback Decoder, The MAP Decoding Algorithm.

Total Periods: 56

TEXT BOOKS:

1. Thomas M. Cover and Joy A. Thomas, Elements of Information Theory, John Wiley & Sons, 1 st Edition,1999.
2. Bernard sklar, "Digital Communications – Fundamental and Application", Pearson Education, 2 nd Edition, 2009.

REFERENCES:

1. Robert Gallager, Information Theory and Reliable Communication, John Wiley & Sons,1st Edition,1968.
2. John G. Proakis, "Digital Communications", Mc. Graw Hill Publication, 5th Edition, 2008.
3. SHU LIN and Daniel J. Costello, Jr., "Error Control Coding – Fundamentals and Applications", Prentice Hall, 2nd Edition, 2002.

M. Tech. (CMS)-II Semester
(14MT26102) SOFTWARE DEFINED RADIO

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Wireless Communications at UG Level

COURSE DESCRIPTION:
Principles of software defined radio; Multirate signal processing; Digital generation of signals; Smart antennas with applications.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in the evolving paradigm of Software defined radio and technologies for its implementation.
CO2. Analyze complex problems critically in the domains of Radio frequency implementation issues, multirate signal processing in SDR, as well as a Smart antenna techniques for better spectrum exploitation for conducting research.
CO3. Apply appropriate techniques for the development of scientific and technological knowledge in designing software defined radios and their usage for cognitive radio.

DETAILED SYLLABUS

UNIT – I: INTRODUCTION TO SOFTWARE RADIO CONCEPTS (Periods:14)
The need for Software radios and its definition, Characteristics and benefits of Software radio, Design principles of a software radio.
Radio Frequency Implementation Issues: Purpose of RF front – end, Dynamic range, RF receiver front – end topologies, Enhanced flexibility of the RF chain with software radios, Importance of the components to overall performance, Transmitter architectures and their issues, Noise and distortion in the RF chain, ADC & DAC distortion, Pre-distortion, Flexible RF systems using micro-electromechanical systems.
UNIT – II: MULTIRATE SIGNAL PROCESSING IN SDR (Periods:08)
Sample rate conversion principles, Polyphase filters, Digital filter banks, Timing recovery in digital receivers using multirate digital filters.
UNIT -III: DIGITAL GENERATION OF SIGNALS (Periods:13)
Introduction, Comparison of direct digital synthesis with analog signal synthesis, Approaches to direct digital synthesis, Analysis of spurious signals, Spurious components due to periodic jitter, Bandpass signal generation, Performance of direct digital synthesis systems, Hybrid DDS – PLL Systems, Applications of direct digital synthesis, Generation of random sequences, ROM compression techniques.

UNIT – IV: SMART ANTENNAS (Periods:13)

Introduction, Vector channel modelling, Benefits of smart antennas, Structures for beamforming systems, Smart antenna algorithms, Diversity and Space time adaptive signal processing, Algorithms for transmit STAP, Hardware implementation of smart antennas, Array calibration, Digital Hardware Choices-Key hardware elements, DSP processors, FPGAs, Power management issues.

UNIT – V: OBJECT ORIENTED REPRESENTATION OF RADIOS AND NETWORK (Periods:10)

Networks, Object –oriented programming, Object brokers, Mobile application environments, Joint Tactical radio system.

Case Studies in Software Radio Design: SPEAKeasy, JTRS, Wireless Information transfer system, SDR-3000 digital transceiver subsystem, Spectrum Ware, Brief introduction to Cognitive Networking.

Total periods: 58

TEXT BOOKS:

1. Jeffrey Hugh Reed, "Software Radio: A Modern Approach to Radio Engineering," Prentice Hall Professional, 2002.
2. Paul Burns, "Software Defined Radio for 3G," Artech House, 2002.

REFERENCE BOOKS:

1. Tony J Rouphael, "RF and DSP for SDR," Elsevier Newnes Press, 2008.
2. P. Kenington, "RF and Baseband Techniques for Software Defined Radio," Artech House, 2005.

M. Tech. (CMS & DECS)-II Semester
(14MT23805) WIRELESS COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Digital Communications at UG Level.

COURSE DESCRIPTION:
Introduction to cellular wireless communication systems; Radio propagation in mobile environment; Equalization and Diversity techniques; Multiple access techniques; Introduction to wireless networking; Multicarrier modulation techniques.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Cellular systems and wireless standards
- Radio wave propagation in wireless environment
- Equalization and diversity techniques
- Multiple access techniques and networking
- Multicarrier modulation

CO2. Analyze complex engineering problems critically for conducting research in wireless systems.
CO3. Solve engineering problems with wide range of solutions in wireless communications.
CO4. Apply appropriate techniques to engineering activities in the field of wireless communications.

DETAILED SYLLABUS

UNIT – I: INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS AND CELLULAR CONCEPT (Periods:11)

Evolution of Mobile Radio Communication Systems, Examples of Wireless Communication Systems, 1G, 2G, 2.5G, and 3G Wireless Cellular Networks and Standards, Frequency Reuse Concept, Channel Assignment Strategies, Interference and System Capacity, Trunking and Grade of Service, Improving Coverage and Capacity in Cellular Systems-cell splitting and sectoring. Problem solving.

UNIT – II: MOBILE RADIO PROPAGATION (Periods:15)

Large Scale Path Loss: Introduction, Free Space Propagation Model, Relating Power to Electric field, Propagation Mechanisms – Reflection, Diffraction, and Scattering. Practical Budget Design using Path Loss Models, Outdoor and Indoor Propagation Models. Problem solving.

Small Scale Fading and Multipath: Small Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small Scale Multipath Measurements, Parameters of Mobile Channels, Types of Small Scale Fading

(all variations*),* Statistical Models – Clarke's Model for Flat Fading, and Jake's Model. Problem solving.

UNIT -III: EQUALIZATION & DIVERSITY TECHNIQUES (Periods:11)

Equalization: Introduction, Survey of Equalization Techniques, Linear and Non-linear Equalizers – Linear Transversal Equalizer, Decision Feedback Equalizer (DFE). Algorithms for Adaptive Equalization – Zero Forcing, LMS, and RLS. Problem solving.

Diversity Techniques: Realization of Independent Fading Paths, Receiver Diversity – System Model, Selection Combining, Threshold Combining, Maximal Ratio Combining, and Equal Gain Combining, Rake receiver. Transmit Diversity–Channel known at Transmitter, Channel unknown at Transmitter – the Alamouti Scheme, analysis.

UNIT – IV: MULTIPLE ACCESS TECHNIQUES & NETWORKING (Periods:12)

Introduction to Multiple Access: FDMA, TDMA, CDMA, SDMA, Packet Radio - Pure ALOHA, Slotted ALOHA, CSMA, and Reservation protocols. Capacity of Cellular Systems- Cellular CDMA. Problem Solving.

Introduction to Wireless Networking: Introduction to Wireless Networks, Differences between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel Signaling.

UNIT – V: MULTICARRIER MODULATION (Periods:08)

Data Transmission using Multiple Carriers, Multicarrier Modulation with Overlapping Subchannels, Discrete Implementation of Multicarrier Modulation – DFT and its properties, The Cyclic Prefix, Orthogonal Frequency Division Multiplexing (OFDM), Matrix Representation of OFDM, Vector Coding. Challenges in Multicarrier Systems. Problem solving.

Total periods: 56

TEXT BOOKS:

1. T. S. Rappaport, "Wireless Communications, Principles and Practice," Prentice Hall, 2nd Edition, 2002.
2. Andrea Goldsmith, "Wireless Communications," Cambridge University Press, 2005.

REFERENCE BOOKS:

1. David Tse, PramodViswanath, "Fundamentals of Wireless Communications," Cambridge University Press, 2006.
2. Dr. Kamilo Feher, "Wireless Digital Communications," Prentice Hall, 1995.

M. Tech. (CMS)-II Semester (Elective-II)
(14MT26103) EMI/EMC

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Courses on Electromagnetic waves and Transmission lines, Antennas and wave propagation & Microwave engineering at UG Level.

COURSE DESCRIPTION:
Sources of EMI; Standards for EMI/EMC and test sites; Interference measurements; Effects of grounding, shielding and bonding; Components for EMC.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate knowledge in
- electromagnetic interference effects
- standards of EMC
- Radiated and conducted interference measurements
- Effects of grounding at high frequencies

CO2. Analysis and design of electronic systems for real time applications.
CO3. Apply appropriate research methodologies, techniques to contribute individually and in groups for the development of scientific knowledge in electronic systems.
CO4. Demonstrate knowledge and understanding of effects of electromagnetic interference and apply the same in practice.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION AND SOURCES OF EMI AND NONIDEAL BEHAVIOR OF COMPONENTS (Periods:10)

Concepts and Definition of EMI and EMC, Natural and man-made EMI sources. Non-ideal behavior of components-Wires, printed circuit board (PCB) lands, effect of component leads, resistors, capacitors, inductors.

UNIT-II: EMI/EMC STANDARDS AND OPEN AREA TEST SITES (Periods:10)

Introduction - Standards for EMI/EMC, MIL, STD 461 /462, IEEE/AXSI Standards , CISPR/IEC Standards, FCC regulations. Open area test sites- open area test site measurements, Measurement precautions, open area test site, Terrain Roughness, Normalized Site Attenuation, Measurement of test site imperfections, Antenna factor measurement, Measurement errors.

UNIT-III: RADIATED INTERFERENCE AND CONDUCTED INTERFERENCE MEASUREMENTS (Periods:11)

Radiated Interference measurements-Anechoic chamber, Transverse Electromagnetic Cell, Reverberating chamber, Giga-Hertz TEM Cell, Comparison of test facilities.

Conducted Interference measurements- Characterization of conduction

currents/voltages, Conducted EM noise on power supply lines, Conducted EMI from equipment, Immunity to conducted EMI, Detectors and measurement.

UNIT-IV: GROUNDING, SHIELDING AND BONDING (Periods:13)

Grounding - Principles and Practice of Earthing, Precautions in Earthing, Measurements of ground resistance, System grounding for EMC, Cable shield Grounding. Shielding- Shielding Theory and Effectiveness, Shielding Materials, Shielding Integrity at discontinuities, Conductive coatings, Cable shielding, Shielding Effectiveness measurements. Electrical Bonding.

UNIT-V: EMC FILTERS, CABLES, CONNECTORS AND COMPONENTS (Periods:10)

Characteristics and Types of Filters - Impedance Mismatch Effects, Lumped Element Low Pass Filter, High Pass Filter, Band Pass Filter, Band Reject filter. Power Line filter Design - Common mode filter, Differential mode filter, Combined CM and DM filter. EMI suppression cables. EMC connectors.

EMC Gaskets - Knitted Wire-Mesh Gaskets, Wire Screen Gaskets, Oriented Wire mesh, Conductive Elastomer, Transparent Conductive windows, Conductive Adhesive, Conductive Grease. Conductive Coatings. Isolation transformers. Opto Isolators.

Total Periods: 54

TEXT BOOKS

1. V. Prasad Kodali, "Engineering Electromagnetic Compatibility", S.Chand & company Ltd., 1st edition,2000.
2. Clayton R. Paul, "Introduction to Electromagnetic Compatibility", John Wiley and Sons, 2nd edition, 2008.

REFERENCE BOOKS

1. Christos Christopoulos, "Principles and Techniques of Electromagnetic Compatibility", CRC Press (Taylor & Francis Group) 2nd edition, 2007.

M. Tech. (CMS)-II Semester (Elective-II)
(14MT26104) RADAR SIGNAL PROCESSING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE: A course on Communication systems at UG level.

COURSE DESCRIPTION:
Radar range equation and matched filter; Demodulation of radar signals in the presence of noise; Wave form selection and radar clutter; Pulse compression and Phase coding techniques.

COURSE OUTCOMES: After completion of the course, the student will be able to
CO1: Demonstrate knowledge in
- Characteristics of matched filter
- Detection criteria of radar signals in noise environment.
- Radar waveform design requirements.
- Pulse compression techniques
- Different coding techniques.

CO2: Develop skills in designing Radar systems in different noise environments.
CO3: Apply appropriate techniques for radar signal de-noising.

DETAILED SYLLABUS
UNIT - I: RANGE EQUATION AND MATCHED FILTER (Periods:13)
Introduction– Radar Frequencies, Radar Block Diagram, Radar Equation, Information Available from Radar Echo. Review of Radar Range Performance– General Radar Range Equation, Radar Detection with Noise Jamming, Beacon and Repeater Equations, Bistatic Radar.
Matched Filter Receiver – Impulse Response, Frequency Response Characteristic and its Derivation. Matched Filter and Correlation Function, Correlation Detection and Cross-Correlation Receiver. Efficiency of Non-Matched Filters, Matched Filter for Non-White Noise.
UNIT - II: DETECTION OF RADAR SIGNALS IN NOISE (Periods:10)
Detection Criteria – Neyman-Pearson Observer, Likelihood-Ratio Receiver, Inverse Probability Receiver, Sequential Observer, Detectors –Envelope Detector, Logarithmic Detector, I/Q Detector. Automatic Detection – CFAR Receiver, Cell Averaging CFAR Receiver, CFAR Loss, CFAR Uses in Radar. Radar Signal Management –Schematics, Component Parts, Resources and Constraints.
UNIT - III: WAVEFORM SELECTION (Periods:09)
Radar Ambiguity Function and Ambiguity Diagram – Principles and Properties; Specific Cases – Ideal Case, Single Pulse of Sine Wave, Periodic Pulse Train, Single Linear FM Pulse, Noise like Waveforms. Waveform Design Requirements. Radar clutter- Introduction, surface clutter, Land clutter, Detection of targets in Clutter.

UNIT - IV: PULSE COMPRESSION IN RADAR SIGNALS (Periods:08)

Introduction, Significance, Types. Linear FM Pulse Compression – Block Diagram, Characteristics, Reduction of Time Side lobes, Stretch Techniques, Generation and Decoding of FM Waveforms – Block Schematic and Characteristics of Passive System, Digital Compression,
SAW Pulse Compression.

UNIT - V: PHASE CODING TECHNIQUES (Periods:13)

Phase Coding Techniques: Principles, Binary Phase Coding, Barker Codes, Maximal Length Sequences (MLS/LRS/PN), Block Diagram of a Phase Coded CW Radar.

Poly Phase Codes : Frank Codes, Costas Codes, Non-Linear FM Pulse Compression, Doppler Tolerant PC Waveforms – Short Pulse, Linear Period Modulation (LPM/HFM), Side lobe Reduction for Phase Coded PC Signals, Complementary codes, Huffman codes, Limiting in Pulse Compression, Cross-Correlation Properties, compatibility.

Total Periods : 53

TEXT BOOKS:

1. M.I. Skolnik, "*Introduction to Radar Systems",* TMH, 3rd Edition, 2001.
2. Fred E. Nathanson, "*Radar Design Principles – Signal Processing and The Environment",*McGraw Hill,Inc, 2nd Edition,1991.
3. 3 M.I. Skolnik, *Radar Handbook,* McGraw Hill, 2nd Edition, 1991.

REFERENCE BOOKS:

1. Peyton Z. Peebles Jr., *Radar Principles,* Wiley India Pvt. Ltd., 1998.
2. R. Nit berg, *Radar Signal Processing and Adaptive Systems,* Artech House, 1999.
3. F.E. Nathanson, *Radar Design Principles,* 1st Edition, McGraw Hill, 1969

M. Tech. (CMS)- II Semester (Elective-II)
(14MT26105) TELEMETRY AND TELECONTROL

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Courses on Analog Communications, Digital Communications, Satellite Communications and Optical Communications at UG level.

COURSE DESCRIPTION:
Principles of telemetry; Channel coding; Multiplexing systems; Satellite and optical telemetry; Analog and digital telecontrol techniques.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate in-depth knowledge in
- Telemetry and Telecontrol systems
- Symbols and Codes
- Different multiplexers in telemetry
- Satellite and optical telemetry systems

CO2. Analyze complex engineering problems critically in the domain of Telemetry and Telecontrol systems for conducting research.
CO3. Solve engineering problems for feasible and optimal solutions in the core area of Telemetry and
CO4. Apply appropriate techniques to complex engineering activities in the field of telemetry and telecontrol systems.

DETAILED SYLLABUS

UNIT–I:TELEMETRY PRINCIPLES (Periods:08)
Introduction, Functional blocks of Telemetry system, Methods of Telemetry – Non Electrical, Electrical, Pneumatic, Frequency, Power Line Carrier Communication .

UNIT – II: SYMBOLS AND CODES (Periods:07)
Bits and Symbols, Time function pulses, Line and Channel Coding, Modulation Codes, Intersymbol Interference.

UNIT – III: FREQUENCY DIVISION AND TIME DIVISION MULTIPLEXED SYSTEMS (Periods:13)
FDM, IRIG Standard, FM and PM Circuits, Receiving end, PLL. TDM-PAM systems, PAM /PM and TDM–PCM Systems. PCM reception. Differential PCM. Modems-Introduction, QAM, Modem Protocols.

UNIT – IV: SATELLITE AND OPTICAL TELEMETRY (Periods:10)
General considerations, TT&C Service, Digital Transmission systems, TT&C Subsystems, satellite Telemetry and Communications.
Optical fibers Cable – dispersion, losses, connectors and splicers, Sources and detectors, Transmitter and Receiving Circuits, Coherent Optical Fiber Communication System, WDM.

UNIT – V: TELECONTROL METHODS (Periods:12)

Analog and Digital techniques in Telecontrol, Telecontrol apparatus – Remote adjustment, Guidance and regulation – Telecontrol using information theory – Example of a Telecontrol System.

Total Periods: 50

TEXT BOOKS:

1. D. Patranabis, Telemetry Principles, Tata McGraw-Hill, 1999
2. Swoboda G., Telecontrol Methods and Applications of Telemetry and Remote Control, Reinhold Publishing Corp., London, 1991

REFERENCE BOOKS:

1. Gruenberg L., Handbook of Telemetry and Remote Control, McGraw Hill, New York, 1987.
2. Young R.E., Telemetry Engineering, Little Books Ltd., London, 1988.
3. Housley T.,Data Communication and Teleprocessing System, PH Intl., Englewood Cliffs, New Jersey, 1987.

M. Tech. (CMS & VLSI)-II Semester (Elective-II)
(14MT25709) WIRELESS SENSOR NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
A Course on Wireless Communications at UG Level

COURSE DESCRIPTION:
Concepts of wireless sensor networks; Physical, Network, Transport and Application layers.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1. Demonstrate advanced knowledge in
- Wireless Sensor Networks
- Physical layer
- Data link layer
- Network layer
- Transport layer

CO2. Analyze and design complex problems critically in the domains of Wireless Communications and Wireless sensor Networks for conducting research.
CO3. Apply appropriate techniques to for the development of scientific knowledge in Wireless Sensor Networks.
CO4. Demonstrate knowledge and understanding of wireless sensor networks and apply the same in practice.

DETAILED SYLLABUS
UNIT – I: INTRODUCTION TO WIRELESS SENSOR NETWORKS (Periods:11)
Challenges for wireless sensor networks, Comparison of sensor network with ad hoc network, Single node architecture - Hardware components, energy consumption of sensor nodes. Network architecture: Sensor network scenarios - types of sources and sinks, single hop versus multi-hop networks, multiple sinks and sources. Design principles for wireless sensor networks.

UNIT – II: PHYSICAL LAYER (Periods:11)
Introduction, wireless channel and communication fundamentals – frequency allocation, modulation and demodulation, wave propagation effects and noise, channels models, spread spectrum communication, packet transmission and synchronization, quality of wireless channels and measures for improvement. Physical layer and transceiver design consideration in wireless sensor networks - Energy usage profile, choice of modulation, Power Management .

UNIT -III: DATA LINK LAYER (Periods:16)
MAC protocols: fundamentals of wireless MAC protocols - Requirements and design constraints for wireless MAC protocols, Important classes of MAC protocols, MAC protocols for wireless sensor networks. Low duty cycle

protocols and wakeup concepts - Sparse topology and energy management (STEM), S-MAC, Wakeup radio concepts. Contention-based protocols - CSMA protocols, PAMAS. Schedule-based protocols - SMAC, BMAC, Traffic-adaptive medium access protocol (TRAMA). Link Layer protocols – fundamentals task and requirements, error control - Causes and characteristics of transmission errors, ARQ techniques, FEC techniques, Hybrid schemes, Power control,

UNIT – IV: NETWORK LAYER (Periods:10)

Gossiping and agent-based uni-cast forwarding - Basic idea, Randomized forwarding. Energy-efficient unicast, Broadcast and multicast - Source-based tree protocols, Shared, core-based tree protocols, Mesh-based protocols. geographic routing - Basics of position-based routing, Geocasting. Mobile nodes - Mobile sinks, Mobile data collectors, Mobile regions. Data centric and content-based networking - Introduction, Data-centric routing, Data aggregation.

UNIT – V: TRANSPORT LAYER (Periods:09)

The transport layer and QoS in wireless sensor networks - Quality of service/reliability, Transport protocols. Coverage and deployment - Sensing models, Coverage measures, Uniform random deployments: Poisson point processes, Coverage of random deployments: Boolean sensing model, general sensing model, Coverage determination, Coverage of grid deployments. Reliable data transport, Single packet delivery - Using a single path, Multiple paths, Multiple receivers. Congestion control and rate control - Congestion situations in sensor networks, Mechanisms for congestion detection and handling, Protocols with rate control, The CODA congestion-control framework.

Total periods: 57

TEXT BOOKS:

1. Holger Karl, Andreas willig "Protocol and Architecture for Wireless Sensor Networks", John wiley publication, Oct 2007.

REFERENCE BOOKS:

1. Feng zhao, Leonidas guibas, Elsivier , "Wireless Sensor Networks: an information processing approach –publication, 2004.
2. Edgar H .Callaway, First Edition,"Wireless Sensor Networks : Architecture and protocol", CRC press 2003.
3. C.S.Raghavendra Krishna, M.Sivalingam and Tarib znati, "Wireless Sensor Networks", Springer publication, 2006.

M. Tech. (CMS) - II SEMESTER
(14MT26121) COMMUNICATIONS LAB - II

Int. Marks	Ext. Marks	Max. Marks	L	T	P	C
25	50	75	-	-	4	2

PRE- REQUISITES: Simulation lab at UG level

COURSE DESCRIPTION:

Simulation of communication systems over communication channels with and without line coding; Design and simulation of Bussgang Blind channel equalizer; Adaptive equalizers using LMS and RLS algorithms; Image processing techniques; Design and simulation of WDM systems.

COURSE OUTCOMES: At the end of the course, students will be able to

CO1. Demonstrate skills in
- Simulation of Rayleigh fading channel in the mobile environment.
- Design and simulation of an adaptive equalizer using LMS and RLS algorithms.
- Designing communication system over a Gaussian channel and evaluate its performance.
- Simulating communication system using convolutional codes & Viterbi Decoding.
- Developing Color image in various color models.
- Performing image smoothening and sharpening.
- Designing WDM system.

CO2. Solve engineering problems for feasible and optimal solutions in the core area of Communications.

CO3. Use MATLAB Toolboxes to complex engineering activities in the domain of communications.

CO4. Demonstrate Knowledge and understanding of Engineering Principles in the field of communications.

List of experiments:

1. Simulation of Rayleigh fading channel in the mobile environment. (2 time slots)
2. Design and performance evaluation of CDMA communication system over a Gaussian channel. (2 time slots)
3. Simulation of communication system using convolutional codes & Viterbi Decoding. (2 time slots)
4. Design and simulation of an adaptive equalizer using LMS algorithm. (1 time slot)
5. Design and simulation of an adaptive equalizer using RLS algorithm. (1 time slot)
6. Design and simulation of communication system using Bussgang Blind channel equalizer. (2 time slots)

7. Smoothening and Sharpening of a given image.
   (1 time slot)
8. Color image in various color models.
   (1 time slot)
9. Design of WDM system.
   (2 time slots)

Tools required:
MATLAB with communication & image processing tool boxes and OptSim and ModeSYS software.

REFERENCE BOOKS:

1. Advanced communication lab-II manual of the department.
2. W.H. Tranter, K. Sam Shanmugham, T.S. Rappaport, and K.L. Kosbar, *Principles of Communication System Simulation with Wireless Applications,* Pearson, 2004.
3. J.G. Proakis, and M. Salehi, *Contemporary Communication Systems using MATLAB,* cengage learning, *2nd Edition,* 2004.
4. *R. C. Gonzalez, R. E. Woods, Steven L. Eddins, Digital Image Processing using MATLAB, Gatesmark publishing,2nd Edition, 2009.*
5. OptSim and ModeSYS user manual.

M. Tech. (CMS) – II Semester
(14MT26122) SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	50	50	--	--	--	2

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of seminar topic; Literature survey; Preparation of technical report and Presentation.

COURSE OUTCOMES:
On successful completion of the course, the student will be able to

CO1. Demonstrate capacity to identify an advanced topic for seminar in core and allied areas.

CO2. Extract information pertinent to the topic through literature survey.

CO3. Comprehend extracted information through analysis and synthesis critically.

CO4. Plan, organize, prepare and present effective written and oral technical report on the topic.

CO5. Adapt to independent and reflective learning for sustainable professional growth.

M. Tech. (CMS) – III & IV Semesters
(14MT36121 & 14MT46121) PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
80	120	200	--	--	--	16

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation.

COURSE OUTCOMES:
On successful completion of the course, the student will be able to

CO1. Demonstrate capacity to identify an advanced topic for project work in core and allied areas.

CO2. Gather information related to the topic through literature survey.

CO3. Comprehend gathered information through critical analysis and synthesis.

CO4. Solve engineering problems pertinent to the chosen topic for feasible solutions.

CO5. Use the techniques, skills and modern engineering tools necessary for project work.

CO6. Do time and cost analysis on the project.

CO7. Plan, prepare and present effective written and oral technical report on the topic.

CO8. Adapt to independent and reflective learning for sustainable professional growth.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF EEE

COURSE STRUCTURE for M.Tech. (EPS)

I-SEMESTER

Subject Code	Subject	L	T	P	C	Max. Marks		
						Int.	Ext.	Total
14MT10701	Power System Security and State Estimation	4	-	-	4	40	60	100
14MT10702	Static and Digital Protection of Power System	4	-	-	4	40	60	100
14MT10703	Advanced Power System Stability Analysis	4	-	-	4	40	60	100
14MT10704	Power Electronic Converters	4	-	-	4	40	60	100
14MT10705	Advanced Control Systems	4	-	-	4	40	60	100
Elective – I								
14MT10706	Microcontrollers and Applications	4	-	-	4	40	60	100
14MT10707	Reactive Power Compensation and Management							
14MT10708	Solar and Wind Energy Conversion Systems							
14MT10709	Optimization Techniques							
14MT10310	Research methodology	3	-	-	3	40	60	100
Laboratory								
14MT10721	Power Systems and Relays lab	-	-	4	2	25	50	75
	Total	**27**	**-**	**4**	**29**	**305**	**470**	**715**

II-SEMESTER

Subject Code	Subject	L	T	P	C	Max. Marks		
						Int.	Ext.	Total
14MT20701	Operation and Control of Power System	4		-	4	40	60	100
14MT20702	Flexible AC Transmission System	4		-	4	40	60	100
14MT20703	Power Quality	4		-	4	40	60	100
14MT20704	Smart Grid Technology	4		-	4	40	60	100
14MT20705	Intelligent Control	4		-	4	40	60	100
Elective – II								
14MT20706	High Voltage DC Transmission	4	-	-	4	40	60	100
14MT20707	Restructured Power System							
14MT20708	Power System Reliability							
14MT20709	Energy Audit, Conservation and Management							
Laboratory								
14MT20721	Power Systems Simulation lab	-	-	4	2	25	50	75
14MT20722	Seminar	-	-	-	2	-	50	50
	Total	**24**	**-**	**4**	**28**	**265**	**460**	**725**

III-SEMESTER

Subject Code	Course	Periods per Week			C	Int.	Ext.	Total
		L	T	P*				
14MT30721	Project Work Phase-I	-	-	-	4	40	-	40
Total		-	-	-	4	40	-	40

*Fulltime Project Work

IV-SEMESTER

Subject Code	Course	Periods per Week			C	Int.	Ext.	Total
		L	T	P*				
14MT40721	Project Work Phase-II	-	-	-	12	40	120	160
Total		**-**	**-**	**-**	**12**	**40**	**120**	**160**

*Fulltime Project Work

Total Credits: 73 **Total Marks: 1700**

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

M. Tech. (EPS), I-Semester
(14MT10701) POWER SYSTEM SECURITY AND STATE ESTIMATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Power system Analysis at UG level

COURSE DESCRIPTION:
Power system network matrices; AC and DC Load flow studies; Balanced and unbalanced Short circuit analysis; Power system security; Methods of Power System State estimation

COURSE OUTCOMES:
On successful completion of the course, student will be able to
1. demonstrate knowledge on:
   - formation of network matrices.
   - developing load flow solutions and fault analysis for different operating conditions.
   - state estimation and security analysis of power systems.
2. analyze the state and security of power system state for operational contingencies.
3. apply the concepts of state estimation in designing operational strategy for secured operation of power system.

DETAILED SYLLABUS:

UNIT-I: POWER SYSTEM NETWORK MATRICES
Formation of bus admittance matrices by direct inspection method - Algorithm for formation of Bus impedance matrix: addition of a branch and addition of a link, removal element in Bus impedance matrix – Simple problems. Π-representation of off-nominal tap transformers.

UNIT-II: POWER FLOW STUDIES
Introduction to load flow analysis. Classification of buses, Load flow solution methods – Gauss-Seidal method, Newton Raphson method, Decoupled and fast decoupled load flow, Comparison of load flow methods, DC power flow method – Simple problems.

UNIT-III: FAULT ANALYSIS
Short circuit studies – introduction, short circuit calculations using Z_{bus}, Z_f^{abc}, Y_f^{abc}, Z_f^{012} and Y_f^{012} matrices for various faults. Analysis of balanced and unbalanced three phase faults – Simple problems.

UNIT-IV: POWER SYSTEM SECURITY
Introduction to power system security, Factors influencing power system security, Contingency analysis: Detection of Network problems, linear

sensitivity factors, AC power flow methods, Contingency selection, concentric relaxation, bounding – simple problems.

UNIT-V: STATE ESTIMATION IN POWER SYSTEM

Power system state estimation, Methods of state estimation – method of least squares, orthogonal decomposition, Treatment of bad data – applications to power system state estimation – simple problems.

TEXT BOOKS:

1. Allen J.Wood and Wollenberg B.F., *Power Generation Operation and control*, John Wiley & Sons, 2nd edition, 2006.
2. Nagrath I.J. and *Kothari D.P., Modern Power System Analysis,* TMH, New Delhi, 2004.

REFERENCES:

1. Grainger J.J. and Stevenson W.D., *Power System Analysis*, Tata McGraw Hill, New Delhi, 2003.
2. Stagg and El Abiad*: Computer methods in power systems analysis*, McGraw Hill ISE, 1986.

M. Tech. (EPS), I-Semester
(14MT10702) STATIC AND DIGITAL PROTECTION OF POWER SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Switchgear and Protection and Microprocessors and Microcontrollers at UG level.

COURSE DESCRIPTION:
Fundamentals of static and digital relays; Amplitude and Phase Comparators; characteristics of Static over current and differential relays; Static Distance relays; Numerical relays

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge in
    - digital and numerical relays.
    - Operation of static and microprocessor based relays.
2. implement advanced skills in protection of power system components.
3. design and develop different power system protection schemes.
4. select and apply different relays in real time power system protection.

DETAILED SYLLABUS

UNIT-I: **INTRODUCTION TO STATIC AND DIGITAL RELAYS**

Static Relays - basic construction and advantages. Level detectors, Replica impedance, Mixing circuits, Phase and Amplitude Comparators – General equation for two input phase and amplitude comparators, Duality between Phase and Amplitude Comparators

Numerical Relays: Block diagram of typical Numerical Relay – Advantages and Disadvantages.

UNIT-II: **COMPARATORS**

Amplitude comparators: Circulating current type, opposed voltage type rectifier bridge comparators – Direct and Instantaneous comparators.

Phase comparators: Coincidence circuit type - block spike phase comparator, techniques to measure the period of coincidence – Integrating type – Rectifier and vector product type phase comparators.

Multi–Input comparators: Conic section characteristics – Three input amplitude comparator – Hybrid comparator.

UNIT-III: STATIC OVER CURRENTAND DIFFERENTIAL RELAYS

Static over current relays: Introduction, Instantaneous over current relay – Time over current relays. Basic principles – Definite time, Inverse Definite time and Directional over current relays.

Static Differential Relays: Analysis of Static differential relays – static relay schemes – Duo bias transformer differential protection – Harmonic restraint relay.

UNIT-IV: STATIC DISTANCE RELAYS

Static impedance, Reactance, MHO and angle impedance relays – sampling comparator – realization of reactance and MHO relays using a sampling comparator.

Power Swings: Effect of power swings on the performance of distance relays, Power swing analysis, Principle of out-of-step tripping and blocking relays, effect of line length and source impedance on distance relays.

UNIT-V: MICROPROCESSOR BASED PROTECTIVE RELAYS

Microprocessor based over current relays, Impedance relay, Directional relay, Reactance relay. Generalized mathematical expression for distance relays, measurement of resistance and reactance, MHO and offset-MHO relays – Realization of MHO characteristics, realization of offset MHO characteristics – Microprocessor Implementation of Digital Distance Relaying Algorithms.

TEXT BOOKS:

1. T.S. Madhava Rao, *Power system Protection static relay*, 2nd edition, Tata McGraw Hill Publishing Company limited, 2004.
2. Badri Ram and D.N. Vishwakarma, *Power system Protection and Switchgear*, 2nd edition, Tata McGraw Hill Publication Company limited, 2013.

REFERENCE BOOKS:

1. Bhuvanesh A Oza, Nirmal Kumar C Nair et., al., *Power system protection and switchgear*, Tata McGraw Hill Publication Company Limited.

M. Tech. (EPS), I-Semester
(14MT10703) ADVANCED POWER SYSTEM STABILITY ANALYSIS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Power System operation and control, Power system Analysis and Control systems at UG level

COURSE DESCRIPTION:
Introduction to the synchronous machine classical model; state space models of synchronous machine; Methods of Excitation systems and modelling; Effect of excitation on stability; Analysis of Voltage stability

COURSE OUTCOMES:
On successful completion of the course, student will be able to
1. demonstrate knowledge on:
   - transient and dynamic stability studies for large power systems.
   - modeling of SMIB, multi-machine systems and excitation systems.
   - voltage control and reactive power management concepts.
2. assess various control schemes for better performance of the interconnected power system with economic considerations.
3. design and develop efficient control techniques for enhancement of voltage stability, rotor-angle stability and reactive power control in large interconnected power systems.

DETAILED SYLLABUS:

UNIT-I: THE ELEMENTARY MATHEMATICAL MODEL

A Classical model of single machine connected to infinite bus – Problems. System Response to small Disturbances: Block diagram of unregulated and regulated synchronous machine, methods of studies – Effect of small changes of speed. Regulated synchronous machine – voltage regulator with one time lag – Governor with one time lag.

Classical model of multi-machine system – modes of oscillation of unregulated Multi-machine system – Problems.

UNIT-II: THE SYNCHRONOUS MACHINE MODEL

Introduction – Clarkes's and Park's Transformation – flux linkage equations, self and mutual inductances of stator and rotor, transformation of inductances – formulations of state space model of one machine system connected to infinite bus, voltage, current equations – effect of excitation on Dynamic stability – examination of dynamic stability by Routh's criterion.

UNIT-III EXCITATION SYSTEMS

Simplified view of excitation control – Control configuration – Excitation system response – Non-continuously regulated systems – continuously regulated systems – Excitation system compensation – state space description of the excitation system - simplified linear model.

Types of Excitation systems: Type-2 system: rotating rectifier system, Type-3 system: Static with terminal potential and current supplies, Type-4 system: non–continuous acting - Block diagram representation – state space representation.

UNIT-IV: EFFECT OF EXCITATION ON STABILITY

Introduction – effect of excitation on generator power limits – Effect of the excitation system on Transient stability. Approximate model of the complete exciter – generator system – Supplementary stabilizing signals – Block diagram of the linear system – Lead compensation – Stability aspect using Eigen value approach.

UNIT-V: VOLTAGE STABILITY ANALYSIS

Voltage stability – factors affecting voltage instability and collapse – Comparison of angle and voltage stability – Analysis of voltage instability collapse – Control of voltage instability.

Review of Lyapunov's stability theorems of non-linear systems using energy concept – Method based on first concept – Method based on first integrals – Quadratic forms – Variable gradient method – Zubov's method – Popov's method, Lyapunov function for single machine connected to infinite bus.

TEXT BOOKS:

1. P.M. Anderson, A.A. Fouad, *Power System Control and Stability*, 2nd edition, IEEE Press, 2003.
2. K.R. Padiyar, *Power System Dynamics (Stability & Control)*, 2nd edition, B.S. Publications, Hyderabad, India, 2008.

REFERENCES:

1. Prabha Kundur, Neal J.Balu, Mark G.Lauby, *Power System Stability and Control*, 2nd edition, McGraw-Hill, 1994.
2. M.A. Pai, *Power System Stability – Analysis by the direct method of Lyapunov*, North Holland Publishing Company, New York, 1981.

M. Tech. (EPS), I-Semester
(14MT10704) POWER ELECTRONIC CONVERTERS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Power Electronics at UG level.

COURSE DESCRIPTION:
Power Semiconductor Devices; Controlled Rectifiers; AC Voltage Controllers, operation and analysis of Cycloconverters; Analysis of DC-DC and Resonant Converters; Multi Level Inverters and PWM techniques

COURSE OUTCOMES:
On successful completion of the course, student will be able to
1. demonstrate in-depth knowledge in advanced Power devices and converters.
2. analyze and design power converter modules for various applications in power industry.
3. extend the concepts of power electronic converters for HVDC and FACTS.

DETAILED SYLLABUS

UNIT-I: MODERN POWER SEMICONDUCTOR DEVICES
Power Diode - Reverse recovery characteristics, types. Steady state characteristics and switching characteristics of Power transistors (power MOSFET, IGBT) and Thyristors(GTO, IGCT). Gate drive circuits for SCR, MOSFET, IGBT and Base drive circuit for Power BJT. Comparison of power devices.

UNIT-II: MULTI-PULSE CONTROLLEDRECTIFIERS
Six pulse SCR rectifiers – semi and full converters, operation with different firing angles-Effect of line inductance - power factor and THD. Power factor improvement – extinction angle control, symmetric angle control, PWM control – single and three phase control. Three phase dual converters. Single phase series converters. Twelve pulse SCR rectifiers – idealized 12 pulse rectifier operation, effect of line and leakage inductance, power factor and THD. 18 and 24 pulse SCR rectifiers, operation.

UNIT-III: AC VOLTAGE CONTROLLERS AND CYCLOCONVERTERS
Single phase AC voltage controllers with R, RL and RLE loads. AC voltage controllers with PWM Control. Effect of source and load inductances. Synchronous tap changers – Applications. Three Phase AC Voltage Controllers – Analysis of controllers with star and delta Connection, applications, numerical problems. Single phase and three phase cycloconverters – analysis with Mid-point and bridge configurations – Limitations – Advantages – Applications – numerical problems

UNIT-IV: ANALYSIS OF DC-DC AND RESONANT CONVERTERS
Voltage commutated chopper. Current commutated chopper. Switch mode regulators – buck, boost, buck-boost and cuk regulators – condition for

continuous inductor current and capacitor voltage - design of LC filter – comparison of regulators. Multi-output boost converters – advantages, applications, Numerical problems Resonant Converters – Concept of ZVS and ZCS, principle of operation, analysis of M-type and L-type Converters

UNIT-V: PWM AND MULTI LEVEL INVERTERS

Voltage control of single phase inverters – single, multiple, sinusoidal, modified sinusoidal pulse width modulation, phase displacement control Advanced PWM techniques – trapezoidal, staircase, stepped, harmonic injection, delta modulations Voltage control of three phase inverter - sinusoidal PWM, 60 degree PWM, third harmonic PWM, space vector modulation. Harmonic reduction Multilevel inverters – Types – diode clamped, flying capacitor, cascaded – operation, features, applications.

TEXT BOOKS:

1. Rashid M.H., *Power Electronics Circuits, Devices and Applications*, 3rd edition, Prentice Hall publications, 2009.
2. Ned Mohan, Undeland and Robbin, *Power Electronics: Converters, Application and Design*, John Wiley and sons Inc., Newyork, 1995.

REFERENCE BOOKS:

1. Bin Wu, *High power converters and AC Drives,* John Wiley and Sons, 2006.
2. P.C Sen, *Modern Power Electronics*, 1st edition, Wheeler publishing Company, 1998.

M. Tech. (EPS), I-Semester
(14MT10705) ADVANCED CONTROL SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Control Systems at UG level

COURSE DESCRIPTION:
Advanced concepts of controllability, observability; Analysis of non-linear systems; Lyapunov stability and design of controllers and observers; optimal control concepts

COURSE OUTCOMES:
On successful completion of the course, student will be able to
1. demonstrate knowledge in state space analysis, controllability, observability, stability of linear and non-linear control systems.
2. apply describing function, Phase-Plane methods and Lyapunov's stability criterion for non-linear system stability analysis.
3. design controllers and observers using state feedback techniques.

DETAILED SYLLABUS

UNIT–I: CONTROLLABILITY AND OBSERVABILITY
Review of state variable techniques – Concept of controllability and observability, Tests for Controllability and Observability for Continuous Time Systems – Principle of Duality, Controllability and Observability of State Models in Jordan Canonical Form and Other Canonical Forms – Effect of State Feedback on Controllability and Observability.

UNIT–II: ANALYSIS OF NON-LINEAR SYSTEMS
Introduction to Nonlinear Systems, Types of physical Non-linearities, Characteristics of non-linearities, properties of nonlinear systems. Describing Functions, Derivation of Describing Functions for: Dead Zone, Saturation, Backlash, Relay with Dead Zone and Hysteresis. Stability analysis of non-linear systems through describing functions. Phase-Plane Analysis, Singular Points, Isocline method, Delta method.

UNIT-III: STABILITY ANALYSIS
Stability in the Sense of Lyapunov, Lyapunov stability theorems, Definiteness, Sylvester principle, stability analysis by Lyapunov second method, Lyapunov functions, Krasovskii's Method, Variable gradient method

UNIT–IV: CONTROLLERS AND OBSERVERS DESIGN
Design of State Feedback Controller through Pole Placement - Full Order Observer and Reduced Order Observer, state regulator problem

UNIT–V: OPTIMAL CONTROL
Introduction to Optimal Control - Formulation of Optimal Control Problems - Calculus of Variations, Minimization of functional of Single Function, Euler Lagrange Equation, Constrained Minimization, Minimum Principle, Control Variable Inequality Constraints.

TEXT BOOKS:

1. M. Gopal, *Modern Control System Theory*, 2nd edition, New Age International Publishers, 1996.
2. K. Ogata, *Modern Control Engineering,* 3rd edition, Prentice Hall of India, 1998.

REFERENCE BOOKS:

1. I.J. Nagrath and M.Gopal, *Control Systems Engineering*, New Age International (P) Ltd. 2007.
2. M. Gopal, *Digital Control and State Variable Methods,* Tata Mc Graw-Hill Companies, 1997.

M. Tech. (EPS), I-Semester
(14MT10706) MICROCONTROLLERS AND APPLICATIONS
(Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Digital logic, Microprocessors and Microcontrollers at UG level

COURSE DESCRIPTION:
8051 Microcontroller: Architecture, Programming and Interfacing; PIC Microcontrollers: Architecture, features, programming and Interfacing

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge on
    - architecture of 8051 and PIC microcontroller
    - variants of 8051 and PIC
2. critically analyze and develop a suitable interface with an appropriate Microcontroller for the control operations.
3. develop programs for stand-alone systems.

DETAILED SYLLABUS

UNIT–I: 8051 MICROCONTROLLER
Overview of 8051 microcontrollers. 8051/8052 – architecture and features. Memory – internal / external Program, Data memory and their interfacing. Data memory – Register Bank, Bit addressable space, scratch pad area. Special Function Registers (SFRs). Instruction set – Data transfer, Arithmetic, logical, branch control instructions. Addressing modes. Timers – Mode - 0, 1, 2 and 3 operations, TMOD, TCON. Timer applications – wave generation, Device control operations.

UNIT-II: INTERFACING
Basics of serial communication – RS232, MAX232, Baud rate. Serial port programming - SCON, SMOD, SBUF, PCON. Interrupts – IE, TCON, IP. Applications using interrupts of 8051/8052 – wave generation, Device control operations. Interfacing – ADC, DAC, DC motor and PWM

UNNIT-III: PIC MICROCONTROLLERS
CISC Vs RISC. Harvard Vs Von Neumann architectures. PIC16F87XA architecture and features. PIC16 Memory organization – program memory, data memory. PIC Register file – General purpose registers and SFRs.
Introduction to PIC Assembly Programming, PIC Data Format and Directives. PIC programming tools. Instruction set – data transfer, arithmetic, logical, bit manipulation, branch Instructions. I/O Port Programming. Addressing modes – Immediate, Direct, Register Indirect Addressing Modes. Macros and Modules.

UNIT–IV: SERIAL, INTERRUPT, I/O PORTS AND TIMER PROGRAMMING
I/O ports – Port A, TRISA, Port B, TRISB, Port C TRISC. Timer - 0, 1, 2 modules. Compare mode, capture mode. PIC Serial Port programming, PIC

Interrupts, Programming Timer Interrupts, Programming the Serial Communication Interrupts, Port-B - Change Interrupt, Interrupt Priority in the PIC.

UNIT–V: PIC INTERFACING

ADC Characteristics, ADC Programming in the PIC, DAC Interfacing, Sensor Interfacing and Signal Conditioning, Standard and Enhanced CCP Modules, Compare Mode Programming, Capture Mode Programming, PWM Programming, ECCP Programming, Relays and Opto-isolators, Stepper Motor Interfacing, DC Motor Interfacing and PWM, PWM Motor Control with CCP, DC Motor Control with ECCP.

TEXT BOOKS:

1. Muhammad Ali Mazidi, Jancie Gillispie Mazidi, Rolin McKinlay, *The 8051 Microcontroller and Embedded Sytems using Assembly and C*, 2nd edition, Pearson Education.
2. John B. Peatman, *Design with PIC Microcontrollers*, Pearson Education, 2007.

REFERENCE BOOKS:

1. PIC16F87XA manual.
2. Muhammad Ali Mazidi, Rolin D. McKinlay, Danny Causey, *PIC Microcontroller and Embedded Systems using assembly and C for PIC 18,* Pearson Education, 1999.
3. John B. Peatman, *Embedded design with the PIC18F452 Microcontroller*, Printice Hall, 2003.

M. Tech. (EPS), I-Semester
(14MT10707)REACTIVE POWER COMPENSATION AND MANAGEMENT
(Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Power Systems at UG level

COURSE DESCRIPTION:
Reactive Power Compensation: Line and Load compensation; compensating devices; Reactive power coordination: Power Quality; Reactive power management in Domestic and Industrial Sectors

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge on:
   - different methods of reactive power compensation.
   - types of load patterns and loss reduction methods in distribution lines.
   - quality of power supply and reactive power coordination
2. analyze different types of compensations**.**
3. apply skills in designing a compensator for an industrial application**.**

DETAILED SYLLABUS

UNIT-I: REACTIVE POWER COMPENSATION

Need for Reactive Power compensation – reactive power characteristics. Ideal compensator, Practical compensation – power factor correction and voltage regulation. Load compensator as a voltage regulator, phase balancing and power factor correction of unsymmetrical loads– examples.

UNIT-II: REACTIVE POWER COMPENSATION IN TRANSMISSION SYSTEMS

Steady state Reactive power compensation – Uncompensated line. Types of compensation, Passive shunt, series and dynamic shunt compensation – examples.

Transient state Reactive power compensation – Characteristic time periods. Passive shunt compensation. Static compensations – series capacitor compensation, compensation using synchronous condensers - examples.

UNIT-III: REACTIVE POWER COORDINATION

Reactive power coordination: Objective, Mathematical modeling, Operation planning, transmission benefits. Basic concepts of quality of power supply: Disturbances, steady – state variations, effects of under voltages, frequency, Harmonics, radio frequency and electromagnetic interferences.

UNIT-IV: REACTIVE POWER MANAGEMENT

Demand side management: Load patterns, basic methods of load shaping, power tariffs, KVAR based tariffs penalties for voltage flickers and Harmonic voltage levels.

Distribution side Management: System losses, loss reduction methods, examples, Reactive power planning: Objectives, Economic Planning, capacitor placement and retrofitting of capacitor banks.

UNIT-V: REACTIVE POWER MANAGEMENT IN DOMESTIC AND INDUSTRIAL SECTORS

KVAR requirements for domestic appliances: Purpose of using capacitors, selection of capacitors, deciding factors. Types of available capacitor – characteristics and Limitations. Typical layout of traction systems–reactive power control requirements. Distribution transformers, Electric arc furnaces, textile and plastic industries, furnace transformer, filter requirements, remedial measures, and power factor of an arc furnace.

TEXT BOOKS:

1. T.J.E.Miller, *Reactive power control in Electric power systems*, John Wiley and Sons, 1982
2. D.M. Tagare, *Reactive power Management*, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2004.

REFERENCES:

1. Wolfgang Hofmann, Jurgen Schlabbach, Wolfgang Just, *Reactive Power Compensation: A Practical Guide*, Wiley, April, 2012

M. Tech. (EPS), I-Semester
(14MT10708) SOLAR AND WIND ENERGY CONVERSION SYSTEMS
(Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITES:
Power Electronics and Non-Conventional Energy Resources at UG level.

COURSE DESCRIPTION:
Non-Conventional energy resources; Wind and Solar energy systems: design and operation; Power Conditioning Schemes for Solar and Wind Energy systems; Impact of power quality problems

COURSE OUTCOMES:
On successful completion of the course, student will be able to
1. demonstrate knowledge on role of power electronics for renewable energy.
2. analyze the power conditioning schemes for grid connected systems.
3. apply skills in designing wind, solar systems and their integration.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO RENEWABLE ENERGY SYSTEMS
Renewable Energy systems, Environmental aspects of electric energy conversion: impacts of renewable energy generation on environment - Qualitative study of different renewable energy resources: Solar, wind, ocean, Biomass and Fuel cell.

UNIT-II: DESIGN AND OPERATION OF WIND POWER SYSTEM
Wind Power System: Components, Turbine Rating, Electrical Load Matching, Variable-Speed operation, system design features, Maximum Power Operation, System Control Requirements, Speed Control, Rate Control and Environmental Aspects. Wind Energy Conversion Systems and their Classification.

UNIT-III: DESIGN AND OPERATION OF PV SYSTEM
Solar Photovoltaic Power System: The PV Cell, Module and Array, Equivalent Electrical Circuit, Open Circuit Voltage and Short Circuit Current, I-V and P-V Curves, Array Design, Peak Power Point Operation, PV System Components.
Solar Thermal System: Energy Collection, Synchronous Generator, Equivalent Electrical circuit, Excitation Methods, Electrical Power Output, Transient Stability Limit, Commercial Power Plants.

UNIT-IV: POWER CONDITIONING SCHEMES FOR SOLAR AND WIND ENERGY SYSTEMS
Switching devices for solar energy conversion: DC power conditioning converters, maximum power point tracking algorithms, AC Power conditioners, Line commutated inverters, synchronized operation with grid supply, Harmonic reduction.

Wind energy Conversion system (WECS): Performance of Induction generators for WECS, Self excited induction generator (SEIG) for isolated power generators. Controllable DC power from SEIGs, system performance, Grid related problems, generator control, AC voltage controllers, Harmonic reduction and Power factor improvement.

UNIT-V: POWER QUALITY ISSUES IN INTEGRATION OF RENEWABLE ENERGY RESOURCES

Stand alone and Grid connected systems, Power Quality issues, Impact of power quality problems on DG, Mitigation of power quality problems, Role of custom power devices in Distributed Generation.

TEXT BOOKS:

1. Mukund. R. Patel, *Wind and Solar Power Systems*, CRC Press, 1999.
2. G.D. Rai, *Non - Conventional Energy Resources*, Khanna Publishers, 2002.

REFERENCES:

1. Daniel, Hunt. V, *Wind Power – A Hand Book of WECS*, Van Nostrend Co., New York, 1998.
2. Arindam Ghosh, Gerard Ledwich, *Power Quality Enhancement Using Custom Power Devices,* Springer, 2002.
3. Roger C. Dugan, Mark E. Mc. Granaghan, Surya Santosoh and H. Wayne Beaty, *Electrical Power Systems Quality*, 2nd edition, TATA McGraw Hill, 2010.

M. Tech. (EPS), I-Semester
(14MT10709) OPTIMIZATION TECHNIQUES
(Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Probability and Statistics and Mathematical Methods at UG level.

COURSE DESCRIPTION:
Linear and Nonlinear programming; one dimensional and multi-dimensional search methods; Dynamic programming

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge on:
    - Linear programming.
    - Non-linear programming
    - Dynamic Programming Assessment.
    - Univariate Estimation.
2. analyze problems on queuing models and develop convincing solutions.
3. apply problem solving skills in dynamic and static system.

DETAILED SYLLABUS

UNIT-I: **LINEAR PROGRAMMING**

Formulation of LPP, Graphical Method, Basic Definitions, Simplex method, Duality theory, Fundamental theorem, Dual Simplex Method, Primal Dual method, Sensitivity analysis. Transportation and Assignment problems: Shortest path problem, Max-flow problem and Mini - cost Flow Problem.

UNIT-II: NON-LINEAR PROGRAMMING

Convex sets and functions, constrained optimization methods: Introduction, Kuhn-Tucker conditions, convex optimization, Lagrange multipliers, One-dimensional minimization method, search method, unconstrained and constrained optimization.

UNIT- III: ONE DIMENSIONAL SEARCH METHODS

Unimodal functions, simultaneous uniform search method, Sequential search method, Fibonacci search method, Golden section search method.

UNIT-IV: MULTI-DIMENSIONAL SEARCH METHODS

Multi-dimensional Search Methods: Univariate search method, Method of steepest descent, Conjugate gradient method, Fletcher Reeves method,

Constrained Multi-dimensional Search Methods: Rosen's Gradient projection method, Penalty function method.

UNIT-V: DYNAMIC PROGRAMMING

Dynamic programming: Multistage decision problems, computation procedure and case studies. Fundamentals of queuing system, Poisson process, the birth and death process, special queuing methods.

TEXT BOOKS:

1. S.S Rao, *Optimization: Theory and Practices*, New Age Int. (P) Ltd. Publishers, New Delhi.
2. S. D. Sharma, *Operations Research*, S Chand Publications, New Delhi, 2008.

REFERENCE BOOKS:

1. TahaH.A., *Operations Research; An Introduction*, 7th edition, Mac Millan Publishing Co., 2003.
2. Pant J.C., *Introduction to Optimization techniques (Operations Research)*, 6th edition, Jain Brothers, New Delhi, 2005.
3. S. Hira and P.K.Gupta., *Problems in Operations Research*, S Chand Publications, New Delhi, 2007.

M. Tech. I-Semester
(14MT10310) RESEARCH METHODOLOGY
(Common to all M. Tech. Programmes)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	--	--	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Fundamentals of research work - research problem and design; Data collection, Analysis and hypothesis; Statistics in Research; Interpretation and Report Writing.

COURSE OUTCOMES:

On successful completion of course, the student will be able to

1. Demonstrate knowledge on research approaches, research process and data collection.
2. Identify and analyze research problem.
3. Solve the research problems using statistical methods.
4. Carryout literature survey and apply good research methodologies for the development of scientific / technological knowledge in one or more domains of engineering.
5. Learn, select and apply modern engineering tools to complex engineering activities.
6. Write effective research reports.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO RESEARCH METHODOLOGY

Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research.

UNIT-II: RESEARCH PROBLEM AND DESIGN

Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem. Features of Good Design, Research Design Concepts, Different Research Designs.

UNIT-III: DATA COLLECTION, ANALYSIS AND HYPOTHESIS

Different Methods of Data Collection, Processing Operations, Types of Analysis, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure.

UNIT-IV: STATISTICS IN RESEARCH

Review of Statistical Techniques - Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry. Normal Distribution, Chi-Square Test as a Test of Goodness of Fit.

UNIT-V: INTERPRETATION AND REPORT WRITING

Interpretation – Techniques and Precautions. Report Writing – Significance, Stages, Layout. Types of reports, Precautions in Writing Reports.

TEXT BOOK:

1. C.R. Kothari, *Research Methodology: Methods and Techniques*, New Age International Publishers, New Delhi, 2nd Revised edition, 2004.

REFERENCE BOOKS:

1. Ranjit Kumar, *Research Methodology: A step-by-step guide for beginners*, Sage South Asia, 3rd edition, 2011.
2. R. Panneerselvam, Research Methodology, PHI learning Pvt. Ltd., 2009.

M. Tech. (EPS), II-Semester
(14MT10721)POWER SYSTEMS AND RELAYS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	--	--	4	2

PRE-REQUISITES:
Electrical Machines and Power Systems at UG Level

COURSE DESCRIPTION:
Relay testing, fault analysis, determination of sequence reactances of power system components, dielectric strength of transformer oil and synchronous machine power angle characteristic.

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate in-depth knowledge in power system protection and testing of relays.
2. analyze and apply protective schemes and testing methods in the field of power systems.
3. apply skills in identifying, selecting and developing suitable protection schemes for reliable operation of power system.
4. execute real time projects in the field of power system operation and control.

List of experiments:
Conduct any Twelve experiments from the following:

1. Determination of Sub-transient reactances of Salient Pole Synchronous Machine.
2. Determination of Sequence Impedances of Cylindrical Rotor Synchronous Machine.
3. Fault Analysis
   i) LG and LL Faults
   ii) LLG and LLLG Faults
4. Measurement of Dielectric Strength of Transformer Oil Using Variable Electrodes.
5. Reactive power compensation using Tap changing transformer.
6. Power Angle Characteristic of Three-Phase Salient Pole Synchronous Machine.
7. Long Transmission line analysis.
8. Determination of Sequence Components of Salient Pole Synchronous Machine.
9. Scott Connection of Transformers.
10. Characteristics of Over Current Relay.
11. Characteristics of Over Voltage Relay.
12. Characteristics of Percentage Biased Differential Relay.
13. Testing of Frequency Relay.
14. Testing of Reverse Power Relay.

M. Tech. (EPS), II-Semester
(14MT20701) OPERATION AND CONTROL OF POWER SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	3

PRE-REQUISITES:
Power Systems operation and control, Control Systems at UG level
Power System security and state estimation at PG level

COURSE DESCRIPTION:
Economic dispatch problem with and without Transmission losses; Optimal power flow problem; Unit commitment; Hydro-thermal scheduling; Automatic generation control in an interconnected power systems.

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge on:
   - economic operations of various power plants and their scheduling methods.
   - coordination of hydro thermal power plant for optimal and secured operation.
   - automatic generation control importance and their control strategies for reliable operation of interconnected power systems.
2. apply skills to envisage and solve problems to obtain optimal solution in power system operation and control for the needs of industry and society.
3. apply various optimization algorithms for:
   - optimal generation scheduling of thermal power plants.
   - scheduling and coordination of hydro thermal power plants.
   - regulation of load frequency control problems.

DETAILED SYLLABUS:

UNIT-I: ECONOMIC DISPATCH OF GENERATING PLANTS

Economic operation importance – generator unit characteristics – Economic dispatch problem without transmission losses. Solution methods of economic dispatch: Gradient method, Reduced Gradient method, Newton's method, Base point and participation factor method – simple problems.

UNIT-II: TRANSMISSION SYSTEM EFFECTS AND OPTIMAL POWER FLOW PROBLEM

Economic dispatch problem with transmission losses. Expression for transmission loss - Simple problems. Optimal power flow problem – Optimal power flow with inequality constraints – problem formulation, steepest descent method. Optimal power flow with equality constraints on control variables and dependent variables.

UNIT-III: UNIT COMMITMENT

Characteristics of thermal units – Input-Output characteristics, Heat Rate and Incremental Heat Rate characteristics, Fuel cost and Incremental Fuel cost characteristics, Incremental production cost, start-up and shut-down costs. Unit commitment – unit commitment Vs economic dispatch, constraints in unit commitment. Unit commitment solution methods: Priority-List method, Dynamic Programming method – simple problems.

UNIT-IV: HYDROTHERMAL CO-ORDINATION

Long-term and short-term hydro-scheduling problem. Short-term hydrothermal scheduling – condition for optimal operation and maximum efficiency, gradient approach. Hydro units in series. Pumped-storage hydro-scheduling – λ-γ iteration method, gradient method–hydrothermal scheduling using dynamic programming and linear programming. Security constrained unit commitment.

UNIT-V: AUTOMATIC GENERATION CONTROL IN INTERCONNECTED POWER SYSTEMS

Load frequency control Vs Economic dispatch control. Review of single area load frequency control. Two area LFC – Flat frequency regulation, Parallel frequency regulation, Flat tie-line loading control, Tie-line load bias control. AGC features – AGC Implementation– static response of uncontrolled and controlled two-area system – Optimal LFC control for two area AGC. Power exchange in interconnected utilities: utility energy evaluation – Power pools – Transmission effects and Issues: Limitations –Wheeling.

TEXT BOOK:

1. Allen J. Wood & B.F. Woolenberg, *Power Generation, Operation and Control*, John Wiley & Sons, New York, 2006.
2. Nagrath, I.J. and Kothari D.P., *Modern Power System Analysis*, 3rd edition,Tata McGraw-Hill, New Delhi.

REFERENCES:

1. D.P. Kothari & J.S. Dhillon, *Power System Optimization*, Printice Hall of India, 2004.

M. Tech. (EPS), II-Semester
(14MT20702) FLEXIBLE AC TRANSMISSION SYSTEM

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
1. Power Electronics and Power Systems at UG level
2. Power Electronic Converters and Microcontrollers and Applications at I-Sem. of M.Tech. EPS

COURSE DESCRIPTION:
Need for Flexible AC transmission systems; objectives of shunt and series compensation, phase angle regulators; FACTS controllers: shunt, series and combined; Coordination of various FACTS controllers.

COURSE OUTCOMES:
On successful completion of the course, student will be able to
1. demonstrate knowledge on:
   - compensation schemes for real and reactive power control.
   - Static Shunt, Series and Shunt-Series compensation.
   - FACTS devices
2. critically analyze and adopt a suitable FACTS device for the appropriate control operation.
3. apply skills in coordination of multiple FACTS controllers in an interconnected power systems.

DETAILED SYLLABUS
UNIT-I: INTRODUCTION TO AC TRANSMISSION SYSTEMS
Overview of interconnected power system. Power flow in AC systems – Expression for real and reactive power flow between two nodes of a power system, controllable parameters. Power flow in parallel and meshed system. Overview of uncompensated transmission lines – open circuit, short circuit. Overview of compensated transmission lines – shunt and series compensation. Conventional controllers for real and reactive power flows – merits and demerits. FACTS – benefits, types of FACTS controllers.

UNIT-II: STATIC SHUNT COMPENSATION
Objectives of shunt compensation, Expression for real and reactive power flow with mid-point voltage regulation. Variable impedance type static VAR generators - V-I characteristics and control schemes of TCR, TSR, TSC. Q_D-Q_O characteristic and control scheme of TSC-TCR. Switching converter type VAR generators – V-I characteristics and control schemes of STATCOM. Hybrid VAR generators – V-I characteristics of SVC and STATCOM. Regulation slope of SVC and STATCOM through V-I characteristics. Applications of static shunt compensators – Voltage regulation, improvement in transient stability, prevention of voltage instability, power oscillation damping. Comparison of static shunt compensators.

UNIT-III: STATIC SERIES COMPENSATION

Objectives of series compensation, Expression for real and reactive power flow with series line compensation. Variable impedance type series compensators: V-I characteristics and control schemes of GCSC, TSSC, TCSC - modes of operation. Sub-synchronous resonance. Switching converter type series compensator – V-I characteristics, internal and external control schemes of SSSC. Applications of static series compensators – improvement in transient stability, power oscillation damping. Comparison of static series compensators.

UNIT-IV: STATIC PHASE ANGLE REGULATORS AND COMBINED COMPENSATOR

Power flow control by phase angle regulators - Concept of voltage and phase angle regulation. Operation and control of TCVR and TCPAR. Switching converter type phase angle regulators. Objectives of TCPAR - improvement of transient stability, power oscillation damping. UPFC – Principle, expression for real and reactive power between two nodes of UPFC, independent real and reactive power flow control using UPFC, control schemes of UPFC - operating principle and characteristics of IPFC.

UNIT-V: CO-ORDINATION OF FACTS CONTROLLERS

FACTS controller interactions – interaction between multiple SVC's – interaction between multiple TCSC's – SVC-TCSC interaction – coordination of multiple controllers using linear control techniques. Comparative evaluation of different FACTS controllers: performance comparison and cost comparison

TEXT BOOKS:

1. Narain G. Hingorani, Laszi Gyugyi, *Understanding FACTS: Concepts and Technology of Flexible AC Transmission Systems,* Wiley-IEEE Press, 1999.
2. R. Mohan Mathur and Rajiv k. Varma, *Thyristor based FACTS controllers for Electrical Transmission Systems,* Wiley-IEEE Press, 2002.

REFERENCE BOOKS:

1. Xiao-Ping, Rehtanz, Christian, Pal, Bikash, *Flexible AC Transmission Systems: Modeling and Control*, Springer Power Systems Series, 2006.
2. T.J.E. Miller, *Reactive Power control in electric systems*, Wiley, 1982.

M. Tech. (EPS), II-Semester
(14MT20703) POWER QUALITY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	3

PRE-REQUISITES:
Distribution of Electric Power and Power Electronics at UG level

COURSE DESCRIPTION:
Power Quality concepts; harmonics and voltage regulation using conventional methods; power quality enhancement using custom power devices; power quality issues in distributed generation

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge on:
    - various power quality issues and mitigation.
    - power quality issues and operating conflicts in distributed generation.
2. analyze the harmonic distortion due to commercial and industrial loads.
3. apply skills in design of various custom power devices.
4. apply the principles of interfacing distributed generation with utilities.

DETAILED SYLLABUS

UNIT-I: FUNDAMENTALS OF POWER QUALITY
Definition of Power Quality, Classification of Power Quality Issues, Power Quality Standards, Categories and Characteristics of Electromagnetic Phenomena in Power Systems: Impulsive and Oscillatory Transients, Interruption, Sag, Swell, Sustained Interruption, Under Voltage, Over Voltage and Outage. Sources and causes of different Power Quality Disturbances.

UNIT-II: HARMONICS AND APPLIED HARMONICS
Harmonic Distortion, Voltage Vs Current Distortion, Harmonics Vs Transients, Power System Qualities under Non-Sinusoidal Conditions, Harmonic Indices, Harmonic Sources from Commercial Loads, Harmonic Sources from Industrial Loads.
Applied Harmonics**:** Effects of Harmonics, harmonic distortion evaluations, principles of controlling harmonics and devices for controlling harmonic distortion.

UNIT-III: VOLTAGE REGULATION USING CONVENTIONAL METHODS
Principles of regulating the voltage, Devices for voltage regulation: utility step-voltage regulators, ferro-resonant transformers, magnetic synthesizers, on-line UPS systems, motor-generator sets, static VAR compensators, shunt capacitors and series capacitors.

UNIT-IV: POWER QUALITY ENHANCEMENT USING CUSTOM POWER DEVICES Introduction to Custom Power Devices - Network Reconfiguring Type: Solid State Current Limiter (SSCL) - Solid State Breaker (SSB) - Solid State Transfer Switch (SSTS).

Compensating Type: Dynamic Voltage Restorer, Distribution STATCOM and Unified Power Quality Conditioner – operation, realization and control of DVR, DSTATCOM and UPQC – load compensation. Power quality monitoring - Power quality monitoring standards.

UNIT-V: POWER QUALITYISSUES IN DISTRIBUTED GENERATION

DG Technologies, Perspectives on DG benefits - Interface to the Utility System - power quality issues affected by DG - Operating Conflicts: Utility fault-clearing, Reclosing, Interference with relaying, Voltage regulation issues, Islanding - siting DG.

TEXT BOOKS:

1. Roger C. Dugan, Mark E. Mc. Granaghan, Surya Santosoh and H. Wayne Beaty, *Electrical Power Systems Quality*, 2nd edition, TATA McGraw Hill, 2010.
2. Arindam Ghosh, Gerard Ledwich, *Power Quality Enhancement Using Custom Power Devices,* Springer, 2002.

REFERENCE BOOKS:

1. Math H J Bollen, *Understanding Power Quality Problems*, IEEE Press, 1998.
2. C.Sankaran, *Power Quality*, CRC press, 2000.

M. Tech. (EPS), II-Semester
(14MT20704) SMART GRID TECHNOLOGY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Power systems at UG level

COURSE DESCRIPTION:
Concept of smart grid; various information and communication technologies for Smart Grid; Smart metering; Demand side integration; Energy management systems

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge in:
   - Smart grid initiatives and technologies
   - Information and communication technologies for the smart grid.
   - Sensing, measurement, control and automation.
2. apply skills in fault calculation and state estimation.
3. apply various information security tools in the smart grid technology.

DETAILED SYLLABUS

UNIT–I: SMART GRID

Introduction, Ageing assets and lack of circuit capacity, thermal constraints, operational constraints, security of supply, national initiatives, early smart grid initiatives, active distribution networks, virtual power plant, other initiatives and demonstrations, overview of the technologies required for the smart grid.

UNIT–II: COMMUNICATION TECHNOLOGIES FOR THE SMART GRID

Data Communications: Introduction, Dedicated and Shared Communication Channels, Switching Techniques, Circuit Switching, Message Switching, Packet Switching, Communication Channels, Wired Communication, Optical Fiber, Radio Communication, Cellular Mobile Communication, Layered Architecture and Protocols, the ISO/OSI Model, TCP/IP

Communication Technologies: IEEE 802 Series, Mobile Communications, Multi Protocol Label Switching, Power line Communication, Standards for Information Exchange, Standards For Smart Metering, Modbus, DNP3, IEC61850

UNIT–III: INFORMATION SECURITY FOR THE SMART GRID

Introduction, Encryption and Decryption, Symmetric Key Encryption, Public Key Encryption, Authentication, Authentication Based on Shared Secret Key, Authentication Based on Key Distribution Center, Digital Signatures, Secret Key Signature, Public Key Signature, Message Digest, Cyber Security Standards, IEEE 1686: IEEE Standard for Substation Intelligent Electronic Devices(IEDs) Cyber Security Capabilities, IEC 62351: Power Systems Management and Association Information Exchange – Data and Communication Security.

UNIT–IV: SMART METERING AND DEMAND SIDE INTEGRATION

Introduction, smart metering – evolution of electricity metering, key components of smart metering, smart meters: an overview of the hardware used – signal acquisition, signal conditioning, analogue to digital conversion, computation, input/output and communication.

Communication infrastructure and protocols for smart metering - Home area network, Neighborhood Area Network, Data Concentrator, meter data management system, Protocols for communication. Demand Side Integration- Services Provided by DSI, Implementation of DSI, Hardware Support, Flexibility Delivered by Prosumers from the Demand Side, System Support from DSI.

UNIT–V: TRANSMISSION AND DISTRIBUTION MANAGEMENT SYSTEMS

Data Sources, Energy Management System, Wide Area Applications, Visualization Techniques, Data Sources and Associated External Systems, SCADA, Customer Information System, Modelling and Analysis Tools, Distribution System Modelling, Topology Analysis, Load Forecasting, Power Flow Analysis, Fault Calculations, State Estimation, Applications, System Monitoring, Operation, Management, Outage Management System, Energy Storage Technologies, Batteries, Flow Battery, Fuel Cell and Hydrogen Electrolyser, Flywheels, Super conducting Magnetic Energy Storage Systems, Super capacitors.

TEXT BOOKS:

1. Janaka Ekanayake, Liyanage, Wu, Akihiko Yokoyama, Jenkins, *Smart Grid*, Wiley Publications, 2012.
2. James Momoh, *Smart Grid: Fundamentals of Design and Analysis*, Wiley, IEEE Press, 2012.

REFERENCE BOOKS:

1. Raj Samani, *Applied Cyber Security and the Smart Grid*, Syngress Publishers, 2012.

M. Tech. (EPS), II-Semester
(14MT20705) INTELLIGENT CONTROL

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Engineering Mathematics, Power Systems, Power Electronic Drives and Electrical machines at UG level

COURSE DESCRIPTION:
Neural Networks; Fuzzy Logic Systems; Genetic Algorithms; Hybrid Intelligent Systems; Applications

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge to identify and describe soft computing techniques and their roles in building intelligent systems.
2. design and analyze intelligent control systems for electrical engineering problems.
3. identify and apply suitable soft computing techniques for engineering problems.

DETAILED SYLLABUS

UNIT-I: NEURAL NETWORKS
Neural network Architectures, Perceptron model, Learning strategies – Supervised Learning – Radial basis function network, Back propagation Network–Unsupervised Learning – Kohonen's SOM, Full counter propagation Network – Reinforced learning.

UNIT-II: FUZZY LOGIC SYSTEMS
Fuzzy sets– Relations & Operations, Membership functions, Fuzzification, Rule base, Inference Mechanism, Defuzzification and design of Fuzzy control system.

UNIT-III: GENETIC ALGORITHMS
Introduction to evolutionary computation, History of genetics, Genetic algorithms(GA) – main components of GA – selection, crossover, mutation, survival of the fittest, population size, Evaluation of the fitness function and benefits of genetic algorithms.

UNIT-IV: HYBRID INTELLIGENT SYSTEMS
Introduction to hybrid intelligent systems – Adaptive Neuro-Fuzzy Inference Systems – Architecture and Learning. Fuzzy GA systems – rules generation. ANN Learning Using GA – Optimization of weights.

UNIT-V: APPLICATIONS
Speed control of separately excited DC motor using neural networks and fuzzy logic, Load forecasting problem using GA and Neuro-fuzzy approach, Load frequency control using fuzzy logic.

TEXT BOOKS:

1. Fakhreddine O. karray, Clarence De Silva, *Soft computing & intelligent systems design, Theory, tools and applications,* Pearson Education Limited, 2009.
2. S.N.Sivanandam, S.N.Deepa, *Principles of soft computing*, Wiley–India Edition, 2008

REFERENCE BOOKS:

1. Devendra K. Chaturvedi, *Soft Computing: Techniques and Its Applications in Electrical Engineering*, Springer.
2. J.S.R.Jang, C.T.Sun, E.Mizutani, *Neuro-Fuzzy & Soft computing*, Pearson Education Limited, 2004.

M. Tech. (EPS), II-Semester
(14MT20706) High Voltage DC TRANSMISSION
(Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Power Electronics and Power Systems at UG level
Power Electronic converters at PG level

COURSE DESCRIPTION:
HVDC Transmission: capabilities, applications, planning, faults and Protection; Analysis and Control of Power Converter; Harmonics and Filters; Types of Multi-Terminal DC systems and control

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge on:
   - HVDC transmission systems.
   - operation of static converters and analysis.
   - different types of faults and protection schemes in HVDC systems.
2. analyze various static converters in HVDC systems, filters and MTDC systems.
3. design, control and analyze HVDC systems.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO HVDC TRANSMISSION
H.V.D.C Transmission – Comparison of HVAC and HVDC transmission, Power Handling Capabilities of HVDC lines, Applications of HVDC Transmission, Planning for HVDC Transmission, Modern trends in DC Transmission.

UNIT-II: STATIC POWER CONVERTER ANALYSIS AND CONTROL
Static Power Converters – 6 pulse & 12 pulse converters, converter station and terminal equipment. Converter Bridge characteristics, equivalent circuit for converter
Control of HVDC converter: Principle of DC link control – constant current, constant extinction angle and constant ignition angle control. Individual phase control and equidistant firing angle control.

UNIT-III: HARMONICS AND FILTERS
Generation of Harmonics in HVDC systems, methods of harmonics elimination, harmonic instability problems, Causes for instability, remedies for instability problems. Design of AC & DC filters

UNIT-IV: MULTI-TERMINAL DC LINK AND SYSTEMS
Introduction – Potential applications of MTDC systems – Types of MTDC systems – series, parallel and series-parallel systems, their principle of operation and control - Protection of MTDC systems.

UNIT-V: FAULTS AND PROTECTION

Over voltages due to disturbance on DC side, over voltages due to DC and AC side line faults – Converter faults, over current protection – Valve group and DC line protection. Over voltage protection of converters – surge arresters.

TEXT BOOKS:

1. K.R. Padiyar, *High Voltage Direct current Transmission*, New Age International (P) Ltd. Publishers, 2004.
2. S. Rao, *EHV-AC, HVDC Transmission & Distribution Engineering*, Khanna Publishers, 2006.

REFERENCES:

1. E.Uhlman, *Power Transmission by Direct Current*, Springer Verlag, Berlin, 2000.
2. E. W. Kimbark, *Direct current Transmission*, John Wiely & sons, New York.
3. J. Arillaga, *H.V.D.C. Tranmission*, peter peregrilnus Ltd., London UK, 1983.

M. Tech. (EPS), II-Semester
(14MT20707) RESTRUCTURED POWER SYSTEM
(Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Power Systems at UG level

COURSE DESCRIPTION:
Features of Restructured Power systems; Market models; Information and transmission services; Electricity pricing and forecasting; Ancillary services management

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge on:
   - Operation of deregulated electricity market systems.
   - Key issues of electricity market models and their functionalities in different scenarios.
   - Electricity pricing methods and ancillary service management in competitive market.
2. demonstrate analytical skills to envisage market models to provide power exchange among various entities of deregulated power system.
3. implement forecasting methods for minimizing energy price and regulate congestion in interconnected deregulated power system.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF KEY ISSUES IN ELECTRIC UTILITIES
Introduction – Deregulation, need for deregulation, Advantages of deregulation in power system. Restructuring Models: POOLCo Model, Bilateral Model, Hybrid Model – independent system operator (ISO) – Role of ISO – power exchange – market operations – market power – standard cost – transmission pricing – congestion pricing – management of congestion.

UNIT-II: MARKET MODELS IN RESTRUCTURED POWER SYSTEMS
Introduction - Market models based on contractual arrangements: Monopoly model, Single buyer model, Whole sale competition model, Retail competition model. Comparison of various market models. Market architecture: Day-ahead and Hour-Ahead Markets, Block forwards Market, Transmission Congestion Contracts (TCCs), Ancillary service market.

UNIT-III: OASIS: OPEN ACCESS SAME-TIME INFORMATION SYSTEM
Structure of OASIS: Functionality and Architecture of OASIS – Information requirement of OASIS - Transfer Capability on OASIS: Definitions, Transfer Capability Issues, ATC Calculation, TTC Calculation, TRM Calculation, CBM Calculation – Transmission Services – Methodologies to Calculate ATC.

UNIT-IV: ELECTRICITY PRICING - VOLATILITY, RISK AND FORECASTING

Electricity pricing – introduction – electricity price volatility, electricity price indexes – Challenges to Electricity Pricing: Pricing Models, Reliable Forward Curves – Construction of Forward Price Curves: Time frame for Price Curves, Types of Forward Price Curves – Short-term Price Forecasting: Factors Impacting Electricity Price, Forecasting Methods, Analyzing Forecasting Errors.

UNIT-V: ANCILLARY SERVICES MANAGEMENT

Introduction – Types of ancillary services, Classification of ancillary services– Load - generation balancing related services: Frequency regulation, Load following, Spinning reserve services – Voltage control and reactive power support services: Generators, Synchronous condensers, Capacitors and inductors, SVCs, STATCOMs – Black start capability service

TEXT BOOKS:

1. Kankar Bhattacharya, Math H.J. Bollen, Jaap E. Daalder, *Operation of Restructured Power System*, Klumer Academic Publisher, 2001.
2. Mohammad Shahidehpour, and Muwaffaqalomoush, - *Restructured electrical Power systems,* Marcel Dekker, Inc. 2001.

REFERENCES:

1. Loi Lei Lai, *Power system Restructuring and Deregulation*, Jhon Wiley & Sons Ltd., England.

M. Tech. (EPS), II-Semester
(14MT20708) POWER SYSTEM RELIABILITY
(ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Probability and Statistics at UG level

COURSE DESCRIPTION:
Fundamentals of Reliability Engineering; Evaluation of Power system operating capacity reserve; Evaluation of Frequency and Duration Techniques; Reliability Analysis of Interconnected Systems; Power Distribution System Reliability Analysis

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge on
   i. conceptual algorithms for planning and operation of secured power system
   ii. system risks during normal and adverse weather conditions.
2. evaluate complex network configurations using reliability indices.
3. design and develop efficient algorithms for analyzing power system network reliability in real time.

DETAILED SYLLABUS

UNIT–I: **FUNDAMENTALS OF RELIABILITY ENGINEERING**

Probability Concept, Random variables, Probability Density and Distribution functions– Probability Distributions: time dependent and independent, mean, SD, Variance. Reliability function, hazard rate, types of failures, bath tub curve and reliability cost and worth.

Network and Markov Modeling: redundant and non-redundant configuration – complex systems – conditional probability approach, Decomposition Method, cut-set, tie-set approaches – Standby redundant systems – Event trees. Markov chain – Markov Process, STPM, LSP – one, two and three component repairable models

UNIT–II: **EVALUATION OF GENERATING CAPACITY RESERVE**

Introduction – Generation system model – determination of capacity outage probability table – identical units, non-identical units – Determination of transitional rates – deterministic and probabilistic criteria – Sequential addition method– Recursive relation for unit addition, unit removal - LOLP, LOLE and EIR.

UNIT–III: EVALUATION OF FREQUENCY AND DURATION TECHNIQUES

Frequency and duration concepts – Two component repairable model (with & without identical components) – Evaluation of cumulative probability and cumulative frequency by using recursive relation – Equivalent transition rates – non-equivalent transition rates.

System risk indices: Daily load model – Two level representation of daily load modeling– evaluation of probabilities, transitional rates.

UNIT–IV: RELIABILITY ANALYSIS OF INTERCONNECTED SYSTEMS

Introduction – probability array method in two interconnected systems – evaluation techniques – equivalent assisting approach – factors affecting interconnections, effect of tie capacities, tie lines.

Weather effects on transmission lines – common mode failures – circuit breaker model – Preventive maintenance

UNIT–V: DISTRIBUTION SYSTEM RELIABILITY ANALYSIS

Distribution system reliability analysis – Basic indices – Customer oriented indices – Load and energy indices – active and passive failures – open circuit & short circuit failures – simple problems on above indices.

TEXTBOOKS:

1. Roy Billinton and Ronald NAllen, *Reliability Evaluation of Power Systems*, 2nd edition, Springer, New York, 1996.
2. J. Endrenyi, *Reliability Modelling in Electric Power Systems*, 1st edition, John Willey and Sons, US, 1978.

REFERENCES:

1. Roy Billinton and Ronald NAllen, *Reliability Evaluation of Engineering Systems*, 2nd edition, Springer, NewYork, 2013.
2. Charles Eebeling, *An Introduction to Reliability and Maintainability Engineering*, Tata McGraw Hill, India, 2004.

M. Tech. (EPS), II-Semester
(14MT20709) ENERGY AUDITING, CONSERVATION & MANAGEMENT
(ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Managerial Economics and Financial Analysis and Generation of Electric Power at UG level

COURSE DESCRIPTION:
Energy Audit; Energy Management; Energy Efficient Motors and Lighting; Energy Instruments; Computation of Economic Aspects and Analysis

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge on:
    - Energy management, Energy conservation management.
    - Computation of economic aspects and analysis.
    - Energy efficient motors and lighting system.
    - Energy audit instruments.
2. analyze life cycle estimation and cost analysis methods for various components**.**
3. design energy efficient motors and lighting schemes.
4. apply Energy instruments in analysis of economic aspects.

DETAILED SYLLABUS

UNIT-I: BASIC PRINCIPLES OF ENERGY AUDIT

Energy audit – definitions, concept, types of audit, energy index, cost index, pie charts, Sankey diagrams, load profiles, Energy conservation schemes – Energy audit of industries – energy saving potential, energy audit of process industry, thermal power station, building energy audit.

UNIT-II: ENERGY MANAGEMENT

Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting. Energy manger, Qualities and functions, language, Questionnaire – check list for top management.

UNIT-III: ENERGY EFFICIENT MOTORS AND LIGHTING

Energy efficient motors, factors affecting efficiency, loss distribution, constructional details, characteristics – variable speed, variable duty cycle systems, RMS hp- voltage variation– voltage unbalance – over motoring – motor energy audit. Good lighting system design and practice, lighting control, lighting energy audit

UNIT-IV: ENERGY INSTRUMENTS

Energy Instruments: watt meter, data loggers, thermocouples, pyrometers, lux meters, tongue testers, application of PLC's.

UNIT-V: COMPUTATION OF ECONOMIC ASPECTS AND ANALYSIS

Economic Analysis – Depreciation Methods, time value of money, rate of return, present worth method, replacement analysis, life cycle costing analysis - Energy efficient motors, calculation of simple payback method, net present worth method - Power factor correction, lighting - Applications of life cycle costing analysis, return on investment.

TEXT BOOKS:

1. W.R. Murphy & G. Mckay Butterworth, *Energy Management*, Heinemann publications.
2. Paul O' Callaghan, *Energy Management*, 1st edition, McGraw Hill Book company.

REFERENCE BOOKS:

1. John C. Andreas, *Energy Efficient Electric Motors*, 2nd edition, Marcel Dekker Inc. Ltd.,
2. W.C. Turner, *Energy management Hand Book*, John Wiley and sons.

M. Tech. (EPS), II-Semester
(14MT20721) POWER SYSTEMS SIMULATION LABORATORY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	--	--	4	2

PRE-REQUISITES:
Power system, Power electronics, Control Systems and Electrical Machines at UG level
Economic operation and control of power system at PG level

COURSE DESCRIPTION:
Modelling, simulation and analysis of multi area power system, load flows, load frequency control, power system stability, power quality problems and power electronic converters

COURSE OUTCOMES:
On successful completion of the course, student will be able to
1. demonstrate knowledge in analyzing the power system behavior using simulation / programming tools.
2. design and perform experiments, as well as analyze and interpret results for better understanding of power system operation.
3. design various power system networks through programming and simulation for better functionality.
4. select and apply modern software tools for solving real time problems in the existing power system.

DETAILED SYLLABUS
Conduct any Twelve experiments from the following:
1. Formation of bus admittance matrix with and without off-nominal ratios of transformer of a power system network using MATLAB
2. Formation of Bus Impedance matrix with and without mutual coupling of a power system network using MATLAB
3. Load flow studies using
   (a) Gauss Seidal Method
   (b) Newton Rahpason Method
   (c) Fast Decoupled Method
4. Transient stability analysis
5. Economic Dispatch using MATLAB
6. Modeling of standard test system with generator excitation and governor action using SIMULINK
7. Modeling and analysis of automatic load frequency control of multi-area power system using SIMULINK
8. Simulation of power quality problems (like Sag/Swell, interruption, transients, harmonics, flickers etc.) using SIMULINK

9. Single phase half-controlled converter using R- and RL- loads using MATLAB/ SIMULINK.
10. Single phase full-controlled converter using R- and RL- loads using MATLAB/ SIMULINK
11. Analysis of Transmission line parameters using PSCAD
12. Simulation of Capacitor switching transient using PSCAD
13. Transformer inrush currents measurement using PSCAD
14. Analysis of Short circuit studies with and with fault impedance using PSCAD
15. Simulation of FACTS controllers using PSCAD

M. Tech. (EPS), II-Semester
(14MT20722) SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	50	50	--	--	--	2

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of seminar topic; Literature survey; Preparation of technical report and Presentation.

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate in-depth knowledge in core and allied areas of interest.
2. analyze and synthesize information related to the areas.
3. conceptualize and construct research problems.
4. extract information pertinent to a specific area through literature survey to conduct research.
5. identify the applicability of modern software and tools.
6. contribute positively to multidisciplinary groups in emerging areas with objectivity and rational analysis.
7. plan, organize, prepare and present effective written and oral technical reports.
8. engage in lifelong learning to improve competence.
9. acquire awareness on professional code of conduct in the chosen area.
10. develop independent and reflective learning.

M. Tech. (EPS), III & IV Semesters
(14MT30721 & 14MT40721) PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
80	120	200	--	--	--	16

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation.

COURSE OUTCOMES:
On successful completion of the course, student will be able to

1. demonstrate knowledge in the areas of interest.
2. analyze critically chosen project topic for conducting research.
3. apply knowledge gained through Programme, self learning and experience for solution of a given problem efficiently.
4. undertake research confidently in the project domain.
5. use the techniques, skills and modern engineering tools necessary for project work.
6. perform harmonically in multi-disciplinary, multi-cultural groups, and develop a high level of interpersonal skills.
7. manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.
8. communicate effectively in both oral and written forms for preparing and presenting reports.
9. engage in lifelong learning to improve knowledge and competence continuously.
10. perceive professional and ethical responsibility for sustainable development of society.
11. develop independent and reflective learning.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF IT

COURSE STRUCTURE for M.Tech. (SE)

I-SEMESTER

S. No.	Course Code	Course Title	Periods per week			Credits	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT10504	Data Structures and Algorithms	4	-	-	4	40	60	100
2.	14MT12501	Software Development Methodologies	4	-	-	4	40	60	100
3.	14MT12502	Software Process and Project Management	4	-	-	4	40	60	100
4.	14MT12503	Software Requirements and Estimation	4	-	-	4	40	60	100
5.	14MT12504	Web Technologies	4	-	-	4	40	60	100
6.	**Elective-1**								
	14MT12505	Distributed Databases	4	-	-	4	40	60	100
	14MT12506	Machine Learning							
	14MT12507	User Interface Design							
	14MT12508	Cloud Computing							
7.	14MT10310	Research Methodology	3	-	-	3	40	60	100
8.	14MT12521	Data Structures and Web Technologies Lab	-	-	4	2	25	50	75
		Total:	**27**	**-**	**04**	**29**	**305**	**470**	**775**

II-SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT22501	Service Oriented Architecture	4	-	-	4	40	60	100
2.	14MT22502	Software Architecture & Design Patterns	4	-	-	4	40	60	100
3.	14MT22503	Software Measurement and Metrics	4	-	-	4	40	60	100
4.	14MT22504	Software Security Engineering	4	-	-	4	40	60	100
5.	14MT22505	Software Testing	4	-	-	4	40	60	100
	Elective-II								
6.	14MT22506	Big Data Technologies	4	-	-	4	40	60	100
	14MT22507	Software Reliability							
	14MT22508	Software Reverse Engineering							
	14MT22509	Software Reuse							
7.	14MT22522	Seminar	-	-	-	2	-	50	50
8.	14MT22521	Software Development and Testing Lab	-	-	4	2	25	50	75
		Total:	**24**	**-**	**4**	**28**	**265**	**460**	**725**

III-SEMESTER

S. No.	Course Code	Course Title	Periods per week			Credits	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT32521	Project Work- Phase I	-	-	-	4	40	-	40
		Total:	**-**	**-**	**-**	**4**	**40**	**-**	**40**

*Fulltime Project Work

IV-SEMESTER

S. No.	Course Code	Course Title	Periods per week			Credits	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT42521	Project Work- Phase II	-	-	-	12	40	120	160
		Total:	**-**	**-**	**-**	**12**	**40**	**120**	**160**

*Fulltime Project Work

M.Tech. (SE) I Semester
(14MT10504) DATA STRUCTURES AND ALGORITHMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Computer Programming".

COURSE DESCRIPTION:
Linear data structures, algorithms analysis; Searching & sorting, and non-linear data structures; Hashing; Algorithms design techniques – Divide & Conquer and Greedy method; Dynamic programming, backtracking and branch & bound.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain knowledge on:
    - Stacks, Queues and Lists
    - Trees and Graphs,
    - Algorithm design paradigms such as Divide & Conquer, Greedy method and Dynamic programming
    - Backtracking and Branch & Bound techniques.
2. Analyze and determine efficiency of algorithms using space and time complexities.
3. Identify efficient algorithm design techniques and apply Stack, Queue, Tree, and Graph data structures to solve real world computer applications.

DETAILED SYLLABUS

UNIT-I: BASIC DATA STRUCTURES AND ALGORITHM ANALYSIS (Periods:12)

Basic Data Structures: Review of Arrays, Stacks, Queues, Circular Queues, Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists, Terminologies and Applications

Algorithm Analysis: Efficiency of algorithms, Apriori Analysis, Asymptotic Notations, Polynomial Vs Exponential Algorithms, Average, Best and Worst Case Complexities, Analyzing Recursive Programs.

UNIT-II: SEARCHING, SORTING, TREES AND GRAPHS (Periods:13)

Searching and Sorting: Linear Search, Binary Search, Fibonacci Search, Bubble Sort, Insertion sort, Selection Sort, Radix Sort.

Trees: Introduction, Definition and Basic terminologies of trees and binary trees, Representation of trees, Binary Tree Traversals, Threaded binary trees.

Graphs: Basic concepts, Representation and Applications, DFS and BFS Traversals.

UNIT-III: BINARY SEARCH TREES, AVL TREES, B- TREES AND HASH TABLES (Periods:12)

Binary Search Trees: Introduction, Definition, Operations and applications.

AVL Trees: Definition, Operations and applications.

B-Trees: Definition, Operations and applications.

Hash Tables: Introduction, Hash Tables, Hash Functions and its applications.

UNITI-V: DIVIDE AND CONQUER & GREEDY METHOD (Periods:10)

Divide and Conquer: General Method, Binary Search, Finding Maximum and Minimum, Quick Sort, Merge sort, Polyphase Merge Sort, Cascade Merge Sort, Strassen's Matrix Multiplication.

Greedy Method: General Method, Minimum Cost Spanning Trees and Single Source Shortest Path.

UNIT-V: DYNAMIC PROGRAMMING, BACK TRACKING & BRANCH AND BOUND (Periods:12)

Dynamic Programming: General Method, All Pairs Shortest Path, Single Source Shortest Path, 0 / 1 Knapsack problem.

Back Tracking: General Method, 8 – Queen's Problem, Graph Coloring.

Branch and Bound: The Method, LC Search, Control Abstraction, Bounding, 0/1 Knapsack Problem.

Total Periods:59

TEXT BOOKS:

1. G. A. V. Pai, *"Data Structures and Algorithms: Concepts, Techniques and Applications,"* 1st Edition, Tata McGraw Hill, 2008.
2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran**,** *"Fundamentals of Computer Algorithms,"* 2nd Edition, Universities Press (India) Pvt. Ltd, 2008.

REFERENCE BOOKS:

1. D. Samanta, *"Classic Data Structures,"* 1st Edition, PHI Publication, 2008.
2. Mark Allen Weiss, *"Data Structures and Algorithm Analysis in C++,"* 3rd Edition, Pearson Education, 2007.
3. Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, *"Data Structures using C and C++,"* 2nd Edition, Pearson Education, 2006.
4. Sartaj Sahni, *"Data structures, Algorithms and Applications in C++,"* 2nd Edition, Universities press (India) Pvt. Ltd., 2005.

M.Tech. (SE) I Semester
(14MT12501) SOFTWARE DEVELOPMENT METHODOLOGIES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES: A course on "Software Engineering".

COURSE DESCRIPTION:
Software process models; Requirements analysis and modeling; Design techniques; Implementation and modern programming language features; Testing and maintenance of software.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain in-depth knowledge in: Software Paradigms, Agile Development, Software Reuse and Testing.
2. Analyze, design, develop and maintain software systems.
3. Apply Software Engineering Principles and Practices to develop and implement software systems.
4. Demonstrate skills in applying software development methodologies and management principles for effective implementation of software projects.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION (Periods:13)

Software Engineering: Software Process-Generic process model, Prescriptive process model, specialized, unified process. Agile development-Agile Process, Extreme Programming, Adaptive Software Development(ASD), Scrum, Dynamic Systems Development Method(DSDM), Crystal, Feature Driven Development(FDD), Lean Software Development(LSD), Agile Modeling(AM), Agile Unified Process (AUP). Software Engineering Knowledge-core Principles, Principles that guide each framework Activity.

UNIT-II: SOFTWARE REQUIREMENTS AND ANALYSIS (Periods:11)

Establishing the Groundwork, Eliciting Requirements, Developing use cases, Building the requirements model, Negotiating, Validating Requirements. Requirements Analysis, Requirements Modeling Strategies.

UNIT-III: SOFTWARE DESIGN (Periods:13)

Design Process, Design concepts - Abstraction, Architecture, Patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes. Design Model- Data, Architectural, Interface, Component, Deployment Level Design Elements. Design Techniques- Stepwise Refinement, Level of Abstraction, Structure Design, Integrated Top-Down Development, Jackson Structured Programming, Summary of Design Techniques.

UNIT-IV: SOFTWARE IMPLEMENTATION (Periods:10)

Implementation Issues: Structured Coding Techniques, Coding Styles, Standards and Guidelines, Documentation Guidelines.

Modern Programming Language Features: Type checking, User Defined Data Types, Data Abstraction, Exception Handling, Concurrency Mechanism.

UNIT-V: SOFTWARE TESTING AND MAINTENANCE (Periods:12)

Testing: Strategic Approach to Software Testing, Strategic Issues, Testing Strategies for Conventional Software, Object Oriented Software and Web Apps, Validating Testing, System Testing, Art of Debugging.

Maintenance: Software Maintenance, Software Supportability, Reengineering, Business Process Reengineering, Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering, Economics of Reengineering.

Total Periods:59

TEXT BOOKS:

1. Roger S. Pressman, *"Software Engineering – A Practitioner's Approach,"* 7th Edition, Tata McGraw-Hill, 2009.
2. Richard Fairley, *"Software Engineering Concepts,"* Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1. Ian Sommerville, *"Software Engineering,"* 7th Edition, Pearson Education Asia, 2007.
2. Shari Lwarence Pfleeger, Joanne M. Atlee, *"Software Engineering Theory and Practice,"* 3rd Edition, Pearson Education, 2006.

M.Tech. (SE) I Semester
(14MT12502) SOFTWARE PROCESS AND PROJECT MANAGEMENT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Software Engineering"

COURSE DESCRIPTION:
Software process maturity levels; Framework of various activities used in software process- software cost estimation, software standards, inspections, SCM-I & SCM-II, defect prevention; Project management-planning, artifacts of the process, process automation, modern processes transitions and Case studies.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Acquire knowledge of software process and project management activities.
2. Perform analysis of project management techniques for deploying software systems quickly.
3. Skills to solve problems in modern software process and project management.

DETAILED SYLLABUS

UNIT-I: SOFTWARE PROCESS MATURITY AND THE REPEATABLE PROCESS (Periods:11)

A Software Maturity Framework, The Principles of Software Process Change, Software Process Assessment, The Initial Process, Managing Software Organizations, The Project Plan, SCM-I.

UNIT-II: THE DEFINED, MANAGED, OPTIMIZING PROCESS AND RISK MANAGEMENT (Periods:13)

Software Standards, Inspections, SCM-II, Defining the Software Process, SEPG, Data Gathering and Analysis, Managing Software Quality, Defect Prevention, Automating the Software Process, Risk Management – Introduction, The nature of risk, Managing risk, Risk identification, Risk analysis, Reducing the risks, Evaluating risks to the schedule, Calculating the z- values.

UNIT-III: SOFTWARE MANAGEMENT RENAISSANCE AND PROCESS FRAMEWORK (Periods:12)

Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new, Life Cycle Phases, Artifacts of the Process, Workflows of the Process, Checkpoints of the Process.

UNIT-IV: SOFTWARE MANAGEMENT DISCIPLINES (Periods:14)

Iterative Process Planning, Project Organizations and Responsibilities, Process Automation, Project control and Process Instrumentation, Tailoring the Process.

UNIT-V: NEXT GENERATION SOFTWARE ECONOMICS AND CASE STUDIES (Periods:11)

Modern Project Profiles, Next Generation Software Economics, Modern Process Transitions.

Case studies: The command Center Processing and Display System-Replacement (CCPDS-R), Process Improvement and Mapping to the CMM.

Total Periods:46

TEXT BOOKS:

1. Watts S. Humphrey, *"Managing the Software Process,"* 1st Edition, Pearson Education, 2009.
2. Walker Royce, *"Software Project Management,"* 1st Edition, Pearson Education, 2005.

REFERENCES:

1. Bob Hughes and Mike Cotterel, *"Software Project Management,"* 4th Edition, Tata McGraw- Hill, 2006.
2. Joel Henry, *"Software Project Management,"* 1st Edition, Pearson Education, 2004.
3. Roger S. Pressman*, "Software Engineering - A Practitioner's Approach,"* 6th Edition, McGraw-Hill, International Edition, 2001.

M.Tech. (SE) I Semester
(14MT12503) SOFTWARE REQUIREMENTS AND ESTIMATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: Courses on "Software Engineering" and "Object Oriented Analysis & Design".

COURSE DESCRIPTION:
Requirements elicitation, analysis, modeling, and specification; Requirements management; Components of software estimation and Estimation management tools.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain knowledge on:
   - Requirements Engineering and Management
   - Estimation of software size, effort, schedule and cost.
2. Analyze software projects critically and develop a quality software product using Software Requirements and Estimation.
3. Acquire problem solving skills to assess the project risks and create prototypes to manage the risks.

DETAILED SYLLABUS

UNIT-I: SOFTWARE REQUIREMENTS (Periods:15)
Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management.
Software Requirements Engineering: Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality.

UNIT-II: SOFTWARE REQUIREMENTS MANAGEMENT (Periods:10)
Requirements management, Principles and Practices, Requirements Attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain.

UNIT-III: SOFTWARE ESTIMATION (Periods:12)
Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation.
Size Estimation-Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, and Conversion between size measures

UNIT-IV: EFFORT, SCHEDULE AND COST ESTIMATION (Periods:10)
Introduction to Productivity, Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation.

UNIT-V: REQUIREMENTS MANAGEMENT TOOLS (Periods:10)

Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite Pro, Caliber – RM, Implementing requirements management automation.

SOFTWARE ESTIMATION TOOLS

Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools.

Total Periods:57

TEXT BOOKS:

1. Karl E. Weigers, *"Software Requirements,"* 2nd Edition, Microsoft Press, 2013.
2. Rajesh Naik and Swapna Kishore, *"Software Requirements and Estimation,"* Tata McGraw Hill, 2001.

REFERENCE BOOKS:

1. Dean Leffing well and Don Widrig, *"Managing Software Requirements,"* Pearson Education, 2003.
2. Suzanne Robertson and James Robertson, *"Mastering the Requirements Process,"* 2nd Edition, Pearson Education, 2006.
3. Capers Jones, *"Estimating Software Costs,"* 2nd Edition, Tata McGraw-Hill, 2007.
4. M.A. Parthasarathy, *"Practical Software Estimation,"* 1st Edition, Pearson Education, 2007.

M.Tech. (SE) I Semester
(14MT12504) WEB TECHNOLOGIES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION:
Web Technologies- HTML5, CSS, JavaScript, JQuery; Open source server-side scripting language- PHP; MySQL database concepts; and AJAX.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Acquire knowledge in various web page design technologies.
2. Analyze the functionality of client and server side components to validate web pages.
3. Gain skills in dynamic design concepts to make web pages more interactive, scalable and user friendly web applications.

DETAILED SYLLABUS

UNIT–I: HTML5 AND CSS3 (Periods:14)
HTML5: Overview of HTML and XHTML, HTML5 - Introduction, HTML5 Document Structure, Creating Editable Content, Checking Spelling Mistakes, Exploring Custom Data Attributes, Microdata, Client-Side Storage, Drag and Drop Feature, ARIA Accessibility, Offline Web Applications, Web Communications, Cross-Document Messaging and Desktop Notifications, 2D and 3D Graphics. **CSS3**: Introduction, Features of CSS3, Syntax of CSS, Exploring CSS selectors, Inserting CSS in HTML Document, State of CSS3.

UNIT–II: JAVASCRIPT AND JQUERY (Periods:12)
JavaScript: Overview of JavaScript**,** JavaScript Functions, Events, Image Maps and Animations, JavaScript Objects. **JQuery**: Fundamentals of JQuery, JQuery Selectors, JQuery Methods to Access HTML Attributes and Traversing, JQuery Manipulators, Events and Effects.

UNIT–III: INTRODUCTION TO PHP (Periods:10)
Introduction, Data Types, Variables, Constants, Expressions, String Interpolation, Control Structures, Functions, Arrays, Embedding PHP Code in Web Pages, Object Oriented PHP.

UNIT–IV: PHP AND MYSQL (Periods:12)
PHP and Web Forms, Sending Form Data to a Server, Authenticating Users with PHP, Session Handlers, PHP with MySQL, Interacting with the Database, Database Transactions.

UNIT–V: AJAX **(Periods:12)**

Exploring Different Web Technologies, Exploring AJAX, Creating a Sample AJAX Application, Displaying Date and Time using AJAX, Creating the XMLHttpRequest Object, Reading a File Synchronously and Asynchronously, Reading Response Headers, Loading List Boxes Dynamically using XMLHttpRequest Object, JQuery with AJAX, Validating a Field using AJAX and PHP.

Total Periods:60

TEXT BOOKS:

1. Kogent Learning Solutions Inc, *"HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery,"* 1st Edition, Dreamtech Press, 2011.
2. W. Jason Gilmore, *"Beginning PHP and MySQL,"* 4th Edition, APress, 2011.

REFERENCE BOOKS:

1. Andrea Tarr, *"PHP and MySQL,"* 1st Edition, Willy India, 2012.
2. Thomas A. Powell, *"The Complete Reference: HTML and CSS,"* 5th Edition, Tata McGraw Hill, 2010.
3. Steve Suehring, Tim Converse and Joyce Park, *"PHP6 and MySQL,"* 1st Edition, Willy India, 2009.
4. P. J. Deitel and H. M. Deitel, "Internet & World Wide Web How to Program," 4th Edition, Pearson, 2009.

M.Tech. (SE) I Semester
(14MT12505) DISTRIBUTED DATABASES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A Course on "Database Management Systems"

COURSE DESCRIPTION:
Distributed database Design framework; Query processing and query optimization techniques; Distributed transactions management and reliability; Database administration activities; Case studies on Distributed database systems.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain in-depth knowledge in distributed database architecture and recovery from failures.
2. Perform analysis on translating global queries into fragment queries to respond quickly for user queries.
3. Design and develop techniques to avoid concurrency problems in distributed databases.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION, PRINCIPLES & DISTRIBUTED DATABASE DESIGN (Periods:13)

Features of Distributed databases Versus Centralized databases, Why Distributed Databases?, DDBMSs, Level of Distributed Transparency, Reference Architecture, Types of Data Fragmentation, Distribution Transparency, Access primitives, Integrity constraints, A framework for Distributed Database Design, The Design of Database Fragmentation, The allocation of fragments.

UNIT–II: TRANSLATION OF GLOBAL QUERIES TO FRAGMENT QUERIES & OPTIMIZATION OF ACCESS STRATEGIES (Periods:13)

Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parameter Queries, A Frame Work for Query Optimization, Join Queries, General Queries.

UNIT-III: THE MANAGEMENT OF DISTRIBUTED TRANSACTIONS AND CONCURRENCY CONTROL (Periods:13)

A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrence Control for Distributed Transactions, Architectural aspects of distributed transactions, Foundations of distributed concurrency control, Deadlocks, Timestamps and Optimistic methods.

UNIT–IV: RELIABILITY & DISTRIBUTED DATABASE ADMINISTRATION (Periods:10)

Basic Concepts, Non-blocking Commitment Protocols, Reliability and Concurrency Control, Determining a Consistent View of Network, Detection and

Resolution of Inconsistency, Check points and Cold Restart, Catalog Management, Authorization and Protection.

UNIT–V: DISTRIBUTED DATABASE SYSTEMS: COMMERCIAL SYSTEMS

(Periods:10)

Tandem's ENCOMPASS Distributed Database system, IBM's Inter System Communication, Distributed-INGRES, POREL, Problems of Heterogeneous Distributed Databases, Brief study of MULTIBASE.

Total Periods:59

TEXT BOOKS:

1. Stefano Ceri and Giuseppe Pelagatti, *"Distributed Databases: Principles & Systems,"* McGraw-Hill, 1985.
2. M. Tamer Ozsu and Patrick Valduriez, *"Principles of Distributed Database Systems,"* 2nd Edition, Pearson Education, 2006.

REFERENCE BOOKS:

1. Ramez Elmasri, S. B. Navathe, D.V.L.N. Somayajulu and S. K. Gupta *"Fundamentals of Database Systems", 4*th Edition, Pearson Education, 2006.
2. C. J. Date, A. Kannan and S. Swaminathan *"An Introduction to Database Systems",* 8th Edition, Pearson Education, 2006.

M.Tech. (SE) I Semester
(14MT12506) MACHINE LEARNING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: - NIL -

COURSE DESCRIPTION:
Machine learning fundamentals, applications; Multivariate methods, Bayesian networks, Decision tree learning; Support Vector Machines, Statistical learning methods, Unsupervised learning; Kernal Machines; Combining Multiple Learners and Reinforcement learning.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Acquire knowledge on supervised, unsupervised, and reinforcement machine learning techniques.
2. Analyze, design and develop applications such as Fraud detection, automation of medical diagnosis and games.
3. Apply Machine Learning approaches to solve complexity level of pattern recognition systems.

DETAILED SYLLABUS

UNIT–I: INTRODUCTION (Periods:12)
What is Machine Learning, Examples of Machine Learning Applications. Supervised Learning: Learning a Class from Examples, Vapnik-Chervonenkis (VC) Dimension, Probably Approximately Correct (PAC) Learning, Noise, Learning Multiple Classes, Regression, Model Selection and Generalization and Dimensions of a Supervised Machine Learning Algorithm. Bayesian Decision Theory: Classification, Losses and Risks, Discriminant Functions, Utility Theory and Association Rules.

UNIT–II: MULTIVARIATE METHODS (Periods:12)
Multivariate Data, Parameter Estimation, Estimation of Missing Values, Multivariate Normal Distribution, Multivariate Classification, Tuning Complexity, Discrete Features, Multivariate Regression**.** Dimensionality Reduction: Subset Selection, Principal Components Analysis, Factor Analysis, Multidimensional Scaling, Linear Discriminant Analysis, Isomap, Locally Linear Embedding. Clustering: Mixture Densities, k-Means Clustering, Expectation-Maximization Algorithm, Mixtures of Latent Variable Models, Supervised Learning after Clustering, Hierarchical Clustering, Choosing the Number of Clusters.

UNIT–III: DECISION TREES (Periods:12)
Univariate Trees, Pruning, Rule Extraction from Trees, Learning Rules from Data, Multivariate Trees. Linear Discrimination: Generalizing the Linear Model, Geometry of the Linear Discriminant, Pairwise Separation, Parametric Discrimination Revisited, Gradient Descent, Logistic Discrimination, and Discrimination by Regression. Multilayer Perceptrons: The Perceptron, Training a Perceptron, Learning Boolean Functions, Multilayer Perceptrons, MLP as a Universal Approximator, Backpropagation Algorithm, Training Procedures,

Tuning the Network Size, Bayesian View of Learning, Dimensionality Reduction, Learning Time.

UNIT-IV: KERNEL MACHINES (Periods:12)

Optimal Separating Hyperplane, The Nonseparable Case: Soft Margin Hyperplane, v-SVM, Kernel Trick, Vectorial Kernels, Defining Kernels, Multiple Kernel Learning, Multiclass Kernel Machines, Kernel Machines for Regression, One-Class Kernel Machines, Kernel Dimensionality Reduction. Bayesian Estimation: Estimating the Parameter of a Distribution, Bayesian Estimation of the Parameters of a Function, Gaussian Processes. Hidden Markov Models: Discrete Markov Processes, Hidden Markov Models, Three Basic Problems of HMMs, Evaluation Problem, Finding the State Sequence, Learning Model Parameters, Continuous Observations, The HMM with Input, Model Selection in HMM.

UNIT–V: COMBINING MULTIPLE LEARNERS (Periods:11)

Rationale, Generating Diverse Learners, Model Combination Schemes, Voting, Error-Correcting Output Codes, Bagging, Boosting, Mixture of Experts Revisited, Stacked Generalization, Fine-Tuning an Ensemble, Cascading. Reinforcement Learning: Single State Case: K-Armed Bandit, Elements of Reinforcement Learning, Model-Based Learning, Temporal Difference Learning, Generalization, Partially Observable States.

Total Periods:59

TEXT BOOK:

1. Ethem Alpaydin, *"Introduction to Machine Learning,"* 2nd Edition, MIT Press, 2009.

REFERENCE BOOKS:

1. Tom M. Mitchell, *"Machine Learning,"* McGraw-Hill, 2013
2. Christopher M. Bishop, *"Pattern Recognition and Machine Learning,* 2nd Edition, Springer-Verilog*,"* 2006.
3. Kevin P. Murphy, *"Machine Learning: A Probabilistic Perspective,"* MIT Press, 2012.

M.Tech. (SE) I Semester
(14MT12507) USER INTERFACE DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES: A Course on "Software Engineering".

COURSE DESCRIPTION:
Characteristics & principles of User Interface Design; Requirement analysis-direct & indirect methods; Design- using Formatting menus & windows; Design-using Text boxes, multimedia and Windows layout.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Understand the concepts of user interfaces and related business functions.
2. Analyze user requirements and design interfaces appropriately.
3. Apply the theoretical design principles to design and evaluate user interfaces.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION (Periods:09)
Human Computer Interface, Characteristics of Graphics Interface, Direct Manipulation Graphical System, Web User Interface – Popularity, Characteristics and Principles. User Interface Design Process – Obstacles, Usability, Human Characteristics in Design, Human Interaction Speed.

UNIT-II: HUMAN COMPUTER INTERACTION (Periods:13)
Business Functions, Requirement Analysis – Direct & Indirect Methods, Basic Business Functions, Design Standards, System Timings, Human Consideration in Screen Design, Structures of Menus, Functions of Menus, Contents of Menu.

UNIT-III: FORMATTING MENUS AND WINDOWS (Periods:13)
Formatting, Phrasing the Menu, Selecting Menu Choice, Navigating Menus, Graphical Menus.
Windows: Characteristics, Components - Presentation Styles, Types, Managements, Organizations – Operations, Web Systems, Device– Based Controls Characteristics, Screen – Based Controls, Operate Control.

UNIT-IV: TEXT BOXES AND MULTIMEDIA (Periods:15)
Text Boxes – Selection Control, Combination Control, Custom Control.
Multimedia: Text For Web Pages, Effective Feedback, Guidance and Assistance, Internationalization– Accessibility, Icons, Image, Multimedia, Coloring.

UNIT-V: WINDOWS LAYOUT (Periods:07)
Prototypes, Kinds of Tests, Retest, Information Search, Visualization, Hypermedia, WWW– Software Tools.

Total Periods:57

TEXT BOOKS:

1. Wilbert O. Galitz, "*The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques,"* 2nd Edition, Wiley Publishing Inc., 2007.

REFERENCE BOOKS:

1. Ben Shneiderman, *"Designing the User Interface,"* 3rd Edition, Pearson Education, 1998.
2. Alan Dix, et.al, *"Human Computer Interaction,"* 3rd Edition, Pearson, 2003
3. J. Prece, Y. Rogers and H. Sharp, *"Interaction Design,"* 3rd Edition, Wiley, 2011.
4. Soren Lauesen, *"User Interface Design: A Software Engineering Perspective,"* Addison-Wesley, 2005.

M.Tech. (SE) I Semester
(14MT12508) CLOUD COMPUTING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: Courses on "Operating Systems" and "Computer Networks"

COURSE DESCRIPTION:
Virtualization, Cloud architecture, assessing the value proposition; Understanding services & applications, capacity planning; Platform as a Service case studies- Google & Amazon Services; Cloud management and their applications- Microsoft cloud services, cloud security.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Acquire knowledge on services and types of infrastructural models in Cloud.
2. Identify the Cloud Architectures in developing the Web Applications.
3. Gain problem solving skills to assess & improve quality attributes, security, privacy concerns and performance in Cloud Computing.

DETAILED SYLLABUS

UNIT-I: VIRTUALIZATION (Periods:10)

Introduction to Virtualization, Objectives of Virtualization, Benefits of Virtualized Technology, Adding guest Operating System. Introduction to Virtualization Technologies - Ubuntu, VMware, Microsoft Hyper-V.

UNIT-II: DEFINING CLOUD (Periods:12)

Defining Cloud Computing, Cloud Types - The NIST model, The Cloud Cube Model, Deployment models, Service models, Examining the Characteristics of Cloud Computing, Paradigm shift, Benefits of cloud computing, Disadvantages of cloud computing, Assessing the Role of Open Standards.

Assessing the Value Proposition: Measuring the Cloud's Value, Early adopters and new applications, The laws of cloudonomics, Cloud computing obstacles, Behavioral factors relating to cloud adoption, Measuring cloud computing costs, Avoiding Capital Expenditures, Right-sizing, Computing the Total Cost of Ownership, Specifying Service Level Agreements, Defining Licensing Models.

Understanding Cloud Architecture: Exploring the Cloud Computing Stack, Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud, The Jolicloud Netbook OS, Chromium OS: The Browser as an Operating System.

UNIT-III: UNDERSTANDING SERVICES AND APPLICATIONS BY TYPE (Periods:12)

Defining Infrastructure as a Service (IaaS), IaaS workloads, Pods, aggregation, and silos, Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS), SaaS characteristics, Open SaaS and SOA, Salesforce.com and CRM SaaS, Defining Identity as a Service (IDaaS), what is an identity? Net-

worked identity service classes, Identity system codes of conduct, IDaaS interoperability, Defining Compliance as a Service (CaaS).

Understanding Abstraction and Virtualization: Using Virtualization Technologies, Load Balancing and Virtualization, Advanced load balancing, The Google Cloud Understanding Hypervisors, Virtual machine types, VMware vSphere, Understanding Machine Imaging, Porting Applications, The Simple Cloud API, AppZero Virtual Application Appliance.

Capacity Planning: Capacity Planning, Defining Baseline and Metrics, Baseline measurements, System metrics, Load testing, Resource ceilings, Server and instance types, Network Capacity, Scaling.

UNIT-IV: EXPLORING PLATFORM AS A SERVICE (Periods:13)

Defining Services, Salesforce.com versus Force.com, SaaS versus PaaS, Application development, Using PaaS Application Frameworks, Drupal, Eccentex AppBase 3.0, LongJump, Squarespace, WaveMaker, Wolf Frameworks.

Using Google Web Services: Exploring Google Applications, Surveying the Google Application Portfolio, Indexed search, The dark Web, Aggregation and disintermediation, Productivity applications and services, Enterprise offerings, AdWords, Google Analytics, Google Translate, Exploring the Google Toolkit, The Google APIs, Working with the Google App Engine.

Using Amazon Web Services: Understanding Amazon Web Services, Amazon Web Service Components and Services, Working with the Elastic Compute Cloud (EC2), Amazon Machine Images, Pricing models, System images and software, Creating an account and instance on EC2, Working with Amazon Storage Systems, Amazon Simple Storage System (S3), Amazon Elastic Block Store (EBS), CloudFront, Understanding Amazon Database Services, Amazon SimpleDB, Amazon Relational Database Service (RDS), Choosing a database for AWS.

UNIT-V: USING MICROSOFT CLOUD SERVICES (Periods:12)

Exploring Microsoft Cloud Services, Defining the Windows Azure Platform, The software plus services approach, The Azure Platform, The Windows Azure service, Windows Azure AppFabric, Azure Content Delivery Network, SQL Azure, Windows Azure pricing, Windows Live services, Using Windows Live, Windows Live Essentials, Windows Live Home, windows live for mobile.

Managing the Cloud: Administrating the Clouds, Management responsibilities, Lifecycle Management, Cloud Management Products, Emerging Cloud Management Standards, DMTF Cloud Management standards, Cloud Commons and SMI.

Understanding Cloud Security: Securing the Cloud, The security boundary, Security service boundary, Security mapping, Securing Data, Brokered cloud storage access, Storage location and tenancy, Encryption, Auditing and compliance, Establishing Identity and Presence, Identity protocol standards, Windows Azure identity standards.

Total Periods:59

TEXT BOOKS:

1. Barrie Sosinsky, *"Cloud Computing Bible,"* 1st Edition, Wiley India Pvt Ltd, 2011.
2. Ivanka Menken and Ivanka Menken, *"Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book,"* 1st Edition, Emereo Pty. Ltd., 2009.

REFERENCE BOOKS:

1. Anthony T. Velte, Toby J. Velte Robert Elsenpeter, *"Cloud Computing: A Practical Approach,"* 1st Edition, Tata Mc Graw Hill, 2010.
2. John W. Rittinghouse and James F. Ransome, *"Cloud Computing Implementation, Management and Security,"* 1st Edition, CRC Press, Taylor & Francis Group, 2010.
3. George Reese, *"Cloud Application Architectures,"* 1st Edition, O'Reilly Publishers, 2010.
4. David S. Linthicum, *"Cloud Computing and SOA Convergence in your Enterprise,"* 1st Edition, Addison- Wesley, 2010.

M. Tech. – I Semester
(14MT10310) RESEARCH METHODOLOGY
(Common to all M. Tech. Programmes)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	--	--	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Fundamentals of research work - research problem and design; Data collection, Analysis and hypothesis; Statistics in Research; Interpretation and Report Writing.

COURSE OUTCOMES:

On successful completion of this course, the student will be able to

1. Demonstrate knowledge on research approaches, research process and data collection.
2. Identify and analyze research problem.
3. Solve the research problems using statistical methods.
4. Carryout literature survey and apply good research methodologies for the development of scientific/ technological knowledge in one or more domains of engineering.
5. Learn, select and apply modern engineering tools to complex engineering activities.
6. Write effective research reports.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO RESEARCH METHODOLOGY (Periods:07)

Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research.

UNIT-II: RESEARCH PROBLEM AND DESIGN (Periods:09)

Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem. Features of Good Design, Research Design Concepts, Different Research Designs.

UNIT-III: DATA COLLECTION, ANALYSIS, AND HYPOTHESIS (Periods:09)

Different Methods of Data Collection, Processing Operations, Types of Analysis, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure.

UNIT-IV: STATISTICS IN RESEARCH (Periods:09)

Review of Statistical Techniques - Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry. Normal Distribution, Chi-Square Test as a Test of Goodness of Fit.

UNIT-V: INTERPRETATION AND REPORT WRITING (Periods:06)

Interpretation – Techniques and Precautions. Report Writing – Significance, Stages, Layout. Types of reports, Precautions in Writing Reports.

Total Periods: 40

TEXT BOOK:

1. C.R. Kothari, *Research Methodology: Methods and Techniques*, New Age International Publishers, New Delhi, 2nd Revised Edition, 2004.

REFERENCE BOOKS:

1. Ranjit Kumar, *Research Methodology: A step-by-step guide for beginners*, Sage South Asia, 3rd ed., 2011.
2. R. Panneerselvam, Research Methodology, PHI learning Pvt. Ltd., 2009

M.Tech. (SE) I Semester
(14MT12521) DATA STRUCTURES AND WEB TECHNOLOGIES LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	4	2

PRE-REQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION:
Implementation of various linear and non-linear data structures using C++; Design and development of the interactive dynamic web sites using web technologies-HTML5, CSS3, JavaScript, JQuery, PHP and AJAX.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Understanding of:
   - Linear data structures: lists, stacks and queues
   - Non-linear data structures: trees and graphs
   - Dynamic programming and algorithms design techniques
   - Acquire practical knowledge on various web page design technologies like HTML5, CSS3, JavaScript, JQuery and AJAX.
2. Gain skills in developing effective and efficient algorithms and data structures to solve real-world problems and to develop web pages which are more dynamic, interactive, scalable and user friendly.
3. Design more efficient client-server applications using modern web design tools.

LIST OF EXPERIMENTS:
Data Structures:

Week-1: Write C++ programs to implement the following using an array.
a) Stack ADT b) Queue ADT

Week-2: Write C++ programs to implement the following using a singly linked list.
a) Stack ADT b) Queue ADT

Week-3: Write C++ programs to implement the circular queue ADT using a doubly linked list and an Array.

Week-4: Write C++ programs for the implementation of BFS and DFS for a given graph.

Week-5: Write C++ programs that use recursive functions to traverse the given binary tree in:
a) Preorder b) Inorder c) Postorder

Week-6: Write a C++ program to perform the following operations:
a) Insert an element into a Binary Search Tree.
b) Delete an element from a Binary Search Tree.
c) Search for a key element in a Binary Search Tree.

Week-7: Write a C++ program to perform the following operations
a) Insertion into an AVL - Tree
b) Deletion from an AVL – Tree

Week-8: Write C++ programs for implementing the following using Divide and Conquer:
a) Binary search b) Merge sort c) Quick sort

Week-9: Write C++ programs for implementing the following using Greedy method:
a) Kruskal's algorithm
b) Prim's algorithm

Week-10: Write a C++ program to implement following using Dynamic programming
a) All Pairs Shortest Path.
b) Single Source Shortest Path

Week-11: Write a C++ program for implementing following
a) 8 Queen's problem using back tracking
b) 0/1 Knapsack problem using Branch and Bound

Web Technologies:

1. Design a web page with the following features using HTML5 and CSS3
   a. Displaying of images with Custom animated effects
   b. Playing of selected video from the list of loaded videos
2. a. Design a web page to store user information like user name and mobile number using local storage concept.
   b. Design a web page to store employee information including Name, ID, Department, Salary and Address on a client's machine using a real SQL database.
3. Design a web page that:
   a. Shows the animated text in increasing and decreasing font size
   b. Changes the size of the area in a web page using DIV tag
   c. Hides and Shows elements on web page.
4. Design a web page that allows the user to edit the content of a web page element and to change the position of elements using drag and drop features of HTML5.
5. Design a PHP page that reads User Name and Favorite Color from the html form and then displays user name in green color and sets user favorite color as a background color to the web page.
6. Write a PHP code to read the user id and password entered in the Login form and authenticate with the values (user id and passwords) available in the cookie. If he/she is a valid user (i.e., user id and password match) you should welcome him/her by user id otherwise you should display a message stating that he/she is not an authorized user. **Note**: Assume four user id's user1, user2, user3 and user4 and their passwords pwd1, pwd2, pwd3 and pwd4 respectively. Create four cookies on four user id's and passwords and then validate.
7. a) Design a PHP page that reads user details from the registration form and store user information into a MySQL database.
   b) Write a PHP code to authenticate users by reading user id and password from the Login form. Compare User id and password values with user id's and passwords stored at database. If he/she is a valid user (i.e., user id and password match) you should welcome him/her by name (first name + last name), otherwise make that as unauthorized access.

8. Design a web page to update some part of the web page content using XML Http Request object.

REFERENCE BOOKS:

1. Sartaj Sahni *"Data structures, Algorithms and Applications in C++,"* 2nd Edition, Universities press (India) Pvt. Ltd, 2005
2. Adam Drozdek *"Data Structures and Algorithms in C++,"* 4th Edition, Delmar Cengage Learning, 2012.
3. Kogent Learning Solutions Inc, *"HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery,"* 1st Edition, Dreamtech Press, 2011.
4. W. Jason Gilmore, *"Beginning PHP and MySQL,"* 4th Edition, APress, 2011.

M.Tech. (SE) II Semester
(14MT22501) SERVICE ORIENTED ARCHITECTURE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES: Courses on "Software Engineering" and "Web Technologies".

COURSE DESCRIPTION:
Introduction to SOA, Web services & Primitive SOA; WS extensions; Principles of SOA, Service Layers, Delivery strategies; Service Modeling; Service and Business process design- Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL), and Web Services- Business Process Execution Language (WS-BPEL).

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain knowledge on:
    - Fundamental of web services.
    - Principles, services and policies of service orientation.
2. Analyze complex business process critically in identifying appropriate service model logic.
3. Gain skills on Technologies: XML, WSDL, BPEL related to SOA.

DETAILED SYLLABUS

UNIT-I: SOA AND WEB SERVICES FUNDAMENTALS (Periods:10)

Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common tangible benefits of SOA, Common pitfalls of adopting SOA.

Web Services and Primitive SOA: The Web Services frame work, Services, Service descriptions, Messaging.

UNIT-II: SOA AND WS EXTENSIONS (Periods:12)

Web Services and Contemporary SOA (Part-I Activity Management and Composition): Message Exchange Patterns, Service Activity, Coordination, Atomic transactions, Business Activities, Orchestration, Choreography.

Web Services and Contemporary SOA (Part-II Advanced Messaging, Metadata and Security): Addressing, Reliable messaging, Correlation, Policies, Metadata exchange, Security, Notification and eventing.

UNIT-III: PRINCIPLES, SERVICE LAYERS AND PLANNING (Periods:12)

Principles of Service-Orientation: Anatomy of SOA, Common principles of Service Orientation, Service Orientation and Object Orientation.

Service Layers: Service-Orientation and Contemporary SOA, Service Layer Abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

SOA Delivery Strategies: SOA delivery lifecycle phases, The Top-down strategy, The bottom-up strategy, The agile strategy.

UNIT-IV: BUILDING SOA (ANALYSIS) (Periods:09)

Introduction: Introduction to Service Oriented Analysis, Benefits of a Business Centric SOA, Deriving Business Services.

Service Modeling: Service Modeling, Service Modeling guidelines, Classifying Service model logic, Contrasting Service modeling approaches.

UNIT-V: BUILDING SOA (DESIGN) (Periods:13)

Introduction: Introduction to Service-Oriented design, WSDL related XML Schema language basics, WSDL language basics, SOAP language basics, Service interface design tools.

Service Design: Service Design overview, Entity-centric business Service Design, Application Service Design, Task-centric business Service Design, Service Design guidelines.

Business Process Design: WS-BPEL language basics, WS- Coordination overview, Service Oriented Business process Design.

Total Periods:56

TEXT BOOK:

1. Thomas Erl, *"Service-Oriented Architecture - Concepts, Technology and Design,"* Pearson, 2008.

REFERENCE BOOKS:

1. Shankar Kambhampaty, *"Service Oriented Architecture for Enterprise and Cloud Applications,"* Wiley- India, 2012
2. Eric Newcomer and Greg Lomow, *"Understanding SOA with Web Services,"* Pearson Education, 2007.
3. M. Rosen et al., *"Applied SOA,"* Wiley India Pvt. Ltd, 2009.

M.Tech. (SE) II Semester
(14MT22502) SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: Courses on "Software Development Methodologies," and "Object Oriented Programming".

COURSE DESCRIPTION:
Software Architecture and Architecture Business Cycle(ABC); Understanding the requirements, designing, documenting, and reconstructing software architectures; Evaluating the architectures and Moving From one System to Many; Fundamentals of Design Patterns, Creational, Structural and Behavioral Patterns.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain knowledge in:
   i. Software architecture styles and business life cycle.
   ii. Various design issues and patterns.
2. Analyze and identify architectural styles and patterns to solve software design problems.
3. Apply appropriate software pattern to solve problems in object oriented software design process.

DETAILED SYLLABUS

UNIT I: ENVISIONING ARCHITECTURE (Periods:12)

Introduction to Software Architecture (SA) and Architecture Business Cycle (ABC):
What is Software Architecture, What Software Architecture is and What it isn't, Architectural Structures and Views, What makes a good Architecture, Why is SA important, Where do Architectures come from, Software Processes and the ABC, Architectural Patterns, Reference Model and Reference Architecture.
Pattern System: What is Pattern System, Pattern Classification, Pattern Selection, Introduction to Architectural Patterns, Pipes & Filter, Model-View-Controller.

UNIT II: CREATING AN ARCHITECTURE (Periods:14)

Understanding the Requirements: Functionality and Architecture, Architecture and Quality Attributes (QA), System QAs, QA Scenarios in Practice, Business and Architecture Qualities, Achieving Qualities.
Designing the Architecture: Architecture in the Life Cycle, Attribute Driven Design (ADD).
Documenting Software Architectures: Uses of Architectural Documentation, Views. **Reconstructing Software Architectures:**

Information Extraction, Database Construction, View Fusion and Reconstruction.

UNIT III: ANALYZING ARCHITECTURES AND MOVING FROM ONE SYSTEM TO MANY (Periods:09)

Evaluating the Architecture: The ATAM, The CBAM.

Moving From one System to Many: Software Product Lines, Building Systems from off the shelf components, Software Architecture in the future.

UNIT IV: INTRODUCTION TO DESIGN PATTERN AND CREATIONAL PATTERNS (Periods:09)

Introduction to Design Patterns: What is Design Pattern(DP), Design Patterns in Smalltalk MVC, Describing DPs, The Catalog of DPs, Organizing the Catalog, How DP Solve Design Problem, How to Select and Use of a DP.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype.

UNIT V: STRUCTURAL AND BEHAVIORAL PATTERNS (Periods:11)

Structural Patterns: Adapter, Composite, Decorator, Flyweight.

Behavioral Patterns: Command, Iterator, Mediator, Observer, State.

Total Periods:55

TEXT BOOKS:

1. Len Bass, Paul Clements and Rick Kazman, *"Software Architecture in Practice,"* 2nd Edition, Addison-Wesley, 2003.
2. Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides *"Design Patterns: Elements of Reusable Object-Oriented Software,"* Pearson Education, 1995.

REFERENCE BOOKS:

1. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad and Michael Stal, *"Pattern-Oriented Software Architecture: A System of Pattern,"* Volume 1, John Wiley & Sons, 2001.
2. Mary Shaw and David Garlan, *"Software Architecture: Perspectives on an Emerging Discipline,"* Prentice Hall, 1996.
3. Eric Freeman and Elisabeth Freeman, *"Head First Design patterns,"* O'REILLY, 2004.
4. Richard N. Taylor, N. Medvidovic and Eric M. Dashofy, *"Software Architecture: Foundations, Theory, and Practice,"* Wiley, 2006.

M.Tech. (SE) II Semester
(14MT22503) SOFTWARE MEASUREMENT AND METRICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES: A course on "Software Engineering".

COURSE DESCRIPTION:
Software measurement theory; Models of software engineering measurement; Software products metrics, software process metrics; Measuring & management and Software quality metrics.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain knowledge in:
    - Data collection and measures.
    - Software quality.
2. Acquire skills in analyzing project implementation risks and make decisions appropriately to develop product.
3. Apply software metrics to measure the parameters of a project.

DETAILED SYLLABUS

UNIT-I: FUNDAMENTALS OF MEASUREMENT (Periods:10)

Measurement and Basics of Measurement - Measurement in Everyday Life, Measurement in Software Engineering, Scope of Software Metrics, Representational Theory of Measurement, Measurement and Models, Measurement Scales and Scale Types.

UNIT-II: ANALYSIS OF MEASUREMENT (Periods:11)

Goal-Based Frame Work for Software Measurement - Classifying Software Measures, Determining what to measure, Applying Frame Work, Software Measurement Validation

Software Metrics Data Collection - Good Data, Definition of Data, Collecting, Storing and Extracting Data.

UNIT-III: PRODUCT ATTRIBUTES (Periods:12)

Measuring Internal Product Attributes – Size - Aspects of software size, Length, Reuse, Functionality, Complexity.

Structure - Types of structural measures, Control-flow structure, Modularity and information flow attributes.

UNIT-IV: MEASUREMENT AND MANAGEMENT (Periods:11)

Measuring External Product Attributes: Modeling Software Quality, Measuring Aspects of Quality. Object-Oriented Metrics: Object-Oriented Concepts and Constructs, Design and Complexity metrics, Productivity Metrics, Quality and Quality Management Metrics, Lessons Learned for OO Projects.

UNIT-V: QUALITY METRICS (Periods:11)

Software Quality Metrics Overview - Product Quality Metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metrics Programs,

Collecting Software Engineering Data, Applying the Seven Basic Quality Tools in Software Development.

Total Periods:55

TEXT BOOKS:

1. Fenton, Pfleeger, *"Software Metrics,"* 2nd Edition, Thomson, 2005.
2. Stephen H. Kan, *"Metrics and Models in Software Quality Engineering,"* 2nd Edition, Addison Wesley, 2011.

REFERENCE BOOKS:

1. Linda M. Laird and Carol Brennan, "Software Measurement and Estimation - A Practical Approach," IEEE Computer Science Press and Wiley Inter Science, 2006.
2. C Ravindranath Pandian: "Software Metrics: A guide to Planning Analysis and Implementation," Auerbach Publications, 2005.

M.Tech. (SE) II Semester
(14MT22504) SOFTWARE SECURITY ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES: Courses on "Software Engineering," and "Network Security".

COURSE DESCRIPTION:
Importance of security in software; Requirements engineering for secure software; Secure software architecture & design, secure coding & testing; System assembly challenges; and Governance & managing.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain knowledge on security issues in:
    - Requirement Engineering
    - Architecture and Design
    - Coding and Testing
    - System Assembling
2. Analyze complex software projects to describe security risks and mitigation techniques.
3. Acquire skills to solve the different security risks arising at different levels of software development life cycle.

DETAILED SYLLABUS

UNIT-I: IMPORTANCE OF SECURITY IN SOFTWARE (Periods:12)

Security a Software Issue: Introduction, The problem, Software Assurance and Software Security, Threats to software security, Sources of software insecurity, Benefits of detecting software security defects early, Managing secure software development.

What Makes Software Secure: Introduction, Properties of Secure Software, Influencing the security properties of software, Asserting and specifying the desired security properties.

UNIT-II: REQUIREMENTS ENGINEERING (Periods:10)

Requirements Engineering for Secure Software: Introduction, Misuse and abuse cases, the SQUARE process Model, SQUARE sample outputs, Requirements elicitation, Requirements prioritization.

UNIT-III: SECURITY PRINCIPLES IN SDLC (Periods:12)

Secure Software Architecture and Design: Introduction, Software Security practices for Architecture and Design - architectural risk analysis, Software security knowledge for Architecture and Design - Security principles, Security guidelines and Attack patterns.

Secure Coding and Testing: Introduction, Code analysis, Software Security testing, Security testing considerations throughout the SDLC.

UNIT-IV: SECURITY AND COMPLEXITY (Periods:10)

System Assembly Challenges: Introduction, Security failures, Functional and attacker perspectives for security analysis in web services and identity management, system complexity drivers and security.

UNIT-V: GOVERNANCE AND MANAGING (Periods:12)

Governance and Managing for more Secure Software: Introduction, Governance and security, adopting an enterprise software security framework, how much security is enough, Security and Project Management, Maturity of Practice.

Total Periods:56

TEXTBOOK:

1. Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, and Nancy R. Mead, *"Security Engineering: A Guide for Project Managers,"* Pearson Education, 2009.

REFERENCE BOOKS:

1. Gary McGraw, *"Software Security: Building Security In,"* Addison-Wesley, 2006.
2. Mark Dowd, John McDonald and Justin Schuh, *"The Art of Software Security Assessment: Identifying and Preventing Software Vulnerabilities,"* 1st Edition, Addison-Wesley, 2006.
3. John Viega and Gary McGraw, *"Building Secure Software: How to Avoid Security Problems the Right Way,"* Addison-Wesley, 2001.
4. G. Hoglund and G. McGraw, *"Exploiting Software: How to Break Code,"* Addison-Wesley, 2004.

M.Tech. (SE) II Semester
(14MT22505) SOFTWARE TESTING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: Courses on "Software Engineering," and "Software Measurements and Metrics".

COURSE DESCRIPTION:
Software testing principles, functional & structural testing; Integration, regression & internationalization testing; Ad-hoc testing, testing of object oriented systems, usability & accessibility testing; Software test management & metrics; Software test automation.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain in-depth knowledge in software testing methodologies, and test strategies.
2. Analyze contemporary issues in software testing and design best test strategies.
3. Acquire problem solving skills to ensure quality software development to meet the industry standards.

DETAILED SYLLABUS

UNIT-I: **SOFTWARE TESTING CONCEPTS – I (Periods:12)**

A Perspective on Testing: Definitions, Test cases, Identifying Test cases, Error & Fault Taxonomies, Levels of Testing.

Functional Testing: Boundary Value Testing - Boundary Value Analysis, Test case Examples, Random Testing, Guidelines for Boundary Value Testing. Equivalence Class Testing - Equivalence Classes, Test case Examples, Guidelines and Observations. Decision Table based Testing - Decision Tables, Test case Examples, Guidelines and Observations.

Structural Testing: Path Testing - DD-Paths, Test Coverage Metrics, Basis Path Testing, Guidelines and Observations. Dataflow Testing - Define/Use Testing & Examples, Slice based Testing & Examples, Guidelines and Observations.

UNIT-II: SOFTWARE TESTING CONCEPTS – II (Periods:12)

Integration Testing: Scenario Testing, Defect bash. System and acceptance testing - functional, non-functional testing. Performance testing, Regression Testing - Definition, Types, When & How to do regression testing, Best practices. Internationalization Testing - Introduction, Test Phases of Internationalization testing, and Enabling testing, Locale Testing, Language testing, Localization testing.

UNIT-III: SOFTWARE TESTING CONCEPTS – III (Periods:10)

Ad-hoc testing: Overview, Buddy, Pair, Exploratory, Iterative, Agile and Extreme Testings. Testing of Object-oriented systems - Introduction, Primer on

object oriented software, Differences in OO testing. Usability And Accessibility Testing - what is usability testing, approach to usability, when to do usability testing, how to achieve usability, quality factors for usability, accessibility testing, tools for usability.

UNIT-IV: SOFTWARE TEST MANAGEMENT AND METRICS (Periods:10)

Test planning, Test Management, Test Process and Reporting, Software Test matrices and Measurement: Type of Metrics, Project Metrics, Productivity Metrics, Progress Metrics, Release Metrics.

UNIT-V: SOFTWARE TEST AUTOMATION (Periods:13)

Test Automation: Scope of Automation, Design and Architecture of automation, Process Model for Automation. Load Runner, Selenium, QTP, RFT and RQM, Bugzilla.

Total Periods:57

TEXT BOOKS:

1. Paul C. Jorgensen, *"Software Testing: A Craftman's Approach,"* 3rd Edition, Auerbach Publications, 2008.
2. Srinivasan Desikan and Gopalswami Ramesh *"Software Testing: Principles and Practices,"* 1st Edition, Pearson Education, 2008.

REFERENCE BOOKS:

1. M. G. Limaye, *"Software Testing: Principles and Techniques and Tools,"* Tata Mc Graw – Hill Education, 1st Edition, 2012.
2. Ilene Burnstein, *"Practical Software Testing,"* Springer-Verilog Internation Edition, 2003.
3. Dr. K. V. K. K.Prasad, *"Software Testing Tools,"* Dreamtech, 1st Edition, 2004.
4. The Bugzilla Guide - 4.4.2+ Release (http://www.bugzilla.org/docs/4.4/en/pdf/Bugzilla-Guide.pdf)
5. Introduction to IBM Rational Functional Tester 6.1 (http://www.ibm.com/developerworks/rational/library/04/r-3228/3228.html)
6. Selenium-IDE — Selenium Documentation (http://docs.seleniumhq.org/docs/)

M.Tech. (SE) II Semester
(14MT22506) BIG DATA TECHNOLOGIES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Data Mining and Data Warehousing"

COURSE DESCRIPTION:
Fundamentals of Big Data; Data-parallel programming model- Hadoop, Hadoop I/O; MapReduce features, HDFS; Hive, HBase, Zookeeper; Sqoop and Case studies.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Acquire knowledge on Big Data storage, processing, querying and reporting.
2. Apply Big Data Technologies to solve real-world problems such as stock market, sentiments analysis and massively scalable architectures.
3. Gain skills on various Big Data tools: Sqoop, HBase, MapReduce and Mahout.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO BIG DATA (Periods:12)
The Evolution of Big Data, What is Big Data, Why Big Data Matters, Big Data Sources, The Big Data Revolution, Security, Compliance, Auditing and Protection. Meet Hadoop: Data Storage and Analysis, Comparison with Other Systems, A Brief History of Hadoop, Apache Hadoop and the Hadoop Ecosystem. MapReduce: A Weather Dataset, Analyzing the Data with UNIX Tools, Analyzing the Data with Hadoop, Scaling Out, Hadoop Streaming, Hadoop Pipes. The Hadoop Distributed File system: The Design of HDFS, HDFS Concepts, The Command-Line Interface, Hadoop File systems, The Java Interface, Data Flow, Parallel Copying with distcp, Hadoop Archives.

UNIT-II: HADOOP I/O (Periods:12)
Data Integrity, Compression, Serialization, File-Based Data Structures. Developing a MapReduce Application: The Configuration API, Configuring the Development Environment, Writing a Unit Test, Running Locally on Test Data, Running on a Cluster, Tuning a Job, MapReduce Workflows. How MapReduce Works: Anatomy of a MapReduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution. MapReduce Types and Formats: MapReduce Types, Input Formats, Output Formats.

UNIT-III: MAPREDUCE FEATURES (Periods:12)
Counters, Sorting, Joins, Side Data Distribution, MapReduce Library Classes. Setting Up a Hadoop Cluster: Cluster Specification, Cluster Setup and Installation, SSH Configuration, Hadoop Configuration, YARN Configuration, Security, Benchmarking a Hadoop Cluster, Hadoop in the Cloud. Administering Hadoop: HDFS, Monitoring, Maintenance. Pig: Installing and Running Pig,

Comparison with Databases, Pig Latin, User-Defined Functions, Data Processing Operators, Pig in Practice.

UNIT-IV: HIVE, HBase, ZOOKEEPER (Periods:11)

Installing Hive, Running Hive, Comparison with Traditional Databases, HiveQL, Tables, Querying Data, User - Defined Functions. HBase: HBasics, Concepts, Installation, Clients, HBase versus RDBMS, Praxis. ZooKeeper: Installing and Running ZooKeeper, the ZooKeeper Service, Building Applications with ZooKeeper, ZooKeeper in Production.

UNIT-V: SQOOP AND CASE STUDIES (Periods:12)

Getting Sqoop, Generated Code, Database Imports: A Deeper Look, Working with Imported Data, Importing Large Objects, Performing an Export, Exports: A Deeper Look. Case Studies: Best Practices for Big Data Analytics, Hadoop Usage at Last.fm, Hadoop and Hive at Facebook, Nutch Search Engine, Log Processing at Rackspace, Cascading, and TeraByte Sort on Apache Hadoop, Using Pig and Wukong to Explore Billion-edge Network Graphs.

Total Periods:59

TEXT BOOKS:

1. Tom White, *"Hadoop: The Definitive Guide,"* Oreilly and Yahoo Press, 3rd Edition, 2012.

REFERENCE BOOKS:

1. Frank J. Ohlhorst, *"Big Data Analytics: Turning Big Data into Big Money,"* Wiley Publication, December 2012.
2. Kevin Roebuck, *"Big Data: High-Impact Strategies - What You Need to Know: Definitions, Adoptions, Impact, Benefits, Maturity, Vendors,"* Tebbo Publisher, 2011.
3. Alex Holmes, *"Hadoop in Practice,"* Manning Publications Publisher, 2012.

M. Tech. (SE)-I Semester
(14MT22507) SOFTWARE RELIABILITY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES: Courses on "Software Engineering" and "Probability and Statistics".

COURSE DESCRIPTION:
Software reliability engineering process, developing operational profiles; Software reliability strategies, failures, faults & errors, availability; Software reliability modeling; Software metrics for reliability assessment; Best practice of software reliability engineering, and neural networks for software reliability.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain knowledge on:
    - Concepts of Software and Hardware Reliability.
    - Software Reliability Modeling.
    - Software metrics for Reliability Assessment.
    - Software Reliability Estimation.
    - Best practices of Software Reliability Engineering.
2. Analyze software system failures and develop convincing solutions.
3. Apply problem solving skills in producing failure free software intensive system.

DETAILED SYLLABUS

UNIT-I:**INTRODUCTION AND THE OPERATIONAL PROFILE (Periods:12)**
The Need for Reliable Software, Software Reliability Engineering Concepts, Basic definitions, Software practitioners biggest problem, software reliability engineering approach, software reliability engineering process, defining the product.
The Operational Profile: Reliability concepts, software reliability and hardware reliability, developing operational profiles, applying operational profiles, learning operations and run concepts.

UNIT-II: SOFTWARE RELIABILITY CONCEPTS (Periods:10)
Defining failure for the product, common measure for all associated systems, setting system failure intensity objectives, determining develop software failure intensity objectives, software reliability strategies, failures, faults and errors, availability, system and component reliabilities & failure intensities, predicting basic failure intensity.

UNIT- III: SOFTWARE RELIABILITY MODELING SURVEY (Periods:10)
Introduction, Historical Perspective and Implementation, Exponential Failure Time Class of Models, Weibull and Gamma Failure Time Class of Models, Infinite Failure Category Models, Bayesian Models, Model Relationship, Software Reliability Prediction in Early Phases of the Life Cycle.

UNIT-IV: RELIABILITY ASSESSMENT AND SOFTWARE TESTING (Periods:12)

Software Metrics for Reliability Assessment: Introduction, Static Program Complexity, Dynamic Program Complexity, Software Complexity and Software Quality, Software Reliability Modeling.

Software Testing: Introduction, Overview of Software Testing, Operational Profiles, Time/Structure based Software Reliability Estimation.

UNIT-V: BEST PRACTISES AND NEURAL NETWORKS (Periods:12)

Best Practice of SRE: Benefits and approaches of SRE, SRE during requirements phase, SRE during implementation phase, SRE during Maintenance phase.

Neural Networks: Introduction, Neural Networks for software reliability, software reliability growth modeling.

TEXT BOOKS:

1. Michael R. Lyu, *"Handbook of Software Reliability Engineering,"* IEEE Computer Society Press, McGraw-Hill Book Company, 2005.
2. John D. Musa, *"Software Reliability Engineering,"* 2nd Edition, Tata McGraw-Hill, 2011.

REFERENCE BOOKS:

1. Patric D. T. O Connor, *"Practical Reliability Engineering,"* 4th Edition, John Wesley & Sons, 2003.
2. Anderson and PA Lee, *"Fault tolerance principles and Practice,"* PHI, 1981.

M.Tech. (SE) II Semester
(14MT22508) SOFTWARE REVERSE ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES: Courses on "Software Engineering," and "Object Oriented Programming".

COURSE DESCRIPTION:
Fundamentals of software reverse engineering, object flow graph, low level software; reversing Tools; Locating undocumented APIs; UML diagrams; Reversing malware, and Anti reversing techniques.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain Knowledge on
   - Finding malicious code.
   - Discovering unexpected flaws and faults.
   - Finding the use of others code.
   - Learning from others products of a different domain or purpose.
2. Analyze well designed Software System and discover new opportunities for innovation.

DETAILED SYLLABUS

UNIT-I: FOUNDATIONS (Periods:13)

Need for Reverse Engineering, Software Reverse Engineering, Reverse Applications, Low Level Software, The Reversing Process, The Tools, Is Reversing Legal and Code Samples Tools.

Object Flow Graph: Abstract Language, Object Flow Graph, Containers, Flow Propagation Algorithm, Object Sensitivity, The elib Program.

Low Level Software: High Level Perspectives, Low Level Perspectives, Assembly Language, A Primer on Compilers and Compilation, Execution Environments.

UNIT-II: **REVERSING TOOLS (Periods:07)**

Different Reversing Approaches, Disassemblers, Debuggers, Decompilers, System-Monitoring Tools, Patching Tools, Miscellaneous Reversing Tools.

UNIT-III: BEYOND THE DOCUMENTATION (Periods:08)

Reversing and Interoperability, Laying the Ground Rules, Locating Undocumented APIs, Case Study.

UNIT-IV: CLASS, OBJECT, INTERACTION AND STATE DIAGRAMS (Periods:14)

Class Diagram: Recovery, Declared Vs Actual Types, Containers, The elib Program.

Object Diagram: Introduction, Object Sensitivity, Dynamic Analysis, The elib Program.

Interaction Diagram: Introduction, Interaction Diagram Recovery, Dynamic Analysis, The elib Program.

State Diagram: Introduction, Abstract Interpretation, State Diagram Recovery, The elib Program.

UNIT-V: PACKAGE DIAGRAM, REVERSING AND ANTI REVERSING TECHNIQUES (Periods:16)

Package Diagram: Recovery, Clustering, Concept Analysis, The elib Program, Tool Architecture, The elib Program, Perspectives.

Reversing Malware: Types of malware, Sticky software, Future malware, Uses of malware, Malware vulnerability, Polymorphism, Metamorphism, establishing a secure environment.

Anti Reversing Techniques : Introduction to Anti reversing, Basic approaches to anti reversing, Eliminating symbolic information, Code encryption, Active anti debugger techniques, Confusing Disassemblers, Code obfuscation, Control flow transformations, Data transformations.

Total Periods:58

TEXT BOOKS:

1. Paolo Tonella &Alessandra Potrich, "*Reverse Engineering of Object Oriented Code*," Springer-2005.
2. Eldad Eilam, "*Reversing: Secrets of Reverse Engineering*," Wiley, 2005.

M.Tech. (SE) II Semester
(14MT22509) SOFTWARE REUSE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES: Courses on "Software Engineering," and "Object Oriented Concepts".

COURSE DESCRIPTION:
Software reuse success factors, reuse driven software engineering; Architectural styles, architectural elements; Processes- Object Oriented Business Engineering; Organizing a reuse business- Transition to a reuse business, managing the reuse business, and business engineering.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Gain knowledge on:
    - Component System Engineering
    - Application System Engineering
    - Application Family Engineering
    - Managing reuse
2. Analyze complex legacy software systems to identify reusable components.

DETAILED SYLLABUS

UNIT-I: INTRODUCING THE REUSE DRIVEN SOFTWARE ENGINEERING BUSINESS (Periods:08)

Software Reuse success factors: Software reuse a simple idea, A systematic approach makes pragmatic reuse work, Reuse requires changes in process, Reuse requires changes in organization, Adopting Reuse, Set of principles.

Reuse Driven Software Engineering is a Business: Make Reuse cost effective, Reuse business characteristics, Architect Components and Applications, Software Engineering processes, Establishing and Managing a Reuse business.

UNIT-II: ARCHITECTURAL STYLE-I (Periods:12)

Object Oriented Software Engineering, Application and Component System, Use case Components.

UNIT-III: ARCHITECTURAL STYLE-II (Periods:12)

Object Components: Object models define system architecture and design, Reusing Analysis and design components, Expressing variability in object model components, Tracing use case variability to the object model, Reusable analysis components, Reusable design and implementation components, Layered Architecture.

UNIT-IV: PROCESSES (Periods:13)

Object Oriented Business Engineering, Applying Business Engineering to Define Processes and Organization, Application Family Engineering

UNIT-V: ORGANIZING A REUSE BUSINESS (Periods:12)

Transition to a Reuse Business, Managing the Reuse Business, Making the Reuse Business work: Reuse improves the performance of business processes, misconceptions, Doing reuse is difficult, Reuse depends on architecture, Business engineering.

Total Periods:57

TEXT BOOK:

1. Ivar Jacobson, Martin Gress, Patrick Johnson, *"Software Reuse,"* Pearson Education, 2004.

REFERENCE BOOKS:

1. Eve-Andre Karisson, *"Software Reuse – A Holistic Approach,"* John Wiley and Sons, 1996.
2. Karma McClure, *"Software Reuse Techniques – Additional reuse to the systems development process,"* Prentice Hall, 1997.

M.Tech. (SE) II Semester
(14MT22521) SOFTWARE DEVELOPMENT AND TESTING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	4	2

PRE-REQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION:
Hands-on experience in software development life cycle activities-requirements specification using RequisitePro tool, modeling using AgroUML tool; Implementation of design patterns; Refactoring using InsRefactor and SafeRefactor Eclipse Plugins.; Test plan document; Regression testing, functional testing using QTP, RFT and Selenium; Performance testing using Load Runner, RPT and Web Performance Tool.

COURSE OUTCOMES:
On successful completion of this course, the student will be able to:

1. Acquire software testing knowledge and experience by handling the design and conduct software testing processes.
2. Identify key entities and relationships in the problem domain and write succinct textual descriptions of problems in the style of a user manual.
3. Apply various testing phases and automate while testing the application and apply Software Engineering concepts and practices in
    i. Identify customer's needs.
    ii. Evaluate system for feasibility.
    iii. Perform economic and technical analysis.
    iv. Allocate functions to system elements.
    v. Establish schedule, constraints and estimate cost.
    vi. Create system definitions.

LIST OF EXPERIMENTS:
SOFTWARE DEVELOPMENT:

1. Prepare the Software Requirement Specification (SRS), High Level Design (HLD) and Detailed Design (DD) for the following experiments
   (i) Employee Information System (ii) Online Airline Reservation

Note: For the reference of SRS, HLD and DD templates refer department manual and use Requirement documentation tool (RequisitePro) in Rational Rose.

2. Estimation of Project Metrics for the above 1. (i) and (ii) using COCOMO-II
3. Study and prepare a report on the following tools:
   (i) OSRMT (ii) Microsoft Visio 2010 (iii) Enterprise Architect 7.5
4. Draw ER diagrams and generate SQL statements for the above experiments using ER Master plugin in Eclipse Helios
5. Model UML Usecase, Sequence, Collaboration and Component diagrams for the following experiments using AgroUML tool
   (i) Students Marks Analyzing System (ii) Course Registration System

6. Write the java program for the following design patterns
   (i) Abstract Factory (ii) Decorator
7. Mini Project on Library Systems using Refactoring

Note: Use InsRefactor and SafeRefactor Eclipse Plugins

SOFTWARE TESTING:

1. Create a test plan document for a Desktop based application
2. Write the Functional test cases for a Desktop based application
3. Write the Regression test cases for a Desktop based application
4. Conduct Functional Testing for a Desktop based application using QTP
5. Conduct Functional Testing for a Desktop based application using RFT
6. Conduct Performance Testing for a Desktop based application using Load Runner
7. Conduct Performance Testing for a Desktop based application using RPT
8. Create a test plan document for a Web based application
9. Write the Functional test cases for a Web based application
10. Write the Regression test cases for a Web based application
11. Conduct Functional Testing using Selenium for a Web based application
12. Conduct Performance and Load testing for a Web based application using Web Performance Tool

REFERENCE BOOKS:

1. Ilene Burnstein, *"Practical Software Testing,"* Springer-Verilog Internation Edition, 2003.
2. Dr. K. V. K. K.Prasad, *"Software Testing Tools,"* Dreamtech, 1st Edition, 2004.
3. Introduction to IBM Rational Functional Tester 6.1 (http://www.ibm.com/developerworks/rational/library/04/r-3228/3228.html)
4. Selenium-IDE — Selenium Documentation (http://docs.seleniumhq.org/docs/)
5. Roger S. Pressman, *"Software Engineering, A practitioner's Approach,"* 6th Edition, Tata McGraw-Hill, Edition, 2010.
6. Sommerville, *"Software Engineering,"* 8th Edition, Pearson Education, 2007.
7. James W.Cooper, "Java Design Patterns- A Tutorial," Pearson Education, 2000
8. Rajesh Naik and Swapna Kishore, *"Software Requirements and Estimation,"* Tata McGraw Hill, New Delhi, 2001.

M. Tech. (SE) – II Semester
(14MT22522) SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	50	50	--	--	--	2

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of seminar topic; Literature survey; Preparation of technical report and Presentation.

COURSE OUTCOMES:
On successful completion of the seminar work, the student will be able to:

1. Acquire in-depth knowledge in core and allied areas of interest.
2. Analyze and synthesize information related to the areas.
3. Conceptualize and construct research problems.
4. Extract information pertinent to a specific area through literature survey to conduct research.
5. Identify the applicability of modern software and tools.
6. Contribute positively to multidisciplinary groups in emerging areas with objectivity and rational analysis.
7. Plan, organize, prepare and present effective written and oral technical reports.
8. Develop independent and reflective learning.
9. Acquire awareness on professional code of conduct in the chosen area.
10. Develop independent and reflective learning.

M. Tech. (SE) – III & IV Semesters
(14MT32521& 14MT42521) PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
80	120	200	--	--	--	16

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and Presentation.

COURSE OUTCOMES:
On successful completion of this project work, the student will be able to:

1. Acquire in-depth knowledge in the areas of interest.
2. Analyze critically chosen project topic for conducting research.
3. Apply knowledge gained through Program, self learning and experience for solution of a given problem efficiently.
4. Undertake research confidently in the project domain.
5. Use the techniques, skills and modern engineering tools necessary for project work.
6. Perform harmonically in multi-disciplinary, multi-cultural groups, and develop a high level of interpersonal skills.
7. Manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.
8. Develop communication skills, both oral and written for preparing and presenting reports.
9. Engage in lifelong learning to improve knowledge and competence continuously.
10. Understand professional and ethical responsibility for sustainable development of society.
11. Develop independent and reflective learning.

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF BOT

COURSE STRUCTURE for M.Tech. (BOT)

I-SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT10301	General Microbiology and Biochemistry	4	-	-	4	40	60	100
2.	14MT10302	Molecular biology	4	-	-	4	40	60	100
3.	14MT10303	Microbial Engineering	4	-	-	4	40	60	100
4.	14MT10304	Immunology and Immunotechnology	4	-	-	4	40	60	100
5.	14MT10305	Process Engineering Principles	4	-	-	4	40	60	100
Elective-I									
6.	14MT10306	Analytical Techniques in Biotechnology	4	-	-	4	40	60	100
7.	14MT10307	Enzyme Engineering and Technology							
8.	14MT10308	Food Process and Technology							
9.	14MT10309	Biosensors							
10.	14MT10310	Research Methodology	3	-	-	3	40	60	100
11.	14MT10321	Process Engineering Principles/ Microbiology and Biochemistry Lab	-	-	4	2	25	50	75
TOTAL			**27**	**-**	**4**	**29**	**305**	**470**	**775**

II-SEMESTER

S. No	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P		Int.	Ext.	Total
1.	14MT20301	Bioreactor Engineering	4	-	-	4	40	60	100
2.	14MT20302	Genetic Engineering	4	-	-	4	40	60	100
3.	14MT20303	Bioseparation Processes	4	-	-	4	40	60	100
4.	14MT20304	Environmental biotechnology	4	-	-	4	40	60	100
5.	14MT20305	Bioinformatics	4	-	-	4	40	60	100
Elective-II									
6.	14MT20306	Animal Cell Technology	4	-	-	4	40	60	100
7.	14MT20307	Plant Biotechnology							
8.	14MT20308	Molecular Modeling and Drug Design							
9.	14MT20309	Nanobiotechnology							
10.	14MT20321	Bioprocess Engineering/ Genetic Engineering lab	-	-	4	2	25	50	75
11.	14MT20322	Seminar	-	-	-	2	--	50	50
TOTAL			**24**	**-**	**4**	**28**	**265**	**460**	**725**

III-SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P*		Int.	Ext.	Total
1.	14MT30321	Project Work – Phase I	-	-	-	4	40	--	40
Total:			**-**	**-**	**-**	**4**	**40**	**--**	**40**

*Fulltime Project Work

IV-SEMESTER

S. No.	Course Code	Course Title	Periods per week			C	Scheme of Examination Max. Marks		
			L	T	P*		Int.	Ext.	Total
1.	14MT40321	Project Work – Phase II	-	-	-	12	40	120	160
Total:			**-**	**-**	**-**	**12**	**40**	**120**	**160**
Grand Total:						**73**	**650**	**1050**	**1700**

*Fulltime Project Work

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

M. Tech. (BOT)-I Semester
GENERAL MICROBIOLOGY AND BIOCHEMISTRY
(14MT10301)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Life Sciences.

COURSE DESCRIPTION:
Structure and classification of Microbes; Microbial growth; Microbial diversity, Molecules of life; Bioenergetics.

COURSE OUTCOMES:
By the end of the course, the student is expected to:
1. Gain broad spectrum of knowledge in
    - The types of microbes, their characteristics and classification
    - Methods of culturing microbes according to their nutritional requirements
    - Biochemical tests to confirm physico-chemical properties of a microbial species
    - Bio-molecules of living organisms and their organization
    - Biochemical pathways and Bioenergetics.
2. Analyze and identify pathogenic microbes.
3. Apply appropriate resources and tools to perform experiments in the areas of Microbiology and Biochemistry.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION, NOMENCLATURE, STRUCTURE AND CLASSIFICATION OF BACTERIA, FUNGI AND VIRUSES (Periods:15)

Historical background and Scope of microbiology. Classification of Bacteria - Basic principles and techniques used in bacterial classification; Phylogenetic polyphasic taxonomy, New approaches of bacterial taxonomic classification including Ribosomal RNA sequencing characteristic of primary domains. Structure and classification of viruses and fungi. Replication of bacteriophages.

UNIT II: MICROBIAL GROWTH (Periods:12)

Microbial Growth - The definition of Growth, Bacterial generation time, specific growth rate and yield measurement, Factors affecting microbial growth. Development of pure culture methods: Enrichment culture methods, Pure culture techniques, sterilization methods; Principles of microbial nutrition and construction of culture media; Enrichment culture techniques for isolation of chemoautotrophs, chemoheterotrophs and photosynthetic microorganisms

UNIT III: CELL STRUCTURE AND MICROBIAL DIVERSITY, AND MICROBES FOR HUMAN WELFARE (Periods:14)

Cell Structure and Microbial Diversity - Structural differences between different microbial cell types and cellular organelles; Biochemical methods used to differentiate between Archae, Eubacteria and Eukaryotes. Cell wall of prokaryotes. Microbes For Human Welfare **-** Soil bacteria, VAM, Trichoderma, Agrobacterium, Nitrogen fixation. Industrially important microbes: secondary metabolites, biotransformations, ethanol production.

UNIT-IV: BIO-MOLECULES (Periods:10)

Carbohydrates, Classification of carbohydrates, Classification of Lipids and their important functions. Protein structure and function, Structure and function of Nucleic acids.

UNIT-V: BIOENERGETICS (Periods:08)

Bioenergetics and Catabolic Pathways, High energy compounds, Cellular metabolites, Respiration and Electron Transport.

Total Periods: 59

TEXT BOOKS:

1. Prescott, Harley & Klein, *Microbiology*, Mcgraw-hill, 7th edition, 1999.
2. A.H. Patel, *Industrial Microbiology*, Macmillan India Ltd, 2nd edition, 2012.
3. Brock and Pearson, *Biology of Microorganisms,* Prentice Hall, 3rd edition, 2006.
4. L. Stryer, *Biochemistry,* Freeman, 4th edition, 2002.
5. G. Gottschalk, *Bacterial Metabolism,* Springer-Verlag, New-York, Berlin, 2nd edition, 1986.

REFERENCES:

1. Stanier et al., *General Microbiology,* Mc Millan Education, London, 5th Edition, 1991.
2. R.M. Atlas, *Principles of Microbiology*, William C Brown publications, 2nd edition, 1995.

M. Tech. (BOT)-I Semester
MOLECULAR BIOLOGY (14MT10302)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Life Sciences.

COURSE DESCRIPTION:
Structure and functions of DNA, RNA and proteins; Control of gene expressions; Mutations; Cloning.

COURSE OUTCOMES:
On successful completion of this course the students will be able to

1. Gain advanced knowledge in
   - Molecular aspects of living organisms.
   - DNA and RNA based techniques and RNA mediated control of gene expression.
   - Mutations and mutagens, and also Cloning and ethical issues of cloning.
2. Discuss and analyze issues in molecular biology topics.
3. Apply appropriate techniques and tools to develop transgenic varieties.

DETAILED SYLLABUS:

UNIT-I: Chromosome and DNA structure, DNA replication and repair (Periods:14)

Eukaryotic chromosome structure, Genes arrangement, DNA Structure, Repetitive DNA, CpG islands, Gene amplification, Plasmids, Transposable elements and TY elements, Mechanism of eukaryotic and prokaryotic transposition Prokaryotic and Eukaryotic Replication, Repair, Thermal melting of DNA

UNIT-II: RNA structure synthesis and post transcriptional modifications. (Periods:12)

Different classes of RNA and their functions, RNA synthesis and other post transcriptional modifications, Inhibition of splicing, polyadenylation, disruption of RNA structure and capping, Protein synthesis and translational control, Control of gene expression in Prokaryotes and Eukaryotes.

UNIT-III: RNA mediated control of gene expressions and Applications of different types of RNA (Periods:13)

Molecular mechanism of antisense molecules, siRNA and miRNA, Biochemistry of ribozyme; hammer-head, hairpin and other ribozymes, strategies for designing ribozymes, Applications of antisense and ribozyme technologies.

UNIT-IV: Mutations (Periods:11)

Mutations: Nonsense, missense and point mutations; intragenic and intergenic suppression; Frameshift mutations; physical, chemical and biological mutagens.

UNIT-V: Cloning and Issues of cloning (Periods:08)

Introduction to cloning, Principles of cloning, Restriction enzymes, Vectors, Hosts and Strategies of soluble and insoluble protein expression.

Total Periods: 58

TEXT BOOKS:

1. J.D. Waston, *Molecular Biology of the gene,* CSHL Press, 5th Edition, 2004.
2. B. Lewin, *Genes VI*, Oxford & IBH Publishing Co, 6th edition, 1997.
3. H. William Elliott and C. Daphne, *Biochemistry and Molecular biology,* Elliott, Oxford University press, 3rd Edition, 2005.

REFERENCES:

1. U. Goodenough, *Genetics*, Saunders (W.B.) Co Ltd, 2nd edition, 1984.
2. C. P. Swanson, T. Mertz & W. J. Young, *Cytogenetics*, Prentice-Hall publications, 2nd edition, 1981.
3. S. E. Luria & J. E. Darnell, *General Virology*, John Wiley & Sons Inc, 3rd edition, 1978.
4. B. Alberts et al., *Molecular Biology of the Cell*, New York, Garland Science, 4th edition, 2008.

M. Tech. (BOT) - I Semester
MICROBIAL ENGINEERING (14MT10303)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Bioprocess engineering.

COURSE DESCRIPTION:
Bioreactors; Material and energy balances; Media formulation and optimization; Kinetics of Microbial growth.

COURSE OUTCOMES:
On successful completion of the course, the students would have learnt about
1. Usage of correct biological terms to describe and analyze phenomena/problems in bioprocesses.
2. Various bioreactors such as batch, fed batch and continuous bioreactors.
3. Applying of OFAT, Plackett-Burman, Box-Behnken and Central Composite Designs and designing the optimized fermentation media.
4. Relation and analysis of kinetics of cell growth and product formation.
5. Applying mathematical software MATLAB in order to predict the response of fermentation.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION TO BIOPROCESS (Periods:10)
Steps involved in bioprocess, Generalized bioprocess flow sheet, Different of Bioreactors (Batch, Fed batch and Continuous), Submerged and solid state fermentation, Case studies, Problem solving.

UNIT- II: MATERIAL AND ENERGY BALANCES (Periods:13)
Material balance - Thermodynamic preliminaries, Steady state and equilibrium, Law of conservation of mass, Material balances with recycle and bypass streams.
Energy balance - Basic energy concepts, Intensive and extensive properties, Studies of enthalpy for reactive and non reactive processes, Heat of combustion, Heat of reaction at non standard conditions, Thermodynamics of microbial growth, Energy balance equation for cell culture, Unsteady state energy balance equations, numerical problems relevant to topics.

UNIT- III: MEDIUM FORMULATION AND STERILIZATION (Periods:13)
Raw materials for fermentation processes, Carbon sources, Nitrogen sources, Minerals, Vitamins, and Other Nutrients, Pretreatment of industrial substrates, Simple and Complex media, Media sterilization, Kinetics of thermal death of cells and spores, Design of batch and continuous thermal sterilization, Sterilization equipment, Sterilization of air and filter design, Radiation and chemical sterilization.

UNIT- IV: MEDIUM OPTIMIZATION (Periods:10)

Design of media by OVAT method, Medium optimization by statistical techniques: Plackett- Burman design, ANOVA, response surface methodology: Box-Behnken approach, Central Composite designs, Analysis of data with MATLAB software.

UNIT- V: STOICHIOMETRY AND KINETICS OF MICROBIAL GROWTH AND PRODUCT FORMATION (Periods:14)

Stoichiometry: Elemental balances, Degrees of reduction of biomass and substrate, Yield coefficient, Batch growth kinetics of bacteria, Unstructured models: Monod Model and its limitations, Multisubstrate model, Inhibition models for substrate, product and toxic substances, Development of logistic equation, Leudeking - Piret model of product formation, Maintenance and endogenous metabolism kinetics, Structured models of cell growth and product formation. Kinetics based on molecular mechanism, Model for plasmid structured models - a few examples, Single cell model, Product formation expression and replication, Model of gene expression, Segregated model, Models of plasmid stability, Numerical problems relevant to topic.

Total Periods: 60

TEXT BOOKS:

1. M.L. Shuler and F. Kargi, *Bioprocess Engineering- Basic Concepts*, Prentice Hall of India, 2nd Edition, 2009.
2. P.M. Doran, *Bioprocess Engineering Principles*, Academic Press, 1st Edition, 2008.
3. Arnold, *Manual of Industrial Microbiology and Biotechnology*, ASM, 2004.
4. P.F. Stanbury, A.Whitaker and S.J. Hall, *Principles of Fermentation Technology*, Elsevier, 2nd edition, 2005.

REFERENCE BOOKS:

1. H.W. Blanch and D.S. Clark, *Biochemical Engineering*, Marcel Dekker Publishers, 2nd Edition, 2007.
2. J. E. Bailey and D.F. Ollis, *Biochemical Engineering Fundamentals*, McGraw –Hill International Editions, 2nd Edition, 1986.

M.Tech (BOT) -I semester
IMMUNOLOGY AND IMMUNOTECHNOLOGY (14MT10304)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: Life Sciences.

COURSE DESCRIPTION:
Organization of immune system; Antigens, immunoglobulins and their interactions; Hypersensitivity, autoimmunity; Vaccination; Immunodiagnostic tools.

COURSE OUTCOMES:
On successful completion of the course it is expected that students will be able to:

1. Understand the different components of immune system and the innate and adaptive immune response mechanisms and therapeutical exploitations.
2. Describe the different classes of antigens and antibodies and their interactions and mechanisms in diagnosis of various diseases.
3. Demonstrate the mechanism of hypersensitivity and autoimmune disorders.
4. Comprehend the theory behind vaccination and immunological techniques and create an awareness on the techniques applied to biological problems.

DETAILED SYLLABUS

UNIT- I: STRUCTURE AND FUNCTIONAL ORGANIZATION OF IMMUNE SYSTEM (Periods:11)

Innate and acquired immunity **,** Cells and organs of immune system **-** T cells, B cells, Monocytes, Macrophages, Dendritic cells, Mast cells and Basophils. Primary and secondary lymphoid organs-their structure and functions.

UNIT -II: ANTIGEN, IMMUNOGLOBULINS AND THEIR INTERACTIONS (Periods:11)

Immunogen and Antigen **–** Immunogenicity vs Antigenicity, Primary and secondary immune responses, Major classes of Antigens. Structure of Immunoglobulin, classes and subclasses of Immunoglobulins. Antigen and Antibody Interactions **-** Precipitation, agglutination and complement mediated immune reactions.

UNIT- III : HYPERSENSITIVITY AND AUTOIMMUNITY (Periods:11)

Hypersensitivity- types of hypersensitivity, their relevance and significance.
Autoimmunity- organ specific and systemic autoimmune diseases. (Multiple sclerosis, autoimmune anemia, autoimmune thyroid disease and SLE)

UNIT- IV: VACCINATION AND ADJUVANTS (Periods:10)

Vaccinology **-** Active and passive immunization. Live, Killed, attenuated, subunit vaccines. Idiotypic vaccines . r-DNA and protein based vaccines,

Peptide vaccines, Conjugate vaccines and Recombinant antibodies. Adjuvants-Function of adjuvants, mechanism of action and new generation adjuvants.

UNIT -V: IMMUNOTECHNOLOGY (Periods:12)

Production of monoclonal antibodies (Hybridoma). Immunological techniques **-** Immunodiffusion, immunoblot, immunoflourescence, ELISA, Immunoprecipitation, Immunoelectrophoresis, Biotinylation and Avidin-streptavidin cross linking. Flow cytometry, Mixed lymphocyte reaction. Immuno –PCR.

Total Periods: 55

TEXT BOOKS:

1. Ivan Roitt, J.Brostoff and D.Male., *Immunology*, Mosby Publishers, Spain, 6th edition, 2001.
2. Richard A Goldsby, Thomas J Kindt Barbara A Osborne., *Kuby Immunology,* WH Freeman and Company, 6th edition. 2006.

REFERENCE BOOKS*:*

1. Kenneth Murphy, Paul Travers, Mark Walpot ., *Janeway's Immunobiology*, Garland Science, 7th edition, 2008.
2. Fahim Halim Khan., *The Elements of Immunology*, Pearson Education, 1st edition, 2011.

M. Tech. (BOT)-I Semester
PROCESS ENGINEERING PRINCIPLES (14MT10305)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Basic Sciences

COURSE DESCRIPTION:
Thermodynamic principles; Fluid mechanics; Heat transfer principles; Mass transfer principles and operations; Design of process vessels.

COURSE OUTCOMES:
On successful completion of this course the students will be able to

1. Gain knowledge in the area of process engineering.
2. Analyze complex engineering problems critically for conducting research in process engineering
3. Solve engineering problems with wide range of solutions in bioprocess engineering
4. Apply design principles, resources and tools to engineering activities in the field bioprocess engineering

DETAILED SYLLABUS

UNIT I: FUNDAMENTALS OF PROCESS ENGINEERING (Periods:09)
Fundamentals of Process Engineering **-** Brief overview, Concepts of unit operation & unit process with examples, Units and dimensions, Dimensional analysis, Presentation and Analysis of data.

UNIT II: BASICS OF THERMODYNAMICS (Periods:08)
Basics of Thermodynamics - Various thermodynamic properties, Laws of thermodynamics, simple numerical problems, Basics of Phase and Chemical Equilibria**.**

UNIT III: FLUID MECHANICS (Periods:14)
Fluid Mechanics-Various types of fluids, Equation of continuity, Derivation of Bernoulli's equation for one dimensional flow, its limitations and corrections and applications in flow meters.
Solid-Fluid Flow - packed beds and pressure drop through packed beds, Fluidization – concept, significance in process industries, and pressure drop across fluidized beds.

UNIT IV: HEAT TRANSFER (Periods:15)
Conductive Heat transfer - Governing laws of heat transfer, compound resistances in series, simple numerical problems on steady state heat conduction.
Convective Heat transfer –Natural and forced convection, dimensionless numbers in heat transfer, concept of heat transfer coefficient and overall heat transfer coefficient, combined heat transfer by conduction, convection and radiation.

UNIT V: MASS TRANSFER (Periods:14)

Mass transfer –Principles of Mass transfer, Analogy of momentum heat and mass transfer, diffusivities of gases and liquids, theories of mass transfer, concept of mass transfer coefficients, dimensionless numbers.

Mass Transfer operations - Solid-Liquid, Liquid-Liquid, Gas-Liquid Operations and their importance in bioprocessing with typical examples.

Total Periods: 60

TEXT BOOKS:

1. W L McCabe, J M Simth and P Harriott, *Unit operations of Chemical Engineering*, McGraw Hill publishers, 2005.
2. D G Rao, *Introduction to Biochemical Engineering*, Tata McGraw Hill Publications, 2nd edition, 2005.
3. R E Treybal, *Mass Transfer Operations*, McGraw Hill Publications, Third Edition 1981.
4. J M Smith and H C Van Ness, *Introduction to Chemical Engineering Thermodynamics*, McGraw Hill Publications 6th edition 2005.

REFERENCES:

1. Pauline M Doran, *Bioprocess Engineering principles*, Academic Press, 1995.
2. A.Gavhane, *Unit Operations-1*, K. Nirali Prakashan Publication.2007
3. C.J.Geankoplis, *Transport Process and Unit Operation*, Prentice Hall India Ltd, 3rd edition 2007

M. Tech (BOT) I Semester
ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY
[Elective-I] (14MT10306)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Basic Sciences.

COURSE DESCRIPTION:
Microscopy, Centrifugation; Electrophoresis; Spectroscopy; Chromatography; Radioisotopes.

COURSE OUTCOMES:
At the end of the course, a student will be able to:
1. Gain knowledge in:
    - Spectroscopic and Chromatography techniques
    - Radioisotopic techniques
    - Automatic analyzer
    - Blotting techniques
2. Identify sources of signal error and noise, and give suggestions to trouble and supervision of analytical instrumentation lab.
3. Analyze the data and interpret the results with respect to biological and non-biological systems.
4. Apply appropriate analytical techniques or tools to engineering activities in fields of chemical, physical and biological sciences.

DETAILED SYLLABUS

UNIT-I: MICROSCOPY AND CENTRIFUGATION (Periods:11)
Microscopy-Introduction, principles and applications of phase contrast, confocal microscope, electron microscope and atomic force microscopy. Centrifugation-theory and applications to biological systems, rotors-angle/vertical/zonal/continuous flow buoyant density centrifugation, principle and application of ultracentrifugation.

UNIT-II: ELECTROPHORESIS (Periods:11)
Different methods of electrophoresis for protein, nucleic acids and immuno-electrophoresis, pulsed field electrophoresis, 2-D gel electrophoresis, iso-electric focusing, capillary electrophoresis, blotting techniques.

UNIT-III: SPECTROSCOPY (Periods:14)
Introduction to principle and applications of UV-Visible, FTIR, Fluorescence, Optical Rotary Dispersion (ORD) and Circular Dichroism (CD), X-Ray Diffraction (XRD), Nuclear Magnetic Resonance spectroscopy, Electron Spin Resonance, Mass spectrometry–Matrix Assisted Laser Desorption Ionization-Time of Flight (MALDI Tof).

UNIT-IV: CHROMATOGRAPHY (Periods:12)

Principle & applications of chromatography techniques – adsorption, affinity, partition, ion-exchange, gel permeation, GLC, TLC, HPLC and FPLC.

UNIT-V: RADIOISOTOPE AND OTHER SEPARATION TECHNIQUES (Periods:09)

Radioactive decay types and measurements, GM counter–principle and applications, radio immuno assay (RIA), autoradiography, automatic analyzer for amino acids, cell sorters and their applications, theory of lyophilization and its applications to biological systems.

Total periods: 57

TEXT BOOKS:

1. G.R. Chatwal and S.K. Anand, *Instrumental Methods of Chemical analysis*, Himalaya publishing house, 1st Edition, 2009.
2. Pranab Kumar Banerjee, *Introduction to Biophysics*, S Chand and company, 1st Edition, 2008.

REFERENCE BOOKS:

1. Dinesh kumar Chatanta and Prahlad Singh Mehra, *Instrumental methods of analysis in Biotechnology*, I.K.International Publishing House Pvt. Ltd., 1st Edition, 2012.
2. Kakoli Upadhyay and Nirmaendu Nath, *Biophysical Chemistry*, Avinash Upadhyay", Himalaya publishing house pvt. Ltd., 4th Edition, 2012.
3. Hobart H.Willard / Lynne L.Merritt / John A.Dean / Frank A.Settle, *Instrumental methods of analysis*, CBS publishers and distributors, 7th Edition, 2012.
4. Douglas A. Skoog, F. James Holler and Stanely R. Crouch, *Principle of Instrumental Analysis*, Brooks/Cole Pub Co, 6th Edition, 2006.

M. Tech. (BOT)-I Semester
ENZYME ENGINEERING AND TECHNOLOGY (Elective-I)
(14MT10307)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Applied Life Sciences

COURSE DESCRIPTION
Enzymes; Enzyme Purification, characterization; Enzyme kinetics; Immobilization; Applications.

COURSE OUTCOMES:
By the end of the course, the student is expected to:

1. Gain advanced knowledge in
   - Concepts like enzyme structure, active site of an enzyme, its properties and interactions with its substrate.
   - Difficulties involved in studying enzymatic reactions
   - Principles underlying various enzymatic reactor systems for industrial applications and their scale up.
2. Analyze enzyme mediated reactions and identify useful enzymes for industries
3. Employ their skills to conduct experiments in areas such as enzyme production and enzyme applications
4. Use modern enzyme engineering tools to modify enzymes various biological assays and its applications

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO ENZYMES (Periods:12)

Introduction to enzymes **-** Nomenclature and classification of enzymes specific activity, turnover number. Basis of enzymatic reaction, collision theory and transition state theory. Hydrolytic, covalent, acid-base, electrostatic and metal ion involved catalysis. Energetics of substrate binding. The mechanism of action of Chymotrypsin, Lysozyme and Glyceraldehyde-3-phosphate dehydrogenase, Determination of the number of active sites of enzyme.

UNIT-II: PURIFICATION AND CHARACTERIZATION OF ENZYMES (Periods:12)

Purification of Enzymes **-** Extraction of enzymes, Enzyme assays, Purification of enzymes by using different techniques. Temperature dependence of rate constants of enzymatic reaction, thermal deactivation, pH effect on rate constants and protein structure. Stoichiometry of bioreaction and energetics of enzymatic reaction, ATP and redox potential balance. Yield coefficients and their correlation with the stoichiometry.

UNIT –III: ENZYME KINETICS (Periods:16)

Enzyme kinetics - kinetics of single substrate enzyme catalyzed reactions. Michaelis-Menten equation, Brigg's-Haldane equation and estimation of constants using graphical technique. Enzyme inhibition kinetics substrate, product and toxic substance inhibition. Pre steady state kinetics, determination of rate constants, rapid mixing, stopped flow and relaxation technique. Enzyme kinetics at limiting condition, enzyme kinetics at interface and kinetics of multi substrate reactions.

UNIT-IV: IMMOBILIZATION OF ENZYMES (Periods:10)

Immobilization of biocatalysts an introduction, Electrostatic effect, effect of charged and uncharged support, Effect of external and internal mass transfer, Damkohler number, Effectiveness factor, Intraparticle diffusion kinetics, Biot number.

UNIT-V: APPLICATIONS OF ENZYMES (Periods:08)

Types of Biosensors, design of enzyme electrodes and their application as biosensors in industry, healthcare and environment, Applications of enzyme analysis

Total Periods: 58

TEXT BOOKS:

1. T. Palmer, *Enzymes*, East – West Press Private Ltd., 1st Edition 2004.
2. H.W. Blanch and D.S. Clark, *Biochemical Engineering*, Marcel Decker Year of Publication, 2007.

REFERENCES:

1. E. J. Bailey & F. D. Ollis, *Biochemical Engineering Fundamentals*, McGraw–Hill International Editions, 2nd Edition, 1986.
2. K. Schugerl and K.H. Bellgart, *Bioreaction Engineering, modeling and control (Eds)*, Springer-Verlog, Berlin, 2000.
3. A. Wiseman, *Handbook of Enzyme Biotechnology*, Ellis Horwood Publication, 3rd Edition, 1985.
4. A. Moser, *Bioprocess technology, kinetics and reactors*, Springer Verlog, 1988.
5. S. T. A. Inamdar, *Biochemical engineering principles and functions*, PHI Learning private LTD., 3rd edition, 2013.

M. Tech. (BOT) - I Semester
FOOD PROCESS AND TECHNOLOGY (Elective-I) (14MT10308)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Applied Life Sciences and Process Engineering.

COURSE DESCRITPION:
Food microbiology; Food chemistry; Food spoilage and preservation; Food processing; Food biotechnology.

COURSE OUTCOMES:
At the end of the course, the students are capable of

1. Acquiring in-depth knowledge of dryers, evaporators, microfilter, ultrafilter, reverse osmosis unit, and freezers used in food preservation and processing.
2. Analyzing each processing technique required for enhancing the shelf-life of food
3. Applying engineering concepts for conducting research in food industries

DETAILED SYLLABUS

UNIT- I: FOOD MICROBIOLOGY (Periods:10)
Introduction to microbiology of food, Types of microorganism associated with food - molds, yeasts and bacteria, Microbial growth pattern, Physical and chemical methods influencing destruction of microorganisms, Microorganisms in natural food products and their control, Biochemical changes caused by microorganism.

UNIT- II: FOOD CHEMISTRY (Periods:12)
Food chemistry - Importance, role of water in food, water activity and shelf life of food, CA/MA storage, Carbohydrates – chemical reactions, functional properties of sugars and polysaccharides in foods, Protein and amino acids - physical and chemical properties, distribution, Lipids - use of lipids in foods, physical and chemical properties, effects of processing on functional properties and nutritive value, Natural food flavours, Pigments in foods and their industrial applications.

UNIT –III: FOOD SPOILAGE AND PRESERVATION (Periods:13)
Deterioration and spoilage of various types of food products, Food contaminants- physical, chemical, microbial and other contaminants, Food toxicants, Preservation of food - Removal or supply of heat, dehydration, irradiation, addition of chemicals and fermentation, Food additives, Safety and quality evaluation of additives.

UNIT- IV: FOOD PROCESSING (Periods:10)
Basic principles of food processing, Unit operations and equipment involved in commercially important food processing methods – Reverse osmosis, Electrodialysis and Concentration polarization, Process control in food

processing by proportional controller, Materials and containers used in food packaging.

UNIT- V: FOOD BIOTECHNOLOGY (Periods:09)

History and development of food biotechnology, Application of genetics to food production, Regulatory and social aspects of GM foods. Genetically modified foods (GMF), Technological processes for industrial manufacture of selected foods of commercial importance from plants and animal sources.

Total periods: 54

TEXT BOOKS:

1. W.C.Frazier and D.C. Westhoff, *Food Microbiology*, Tata McGraw-Hill, 4th Edition, 1995.
2. B. Sivasankar, *Food Processing and Preservation*, Prentice Hall of India Pvt. Ltd., 2002.
3. Kalidas Shetty, P. Gopinadhan , Antony L.Pometto, Robert E.levin, *Functional Foods and Biotechnology*, Taylor and Francis, CRC Press, 2nd Edition, 2005.

REFERENCE BOOKS:

1. Owen R. Fennema, *Food Chemistry*, Marcel Dekker Inc., Third Edition, 1996.
2. Shishir Sinha, NPTEL Material on Food Science and Biotechnology, 2014.

M. Tech. (BOT) - I Semester
BIOSENSORS [Elective-I] (14MT10309)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Basic Sciences.

COURSE DESCRIPTION:
Biosensors; Immobilization, Fabrication of biosensors; optical biosensors; Nanobiosensors; Design, Modeling, applications of biosensors.

COURSE OUTCOMES:
At the end of the course, a student will be able to:
1. Gain advanced knowledge in:
    - Technologies of biosensor and nano-biosensor
    - Transduction technology
    - Applications of cell based biosensors
    - Immobilization and fabrication of biosensors
2. Identify source of biosensor signal problems, give suggestions to trouble shooting and conduct research in biosensor technology.
3. Analyze the data and interpret the results with respect to biological and non-biological samples.
4. Apply suitable fabrication technique to design and modeling a biosensor, and evaluate its performance in different fields of interest.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION (Periods:09)
Introduction and classification to sensor system, history, scope, components, basic design, principle and applications of biosensor, assay and characteristics of biosensor, classification of biosensors based of transducer and recognition element.

UNIT-II: IMMOBILIZATION, FABRICATION AND BIOSENSOR TECHNOLOGY (Periods:13)
Principle, technique, applications and types of immobilization (immobilization of histamine biosensor and antibodies), fabrication techniques (fabrication of glucose sensor and nanobiosensor), biosensor technology-DNA, chip based, wireless and ambary biosensor technologies.

UNIT-III: OPTICAL BIOSENSORS (Periods:11)
Introduction, immobilization, fabrication and applications of surface plasmon resonance biosensor, fiber optic biosensor, myoglobin based optical biosensor, automated biosensor and optical biosensor for probing cell signaling.

UNIT-IV: NANOBIOSENSORS (Periods:11)
Nanobiosensor technology, detection strategies & device engineering, principle and applications of fiber optic, aptamer, medical & microbial based nanobiosensors.

UNIT-V: DESIGN, MODELING AND APPLICATIONS OF VARIOUS BIOSENSORS (Periods:14)

Design, modeling and applications of enzyme biosensor, glucose biosensor, urea biosensor, cholesterol biosensor, BOD biosensor, DNA biosensor, immunosensor and microbial biosensor.

Total periods: 58

TEXT BOOKS:

1. D. Dharaneeswara Reddy, O.M.Hussain, D.V.R. Sai Gopal, D. Muralidhara Rao and K.S. Sastry, *Biosensors and Bioelectronics*, I.K. International Publishing House Pvt. Ltd., 1st Edition, 2013.
2. Raj Mohan Joshi, *Biosenso*rs, Gyan Publishing House, 1st Edition, 2006.

REFERENCE BOOKS:

1. Rafael Comeaux and Pablo Novotny, *Biosensors: Properties, Materials and Applications*, Nova Science Publishers, 1st Edition, 2009.
2. Brain R. Eggins, *Biosensor: An Introduction*, Wiley-Teubner, 1st Edition, 2007.
3. Richard P. Buck, William E. Hatfield, Mirtha Umana and Edmond F. Bowden, *Biosensor Technology: Fundamentals and Applications*, CRC press, 1st Edition, 1990.

M. Tech. – I Semester
(14MT10310) RESEARCH METHODOLOGY
(Common to all M. Tech. Programmes)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	--	--	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Fundamentals of research work - research problem and design; Data collection, Analysis and hypothesis; Statistics in Research; Interpretation and Report Writing.

COURSE OUTCOMES:

On successful completion of course, the student will be able to

CO1. Demonstrate knowledge on research approaches, research process and data collection.

CO2. Identify and analyze research problem.

CO3. Solve the research problems using statistical methods.

CO4. Carryout literature survey and apply good research methodologies for the development of scientific/ technological knowledge in one or more domains of engineering.

CO5. Learn, select and apply modern engineering tools to complex engineering activities.

CO6. Write effective research reports.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO RESEARCH METHODOLOGY (Periods:07)

Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research.

UNIT-II: RESEARCH PROBLEM AND DESIGN (Periods:09)

Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem. Features of Good Design, Research Design Concepts, Different Research Designs.

UNIT-III: DATA COLLECTION, ANALYSIS, AND HYPOTHESIS (Periods:09)

Different Methods of Data Collection, Processing Operations, Types of Analysis, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure.

UNIT-IV: STATISTICS IN RESEARCH (Periods:09)

Review of Statistical Techniques - Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry. Normal Distribution, Chi-Square Test as a Test of Goodness of Fit.

UNIT-V: INTERPRETATION AND REPORT WRITING (Periods:06)

Interpretation – Techniques and Precautions. Report Writing – Significance, Stages, Layout. Types of reports, Precautions in Writing Reports.

Total Periods: 40

TEXT BOOK:

1. C.R. Kothari, *Research Methodology: Methods and Techniques*, New Age International Publishers, New Delhi, 2nd Revised Edition, 2004.

REFERENCE BOOKS:

1. Ranjit Kumar, *Research Methodology: A step-by-step guide for beginners*, Sage South Asia, 3rd ed., 2011.
2. R. Panneerselvam, Research Methodology, PHI learning Pvt. Ltd., 2009.

M. Tech. (BOT)- I Semester
PROCESS ENGINEERING PRINCIPLES / MICROBIOLOGY & BIOCHEMISTRY LAB (14MT10321)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
20	80	100	--	--	4	2

PRE-REQUISITES:

Process Engineering and Basic Sciences.

DESCRIPTION

Practical aspects of process engineering principles, design; Laboratory techniques of Biochemistry, and Microbiology.

COURSE OUTCOMES:

After successful completion of the course, the students will be able to

1. Understand and apply the principles and usage of various unit operations.
2. Choose appropriate methods for carrying Microbiology and Biochemistry experiments.
3. Perform separation of bio-molecules through available separation techniques.
4. Isolate and quantity Nucleic acids .

DETAILED SYLLABUS

1. PROCESS ENGINEERING PRINCIPLES

LIST OF EXPERIMENTS:

1. Evaluation of friction factor through pipes and packed columns.(3 periods)
2. Heat transfer in forced and natural conduction. (3 periods)
3. Distillation of multi component mixture. (3 periods)
4. Estimation of Diffusivity of volatile liquids. (3 periods)
5. Solvent extraction (Solid-Liquid and Liquid-Liquid). (3 periods)

2. MICROBIOLOGY & BIOCHEMISTRY LAB

LIST OF EXPERIMENTS:

1. Basic techniques in handling microbes – sterilization, media preparation, precautions. (3 periods)
2. Study of growth rate and the factors affecting it. (3 periods)
3. Chromatography – including Paper, TLC, GLC, Gel filtration chromatography (HPLC) and Ion exchange chromatography (FPLC). (6 periods)
4. Electrophoresis and Blotting Techniques-PAGE and SDS-PAGE. Determination of molecular weight. Western Blot Technique. (6 periods)
5. Quantitative determination of carbohydrate content: e.g. .Preparation of Starch from various sources, starch hydrolysis and determination of carbohydrate content. (6 periods)

6. Estimation of proteins by Lowry's and Biuret methods e.g. in milk, legumes and pulses. (3 Periods)
7. Isolation and Estimation of DNA by Diphenylamine reaction and UV spectroscopic method. (6 periods)

Total Periods: 48

M. Tech. (BOT)-II Semester
BIOREACTOR ENGINEERING (14MT20301)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Process Engineering Principles and Microbiology

COURSE DESCRIPTION:
Components of bioreactors; Types of bioreactors; Application of mass transfer principles; Mixing principles; Animal cell bioreactors; Automation and scaleup.

COURSE OUTCOMES:
On successful completion of this course the students will be able to

1. Gain knowledge in the area of bioreactor engineering.
2. Analyze complex engineering problems critically for conducting research in bioreactor engineering.
3. Solve engineering problems with wide range of solutions in bioreactor engineering.
4. Apply design principles, resources and tools to engineering activities in the field bioreactor engineering.
5. Design an automated cascade control system.

DETAILED SYLLABUS

UNIT I **(Periods:10)**

Introduction – Bioreactor function, types of bioreactors. Modes of bioreactor operations, Main components of the bioreactor and their function. Performance equations for batch, fedbatch and continuous reactors

Novel Bioreactors – Bubble column, bubble generation at an orifice, bubble coalescence and breakup, gas holdup, interfacial area, immobile and mobile gas liquid interface, regimes of bubbles, design of bubble columns, Cascade reactor, air left reactor, Fluidized bed bioreactors, trickle bed reactors, Immobilized bioreactors, recycle bioreactors.

UNIT II **(Periods:12)**

Mass transfer –introduction to mass transfer between phases, mass transfer in porous solids,

Gas-liquid mass transfer in cellular systems, solubility of gases (O_2, CO_2) in biological media, mass balances for two – phase bioreactor.

Oxygen transfer – Introduction, oxygen transfer process, factor effecting k_La interfacial area and oxygen transfer, factors effecting the saturation concentration of oxygen, oxygen uptake.

Heat transfer-Methods of temperature regulation, Design aspects

UNIT III **(Periods:10)**

Mixing – Mechanism and necessity of mixing, various types of mixing equipment, power requirement for mixing in aerated and non aerated tanks, agitated and non-agitated tanks for Newtonian and non Newtonian fluid. Mixing time in agitated reactor, residence time distribution, non-ideal reactor and

multiphase bioreactor. Mass transfer in agitated tanks, correlations with k_La in Newtonian and Non-Newtonian liquid, Power number. Experimental determination of k_La, static method, dynamic method, chemical method and electrochemical method.

UNIT IV **(Periods:13)**

Aeration and Agitation in Animal Cell Bioreactors – Introduction, cell damage in animal cell bioreactors, shear damage, bubble damage, methods of minimizing cell damage. Laminar & Turbulent flow in stirred tank bioreactors, turbulent eddies, kolmogrov eddy size, Preventing vortex formation, Off centre impellers, Baffles.

UNIT V **(Periods:11)**

Control of Bioreactors – strategy, online and offline monitoring of bioreactors; computerized bioprocess control. Direct regulatory control and cascade control mechanism. Sensors used in the bioreactor- Ph, O_2, CO_2 electrode, Scale up and scale down of mass transfer equipment in bioprocess

Total Periods: 56

TEXT BOOKS

1. Bailey JE, Ollis, *Biochemical Engineering fundamentals*, 2nd edition, 1986.
2. Blanch HW and Clark DS, *Biochemical Engineering*, Marcel Decker 2nd edition, 1987.
3. P M Doran, *Bioprocess Engineering Principles*, Academic Press, 1995.
4. M.L. Shuler and F.Kargi, *Bioprocess Engineering- Basic Concepts*, Prentice Hall of India, 2nd Edition, 2009

REFERENCE BOOKS:

1. Wiseman, A, Ellis*, Handbook of Enzyme Biotechnology*, Horwood Publication, 3rd Edition, 1999.
2. Moser. A, *Bioprocess Technology: kinetics and* reactors, SpringerVerlag, 1988.
3. Schugerl K, Bellgart K H, *Bioreaction Engineering, Modeling and control,* (Eds), Springer – verlag, Berlin, 4th edition, 2000.
4. Syed Tanveer Ahmed Inamdar, *Biochemical Engineering Principles and functions*, PHI Learning Private Limited, 2nd edition.1988.

M. Tech. (BOT)-II Semester
GENETIC ENGINEERING (14MT20302)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Molecular biology.

COURSE DESCRIPTION:
Essence of Genetic engineering; Purification of Nucleic acids; Gene cloning; Gene regulation; Gene expression strategies.

COURSE OUTCOMES
On successful completion of this course the students will be able to

1. Gain advanced knowledge in various molecular tools or techniques used in genetic engineering and their applications.
2. Identify and resolve issues associated with nucleic acid purification and sequencing
3. Apply various modern tools of genetic engineering in fields such as environment, plants, animals and microorganisms.
4. Acquire professional and intellectual integrity, professional code of conduct and ethics for accepted usage of Genetic engineering

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO GENETIC ENGINEERING (Periods:11)
Scope, Milestones, and guidelines of Genetic Engineering, Molecular Tools in genetic engineering: Restriction enzymes, ligases, s1 nuclease, terminal deoxynucleotides, transferases, polymerases, Reverse Transcriptase and Alkaline phosphatase. Modification enzymes and Molecular markers.

UNIT-II: PURIFICATION AND SEQUENCE OF NUCLEIC ACIDS (Periods:10)
Nucleic acid Purification and amplification and its applications. Restriction Mapping of DNA Fragments and Map Construction. Gene Cloning Vectors-Plasmids, bacteriophages, phagemids, cosmids, Artificial chromosomes. DNA sequencing methods.

UNIT-III: GENE CLONING (Periods:13)
cDNA Synthesis and cDNA library preparations. Cloning mRNA enrichment, reverse transcription, DNA primers, Linkers, adaptors and their chemical synthesis, Library construction and screening. Genomic libraries (complete sequencing projects). Alternative Strategies of Gene Cloning Cloning interacting genes- Two-and three hybrid systems, cloning differentially expressed genes. Site-directed Mutagenesis and Protein Engineering

UNIT-IV: GENE REGULATION (Periods:12)
Study of Gene Regulation, DNA transfection, Northern blot, Primer extension, S1 mapping, RNase protection assay, Reporter assays. Transgenic and Gene Knockout Technologies Targeted gene replacement, Chromosome engineering.

Gene Therapy Vector engineering. Strategies of gene delivery, gene replacement/augmentation, gene correction, gene editing, gene regulation and silencing.

UNIT-V: GENE EXPRESSION STRATEGIES (Periods:14)

Expression Strategies for Heterologous Genes, Vector engineering and codon optimization, host engineering, *In-vitro* transcription and translation, expression in bacteria, expression in Yeast, expression in insects and insect cells, expression in mammalian cells, expression in plants. Processing of Recombinant Proteins Purification and refolding, Characterization of recombinant proteins, stabilization of proteins.

Total Periods: 60

TEXT BOOKS:

1. J. Sambrook, E.F. Fritsch and T. Maniatis, *Molecular Cloning, a Laboratory Manual,* Cold Spring Harbor Laboratory Press, New York, 1st edition, 2000.
2. M. Glover and B.D. Hames, *DNA Cloning- a Practical Approach,* IRL Press, Oxford, 1st edition, 1995.
3. S.B. Primrose, *Molecular Biotechnology*, Blackwell Scientific Publishers, Oxford, 2nd Edition, 1994.

REFERENCES:

1. P. B. Kaufman, W. Wu, D. Kim and L.J. Cseke, *Molecular and Cellular Methods in Biology and Medicine*, CRC Press, Florida, 6th edition, 2006.
2. S.L. Berger and A.R. Kimmel, *Methods in Enzymology*, Guide to Molecular Cloning Techniques", Academic Press, Inc. San Diego, vol. 152,2nd edition,1998,
3. D.V. Goeddel, *Methods in Enzymology*, Vol 185, Gene Expression Technology", Academic Press, Inc., San Diego, 1990.
4. D. A. Mickloss and G.A. Froyer, *DNA Science. A First Course in Recombinant Technology*, Cold Spring Harbor Laboratory Press, New York, 1st edition, 1990.

M. Tech. (BOT) - II Semester
BIOSEPARATION PROCESSES (14MT20303)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Process Engineering Principles.

COURSE DESCRIPTION:
Importance of separation in process industries; Membrane processes; Product enrichment methods; Product resolution and fractionation; Product polishing and novel techniques.

COURSE OUTCOMES:
Students should be able to:

1. Understand the requirements for successful bioseparation processes including filtration, centrifugation, membrane separation processes, precipitation, solvent extraction, chromatography techniques, crystallization, and drying.
2. Analyze complex engineering problems in order enhance research skills in the isolation and purification of therapeutic, diagnostic enzymes, and bulk products
3. Estimate profitability of bioprocess based on its capital and production costs.
4. Apply innovative technologies such as pervaporation, supercritical fluid extraction and electrodialysis.

DETAILED SYALLUBUS

UNIT- I: OVERVIEW OF BIOSEPARATION PROCESSES (Periods:13)
Bioprocess flow sheet, various stages of downstream processing, Characteristics of biomolecules and their differences, Criteria for selection of bioseparation techniques, Cell Disruption: Mechanical and Nonmechanical methods, Solid- liquid separation- Filtration and centrifugation, Pre-treatment strategies.

UNIT- II: MEMBRANE PROCESSES (Periods:10)
Types of membranes, Problems of membranes, Microfiltration – Principle and applications, Ultrafiltration – Flux equations, Dialysis, Reverse osmosis, Electrodialysis.

UNIT- III: PRODUCT ENRICHMENT TECHNIQUES (Periods:12)
Liquid-liquid extraction **-** Extraction process and principles, Phase equilibrium, Batch and continuous extraction, Co-current and countercurrent extraction processes, Equipment for solvent extraction , Aqueous two phase extraction. Precipitation - Salt and solvent precipitation.

UNIT- IV: PRODUCT RESOLUTION AND FRACTIONATION (Periods:12)
Principles of chromatography, Types of chromatographic methods**:** Gel chromatography, Adsorption chromatography, Ion – exchange chromatography, Affinity chromatography, High pressure/performance liquid

chromatography, Hydrophobic interaction chromatography, Reverse phase and Gas chromatography, Problem solving,

UNIT- V: PRODUCT POLISHING AND NOVEL TECHNIQUES (Periods:12)

Crystallization- Principles of crystallization, Crystallization equipment, Drying- Various types of drying methods, Principles of drying, EMC-RH data, Drying curves, Various types of industrial dryers and criteria for the selection of dryers, Freeze drying technique and its advantages over other methods, Novel separation processes- Reverse micellar operation, Supercritical fluid extraction, Pervaporation, Membrane chromatography.

Total Periods: 57

TEXT BOOKS:

1. B.Sivasankar, *Bioseparations: Principles and Techniques*, Prentice Hall of India Private Limited, 1st Edition, 2005.
2. Butterworth – Heinemann, *Product Recovery in Bioprocess technology*, BIOTOL Series, Imprint of Elsevier, 1st Edition, 2007.

REFERENCE BOOKS:

1. M.Moo Young, *Comprehensive Biotechnology*, Vol. 4, 2nd Edition,1985.
2. P.C.Wankat, *Rate Controlled Separations*, Elsevier, 1990.
3. D.Mukesh, *NPTEL Material on Downstream Processing*, 2013.

M.Tech (BOT) -II semester
ENVIRONMENTAL BIOTECHNOLOGY (14MT20304)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Microbial Engineering and Process engineering principles.

COURSE DESCRIPTION:
Strategies of waste water treatment; Hazardous waste management; Bioremediation techniques; Environmental management and Biotechnology.

COURSE OUTCOMES:
On successful completion of the course it is expected that students will be able to:

- Understand the different strategies involved in solid waste, waste water and hazardous waste management to facilitate clean technology.
- Demonstrate and describe microbial interactions and the role of microorganisms and methods in bioremediation.
- Describe the use of biotechnological processes to protect the environment.
- Identify suitable measures and find relevant solutions to mitigate environmental problems and adopt green technology.
- Engage in broadcasting the importance of environment and its conservation.

DETAILED SYLLABUS

UNIT I: SOLID WASTE MANAGEMENT (Periods:10)
Solid waste –Definition, Sources and types of solid waste, composition and its determinants of Solid waste. Disposal of Solid Wastes- Refuse disposal, various methods – incinerations, sanitary landfill, Composting. Bioventing and Biosparging.

UNIT II: STRATEGIES OF WASTE WATER TREATMENT (Periods:13)
Waste Water Treatment Technologies **-** Waste water definition and types, major contaminants in waste water. Waste water treatment methods: physical, chemical, biological methods. Aerobic Processes and Anaerobic processes. Bioreactors: principles and their applications for waste water treatment. Process and Production technology - characteristics of effluents and treatment schemes for waste waters of Dairy, Distillery, Tannery, Sugar, Paper and Pulp, Pesticide and Antibiotic industries.

UNIT III: XENOBIOTICS (Periods:12)
Hazardous Waste Management **-** Hazardous wastes – definition, classification, sources and characterization. Physical and biological routes of transport of hazardous substances. Storage and disposal facilities – landfills, underground disposal and sea disposal. Xenobiotic and recalcitrant compounds and their biodegradation. Microbial transformations of hazardous chemicals. Hazardous waste treatment and remediation technologies - waste recovery processes:

solidification, stabilization, and encapsulation - biological processes - thermal processes.

UNIT IV: BIOREMEDIATION (Periods:11)

Bioremediation **-** Bioremediation definition and types of bioremediation, constraints and priorities of Bioremediation, factors affecting the use of bioremediation and applications of bioremediation. Microbial systems for bioremediation. *In situ* and *Ex situ* bioremediation techniques. Liquid, solid and slurry phase bioremediation. Bioremediation methods- physical, chemical, biological, solidification and thermal methods.

UNIT V: ENVIRONMENTAL MANAGEMENT AND BIOTECHNOLOGICAL APPLICATIONS (Periods:12)

Environmental Management **-** Concepts of Environmental Impact Assessment. Prediction and assessment of impact of air, water, biological, socio-economic environment. Methodology for environmental management and Environmental management plan. Concepts of environmental audit. Integrated pest management, Vermitechnology, Phytoremediation. Development of biodegradable and eco-friendly products –biopolymers, bioplastics, biofuels, biodiesel, biofertilizers and biopesticides.

Total Periods: 58

TEXT BOOKS:

1. Alan Scragg *, Environmental Biotechnology*, Oxford University press, 2nd edition, 2005.
2. Dilip Kumar Markandey and Neelima Rajvaidya, *Environmental Biotechnology*, A P H Publishing Corporation, 1st edition, 2004.

REFERENCES:

1. S K Agarwal, *Environmental Biotechnology*, Gulf Publications, 1st edition, 2011.
2. H.V.Jadhav and S.H. Purohit, *Global Pollution and Environmental Monitoring*, Himalaya Publishing House, 1st edition, 2008.
3. Erach Bharucha, *Textbook of Environmental Studies for Undergraduate Courses*, Universities Press, India, 1st edition, 2005.

M. Tech. (BOT)--II Semester
BIOINFORMATICS (14MT20305)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Applied Sciences.

COURSE DESCRIPTION:
Biological data bases; Sequence analysis and modeling; Statistical methods in Bioinformatics; Applications of Bioinformatics.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
1. Gain advanced knowledge in
   a) Biological databases
   b) Genome analysis and genetic manipulations
   c) Protein structure analysis and theoretical modeling of protein structures
   e) Interpreting the results of genomics and proteomics.
2. Analyze protein and nucleic acid sequences and structures
3. Acquire research skills in different areas of bioinformatics
4. Use modern bioinformatics tools to perform genome and proteome analysis.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION TO BIOINFORMATICS AND BIOLOGICAL DATABASES (Periods:05)

Introduction and Classification of Bioinformatics, Emerging areas of Genomics and Proteomics, Biological databases and their management – Protein Sequence databases, Protein structure databases, DNA databases, Restriction enzyme databases, drug databases.

UNIT-II: NUCLEOTIDE SEQUENCE ANALYSIS AND RNA STRUCTURES (Periods:18)

Nucleotide Sequence Analysis**-**Introduction to whole genome analysis, restriction site checks, Sequence assembly, finding overlaps and contigs, shotgun projects, walking primers, ORF analysis, Identification of transcription signals and other sequence patterns, Coding region identification, EST analysis, SNP analysis, Different types of RNA, si-RNA design and development, micro RNA identification strategies, RNA secondary structure, RNA structure Prediction Methods, Introduction to Small nuclear RNAs, Applications of Small nuclear RNA DNA/Protein Sequence alignments.

UNIT-III: PROTEIN SEQUENCE ANALYSIS AND MODELING OF PROTEINS (Periods:15)

Structural properties- Secondary structures, Hydrophobic patterns, structural motifs, Post translational modifications, Folding domain motifs, protein families. Principles of Protein Structure - Secondary Structure prediction methodologies, Threading methods Protein Folds, Protein domains, Tertiary

structure prediction, Modeling of Proteins **-** Homology Modeling of proteins-methodology and applications *Ab initio* protein structure prediction, Energy minimization - concept, applications and methodology, Molecular Dynamics simulations – concept and methodology.

UNIT- IV: STATISTICAL METHODS IN BIOINFORMATICS (Periods:05)

Statistical Methods In Bioinformatics **-** Dynamic programming methods-derivation and algorithms Sequence Alignment concepts, Pair-wise alignment, Heuristic alignments, Multiple alignment, Matrices (PAM, BLOSUM) Statistics and Scoring systems

UNIT-V: ANALYSIS OF THE GENOME SEQUENCING DATA AND BIOINFORMATICS APPLICATIONS AND DRUG MODELLING (Periods:15)

Bioinformatics Applications And Drug Modeling **-** QSAR and Drug Designing Concepts: 2D descriptors and 3D descriptors. Drug Discovery: Drug Discovery Overview, Stages of drug discovery and Introduction to drug discovery tools– MoE and Accelyrs suite. Bioinformatics applications in experimental biotechnology: Automatic 2D Gel analysis- Tools, Principles and methodology, Restriction analysis of DNA sequences, *Insilico* Primer Design, Micro-array image and data analysis, Protein Interaction Mapping (Yeast 2 Hybrids), Functional genomics tools and Functional proteomics tools.

Total periods: 58

TEXT BOOKS:

1. Z. Lacroix and T. Critchlow, *Bioinformatics*, Morgan Kaufmann Publishers, 1st edition, 2003.
2. O. Bosu, *Bioinformatics*, Oxford University press, 1st edition, 2007.

REFERENCE BOOKS:

1. D. W. Mount, *Bioinformatics: Genome and sequence analysis,* Cold Spring Harbor Laboratory Press, U.S, 2nd edition, 2004.
2. A. D. Baxevanis, B. F. Francis Ouellette, *Bioinformatics: A practical guide to the analysis of genes and proteins*, Willey- Interscience publishers, 3rd edition, 2001.
3. P. Clote, R. Backofen*, Computational Molecular Biology – An Introduction*, John Wiley & Sons,4th edition, 2000.
4. J. Xiong, *Essential Bioinformatics*, Cambridge University Press informatics in Proteomics by Srivasthava CRC Publishers, 4th edition, 2006.
5. I. F. Tsigelny, *Protein Structure Prediction: Bioinformatics approach*, TBS The Book Service Ltd, 1st edition, 2002.
6. D. Stekel, *Microarray Bioinformatics*, Cambridge University Press, 1st edition, 2003.

M. Tech. (BOT) - II Semester
ANIMAL CELL TECHNOLOGY [Elective-II] (14MT20306)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Basic Life Sciences.

COURSE DESCRIPTION:
Cell culture techniques; Equipment and media; Cryopreservation; Characterization of cell cultures; Cloning.

COURSE OUTCOMES:
At the end of the course, a student will be able to:
1. Gain advanced knowledge in
    - Cellular/viral oncogenes and oncoviruses
    - Cell cloning
    - Cell banks and transportation of cell lines
    - Stem cell cultures
2. Identify sources of contamination and give suggestions to protect and supervision of animal tissue culture laboratory.
3. Analyze and solve the technological problems critically for conducting research and scaling up of animal cell technology.
4. Apply suitable protocol for determination of viability and cytotoxicity of cells, and the characterization of various cultured cells.
5. Describe and follow ethics for the usage of animal cell cultures and animal models.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION (Periods:08)
Types of animal cell and tissue cultures, advantages, limitations and applications of animal cell culture, culture environment, cell adhesion, cell proliferation and differentiation.

UNIT-II: EQUIPMENT AND MEDIA (Periods:11)
Essential equipment and minimal requirements of cell cultures, sterilization techniques; media-physicochemical properties of media, balanced salt solution, complete media, role of serum & supplements, serum free media (advantage and disadvantages), role of CO_2 in animal cell culture.

UNIT-III: PRIMARY CULTURE AND CRYOPRESERVATION (Periods:16)
Isolation and disaggregation of tissue, steps involved in primary cell culture, cell lines, subculture, propagation, maintenance of cell culture, cell separation, immortalization and transformation, scaling-up of animal cell culture, use of cellular/viral oncogenes and oncoviruses, need of cryopreservation, preservation, cell banks and transportation of cell lines.

UNIT-IV: VIABILITY AND CHARACTERIZATION OF CULTURED CELLS (Periods:14)

Types of culture process, scale-up in suspension and monolayer, cell growth in scale-up, cell viability, cytotoxicity, biology and characterization of cultured cells, measuring parameters of growth, cell synchronization, senescence, apoptosis, stem cell cultures.

UNIT-V: CLONING AND ENGINEERING (Periods:10)

Cell cloning, micro-manipulation and types of cloning, application of animal cell culture, animal cloning and ethical issues, types of stem cell cultures and their applications, cell culture based vaccines, somatic cell genetics, complementary cells and their use.

Total periods: 59

TEXT BOOKS:

1. R. Ian Freshney, *Culture of Animal Cells: A Manual of basic Technique and Specialized Applications*, Wiley-Blackwell, 6th Edition, 2010.
2. Butterworth-Heinemann, *In vitro cultivation of Animal cells*, Elsevier, 1st Edition, 2004.

REFERENCES:

1. Ashok Mukhopadhyay, *Animal cell technology*, IK International Publishing House Pvt. Ltd., 1st Edition, 2009.
2. Sudha Gangal, *Animal tissue culture*, Universities Press (India) Private Limited, 1st Edition, 2007.
3. M. Butler, *Animal cell culture and technology*, Bios Scientific Publishers, 2nd Edition, 2005.
4. Ed. John R.W. Masters, *Animal Cell Culture: Practical Approach*, Oxford University Press, 3rd Edition, 2000.

M.Tech. (BOT) - II Semester
PLANT BIOTECHNOLOGY [Elective-II] (14MT20307)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Life Sciences.

COURSE DESCRIPTION:
Tissue culture; Somatic hybridization; Plant transgenics; Horticulture and Forestry applications; Molecular mapping and marker assisted selection.

COURSE OUTCOMES:
At the end of the course, a student will be able to:

1. Gain knowledge and applications in
    - Transgenic technology
    - Molecular mapping and marker assisted selection
    - Clonal propagation
2. Identify source of contamination and give suggestions to protect and supervision of plant tissue culture laboratory.
3. Analyze and solve the technological problems critically for conducting research in plant biotechnology.
4. Capability to research in establishing the scale up of plant cell culture for production of secondary metabolites.
5. Apply advanced protocol for production of resistance against biotic and abiotic stress plants and haploid production, mapping and cloning.
6. Apply plant tissue culture skills in horticulture and forestry applications.

DETAILED SYLLABUS

UNIT-I: PLANT TISSUE CULTURE (Periods:12)
Historical perspective, culture environment and media composition; totipotency, plant tissue culture types - callus, organ culture (shoot, meristem, root etc), cell suspension, somatic embryogenesis, organogenesis, applications of plant tissue culture.

UNIT-II: SOMATIC HYBRIDIZATION (Periods:10)
Introduction, protoplast-isolation, culture & plant regeneration, somatic hybridization- mechanical and enzymatic methods, and applications, cybrids, somatic cell genetics.

UNIT-III: PLANT TRANSGENIC TECHNOLOGY (Periods:12)
Direct and indirect genetic transformation methods, transgenic crops for resistance against biotic and abiotic stresses, genetically modified crops for male sterility, nutritional quality and quantity, fruit ripening, senescence.

UNIT-IV: APPLICATIONS OF PLANT TISSUE CULTURE TO HORTICULTURE AND FORESTRY (Periods:10)

Production of haploids, synthetic seeds, somaclonal variation, clonal propagation, production of disease free plants, secondary metabolite production, conservation of germplasm.

UNIT-V: MOLECULAR MAPPING AND MARKER ASSISTED SELECTION (MAS) (Periods:14)

Quantitative & qualitative traits, MAS for genes of agronomic importance (*Eg:* Insect resistance); molecular polymorphism, Restriction Fragment Length Polymorphism (RFLP), Random Amplified Polymorphic DNA (RAPD), Sequence Tagged Sites (STS), Amplified Fragment Length Polymorphism (AFLP), Single Nucleotide Polymorphism (SNP) markers; construction of genetic and physical map, gene mapping and cloning, Quantitative Trait Locus (QTL) mapping and cloning.

Total periods: 58

TEXT BOOKS:

1. Ashwani Kumar, Sudhir K. Sopory, *Recent Advances in Plant Biotechnology and Its Applications*, IK International Publishing House Pvt. Ltd., 1st Edition, 2008.
2. S.S. Bhojwani and M.K. Razdan, *Plant Tissue Culture: Theory and Practice*, Elsevier, 1st Edition, 1996**.**

REFERENCE BOOKS:

1. Sant Saran Bhojwani and Prem Kumar Dantu, *Plant Tissue Culture: An introductory text*, 1st Edition, Springer, 2013.
2. Roberta Smith, *Plant Tissue Culture: Techniques and Experiments*, Academic Press, 1st Edition, 2012.
3. Arie Altman, *Plant Biotechnology and Agriculture*, Academic Press, 1st Edition, 2011.
4. Chawla H.S, *Introduction to Plant Biotechnology*, Science Publishers, 2nd Edition, 2004.

M. Tech. (BOT) - II Semester
MOLECULAR MODELING AND DRUG DESIGN (Elective-II)
(14MT20308)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Applied Life Sciences.

COURSE DESCRIPTION:
Molecular modeling of proteins; Quantum mechanics; Protein modeling, Molecular dynamics; Drug design; Design of new molecules.

COURSE OUTCOMES:
On successful completion of this course the students will be able to

1. Gain advanced knowledge in
   - Molecular modeling and its applications
   - Basic requirements for Molecular modeling
   - Different methods used for molecular modeling of proteins.
   - Rational drug design
2. Acquire skills in molecular modeling of unknown proteins and design of novel drugs
3. Use modern bioinformatics tools for novel drug design, and to analyze drug receptor interactions
4. Conduct research in the area of molecular modeling and drug design

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO MOLECULAR MODELLING (Periods:09)
Introduction to Molecular Modeling and various models, Areas of application, Single molecule calculation, assemblies of molecules, reaction of the molecules. Drawbacks of mechanical models as compared to graphical models. Co-ordinate systems, two – matrix, potential energy surface.

UNIT-II: QUANTUM MECHANICS AND EMPIRICAL FORCE FIELD MODELS (Periods:16)
Postulates of quantum mechanics, electronic structure calculations, ab initio, semi-empirical
and density functional theory calculations, molecular size versus accuracy. Approximate molecular orbital theories. Molecular mechanisms, Energy calculations, Bond stretch, Angle bending, torsion angle. Electrostatic interaction- Vanderwaals interactions and miscellaneous interactions.

UNIT-III: COMPARATIVE PROTEIN MODELING AND MOLECULAR DYNAMICS (Periods:13)
Modeling by Homology-the alignment, construction of frame work, selecting variable regions, side chain placement and refinement, validation of protein models–Ramchandran plot, threading and *ab initio* modeling. Molecular Dynamics using simple models. Dynamics with continuous potentials.

Constant temperature and constant dynamics. Conformation searching, Systematic search. Applications to protein folding.

UNIT-IV: ANALOG AND STRUCTURE BASED DRUG DESIGN (Periods:14)

Introduction to QSAR. Lead module, linear and nonlinear modeled equations, biological activities, physicochemical parameter and molecular descriptors, molecular modeling in drug discovery. 3D pharmacophores, molecular docking, De novo ligand design, Free energies and solvation, electrostatic and non-electrostatic contribution to free energies.

UNIT-V: FURTHER APPLICATIONS ON THE DESIGN OF NEW MOLECULES (Periods:06)

3D database searching and virtual screening, Sources of data, molecular similarity and similarity searching, combinatorial libraries – generation and utility.

Total periods: 58

TEXTBOOKS

1. A. Leach, *Molecular Modeling: Principles and applications*, Prentice Hall publishers, 2nd edition, 2001.
2. H. Pieter, Heltje & G. Folkens, *Molecular Modelling*, VCH Publishers, 2003.

REFERENCES:

1. J. M. Goodman, *Chemical Applications of Molecular Modeling*, Royal Society of Chemistry: 2nd edition, 2007.
2. G. H. Grant & W. G. Richards, *Computational Chemistry*, Oxford University Press, 1st edition, 1985.

M. Tech. (BOT) - II Semester
NANOBIOTECHNOLOGY [Elective-II] (14MT20309)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:
Basic Sciences.

COURSE DESCRIPTION:
Nanomaterials; Carbon nanostructures; Protein and DNA based nanostructures, Synthesis of nanomaterials; Applications of nanomaterials.

COURSE OUTCOMES:
At the end of the course, a student will be able to:
1. Gain knowledge in:
   - Biocompatibility
   - Applications of gold nanoparticles
   - Protein and DNA based nanostructures
   - Biosynthesis of nanoparticles
2. Apply suitable nanomaterials and tools to engineering activities in the field of nanobiotechnology.
3. Apply skills in design and modeling of nanobiosensors.

DETAILED SYLLABUS

UNIT-I: BASICS OF NANO-BIOTECHNOLOGY (Periods:13)
Introduction, size, classification, properties of nanomaterials and application of nano in biology, cellular nanostructures, biological building blocks – sizes of building blocks and nanostructures, role of proteins, amino acids, nucleic acids, lipids and polysaccharides in modern biomaterials, biocompatibility and applications of nanobiotechnology.

UNIT-II: CARBON NANOTUBE AND TOOLS FOR NANOSTRUCTURES (Periods:12)
Methods, properties and applications of carbon nanotubes, preparation, characterization and properties of graphene, carbon nanotube based logic gates and optical devices, tools for nanostructures- molecular synthesis, self assembly, polymerization, nanoscale lithography and e-beam lithography.

UNIT-III: PROTEIN AND DNA BASED NANOSTRUCTURES (Periods:13)
Protein based nanostructures- building blocks and templates, proteins as transducers and amplifiers of biomolecular recognition events, DNA-protein nanostructures- DNA template electronics, DNA based metallic nanowires, DNA-gold-nanoparticle conjugates, DNA nanostructures for mechanics and computing, nanoparticles as non-viral transfection agents.

UNIT-IV: BIOLOGICAL METHODS OF SYNTHESIS (Periods:08)
Use of bacteria, fungi for nanoparticle synthesis, viruses as components for the formation of nanostructured materials, synthesis process and application, role of plants in nanoparticle synthesis.

UNIT-V: APPLICATIONS (Periods:14)

Gold nanoparticles-biological imaging, cell deliver vehicles & biosensors, quantum dots – biological imaging & targeted therapies, magnetic nanoparticles, nano-engineered biosensors, fiber optic nano-sensors in medical care, implication in tissue engineering & cancer therapy.

Total periods: 60

TEXT BOOKS:

1. A.K. Bandyopadhyay, *Nano Materials*, New Age Science, 2nd Edition, 2010.
2. T. Pradeep, *Nano: The essentials*, Mc-Graw Hill Publication, 1st Edition, 2007.

REFERENCE BOOKS:

1. Jesus M de la Fuente and V. Grazu, *Nanobiotechnology: Inorganic Nanoparticles to Organic Nanoparticles*, Elsevier publication, 1st Edition, 2012.
2. Frank J. Owens, Charles P. Poole, *Introduction to Nanotechnology*, Wiley, 1st Edition, 2007.
3. Chad A. Mirkin, Christof M. Niemeyer, *Nanobiotechnology II*, Wiely, 1st Edition, 2007.
4. Christof M. Niemeyer, Chad A. Mirkin, *Nanobiotechnology: Concepts, Applications and Perspectives*, John Wiley & Sons, 1st Edition, 2006.

M. Tech. (BOT) - II Semester
BIOPROCESS ENGINEERING AND GENETIC ENGINEERING LAB (14MT20321)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	--	--	4	2

COURSE DESCRIPTION

Kinetics, immobilization of cells; Enzymes and various product recovery operations; Genetic engineering – Screening and transformation techniques.

COURSE OUTCOMES:

Students should be:

1. Gain knowledge on shake flak studies and bioreactor fermentation.
2. Apply kinetic models to both biocatalysts and microbial cells
3. Learn about various modes of operation of bioreactor.
4. Handle genetic engineering techniques.
5. Carry out transformations and identify recombinants.

DETAILED SYLLABUS

1. BIOPROCESS ENGINEERING:

1. Immobilization of whole cells and enzymes by matrix entrapment. Designing of packed bed bioreactor with immobilized cells/enzymes (6 periods)
2. Enzyme kinetic studies: Estimation of Michaelis-Menten parameters. (3 periods)
3. Fermentor design and the study of various parts of fermentor and their function for microbial cell culture. (3 periods)
4. Various bioprocesses followed by product recovery (6 periods)
    a. Fermentative production of enzymes in solid state and submerged conditions
    b. Ethanol production from *S. cerevisae*
5. Microbial kinetic studies: determination of Monod parameters. (3 periods)

2. GENETIC ENGINEERING:

1. Isolation of DNA from plants, animal and bacterial sources. (3 periods)
2. Agarose gel electrophoresis and visualization of DNA on gels. (3 periods)
3. Restriction enzyme digestion. (3 periods)
4. Isolation of plasmid DNA. (3 periods)
5. Isolation of RNA from yeast. (3 periods)
6. Electrophoresis of RNA on denaturing gels. (3 periods)
7. Transformation (3 periods)

Total Periods: 42

M. Tech. (BOT) – II Semester
SEMINAR (14MT20322)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	50	50	--	--	--	2

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of seminar topic; Literature survey; Preparation of technical report and Presentation.

COURSE OUTCOMES: At the end of the course, the student will be able to
CO1. Acquire in-depth knowledge in core and allied areas of interest.
CO2. Analyze and synthesize information related to the areas.
CO3. Conceptualize and construct research problems.
CO4. Extract information pertinent to a specific area through literature survey to conduct research.
CO5. Identify the applicability of modern software and tools.
CO6. Contribute positively to multidisciplinary groups in emerging areas with objectivity and rational analysis.
CO7. Plan, organize, prepare and present effective written and oral technical reports.
CO8. Engage in lifelong learning to improve competence.
CO9. Acquire awareness on professional code of conduct in the chosen area.
CO10. Develop independent and reflective learning.

M. Tech. (BOT) – III & IV Semesters
PROJECT WORK (14MT30321 & 14MT40321)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
80	120	200	--	--	--	16

PRE-REQUISITES: --

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation.

COURSE OUTCOMES: On completion of project work the student will be able to

CO1. Acquire in-depth knowledge in the areas of interest.
CO2. Analyze critically chosen project topic for conducting research.
CO3. Apply knowledge gained through Programme, self learning and experience for solution of a given problem efficiently.
CO4. Undertake research confidently in the project domain.
CO5. Use the techniques, skills and modern engineering tools necessary for project work.
CO6. Perform harmonically in multi-disciplinary, multi-cultural groups, and develop a high level of interpersonal skills.
CO7. Manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.
CO8. Develop communication skills, both oral and written for preparing and presenting reports.
CO9. Engage in lifelong learning to improve knowledge and competence continuously.
CO10. Understand professional and ethical responsibility for sustainable development of society.
CO11. Develop independent and reflective learning.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

(Affiliated to J.N.T. University Anantapur, Anantapuramu)

ACADEMIC REGULATIONS

M.C.A. Regular Three Year Degree Program

(for the batches admitted from the academic year 2014–15)

For pursuing three year postgraduate degree Program of study in Master of Computer Applications (MCA) offered by Sree Vidyanikethan Engineering College under Autonomous status and herein after referred to as SVEC (Autonomous):

1. Applicability : All the rules specified herein, approved by the Academic Council, shall be in force and applicable to students admitted from the academic year 2014-2015 onwards. Any reference to "College" in these rules and regulations stands for SVEC (Autonomous).

2. Extent: All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, SVEC (Autonomous) shall be the Chairman, Academic Council.

3. Admission :

3.1. Admission into First Year of Three Year MCA Degree Program of Study:

3.1.1. Eligibility: Admission to the MCA Degree Program shall be made subject to the eligibility, qualifications prescribed by the competent authority from time to time. Admissions shall be made on the basis of rank obtained by the qualifying candidates at the Entrance Test, subject to reservations or policies framed by the Government of Andhra Pradesh from time to time.

3.1.2. Admission Procedure: Admissions are made into the first year of three year MCA Degree Program as per the stipulations of Andhra Pradesh State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

(a) By the Convener, ICET, (for Category-A Seats).

(b) By the Management (for Category-B Seats).

4. Academic Year: The College shall follow semester pattern for the three year MCA Degree Program for conducting all its curricula. An academic year shall consist of two semesters with semester break after first, third and fifth semesters and summer break after second and fourth semesters. The semester shall have the duration to accommodate a minimum of **16 weeks** of instruction.

First Semester (21 weeks)	Instruction Period: I Spell : 7 weeks II Spell : 9 weeks	16 weeks
	Mid-term Examinations: I Mid : 1 week II Mid : 1 week	2 weeks
	Preparation & Practical Examinations	1 week
	External Examinations	2 weeks
Semester Break		2 weeks
Second Semester (21 weeks)	Instruction Period: I Spell : 7 weeks II Spell : 9 weeks	16 weeks
	Mid-term Examinations: I Mid : 1 week II Mid : 1 week	2 weeks
	Preparation & Practical Examinations	1 week
	External Examinations	2 weeks
Summer Vacation		4 weeks

5. Course Structure: The Program of study shall consist of:

- ☐ General Courses comprising of the following:
  - i. Language / Communication Skills
  - ii. Financial Management
  - iii. Personal Management
  - iv. Mathematics

- ☐ Professional core courses:
  The list of professional core courses are chosen as per the suggestions of the experts, to impart broad based knowledge needed in the Program of study.
- ☐ Elective Courses:
  Elective courses shall be offered to the students to diversify their spectrum of knowledge. The elective courses can be chosen based on the interest of the student to broaden his individual skills and knowledge.
- ☐ Audit Courses:
  Audit courses shall be offered to the students as additional courses to supplement their knowledge/ skills.

Contact hours: Depending on the complexity and volume of the course the number of contact hours per week shall be assigned.

6. Credit System: Credits are assigned based on the following norms given in Table 1.

Table 1

Course	Hours/Week	Credits
Theory	01	01
Practical	03	02
Seminar	--	02
Mini Project	--	02
Project Work	--	12

L = Lecture; T = Tutorial; P = Practical; C = Credits.

i. As a norm, for the theory courses, **one credit** for one contact hour per week is assigned.

ii. As a norm, for practical courses **two credits** will be assigned for three contact hours per week.

iii. Tutorials do not carry any credits

iv. For courses like Project/Seminar/Mini Project, where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

The three year curriculum of MCA Degree Program of study shall have total of **117** credits.

7. Examination System: All components in the Program of study shall be evaluated continuously through internal evaluation and/or an external evaluation conducted as semester-end xamination.

7.1 . Distribution of Marks:

Course	Marks	Examination and Evaluation	Scheme of examination
Theory	60	Semester-end examination of 3 hours duration (External evaluation)	The examination question paper in theory courses shall be for a maximum of 60 marks. The question paper shall be of descriptive type with 5 questions taking one from each unit of syllabus with internal choice and all 5 questions shall be answered. All questions carry equal marks.
	40	Mid-term Examination of 2 hours duration (Internal evaluation)	The question paper shall be of descriptive type with 5 essay type questions out of which 4 are to be answered and evaluated. Two mid - term examinations each for 40 marks are to be conducted. For a total of 40 marks, 75% of better one of the two and 25% of the other one are added and finalized. **Mid-I:** After first spell of instructions (I to II Units). **Mid-II**: After second spell of instructions (III to V Units).

Laboratory	50	Semester-end Lab examination of 3 hours duration (External evaluation)		50 marks are allotted for laboratory examination during semester-end.
	25	15	Day-to-Day evaluation	Performance in laboratory experiments and Record.
		10	Internal evaluation	Two practical tests shall be conducted and the average of the tests is to be finalized for 10 marks.
Seminar	50	Semester-end Examination		Seminar shall be evaluated at semester-end by the Departmental Committee (DC) as given in 7.2.1.
Project Work	200	120	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 7.2.2
		80	Internal evaluation	Continuous evaluation by the DC
Mini Project	75	50	External evaluation	Semester-end Viva-Voce Examination by the DC as given in 7.2.4
		25	Internal evaluation	Continuous evaluation by the DC as given in 7.2.3

7.2 Seminar/ Mini Project/ Project Work/Audit Courses Evaluation:

7.2.1 For the seminar, the student shall collect information through literature survey on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department before presentation. The report and the presentation shall be evaluated at the end of the semester by the DC consisting of Head of the Department, concerned Supervisor and a senior faculty member. The DC is constituted by the Principal on the recommendations of the Head of Department.

7.2.2 Project Work:

7.2.2.1 Every candidate shall be required to submit an abstract after taking up a topic approved by the DC.

7.2.2.2 Registration of Project work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses up to V Semester.

7.2.2.3 The DC shall monitor the progress of the project work.

7.2.2.4 The work on the project work shall be initiated in the penultimate semester and continued in the final semester. The candidate can submit Project work with the approval of DC at the end of the VI semester. Extension of time within the total permissible limit for completing the project is to be obtained from the Chairman, Academic Council.

7.2.2.5 The student shall submit status report in two different phases, in addition to oral presentation before the DC. The DC shall evaluate the project based on the progress, presentations and quality of work.

7.2.2.6 A candidate shall be allowed to submit the project report only after passing all the courses up to V semester and then take viva-voce examination of the project. The viva-voce examination may be conducted once in three months for all the eligible candidates.

7.2.2.7 The viva-voce examination may be conducted for all the eligible candidates as per the VI semester examination schedule.

7.2.2.8 Three copies of the dissertation certified in the prescribed form by the concerned supervisor and HOD shall be submitted to the Department. One copy is to be submitted to the Chief Controller of Examinations, SVEC and one copy to be sent to the examiner. The examiner shall be nominated by the Chief Controller of the Examinations from the panel of three examiners submitted by the Department for a maximum of 10 students at a time for adjudication.

7.2.2.9 If the report of the examiner is favorable, viva-voce examination shall be conducted by a Board consisting of the concerned Supervisor, Head of the Department and the Examiner who adjudicated the project report. The Board shall jointly evaluate the student's performance and award the marks for a maximum of 120.

7.2.2.10 The candidates who fail in viva-voce examination shall have to re-appear the viva-voce examination after three months. If he fails in the second viva-voce examination, the candidate should revise and resubmit the project report followed by viva- voce examination.

7.2.3 For mini-project, the Internal Evaluation shall be made by the DC, on the basis of two seminars presented by each student on the topic of his mini-project. He should carryout mini-project in the Institution on a specialized topic and preparea technical report, showing his understanding over the project and outcomes to be listed as conclusions of the mini-project, and submit a report to the Department before viva-voce examination.

7.2.4 The semester-end mini-project shall be evaluated at the end of the semester by the DC.

7.2.5 For Audit Courses, attendance has to be considered like in case of any regular courses. For laboratory audit courses, laboratory manuals and student observations have to be maintained. Two internal tests have to be conducted by the course teacher, preferably just before regular mid-term examinations.

7.3. Eligibility to appear for the semester-end examination:

7.3.1 A student shall be eligible to appear for semester-end examinations if he acquires a minimum of 75% of attendance in aggregate of all the courses in a semester.

7.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

7.3.3 Shortage of attendance below 65% in aggregate shall in no case be condoned.

7.3.4 Students whose shortage of attendance is not condoned in any semester are not eligible to take heir semester-end examination of that class and their registration shall stand cancelled.

7.3.5 A student shall not be promoted to the next semester unless he satisfies the attendance equirements of the current semester, as applicable. The student may seek readmission for the semester when offered next. He will not be allowed to register for the courses of the semester hale he is in detention.

7.3.6 A stipulated fee shall be payable to the College towards condonation of shortage of attendance.

7.4. Evaluation: Following procedure governs the evaluation.

7.4.1. Marks for components evaluated internally by the faculty should be submitted to the Controller of Examinations one week before the commencement of the semester-end examinations.
The marks for the internal evaluation components shall be added to the external evaluation marks secured in the Semester-End examinations, to arrive at total marks for any course in that semester.

7.4.2. Performance in all the courses is tabulated course-wise and shall e scrutinized by the Examination Committee and moderation is applied if needed, and course-wise marks are finalized. Total obtained in each course are converted into letter grades.

7.4.3. Student-wise tabulation shall be done and individual grade sheet shall be generated and issued to the student.

7.5. Personal verification / Revaluation / Recounting:
Students shall be permitted for personal verification/request for recounting/ revaluation of the semester-end examination answer scripts within a stipulated period after payment of prescribed fee.
After recounting or revaluation, records shall be updated with changes if any and the student shall be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a notice.

7.6. Supplementary Examination:
In addition to the regular semester-end examinations conducted, the College may also schedule and conduct supplementary examinations for all the courses of other semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

8. Re-Registration for Improvement of Internal Marks:
Following are the conditions to avail the benefit of improvement of internal evaluation marks.

8.1 The candidate should have completed the course work and obtained examinations results from I to V semesters.

8.2 Out of the courses the candidate has failed in the examinations due to internal evaluation marks secured being less than 50%, the candidate shall be given one chance for a maximum of 3 theory courses for improvement of internal evaluation marks.

8.3 He should have passed all the remaining courses for which the internal evaluation marks secured more than or equal to 50%.

8.4 The candidate has to register for the chosen courses and fulfill the academic requirements.

8.5 For each course, the candidate has to pay a fee equivalent to one third of the semester tuition fee and the amount is to be remitted in the form of D.D./ Challan in favour of the Principal, Sree Vidyanikethan Engineering College payable at Tirupati along with the requisition through the concerned Head of the Department.

8.6 In the event of availing the Improvement of Internal evaluation marks, the internal evaluation marks as well as the semester-end examinations marks secured in the previous attempt(s) for the re-registered courses stand cancelled.

9. Academic Requirements for completion of regular MCA Program of study:

The following academic requirements have to be satisfied in addition to the attendance requirements for completion of regular MCA Program of study.

9.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, mini project and project if he secures not less than 40% of marks in the semester-end examination and a minimum of 50% of marks in the sum total of the internal evaluation and semester-end examination taken together. For the seminar, he should secure not less than 50% of marks in the external evaluation.

9.2 A student shall register for all the **117** credits and earn all the **117** credits. Marks obtained in the **117** credits shall be considered for the calculation of the DIVISION based on CGPA.

9.3 A student who fails to earn **117** credits as indicated in the course structure within **six** academic years from the year of his admission shall forfeit his seat in MCA Program and his admission stands cancelled.

10. Transitory Regulations:

Students who got detained for want of attendance (**or**) who have not fulfilled academic requirements (**or**) who have failed after having undergone the Program earlier regulations (**or**) who have discontinued and wish to continue the Program are eligible for admission into the unfinished semester from the date of commencement of class work with the same (**or**) equivalent courses as and when courses are offered and they continue to be in the academic regulations they were first admitted.

A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of **six years.**

11. Grades, Grade Point Average and Cumulative Grade Point Average:

11.1. Grade System: After all the components and sub-components of any course (including laboratory courses) are evaluated, the final total marks obtained shall be converted to letter grades on a "**10 point scale**" as described below.

Grades conversion and Grade points allotted

% of Marks obtained	Grade	Description of Grade	Grade Points (GP)
>= 95	S	Superior	10
>= 85 to < 95	O	Outstanding	9
>= 75 to < 85	A	Excellent	8
>= 65 to < 75	B	Very Good	7
>= 55 to < 65	C	Good	6
>= 50 to < 55	D	Pass	5
< 50	F	Fail	0
Not Appeared	N	Absent	0

Pass Marks: A student shall be declared to have passed theory course, laboratory course, mini-project and project work if he secures minimum of 40% marks in semester-end examination, and a minimum of 50% marks in the sum total of internal evaluation and semester-end examination taken together. For the seminar, he shall be declared to have passed if he secures minimum of 50% of marks in the semester-end examination. Otherwise he shall be awarded fail grade - **F** in such a course irrespective of internal marks. **F** is considered as a fail grade indicating that the student has to pass the semester-end examination in that course in future and obtain a grade other than **F** and **N** for passing the course.

11.2. Grade Point Average (GPA):

Grade Point Average (GPA) shall be calculated as given below on a "10 point scale" as an index of the student's performance at the end of each semester:

$$GPA = \frac{\sum (C \; X \; GP)}{\sum C}$$

where ***C*** denotes the credits assigned to the courses undertaken in that semester and ***GP*** denotes the grade points earned by the student in the respective courses.

Note: GPA is calculated only for the candidates who passed all the courses in that semester.

11.3. Cumulative Grade Point Average (CGPA):

The CGPA for any student is awarded only when he completes the Program i.e., when the student passes in all the courses prescribed in the Program. The CGPA is computed on a 10 point scale as given below:

$$CGPA = \frac{\sum(C\ X\ GP)}{\sum C}$$

where ***C*** denotes the credits assigned to courses undertaken up to the end of the Program and *GP* denotes the grade points earned by the student in the respective courses.

12. Grade Sheet: A grade sheet (Marks Memorandum) shall be issued to each student indicating his performance in all courses registered in that semester indicating the GPA.

13. Transcripts: After successful completion of the entire Program of study, a transcript containing performance of all academic years shall be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee.

Partial transcript will also be issued upto any point of study to a student on request.

14. Award of Degree: The Degree shall be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapuramu on the recommendations of the Chairman, Academic Council, SVEC (Autonomous).

14.1. Eligibility: A student shall be eligible for the award of MCA Degree if he fulfills all the following conditions:

- ☐ Registered and successfully completed all the components prescribed in the Program of study to which he is admitted.
- ☐ Successfully acquired the minimum required credits as specified in the curriculum corresponding to the Program of study within the stipulated time.
- ☐ Obtained CGPA greater than or equal to 5.0 (Minimum requirement for declaring as passed).
- ☐ Has no dues to the College, Hostel, Library etc. and to any other amenities provided by the College.
- ☐ No disciplinary action is pending against him.

14.2. Award of Division: Declaration of Division is based on CGPA.

Awarding of Division

CGPA	Division
>= 7.0	First Class with Distinction
>= 6.0 and < 7.0	First Class
>= 5.0 and < 6.0	Second Class

15. Additional academic regulations:

15.1 A student may appear for any number of supplementary examinations within the stipulated time to fulfill regulatory requirements for award of the degree.

15.2 In case of malpractice/improper conduct during the examinations, guidelines shall be followed as shown in the **Annexure-I**.

15.3 When a student is absent for any examination (Mid-term or Semester-end) he shall be awarded **zero** marks in that component (course) and grading will be done accordingly.

15.4 When a component is cancelled as a penalty, he shall be awarded zero marks in that component.

16. Withholding of Results:

If the candidate has not paid dues to the College/ University (or) if any case of indiscipline is pending against him, the result of the candidate shall be withheld and he shall not be allowed/ promoted in to the next higher semester.

17. Amendments to regulations:

The Academic Council of SVEC (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

18. General:

The words such as "he", "him", "his" and "himself" shall be understood to include all students irrespective of gender connotation.

Note : Failure to read and understand the regulations is not an excuse.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)
MCA COURSE STRUCTURE

MCA I-Semester:

S. No.	Course Code	Course Title	Periods Per Week			Credits	Max. Marks		
			L	T	P		IE	EE	Total
Theory									
1.	14MC1HS01	Accounting and Financial Management	3	1	-	3	40	60	100
2.	14MC1BS01	Mathematical Foundations of Computer Science	3	1	-	3	40	60	100
3.	14MC10101	Programming through C	3	1	-	3	40	60	100
4.	14MC10102	Computer Organization	3	1	-	3	40	60	100
5.	14MC10103	Data Structures	3	1	-	3	40	60	100
6.	14MC1HS02	Professional Communication	2	1	-	2	40	60	100
Practical									
7.	14MC10121	Programming in C & Data Structures Lab	-	-	3	2	25	50	75
8.	14MC10122	IT & Management Lab	-	-	3	2	25	50	75
Total			**17**	**6**	**6**	**21**	**290**	**460**	**750**

MCA II-Semester:

S. No.	Course Code	Course Title	Periods Per Week			Credits	Max. Marks		
			L	T	P		IE	EE	Total
Theory									
1.	14MC2BS01	Probability and Statistics	3	1	-	3	40	60	100
2.	14MC20101	Operating Systems	3	1	-	3	40	60	100
3.	14MC20102	Object Oriented Programming	3	1	-	3	40	60	100
4.	14MC20103	Database Management Systems	3	1	-	3	40	60	100
5.	14MC20104	Software Engineering	3	1	-	3	40	60	100
6.	14MC2HS01	Professional Ethics	3	1	-	3	40	60	100
Practical									
7.	14MC20121	Object Oriented Programming through JAVA Lab	-	-	3	2	25	50	75
8.	14MC20122	Database Management Systems Lab	-	-	3	2	25	50	75
Total			**18**	**6**	**6**	**22**	**290**	**460**	**750**

MCA III - Semester:

S. No.	Course Code	Course Title	Periods Per Week			Credits	Max. Marks		
			L	T	P		IE	EE	Total
Theory									
1.	14MC3HS01	Organizational Behavior and Human Resource Management	3	1	-	3	40	60	100
2.	14MC3BS01	Operations Research	3	1	-	3	40	60	100
3.	14MC30101	Object Oriented Analysis and Design	3	1	-	3	40	60	100
4.	14MC30102	Data Warehousing and Data Mining	3	1	-	3	40	60	100
5.	14MC30103	Computer Networks	3	1	-	3	40	60	100
Practical									
6.	14MC30121	Object Oriented Analysis and Design & Networks Lab	-	-	3	2	25	50	75
7.	14MC30122	Data Warehousing and Data Mining Lab	-	-	3	2	25	50	75
Total			**15**	**5**	**6**	**19**	**250**	**400**	**650**
8.	14MC3HS02	* English Language and Communication Skills Lab	--	--	3	--	--	--	--

MCA IV - Semester:

S. No.	Course Code	Course Title	Periods Per Week			Credits	Max. Marks		
			L	T	P		IE	EE	Total
Theory									
1.	14MC40101	Management Information Systems	3	1	-	3	40	60	100
2.	14MC40102	Web Programming	3	1	-	3	40	60	100
3.	14MC40103	Big Data Analytics	3	1	-	3	40	60	100
4.	14MC40104 14MC40105 14MC40106 14MC40107	**Elective-I** i. Service Oriented Architecture ii. Software Project Management iii. User Interface Design iv. Design Patterns	3	1	-	3	40	60	100
5.	14MC40108 14MC40109 14MC40110 14MC40111	**Elective-II** i. Advanced Data Base Management Systems ii. Social Media iii. Semantic Web iv. Information Retrieval Systems	3	1	-	3	40	60	100
6.	14MC4HS01	Business Communication and Presentation Skills	3	1	-	3	40	60	100
Practical									
7.	14MC40121	Web Programming Lab	-	-	3	2	25	50	75
8.	14MC40122	Mini Project	-	-	-	2	25	50	75
Total			**18**	**6**	**3**	**22**	**290**	**460**	**750**

MCA V – Semester:

S. No.	Course Code	Course Title	Periods Per Week			Credits	Max. Marks		
			L	T	P		IE	EE	Total
Theory									
1.	14MC50101	Information Security	3	1	-	3	40	60	100
2.	14MC50102	Software Testing	3	1	-	3	40	60	100
3.	14MC50103	Cloud Computing	3	1	-	3	40	60	100
4.	14MC50104 14MC50105 14MC50106 14MC50107	**Elective-III** i. Mobile Application Development ii. Unix Internals iii. Middleware Technologies iv. Network Management	3	1	-	3	40	60	100
5.	14MC50108 14MC50109 14MC50110 14MC50111	**Elective-IV** i. Business Intelligence ii. Enterprise Resource Planning iii. E-Commerce iv. Multimedia Application Development	3	1	-	3	40	60	100
Practical									
6.	14MC50121	Information Security Lab	-	-	3	2	25	50	75
7.	14MC50122	Software Testing Lab	-	-	3	2	25	50	75
Total			**17**	**3**	**6**	**19**	**250**	**400**	**650**
8.	14MC50123	* Cloud Computing Lab	-	-	3	-	-	-	-

MCA VI – Semester:

S. No.	Course Code	Course Title	Credits	Max. Marks		
				IE	EE	Total
1.	14MC60121	Seminar	2	-	50	50
2.	14MC60122	Project Work	12	80	120	200
Total			**14**	**80**	**170**	**250**

- **Audit Course**

  Total Credits- 117

  Total Marks - 3800

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA I-SEMESTER
14MC1HS01: ACCOUNTING AND FINANCIAL MANAGEMENT

PRE-REQUISITES: --

COURSE DESCRIPTION:

General accounting principles; Computerized Accounting; Financial Management; Break Even Analysis and Capital Budgeting; Financial Statements.

COURSE OBJECTIVES:

I. To impart basic principles and concepts of financial accounting and management.

II. To develop skills related to use of tools and techniques of financial management.

III. To apply the concepts of financial accounting and Financial Management for effective managerial decision making in an organization.

IV. To imbibe Professional values, ethics and skills for Professional development through application of principles of Accounting and Management

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Gain Knowledge in
   - Basic Principles and concepts of Financial Accountancy.
   - Basic concepts of Financial Management.
2. Develop skills in managerial decision making of an organization.
3. Application of Financial Management concepts and Practice of Financial Accounting.
4. Ability to ascertain the profitability and soundness of the organization.
5. Provides prerequisite for advanced tools like Tally and SAP.
6. Facilitates synthesis of financial information to provide valid conclusions.
7. Follow ethical code of conduct in Accounting and Financial activities.
8. Achieve personal excellence and ability to work in an organization.
9. Develop effective Communication in Accounting and Financial transactions.
10. Provides life skills for effective Financial Management of an organization.
11. Appreciate the significance and applications of Accounting and Financial Management in lifelong learning for knowledge and skill upgradation

DETAILED SYLLABUS

UNIT – I : INTRODUCTION TO ACCOUNTING (10 Periods)

Principles, concepts and conventions, double entry system of accounting, classification of accounts, journal, ledger and trial balance.

Computerized Accounting: Introduction to computerized accounting system – advantages of computerized accounting system.

UNIT – II : PREPARATION OF FINANCIAL STATEMENTS (10 Periods)

Trading account, profit and loss account and balance sheet (with simple adjustments).

UNIT – III : FINANCIAL MANAGEMENT (10 Periods)

Meaning and scope, role and objectives. Goals of Financial Management: Profit maximization, wealth maximization, EPS maximization, overcapitalization, undercapitalization, causes for overcapitalization and undercapitalization. Capital and its significance: Types of capital and cost of capital, methods and sources of raising capital.

UNIT – IV : BREAK EVEN ANALYSIS (10 Periods)

Concept of Break Even Point (BEP), cost-volume-profit analysis, determination of BEP, margin of safety and profit/volume (P/V) ratio, impact of changes in cost or selling price on BEP, practical applications of break even analysis (make or buy, add or drop, choosing the product mix with a limiting factor).

UNIT – V : CAPITAL BUDGETING (10 Periods)

Features, proposals, methods of capital budgeting, payback method, Accounting Rate of Return (ARR), time value of money, Net Present Value method (NPV) , Profitability Index (PI) and Internal Rate of Return (IRR) – simple problems.

Total Periods : 50

TEXT BOOKS:

1. A.R. Aryasri, **Accounting and Financial Management**, Tata McGraw Hill Education Pvt. Ltd., 1st Edition 2010.
2. James C Van Horne, **Financial Management and Policy,** Prentice-Hall of India/Pearson, 12th Edition, 2001.

REFERENCE BOOKS :

1. S.P. Jain and K.L. Narang, **Financial Accounting,** Kalyani Publishers, Ludhiana, 6th Edition, 2002.
2. P.C. Tulsian, **Financial Accounting,** Pearson Education, 2004
3. I.M. Pandey, **Financial Management,** Vikas Publishing House Pvt. Ltd., 10th Edition, 2010.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA I-SEMESTER

14MC1BS01: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Concepts of mathematical reasoning; properties of functions and relations; methods of recurrence relations; graphical representation, shortest path algorithms.

COURSE OBJECTIVES:

I. To gain knowledge on Mathematical concepts, develop Business processes and resolve the problems in programming languages.
II. To attain skills of basic search algorithms, to find the shortest path using Kruskal's and Prim's Algorithms.
III. To apply mathematical reasoning, Partial ordering relations and infer the Pigeonhole principles on computer applications.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Apply the principles of discrete mathematical Structures to solve computer Applications.
2. Formulate Computing problems with substantial conclusions using Mathematical reasoning, recurrence relations and Graph Theory.
3. Design and develop mathematical models in Computer Science for real time problems/ business applications.

DETAILED SYLLABUS

UNIT-I: MATHEMATICAL LOGIC AND PREDICATES (13 Periods)

Mathematical Logic and Predicates: Statements and notations, Connectives, Well formed formulas, Truth Tables, Tautology, Normal forms.

Predicates: Predicate calculus, Rules of inference, Consistency, Proof of contradiction

UNIT-II: FUNCTIONS AND RELATIONS (10 Periods)

Relations: Properties of binary relations, Equivalence relations, Partial ordering relations, Hasse diagrams.

Functions: Inverse Functions, Composition of functions, Recursive functions, Lattice and its Properties.

UNIT-III: ALGEBRAIC STRUCTURES & MATHEMATICAL REASONING (12 Periods)

Algebraic structures: Algebraic system Examples and general properties, Semi groups and monoids, Groups, Homomorphism, Isomorphism.**Mathematical Reasoning:** Methods of Proof, Mathematical Induction, The Inclusion- Exclusion Principle, The Pigeonhole principle.

UNIT-IV: RECURRENCE RELATIONS (10 Periods)

Recurrence Relation: Generating functions of Sequences, Calculating co-efficients of Generating function, Homogeneous Recurrence relation, Solving recurrence relations by substitution and generating functions, methods of characteristic roots.

UNIT-V: GRAPHS & TREES (10 Periods)

Graphs: Introduction to Graphs, Types of Graphs, Graphical representations, Paths and Circuits, Euler and Hamiltonian Paths and Circuits, Graph Coloring.

Trees: Introduction to Trees, Binary Search Trees, Spanning Trees, Depth-First Search, Breadth-First Search, Minimum Spanning Trees, Kruskal's Algorithm, Prim's Algorithm.

Total Periods: 55

TEXT BOOKS:

1. Trembly J.P. and Manohar.P, *"Discrete Mathematical Structures with applications to computer science,"* Tata Mc Graw Hill: New Delhi, 2003.
2. Kenneth H. Rosen, *"Discrete Mathematics and its Applications,"* Tata McGraw Hill: New Delhi, 6th edition, 2008.

REFERENCE BOOKS:

1. J.L. Mott, A.Kandel , T.P Baker, *"Discrete Mathematics for Computer Scientists and Mathematicians,"* Prentice Hall India,2004.
2. Dr.D.S.Chandrasekharaiaha, *"Mathematical Foundations of computer science (discrete Structures),"* Prism Books Pvt. Ltd:India, 2006.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA I-SEMESTER
14MC10101: PROGRAMMING THROUGH C

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Fundamental concepts of computers and C language; concepts of arrays, strings and pointers; implementation of functions; derived datatypes; files and preprocessor directives.

COURSE OBJECTIVES:

I. To understand various steps involved in Program development and basic concepts in C Programming Language.
II. To read and write C program that uses pointers, structures and files.
III. To help students to understand the implementation of C language.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Solve the given problem using the syntactical structures of C language.
2. Develop, execute and document solution for various problems using the features of C language.
3. Learn to use arrays, strings, functions, pointers, structures and unions in C.

DETAILED SYLLABUS

UNIT I: INTRODUCTION TO COMPUTERS AND C LANGUAGE AND PROGRAM CONTROL STATEMENTS (12 Periods)

Introduction to Computers and C Language: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, System Development; Introduction to the C Language: Structure of a C Program, Identifiers, Types, Variables, Constants, keywords, Expressions, precedence and Associativity, Evaluating Expressions, Type Conversion.

Program Control Statements: Two way selection : if, if else, nested if else. Multi way selection- else if ladder and switch statement; Repetition: concept of loop, for loop, while loop, do while loop. Break, continue and goto statement.

UNIT II: ARRAYS, STRINGS AND POINTERS (12 Periods)

Arrays, Strings: Array concept, types of array: one dimensional, two dimensional and multi-dimensional arrays. Introduction to string, string representation and initialization, array of strings, string manipulation functions.

Pointers: Introduction, declaration and initialization, arithmetic operations on pointers, Array of pointers, pointer to an array, Dynamic memory management functions: malloc, calloc and realloc and free.

UNIT III: FUNCTIONS (12 Periods)

Functions: Introduction to function, system defined & user defined function. Local and global variable. Parameter passing mechanism: pass by value and pass by reference. Scope, Storage classes, Recursion: recursive function, application of recursion: factorial calculation and Fibonacci number generation.

UNIT IV: DERIVED DATATYPES (12 Periods)

Derived Data Types: Introduction to structure: structure declaration and initialization, anonymous structure, accessing operators, nested structure**.** Array of structure, array within a structure, pointer to structure, passing structures through function. Union: declaration, initialization and its usage. typedef, enumerated types and bit field. Application of structure with pointer: static and dynamic linked list representation.

UNIT V: FILES AND PREPROCESSOR DIRECTIVES (10 Periods)

Files and Preprocessor Directives: Introduction to file, types of file: binary and text file. Operations on File: open, close, read, write and seek. Program to implement sequential access and random access. Preprocessor directive statements and its usage. Command line argument and its usage.

Total Periods : 58

TEXT BOOK:

1. B.A. Forouzan, "*A Structured programming approach using C,*" Third Edition, Cengage learning.

REFERENCE BOOKS:

1. Herbert Schiltz,"Turbo C/C++ The complete Reference," TataMcGraw- Hill.
2. BS Gottrifried, A.Mittal "*Programming in C – A practical approach*," PHI, Tata MC Grawhill.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA I-SEMESTER

14MC10102:COMPUTER ORGANIZATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Basic principles of data representation and digital arithmetic; designing of logic circuits; addressing methods and memory storage; memory access and storage; designing of basic computer.

COURSE OBJECTIVES:

I. To understand the basic structure and operations of digital computer and hierarchical memory system.
II. To discuss in detail the operationS of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction.
III. To find out different ways of communicating with I/O devices and standard I/O interfaces.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Aware of basic components of a computer like CPU, memories, input/output and their organization and solve basic binary mathematical operations using the computer.
2. Apply knowledge of the processor's internal registers and operations.
3. Designing of digital components and logic circuits.

DETAILED SYLLABUS

UNIT I: DATA REPRESENTATION (10 Periods)

Data types, complements, fixed-point representation, floating-point representation, other binary codes and error detection codes, digital computers, logic gates, Boolean algebra and map simplification.

UNIT II: DIGITAL LOGIC CIRCUITS & DIGITAL COMPONENTS (10 Periods)

Combinational circuits, flip-flops, sequential circuits, integrated circuits, decoders, multiplexers, shift registers, binary counters.

UNIT III: CENTRAL PROCESSING UNIT (10 Periods)

Introduction, general register organization, stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, Reduced Instruction Set Computer (RISC).

UNIT IV: BASIC COMPUTER ORGANIZATION AND DESIGN (11 Periods)

Instruction codes, computer registers, computer instructions, timing and control, instruction cycle, Memory Reference Instructions, input-output and interrupt, complete computer description, design of basic computer, design of accumulator logic.

UNIT V: MEMORY ORGANIZATION AND INPUT -OUTPUT ORGANIZATION (12 Periods)

Memory Organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory.

Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of transfer, priority interrupts, Direct Memory Access (DMA) and Input-Output Processor (IOP).

Total Periods : 53

TEXT BOOK:

1. M. Morris Mano, "*Computer System Architecture*," 3rd Edition, Pearson, Education, 2008.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, "*Structured Computer Organization*," 5th Edition, Pearson Education, 2005.
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "*Computer Organization*," 5th edition, McGraw-Hill, 2002.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA I-SEMESTER

14MC10103: DATA STRUCTURES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Knowledge on algorithms, pseudocode and stacks; queues and linear lists; sorting and searching techniques; concepts of graphs and trees; applications of trees and graphs.

COURSE OBJECTIVES:

I. To design and implement basic data structures like stacks, Queues Linked Lists and Trees.
II. Learn advanced nonlinear data structures.
III. To develop Programs using Data Structures.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Understand the usage of data structures.
2. Analyze to solve problems using various data structures like linear list, stack, queue and trees.
3. Apply Tree and Graph structures for implementing solutions to practical problems.
4. Handle operations like, insertion, deletion, sorting and searching mechanism on various data structures.

DETAILED SYLLABUS

UNIT – I: BASIC CONCEPTS AND STACKS (11 Periods)

Basic Concepts: Algorithm**,** Pseudocode, The Abstract Data Type, Model for an Abstract Data Type, ADT Implementations.

Stacks: Concepts of Stack **,** Basic Stack Operations, Stack ADT and its Implementation, Applications-Recursion, Infix to Postfix Transformation, Evaluating Postfix Expressions.

UNIT-II: QUEUES AND GENERAL LINEAR LISTS (12 Periods)

Queues: Concepts of Queue, Basic Queue Operations, Queue ADT and its Implementation Various Queue Structures : Circular Queue - Double ended queue - Priority queue, Applications-Simulation.

General Linear Lists: Basic Operations, Implementations- Single linked list, Double linked list, Circular linked list, Applications- Stacks using Linked List, Queue using Linked List, Polynomial addition, Sparse matrix implementation.

UNIT – III: SORTING AND SEARCHING (11 Periods)

Sorting and Searching: Sorting: Sort Concepts, Sort Stability, Sort Efficiency, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge sort, Heap Sort.

Searching: Sequential Search, Binary Search, Analyzing Search Algorithms.

UNIT – IV: TREES (11 Periods)

Introduction to Trees: Basic Tree Concepts, Binary Trees, General Trees.

Binary Search Trees: Basic Concepts, BST Operations, Binary Search Tree ADT, BST Applications, Threaded Trees.

UNIT – V: AVL SEARCH TREES AND GRAPHS (12 Periods)

AVL Search Trees – AVL Tree Basic Concepts, AVL Tree Implementations, AVL Tree Abstract Data Type, AVL Tree Algorithms; Red Black Tree: Basic Concepts ,Implementations.

Graphs: Basic Concepts, Operations, Graph Storage Structures, Graph Algorithms, Graph ADT, Minimum Spanning Tree , Prims and Kruskals, Dijkstras Algorithm.

Total Periods : 57

TEXT BOOKS:

1. Richard F.Gilberg & Behrouz A. Forouzan, *"Data Structures A Pseudocode Approach with C,"* Thomson 2nd Edition.
2. D Samanta, *"Classic Data Structures,"* PHI Publications, New Delhi.

REFERENCE BOOKS:

1. Mark Allen Weiss, *"Data Structures and Algorithm Analysis in C,"* Second Edition, Pearson Education.
2. Ellis Horowitz, Sartaj Sahni, "Fundamentals of Computer Algorithms", Galgotiabook source, New Delhi.
3. Jean Paul Tremblay and Paul G. Soresson, "An Introduction to Data Structures with Applications", McGraw Hill International editions.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA I-SEMESTER

14MC1HS02: PROFESSIONAL COMMUNICATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	2	1	-	2

PRE-REQUISITES: --

COURSE DESCRIPTION:

Communication Skills: Importance of Communication; Active Listening; Effective speaking; Reading Techniques and Technical Writing.

COURSE OBJECTIVES:

I. To lay basic foundation and impart knowledge of English language, grammar and communication skills.
II. To develop listening, speaking, reading and writing skills among students needed in their personal, academic and professional pursuits.
III. To train students apply the nuances of English for various communication needs.
IV. To build confidence in effective usage of English language..

COURSE OUTCOMES:

After the completion of the course, a successful student will be able to

1. Acquire fundamental and functional knowledge of English language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with professionals and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and life-long learning.

DETAILED SYLLABUS

UNIT – I: IMPORTANCE OF COMMUNICATION (9 Periods)

Language as a tool of Communication – Characteristics of Language – Communicative Skills LSRW – Effective Communication – Modes of Communication – Verbal and Non-verbal Communication Barriers to Communication – Objective and Characteristics – Process of Communication – Levels of Communication – Visual Aids.

UNIT – II: ACTIVE LISTENING (8 Periods)

Introduction – Importance of Listening and Empathy – Reasons for poor Listening – Traits of a Good Listener – Listening Modes – Types of Listening – Barriers to Effective Listening – Listening and Note-taking.

UNIT – III: EFFECTIVE SPEAKING (8 Periods)

Introduction – Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: READING TECHNIQUES (9 Periods)

Introduction – Improving Comprehension Skills – Techniques for Good Comprehension – General Kitchen Layout – Predicting the Content – Understanding the Gist – SQ3R Reading Technique – Study Skills.

UNIT – V: TECHNICAL WRITING (8 Periods)

Introduction – Importance – Characteristics – Audience Recognition / Analysis – Language –Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism – Referencing and Styling.

Total Periods : 42

TEXT BOOK

1. Meenakshi Raman & Sangeetha Sharma, *Technical Communication*, Oxford University Press, New Delhi, Second edition , 2012.

REFERENCE BOOKS

1. Sunitha Mishra, C . Muralikrishna, *Communication Skills for Engineers,* Pearson Education, Delhi, 2012.
2. Kavitha Tyagi & Padma Misra, *Professional Communication,* PHI Learning Private Limited, New Delhi, 2011.
3. Alok Jain, Pravin S. R. Bhatia & A. M. Sheikh, *Professional Communication Skills,* S. Chand & Company Ltd, New Delhi, 2008.
4. Rajendra Pal and J. S. Korlahalli, *Essentials of Business Communication*, Sultan Chand & Sons, Delhi, 2012.

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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA I-SEMESTER
14MC10121: PROGRAMMING IN C AND DATA STRUCTURES LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: --

COURSE DESCRIPTION:

Knowledge on algorithms and flowchart; implementation of arrays, strings, functions and pointers; implementation of stacks, queues and liner lists; sorting and searching techniques.

COURSE OBJECTIVES:

I. To understand various steps involved in Program development and basic concepts in C Programming Language.
II. To design and implement basic and advanced data structures like stacks, Queues and Trees.
III. To develop Programs using C and Data Structures.

COURSE OUTCOMES:

After the completion of the course, a successful student will be able to:

1. Understand the usage of C language features and data structures.
2. Analyze to solve problems using various data structures like linear list, stack, queue, trees.
3. Develop, execute and document solution for various problems using the features of C language.
4. Handle operations like, insertion, deletion, sorting and searching mechanism on various data structures.
5. Emphasize the programming concepts, how they work together which would be learning through meaningful examples.

LIST OF LAB PROGRAMS

1. a) Write an Algorithm and flow chart to read the name and print the name
   b) Write an Algorithm and flow chart to add two numbers.
   c) Write an Algorithm and a flow chart to calculate area of square.
   d) Write Algorithm and flow chart to find the largest of two numbers.
2. a) Write a C Program to find the sum of individual digits of a positive integer.
   b) Write a C Program to find the roots of a quadratic equation.
   c) Write a C program to read in a three digit number produce following output (assuming that the input is 347)
      3 hundreds
      4 tens
      7 units
   d) Write a C program to generate Fibonacci series
3. a) Write a C program to non-recursive and recursive function for the following task
      i. Calculating Factorial
      ii. Swapping the values of two variable
      iii. Minimum/maximum value from the given input
      iv. Nth Fibonacci number
      v. GCD of a Given Number
   b) Write a C Program to Add, Subtract and Multiply Two Matrices Using Functions (Passing arrays as arguments to the function)
   c) Write a C program to determine if the given string is a palindrome or not
4. a) Write a C Program to Insert a Substring into a Given Main String from a Given Position
   b) Write a C Program to Delete n Characters from a Given Position in a Give String
5. a) Write a program to swap two numbers using pointers.
   b) Write a program to find sum of given array using pointers

6. a) Write a C program which copies one file to another.
   b) Write a C program to reverse the first n characters in a file.
   (Note: The file name and n are specified on the command line.)
7. a) Write a C program to display the contents of a file.
   b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)
8. Write a C program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers
9. Write a C program that uses Stack operations to perform the following:
   i) Converting infix expression into postfix expression
   ii) Evaluating the postfix expression
10. Write a C program that uses functions to perform the following operations on single linked list:
    i) Creation ii) Insertion iii) Deletion iv) Traversal
11. Write a C program that uses functions to perform the following operations on double linked list
    i) Creation ii) Insertion iii) Deletion iv) Traversal
12. Write a C program that uses functions to perform the following operations on Circular linked list
    i) Creation ii) Insertion iii) Deletion iv) Traversal
13. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
    i) Bubble sort ii) Selection sort
14. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
    i) Quick sort ii) Merge sort
15. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
    i) Linear search ii) Binary search
16. Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order.
    Ex. input : 10 23 4 6
    output : 6 4 23 10

REFERENCE BOOKS:

1. P. Padmanabham, *"C programming and Data Structures"* , Third Edition, BS Publications
2. M.T. Somashekara, "*Problem Solving with C"*, PHI Learning Private Limited: New Delhi, 2012.
3. E. Karthikeyan, *"A Textbook on C Fundamentals, Data Structures and Problem Solving*," Prentice Hall of India Private Limited: New Delhi, 2008.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA I-SEMESTER
14MC10122: IT & MANAGEMENT LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: --

COURSE DESCRIPTION:

Knowledge on maintenance of PC hardware; importance of word and applications of word processor such as documentinf a text, mail merge etc.; overview of tools in Excel and its features, representing data in various formats; powerpoint presentation using the images, audio; designing a simple webpage using MS publisher; basics of networking, various search engines available and counter measures on threats and viruses; preparation of ledgers; financial statement preparation, journal creation in Tally.

COURSE OBJECTIVES:

I. To train the student on:
   i. Identification of Functional parts of PC
   ii. Internet & WWW
   iii. Computer security issues and preventive measures
   iv. Operating Systems
   v. Financial Accounting and Management

II. To develop skills in assembling and disassembling PC, installation and un-installation of OS, Hardware and Software trouble shooting and tools &techniques of financial management..

III. To apply knowledge and skills of IT to create word documents, excel spread sheets, power point presentations develop website and maintenance of PC.

COURSE OUTCOMES:

On completion of the course, a successful student will be able to:

1. Acquire skills in:
   i. Identification of Functional parts of PC
   ii. Internet & WWW
   iii. Computer security issues and preventive measures
   iv. Operating Systems
   v. Types of computer networks, connecting PC to the Internet, web browsers, search engines,cyber hygiene.
2. Design documents, excel spread sheets, power point presentations and personal websites effectively.
3. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and MS-Office.

LIST OF LAB PROGRAMS

PC Hardware

1. a) Identify the peripherals of a computer, components in a CPU and its functions. Block diagram of CPU along with the configuration of each peripheral.

b) Demonstrating disassembling and assembling the PC back to working condition.

2. a) Introduction to Operating Systems, important of Operating System, components of OS, Installation of Microsoft Windows-XP Operating Systems.

b) Introduction to LINUX OS, Installation of LINUX OS. Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit.

c) **Hardware & Software Troubleshooting:** Diagnosis of PC malfunction, types of faults, common errors and how to fix them. Basic hardware & software troubleshooting steps, PC diagnostic tools

MS-Office :: MS Word

3. Introduction to MS Word, importance of Word as Word Processor, overview of toolbars, saving, accessing files, using help and resources.

Create a word document using the features: Formatting fonts, drop cap, applying text effects, using character spacing, borders & shading, inserting headers & footers, using date & time option.

4. a) Create a word document in MS Word using the features: Inserting tables, bullets & numbering, changing text direction, hyperlink, images from files & clipart, drawing toolbar & word art.

b) Create an invitation using Mail Merge in MS Word.

MS-Office :: MS Excel

5. Introduction to MS Excel as a Spreadsheet tool, overview of toolbars, accessing, saving excel files, using help and resources.

Create a spreadsheet using the features: Gridlines, format cells, summation, auto fill, formatting text, formulae in excel charts.

6. Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, freeze panes, pivot tables, data validation.

MS-Office :: MS Power Point

7. a) Introduction to MS Power Point, utilities, overview of toolbars, PPT orientation, slide layouts, types of views.

Create a power point presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

b) Create a power point presentation using the features: Auto content wizard, hyperlinks, Inserting images, clip art, audio, video, custom animation, slide hiding, tables and charts.

MS Publisher & World Wide Web

8. Introduction to MS Publisher, overview of toolbars, saving files, templates, layouts.

Create a website using the features: Home page, About us, Department, Contact page etc.

Internet & Computer Security

8. **Search Engines & Cyber Hygiene:** Introduction to computer networking, Bookmarks, Search toolbars & pop up blockers. Types of search engines & how to use search engines, Awareness of various threats on Internet, types of attacks & how to overcome. Installation of antivirus software, Configu
9. ration of personal firewall & Windows update on Computers.

MANAGEMENT LAB:

10. Create a Company in tally covering the different aspects of address, E-mail, tax numbers, Financial Years etc,The nature of the company's are:

a) Non-Trading b) Trading c) Manufacturing

11. From the following information create Accounts Groups under suitable Primary Accounts Groups in tally

Bills receivables	Accrued Incomes	Calls – in – Arrears
Prepaid Expenses	Outstanding expenses	Bills payables
Short term investments Shares on investments	Tangible assets Loans & Advances (Liability)	Intangibles assets Raw materials
Work – in – Progress	Loans & Advances from subsidiary (Secure.,)	Capital Reserves
Preliminary (Prim)	Expenses Deposits (Liabilities)	Unclaimed Dividends

12. From the following information create Accounts Ledgers under suitable Accounts Groups in tally.

Petty Cash A/c	Wages A/c	S.B.I A/c
Kishore Capital A/c	Building A/c	Furniture A/c
Good will A/c	Staff Welfare Expenses A/c	Traveling& Conveyance A/c
Salaries Expenses A/c	Trade Expenses A/c	Carriage Inwards Expe., A/c
Fuel & Oils Expenses A/c	Prepaid Insurance A/c	Accrued Wages A/c
A.B Equity Share Investments A/c	Excise Duty A/c	Customs Duty A/c
T.D.S A/c	T.C.S A/c	VAT A/c
Rent Receivable A/c	Provision for Bad debts A/c	Opening Stock A/c
Discount A/c (Cr.)	Land A/c	Office Car A/c
Goods Purchase A/c	Goods Sales A/c	Returns Inwards A/c
Returns Outwards A/c	Carriage Inwards A/c	Carriage Outwards A/c
Kishore Capital Reserve A/c	Plant & Machinery A/c	Provision Taxation A/c
Repairs & Maintenance A/c	Advertisement A/c	Rent Received A/c
Commission A/c (Cr.)	Interest A/c	Outstanding Salaries A/c
Depreciation A/c	Manufacturing Expe,. A/c	Ravi Salary Advance A/c
I.C.I.C.I Secu., Loan A/c	Prasad Unsecu., Loan A/c	Loss on sale of Machinery
Balu Enterprises a/c VJA (Cr.)	Chitra Enterprises A/c (Dr.)	Telephone Deposit A/c
Rent Received in Advance A/c	Bad debts A/c	Bank Charges A/c

13. From the following information create Accounts Ledgers under suitable Accounts Groups in tally\

Petty Cash A/c	Wages A/c	S.B.I A/c
Kishore Capital A/c	Building A/c	Furniture A/c
Good will A/c	Staff Welfare Expenses A/c	Traveling& Conveyance A/c
Salaries Expenses A/c	Trade Expenses A/c	Carriage Inwards Expe., A/c
Fuel & Oils Expenses A/c	Prepaid Insurance A/c	Accrued Wages A/c
A.B Equity Share Investments A/c	Excise Duty A/c	Customs Duty A/c
T.D.S A/c	T.C.S A/c	VAT A/c
Rent Receivable A/c	Provision for Bad debts A/c	Opening Stock A/c
Discount A/c (Cr.)	Land A/c	Office Car A/c
Goods Purchase A/c	Goods Sales A/c	Returns Inwards A/c
Returns Outwards A/c	Carriage Inwards A/c	Carriage Outwards A/c
Kishore Capital Reserve A/c	Plant & Machinery A/c	Provision Taxation A/c
Repairs & Maintenance A/c	Advertisement A/c	Rent Received A/c
Commission A/c (Cr.)	Interest A/c	Outstanding Salaries A/c
Depreciation A/c	Manufacturing Expe,. A/c	Ravi Salary Advance A/c
I.C.I.C.I Secu., Loan A/c	Prasad Unsecu., Loan A/c	Loss on sale of Machinery
Balu Enterprises a/c VJA (Cr.)	Chitra Enterprises A/c (Dr.)	Telephone Deposit A/c
Rent Received in Advance A/c	Bad debts A/c	Bank Charges A/c

14. Journalise from the following transactions in the books of M/s ZXY Ltd, for the month of October, 2006, and also generate the computerized Financial Statements in Tally (**Voucher Entry)**

Date	Transactions	Amounts (Rs.)
1,Oct,2006	Krishna started business with cash	65,000
4,Oct,2006	Goods purchased for cash	14,000
5,Oct,2006	Deposited into S.B.I, Tirupati	2,400
6,Oct,2006	Goods sold for cash	18,000
10,Oct,2006	Cash paid to Gopal	1,000
13,Oct,2006	Goods purchased for cash	15,000
16,Oct,2006	Goods sold to Narayana, Nellore	4,000
19,Oct,2006	Purchased Furniture for cash	2,000
20,Oct,2006	Received cash from Narayana, Nellore	750
24,Oct,2006	Goods purchased from Sridhar, Hyderabad	2,000
28,Oct,2006	Cash paid to Sridhar, Hyderabad	2,000
28,Oct,2006	Withdrew from S.B.I, Tirupati	1,000
29,Oct,2006	Withdrew from S.B.I, Tirupati for personal use	250
30,Oct,2006	Paid for stationary	200
31,Oct,2006	Paid Rent	500
31,Oct,2006	Discount Received	700
31,Oct,2006	Paid salaries	3,100

i. Which report will show the financial position of the company

ii. Name any 5 Accounting reports that can be displayed or printed in tally.

15. From the following information create **Inventory** in tally

16. From the following Trial balance of M/s AB&CO., prepare the Final Accounts (Trading and Profit & Loss A/c and also Balance Sheet) on 31st, March, 2010 in Tally

Trial Balance: Debit Balances (Rs.):Srinivasa Drawings Rs.4,500; Purchases Rs.20,000; Returns Inwards Rs.1,500; Stock (1-4-2005) Rs.8,000; Salary Rs.4,200; Wages Rs.1,200; Rent Rs.350; Bad debts Rs.400; Discount Rs.700; Sundry Debtors Rs.14,000; Cash in hand Rs.260; I.C.I.C.I Bank Rs.5,940; Insurance Rs.400; Trade Expenses Rs.300; Printing Rs.150; Furniture Rs.2000; Machinery Rs.5,000:

Credit Balances (Rs.): Srinivasa Capital Rs.24, 000; Sales Rs.30, 500; Discounts Rs.1, 900; Sundry Creditors Rs.10,000; Bills Payable Rs.2,500' **T.B Total :68,900**

Adjustments: 1.Closing stock was valued at Rs.7, 000; 2. Insurance was prepaid to the extent of Rs.60; 3. Outstanding liabilities were salary Rs.200 and wages Rs.200. 4. Make provision for doubtful debts at 5% on Sundry debtors. 5. Calculate interest on capital at 5% p.a. 6. Depreciate machinery at 5% and furniture at 10%. 7. Provide for discount on creditors at 1%

REFERENCE BOOKS:

1. ITL Education, "*Introduction to Information Technology,*" Pearson 2nd Edition, 2005.
2. John Walken bach, "*Microsoft Office 2010 Bible,*" Wiley India Pvt. Ltd, 2010.
3. Peter Norton, "*Introduction to Computers,*" Tata McGraw-Hill, 7th edition, New Delhi 2012.
4. Vikas Gupta, "*Comdex Information Technology Course Tool Kit,*" WILEY Dreamtech, 2nd edition, New Delhi 2006.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA II-SEMESTER

14MC2BS01: PROBABILITY AND STATISTICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Complex problems with chance of probability; birth, death and arrival rate follows Discrete probability distributions, area under normal curve; statistical quality cintrol in industry; associations between variables using correlation and regression; drawing valid inferences using testing of hypothesis(large and small samples).

COURSE OBJECTIVES:

I. To recognize the concepts of probability and probability distributions.
II. To develop skills in establishing, relationships between two or more characteristics through Correlation and regression analysis.
III. To analyze the problems in various fields of sciences by applying statistical tests and through statistical quality control charts.
IV. Apply knowledge of probability and probability distributions in various fields.

COURSE OUTCOMES:

On Successful completion of this course, student will be able to

1. Assess the quality of the products produced in an industry using control charts.
2. Identify the association between variables using Correlation and Regression Analysis.
3. Apply tests of significance, for drawing valid inferences in research problems and making decisions in industry.

DETAILED SYLLABUS

UNIT-I: PROBABILITY AND RANDOM VARIABLES (14 Periods)

Probability and Random variables: Random experiment, event, sample space, definitions of probability, Addition and Multiplication theorems of probability, conditional probability, Bayes theorem. Mathematical expectation of a random variable and its Mean and Variance.

Random Variables: Discrete and continuous random variables, probability mass function and probability density function of a random variable, distribution function and its properties, problems on random variable.

UNIT-II: PROBABILITY DISTRIBUTIONS & STATISTICAL QUALITY CONTROL (14 Periods)

Probability Distributions: Binomial, Poisson, Normal Distributions - mean, variance and area property problems on N.D.

Statistical Quality Control: Construction of quality control charts X', R, p, np and c-charts.

UNIT-III: CORRELATION AND REGRESSION ANALYSIS (7 Periods)

Correlation Analysis: Types of correlation, Karl Pearson's coefficient of Correlation and Spearman's rank correlation coefficient.

Regression Analysis: Fitting of two lines of regression, regression coefficients.

UNIT-IV: SAMPLING DISTRIBUTIONS, ESTIMATION AND TEST OF SIGNIFICANCE FOR LARGE SAMPLES (11 Periods)

Sampling Distribution and Estimation : Population, sample, parameter, statistic, sampling distribution of sample mean and sample S.D, standard error of a statistic, point and interval estimation.

Test of Significance for Large Samples: Null and alternative hypothesis, type-I and type-II errors, level of significance, one tailed and two tailed tests, large sample test for proportions, large sample tests for means.

UNIT-V: TEST OF SIGNIFICANCE FOR SMALL SAMPLES (9 Periods)

Tests of Significance for Small Samples: Student's t-test: one sample mean and two sample means; chi-square test of goodness of fit and independence of attributes; F-test for equality of two population variances. **Total Periods: 55**

TEXT BOOKS:

1. T.K.V.Iyengar, B. Krishna Gandhi ,et.al, "Probability and Statistics," S.Chand and Company LTD: New Delhi, 3rd Edition,2011.
2. S.C. Gupta and V.K.Kapoor, "Fundamentals of Mathematical Statistics," Sultan Chand and Sons, 11th Edition, 2005.
3. S.C. Gupta and V.K. Kapoor, "Fundamentals of Applied Statistics," S. Chand and Sons: New Delhi, 2010.

REFERENCE BOOKS:

1. Shanaz Bhatul, "Text book of Probability and Statistics," RIDGE Publications, 2nd Edition
2. Richard A. Johnson, "Probability and Statistics for Engineers," Prentice Hall of India, 7th Edition,2010.
3. P.Kandasamy, K.Thilagavathi and K.Gunavathi, "Probability Statistics and Queueing Theory," S.Chand and Company Ltd.; New Delhi, Reprint-2007.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA II-SEMESTER

14MC20101: OPERATING SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Introduction to operating system and its structures; evaluate the performance of scheduling; handling process synchronization and deadlock situations; memory management allocations; implementing page replacement algorithms; protection of system; recovery and fault tolerance techniques.

COURSE OBJECTIVES:

I. To provide basic concepts of operating system and understand the services of operating system.
II. To train the students in solving critical section problem, scheduling algorithms.
III. To develop the scheduling and page replacement algorithms.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Understand the importance of operating system.
2. Identify the performance of various CPU scheduling algorithms.
3. Design and evaluate solutions for handling process synchronization and deadlock problems.
4. Communicate effectively with operating system through application programs.

DETAILED SYLLABUS

UNIT I: INTRODUCTION TO OPERATING SYSTEM STRUCTURES (10 Periods)

Introduction: Role of operating system**,** Computer system organization, Computer System Architecture, Operating system structure, operating system operations, Distributed systems, Special purpose systems, Computing environments, open source operating systems.

System Structures: Operating-system services, user operating system interface, System calls, types of system calls, System programs, Operating System design and implementation, Operating system structure, virtual machines.

UNIT II: PROCESSES, THREADING AND PROCESS SCHEDULING (12 Periods)

Processes: Process concept, Process scheduling, Operations on processes, Interprocess communication, Examples of IPC systems.

Multithreaded Programming: Overview, Multithreading models, threading issues.

Process Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, Multiple-processor scheduling, algorithm evaluation.

UNIT III: SYNCHRONIZATION AND DEADLOCKS (11 Periods)

Synchronization: Background, The Critical-section problem, Peterson's Solution, Synchronization hardware, Semaphores, classic problems of Synchronization, Critical regions, Monitors.

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock.

UNIT IV: MEMORY MANAGEMENT (11 Periods)

Memory Management strategies: Background, Swapping, Contiguous memory allocation, Paging, Structure of page table, Segmentation.

Virtual Memory Management: Background, Demand paging, Copy on write, Page replacement, Allocation of frames, Thrashing, Other considerations.

UNIT V: SYSTEM PROTECTION, RECOVERY AND FAULT TOLERANCE (10 Periods)

System Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, The Security problem, Program threats, System and Network Threats.

Recovery and Fault Tolerance: Faults, Failures and Recovery, Byzantinefaults and Agreement protocols, Recovery, Fault Tolerance Techniques, Resiliency.

Total Periods: 54

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "*Operating System Concepts*," 8thEdition, John Wiley and Sons, 2010.
2. D.M Dhamdheere, "*Operating Systems: A concept-Based Approach*," Second edition, Tata McGraw-Hill Companies, Second edition, 2006.

REFERENCE BOOKS:

1. Achyut S. Godbole, "*Operating Systems*," 2nd Edition, Tata McGraw-Hill, 2005.
2. William Stallings, "*Operating Systems: Internals and Design Principles*," 6thEdition, Pearson Education, 2008.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA II-SEMESTER

14MC20102: OBJECT ORIENTED PROGRAMMING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Programming Through C"

COURSE DESCRIPTION:

Basic concepts of java;declaration of objects and classes; implementation of inheritance and polymorphism; error handling mechanism and files implementation; knowledge on GUI based application development.

COURSE OBJECTIVES:

I. To recognize the basics and principles of Object Oriented Programming in Java environment.
II. To become skilled at Advanced GUI components from the Swing set of GUI components including panels, frames, text areas and many more.
III. To integrate robustness, reusability, and portability into large-scale software development.

COURSE OUTCOMES:

After the completion of the course, a successful student will be able to:

1. Perform basic, computational tasks easily and effectively.
2. Analyze and design a computer programs to solve real world problems based on object-oriented principles.
3. Show competence in the use of java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard.
4. Write simple GUI interfaces for a complex task to interact with users, and to understand the event-based GUI handling principles.
5. Work with computing community using Object Oriented Programming concepts towards developing quality software applications.

DETAILED SYLLABUS

UNIT I: OBJECT ORIENTED PROGRAMMING (OOP) (11 Periods)

Object Oriented Programming (OOP): Programming paradigms, Difference between OOP and Procedure Oriented Programming, OOP principles, encapsulation, inheritance and polymorphism.

Introduction to Java Programming: Features of Java, Comparing Java and other languages, Basics of Java programming, Java program structure, Java buzzwords, JVM and JRE architecture, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, type conversion and casting, Overloading, Math class, Arrays in java.

UNIT II: OBJECTS AND CLASSES (10 Periods)

Objects andClasses: Basics of objects and classes in java, Introducing methods, types of methods: static, non-static methods. Usage of static with data and methods, usage of final with data, methods and classes, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing: call-by-value, recursion, nested classes and inner classes, wrapper classes, Object class.

String Handling: character extraction, modifying a string, data conversion usingvalueOf(), String Buffer, StringBuilder.

UNIT III: INHERITANCE AND POLYMORPHISM (10 P*eriods*)

Inheritance and Polymorphism: Basic concepts, member access rules, usage of super keyword, forms of inheritance, method overloading, method overriding, abstract classes, dynamic method dispatch, using final with inheritance.

Interface: Basic concept, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Differences between classes and interfaces

Package: Defining, creating and accessing a package, understanding CLASSPATH, importing packages, classes and interfaces of util package: Vector, Date, StringTokenizer, Formatter, Scanner, and Random.

UNIT IV: EXCEPTION HANDLING AND MULTITHREADING (12 Periods)

Exception Handling and Multithreading: Concepts of exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, built-in exceptions, creating own exception sub classes.

Multithreading: Concepts of multithreading, differences between process and thread, thread life cycle, creating multiple threads using Thread class, Runnable interface, synchronization, thread priorities, daemon threads.

Managing I/O Files in Java: Concepts of streams, using streams, stream classes: Byte stream, Character stream, using streams, using the File class, I/O exceptions, creation of files, reading/writing characters and Bytes, concatenating and buffering files, random access files, Serialization, reading and writing objects to file.

UNIT V: GUI PROGRAMMING WITH JAVA (12 P*eriods*)

GUI Programming with Java: Abstract Window Toolkit **(AWT)**: AWT Classes, Windows Fundamentals, Working with Windows, Frames, Graphics and Texts – AWT Controls – Layout Managers – Menus.

Swings: Introduction to swings, hierarchy of swing components, containers: top-level containers, JFrame,JWindow, JDialog, light weight containers, JPanel, overview of several swing components: JButton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, JTable, JTree, JTabbedPanes, JScrollPanes, JApplet.

Total Periods : 55

TEXT BOOK:

1. Herbert Schildt,"*The Complete Reference Java J2SE*," Tata McGraw Hill, 7th Edition, 2006.

REFERENCE BOOKS:

1. B.Eswar Reddy, T.V.Suresh Kumar and P.Ragavan, "*Object Oriented Programming with Java*," Pearson Sanguine Publications, 2nd Edition, 2011.
2. H.M.Dietel and P.J.Dietel, "*Java How to Program*," Pearson Education/ PHI, 5th Edition, 2009.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA II-SEMESTER

14MC20103: DATABASE MANAGEMENT SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Fundamental concepts of database system; conceptual design with Entity-Relationship(E-R) modeling; manipulation of data with an interactive query language(SQL); normalization techniques; transactional processing; data storage and indexing concepts.

COURSE OBJECTIVES:

I. To offer basic knowledge in the design and implementation of database system.

II. To be aware of database concepts such as integrity constraints, concurrency control and recovery management.

III. To develop skills in querying, updating and managing the database system.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Apply knowledge of transactional processing system for recovering system from crash.
2. Identify normalization techniques for the development of software applications to realistic problems.
3. Design an application system using Entity-Relationship(ER) diagrams.
4. Learn and apply Structured Query Language(SQL) for database definition and manipulation.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION TO CONCEPTUAL MODELLING, DATABASE CONCEPTS AND ARCHITECTURE (10 Periods)

Introduction and Conceptual Modeling: Databases and Database Users: Introduction, Characteristics of Database Approach, Actors on the Scene, Workers defining the Scene, Advantages of using DBMS Approach.

Database System-Concepts and Architecture: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Language and Interfaces, The Database System Environment- DBMS component modules, database system utilities, Tools, application environments and communication facilities.

UNIT- II: INTRODUCTION TO DATABASE DESIGN AND RELATIONAL MODEL (12 Periods)

Introduction to Database design: Database design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises.

Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying /altering Tables and Views.

UNIT – III: BASIC SQL QUERY & INTRODUCTION TO SCHEMA REFINEMENT (12 Periods)

Form of Basic SQL Query: Examples of Basic SQL Queries, Nested queries: Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators, Aggregate Operators, NULL values :Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL, Triggers and Active Data bases.

Introduction to Schema Refinement: Problems caused by redundancy, Decompositions, Problem related to decomposition, Functional Dependencies, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less- join Decomposition, Dependency preserving Decomposition.

UNIT- IV: OVERVIEW OF TRANSACTION MANAGEMENT, CRASH RECOVERY AND CONCURRENCY CONTROL (11 Periods)

Overview of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Performance of Locking.

Crash recovery: Introduction to ARIES, the Log, Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery.

Concurrency Control: 2PL, Serializability and recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Deadlocks.

UNIT V: OVERVIEW OF STORAGE AND INDEXING (10 Periods)

Overview of Storage & Indexing: Data on External Storage – File Organization & Indexing – Index Data Structures.

Storing Data: The Memory Hierarchy: Magnetic disks, Performance implications of disk structure - Redundant Arrays of Independent Disks.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

Total Periods: 55

TEXT BOOKS:

1. Raghu Ramakrishnan and Johannes Gehrke , "*Data base Management Systems*," 3rd Edition, Tata McGraw-Hill,2003.
2. Ramez Elmasri, Shamkant B. Navathe, Durvasula V.L.N. Somayajulu and Shyam K. Gupta, "*Fundamentals of Database Systems*," 4th edition, Pearson education, 2008.

REFERENCE BOOKS:

1. A.Silberschatz,H.F. Korth, S.Sudarshan, "*Data base System Concepts*," McGraw hill, VIth edition,2006.
2. C.J.Date, "*Introduction to Database Systems*," Pearson Education, 7th edition,2004.
3. M. L. Gillenson, "*Fundamentals of Database Management Systems*," Wiley Student Edition.
4. Peter Rob, A. Ananda Rao and Carlos Coronel, "*Database Management Systems*," Cengage Learning,2008.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA II-SEMESTER

14MC20104: SOFTWARE ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Nature of software, engineering process; process model and software requirements; architectural design and design model; performing user interface design; software testing strategies; maintenance of re-engineering and risk management; structure of estimation models.

COURSE OBJECTIVES:

1. To understand the importance of software engineering process and total quality management during the development of application software.
2. To enhance the development of software application by focusing on Agile Development, Architectural Design**,** COCOMO, Software Testing and Risk Management.
3. To provide a road-map for the development team and end-users of an application software.

COURSE OUTCOMES:

After completion of the course, a successful student able to

1. Understand the different Software models and basic concepts of Software Engineering.
2. Formulate and solve various problems by adopting appropriate methods like requirements elicitation and analysis, COCOMO, RMMM Plan during the development of application software.
3. Design and develop a component/ an entire application software by making use of Agile process Model.
4. Demonstrate the knowledge of understanding by making use of an appropriate process model for the development of application software.
5. Communicate effectively with all the stakeholders of software systems function appropriately on multi-disciplinary teams.
6. Improve the software quality and software testing methodologies.

DETAILED SYALLABUS

UNIT I: SOFTWARE, SOFTWARE ENGINEERING, AND PROCESS (10 Periods)

The nature of Software, The unique nature of WebApps, Software engineering- A layered technology, A Generic process model , Process assessment and improvement, Forward Engineering , Reengineering, Reverse Engineering , CMMI, Software myths.

UNIT II: PROCESS MODELS AND SOFTWARE REQUIREMENTS (13 Periods)

Process Models: Prescriptive process models: The waterfall model, Incremental Process Model: The RAD Model. Evolutionary process models: Prototyping, The Spiral Model , The Unified Process; Phases of the Unified Process, agile development: Agile process, extreme programming. The Unified process, Scrum process.

Software Requirements: Introduction to functional and non-functional requirements, User requirements, System requirements, Interface specifications, the software requirement document, Requirements elicitation and analysis.

UNIT III: ANALYSIS AND DESIGN MODEL (10 Periods)

Analysis Concepts: Data Dictionary, Entity-Relationship Diagrams, Data Flow Diagrams.

Design Concepts: Software design quality guidelines and attributes, Design model.

Architectural Design: Architecture and its importance, Architectural Styles, Architectural design, Architectural mapping using data flow.

UNIT IV: PERFORMING USER INTERFACE DESIGN AND SOFTWARE TESTING (10 Periods)

Performing User Interface Design: Golden rules, User interface analysis and design, interface analysis, interface design steps.

Self Directed Learning: Designing of a Screen Mock for Student Information System.

Software testing strategies: Software testing fundamentals, A strategic approach to software testing, Test strategies: Unit testing and integration testing, System Testing and User Acceptance Testing (UAT)), Design test cases.

UNIT V: RISK MANAGEMENT, MAINTENANCE, RE-ENGINEERING AND ESTIMATION (9 Periods)

Risk management: Reactive versus Proactive Risk strategies, RMMMPlan.

Maintenance and reengineering: Software maintenance, software supportability, reengineering.

Empirical Estimation Models: Structure of Estimation Models, COnstructiveCOstMOdel, Software Equation.

Total Periods : 52

TEXT BOOKS:

1. Roger S. Pressman, *"Software Engineering A practitioner's Approach,"* 7th Edition, McGraw-Hill,2010.
2. Sommerville, *"Software Engineering,"* 8th Edition,Pearson education, 2007.

REFERENCE BOOK:

1. K.K. Agarwal and YogeshSingh*, "Software Engineering,"* New Age International Publishers.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA II-SEMESTER

14MC2HS01: PROFESSIONAL ETHICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Ethical concepts relevant to moral issues in computer science and applications; reasoning and analytical skills; oral issues to provide an interface between social, technological and natural environments; moral dilemmas; Engineering as experimentation; safety and risk; collegiality and loyalty; global issues and ethical audit.

COURSE OBJECTIVES:

I. To inculcate fundamental concepts of Engineering Ethics, Professional Values and Social Responsibility
II. To provide skills in discharging the professional responsibilities as managers, advisors and leaders
III. To apply codes of ethics in workplace
IV. To inculcate a sense of responsibility and safety of others without compromising on ethical issues

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Apply the principles of ethics to solve engineering problems.
2. Analyze the problems in the implementation of moral autonomy and resolve through consensus.
3. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas.
4. Implement the principles of ethics while discharging duties
5. Responsible to follow the codes of ethics.
6. Function as a member, consultant, Manager, Advisor and Leader in multi-disciplinary teams.
7. Write reports without bias and give instructions to follow ethics.
8. Demonstrate the expertise in managing the projects in multidisciplinary environments.
9. Recognize the importance of ethics in profession for lifelong learning.

DETAILED SYLLABUS

UNIT-I: ENGINEERING ETHICS (10 Periods)

Scope and Aim of Engineering Ethics-Senses of Engineering Ethics- Variety of Moral Issues-Types of Inquiry- Moral Dilemmas- Moral Autonomy- Kohlberg's Theory, Gilligan's theory, Consensus and Controversy.

UNIT-II: PROFESSIONAL IDEALS AND VIRTUES (11 Periods)

Theories about Virtues, Professions, Professionalism – characteristics, expectations, Professional Responsibility, Integrity, Self-respect, Sense of "Responsibility". Self-interest, Customs and Religion-Self-interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories- resolving moral dilemmas and moral leadership.

UNIT-III: ENGINEERING AS SOCIAL EXPERIMENTATION (12 Periods)

Engineering as experimentation- Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters-Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT-IV: RESPONSIBILITIES AND RIGHTS (12 Periods)

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, the bart case, employee rights and discrimination.

UNIT-V: GLOBAL ISSUES (10 Periods)

Multinational corporations-Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers – Managerial ethics applied to Engineering Profession, moral leadership.

Total Periods: 55

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, Ethics in Engineering Tata McGraw-Hill, 3rd edition, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, Engineering Ethics, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, Human Values and Professional Ethics, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, Fundamental of Ethics for Scientists and Engineers, Oxford University Press, 1st edition, 2001.
3. Charles F. Fledderman, Engineering Ethics, Pearson Education, 2004.
4. R. Subramanaian, Professional Ethics, Oxford Higher Education, 2013.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA II-SEMESTER

14MC20121: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: A Course on "Programming Through C"

COURSE DESCRIPTION: Knowledge on method and constructor overloading; matrix ADT implementation; packages and interfaces; error handling; GUI components.

COURSE OBJECTIVES:

I. To understand the basics and principles of Object Oriented Programming in Java environment.

II. To study Advanced GUI components from the Swing set of GUI components including panels, frames, text areas and many more.

III. To integrate robustness, reusability, and portability into large-scale software development.

COURSE OUTCOMES:

After the completion of this course, a successful student will be able to

1. Perform basic, computational tasks easily and effectively.
2. Analyze and design a computer programs to solve real world problems based on object-oriented principles.
3. Show competence in the use of java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard.
4. Write simple GUI interfaces for a complex task to interact with users, and to understand the event-based GUI handling principles.
5. Work with computing community using Object Oriented Programming concepts towards developing quality software applications.

LIST OF LAB PROGRAMS

1. Practical knowledge about installation of JDK, environmental variable settings and Know about java compiler and interpreter.
2. a) Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula. If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions.

   b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it.

   c) Write a Java program to find both the largest and smallest number in a list of integers.
3. a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

   b) Write a Java program to multiply two given matrices.
4. a) Write a Java program that uses both recursive and non recursive functions to print the n^{th} value in the Fibonacci sequence.

   b) Demonstrate method overloading and constructor overloading.

   c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)
5. a) Write a Java program to sort a list of names in ascending order.

   b) Write a Java program to implement the matrix ADT using a class. The operations supported by this ADT are:

   a) Reading a matrix. c) Addition of matrices.

   b) Printing a matrix. d) Subtraction of matrices.

   e) Multiplication of matrices.

6. Write a Java Program that uses a recursive function to compute NcR. (Note: n and r values are given.)
7. Write a Java program to perform the following operations:
   a) Read line of Text and make word cap.
   b) Read a line of text and count number of vowels and consonants.
8. a) Write a Java program that makes frequency count of letters in a given text.
   b) Write a Java program that uses functions to perform the following operations:
      i) Inserting a sub-string in to the given main string from a given position.
      ii) Deleting n characters from a given position in a given string.
9. a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
   b) Write a Java program to make frequency count of words in a given text.
10. Write a Java program that illustrates the following:
    a) Creation of simple package.
    b) Accessing a package.
    c) Implementing interfaces.
11. Write a Java program that illustrates the following:
    a) Handling predefined exceptions
    b) Handling user defined exceptions
12. a) Write a Java program that reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
    b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
    c) Write a Java program that displays the number of characters, lines and words in a text file.

Note: Filename, number of the byte in the file to be changed and the new character is specified on the command line.

13. a) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.
    b) Write a java program to demonstrate various GUI components in java (AWT) with appropriate Event Handling.
    c) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format

Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box. (Using SWINGS)

REFERENCES:

1. ww.java2s.com
2. www.roseindia.com
3. www.tutorialspoint.com
4. Department Lab Manual.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA II-Semester

14MC20122: DATABASE MANAGEMENT SYSTEMS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: --

COURSE DESCRIPTION:

Conceptual design with Entity-Relationship (ER) modeling; normalization techniques; manipulation of data with an interactive query language(SQL); procedural programmining using Oracle PL/SQL language.

COURSE OBJECTIVES:

I. To provide basic knowledge in the design and implementation of database schema for a given problem.
II. To be aware of database concepts such as entity integrity constraints, domain integrity constraints, referential integrity constraints etc.,
III. To develop skills in querying, updating and managing the database system.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Impart knowledge in applying normalization techniques for development of application software to realistic problems.
2. Formulate queries in updating and maintaing the database system using SQL.
3. Design a database using ER diagrams and convert ER diagrams into relation schemas.
4. Exploit their knowledge in developing database applications using SQL language.
5. Implement procedural programming using PL/SQL language.

LIST OF LAB PROGRAMS

1. Analyze the problem carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, foreign keys and if any.
2. Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.
3. Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multivalued, and Derived) have different ways of representation.
4. Creation of tables, altering the tables, dropping tables, truncate and rename tables etc.
5. Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies.
   For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.
6. Work on simple queries to access data from tables using SELECT statement and WHERE condition. Also perform insert, update, delete and retrieve data from the database.
7. Practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING clauses.
9. Practice String functions: Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr Datefunctions: Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round Conversion functions: To_char, to_number and to_date.
10. Practice queries on defining Views, creating Views, using Views to change Data, dropping Views, creating Indexes and sequences.
11. Practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.
12. Practice queries using Joins (equi joins, non equi-joins, outer joins: Left outer joins, Right outer joins etc.,)
13. a). Creation of simple PL/SQL Program using declaration, executable and exception handling sections.
    b). Creation of PL/SQL programs using Cursors.
14. Work on Triggers. Creation of trigger, delete trigger, update trigger. Practice triggers using the above database.
15. Learn the procedure for creating packages and develop applications that reference its types, call its subprograms, use its cursor, and raise its exception.

REFERENCE BOOKS:

1. Dr. P. S. Deshpande, "*SQL & PL/SQL for Oracle 10g Black Book*," Dreamtech Press,2007.
2. Ivan Bayross, "*SQL, PL/SQL The Programming Language of ORACLE,*" BPB Publications, 2002.
3. J. J. Patrick, "*SQL Fundamentals*,"2nd edition, Pearson Education, 2002.
4. Rick F. Vander Lans, "*Introduction to SQL*," 4th edition, Addison-Wesley Professional, 2007.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA III – Semester

14MC3HS01: ORGANIZATIONAL BEHAVIOR AND UMAN RESOURCE MANAGEMENT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Individual and group behavior in organizations; organizational behavior, personality, perception and learning personality; introduction to HRM, HR planning, job analysis, recruitment and selection; training, performance appraisal and remuneration; employee participation and contemporary issues.

COURSE OBJECTIVES:

I. To impart basic concepts of organizational behavior, Human Resource Management.
II. To develop skills related to planning and management of Human Resources.
III. To apply the concepts & theory of personality for effective Human Resource Management.

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Gain Knowledge in
    a. Managerial Concepts of Organizational Behavior.
    b. Managerial Skills of Human Resource Management.
2. Develop skills of effective Human Resource Management.
3. Application of concepts and theories for optimum utilization of Human Resource.
4. Inculcates ethical principles and commitment to Professionalism.
5. Develops effective communication among the work group of an Organization.
6. Enriches empathy and enables lifelong human relations.
7. Provides a platform to emerge as a responsible individual in an Organization.
8. Provides life skills for effective operation of an organization.
9. Appreciate the significance of Human Resource Management in lifelong learning for knowledge and skill development.

DETAILED SYLLABUS

UNIT–I: INTRODUCTION TO ORGANIZATIONAL BEHAVIOR (10 Periods)

Introduction to organization -Concepts of organization - meaning of Organizational Behavior(OB), characteristics of OB, role of OB, approaches to the study of OB.

UNIT-II: PERSONALITY, PERCEPTION AND LEARNING (10 Periods)

PERSONALITY: concept, determinants of personality, theories of personality, Organizational applications of personality.

PERCEPTION: Process of perception, inter personal perception, managerial applications of perception.

LEARNING: Components of learning process, Importance of learning, Factors affecting learning

UNIT-III: INTRODUCTION TO HRM (10 Periods)

Functions and objectives of HRM

HR PLANNING: Nature and importance of HRP, factors affecting HRP, HRP Process

JOB ANALYSIS: Nature, Process of job analysis, Job Analysis and Competitive Advantage.

RECRUITMENT & SELECTION: Nature and importance of recruitment, recruitment process, selection process, barriers to effective selection.

UNIT-IV: INDUCTION, TRAINING AND PERFORMANCE APPRAISAL (10 Periods)

INDUCTION: Induction, Orientation Programme, Problems of Orientation

TRAINING: Nature of training and development, gaps in training, the training process, training methods, training for career development

PERFORMANCE APPRAISAL: Managing Performance, Appraisal Process, Job Evaluation Process, Methods of Evaluation

UNIT-V: REMUNERATION, EMPLOYEE PARTICIPATION AND CONTEMPORARY ISSUES (10 Periods)

REMUNERATION: Components of Remuneration, Factors influencing employee remuneration-Incentives, Types of incentives-Incentive Schemes-Employee Benefits and Services

EMPLOYEE PARTICIPATION: Empowering employees through participation-Importance and Limitations

CONTEMPORARY ISSUES: HR BPO, Call Centers, Work Life Balancing, HR Ethics, Working in cross cultural teams –Need and Challenges-Cultural Shock and Reverse Cultural Shock.

Total Periods: 50

TEXT BOOKS:

1. L.M.Prasad, *Organizational behavior*, 4th Edition, Sultan Chand and Sons', 2006.
2. Prof. K. Aswathappa, *Human resource management, text and cases*, 7th Edition, McGraw Hill Publishing company Ltd., 2013.

REFERENCE BOOKS:

1. Fred Luthans, *Organizational Behavior*, 10th Edition, McGraw Hill Higher Education, 2011.
2. Shashi K. Gupta and Rosy Joshi, *Organizational Behavior*, 4th Edition, Kalyani Publications, 2008.
3. P. Subba rao, *Personnel and Human resource management*, 4th Edition, Himalaya Publishing House Pvt. Ltd., 2009.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA III-SEMESTER

14MC3BS01: OPERATIONS RESEARCH

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Optimization in utilization of limited resources in industry; operations research techniques; analysis by using operational methods; project management methods.

COURSE OBJECTIVES:

I. To create awareness, about optimization in utilization of limited resources**.**
II. To understand nuance of project management through operational models.
III. To apply Operations research techniques like Linear Programming Problems, Transportation problem, Assignment problem, Replacement problem and PERT/CPM in Research and Industrial operations.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Apply the knowledge of Linear Programming Problem, Transportation Problem, Assignment Problem, Inventory models PERT/CPM etc., in the fields of business research and industry.
2. Solve complex computational problems using Linear Programming Problem(LPP).
3. Analyze and design the data, to synthesize transformation by using operational models like Transportation Problem, Assignment Problem, Sequencing Problem etc.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO OPERATIONS RESEARCH AND LPP (10 Periods)

Introduction to OR: Introduction, modeling in OR- Phases of OR study.

Linear Programming: Formulation of LPP, Graphical solution of LPP, Simplex method, Artificial variable technique-Big M-method.

UNIT-II: TRANSPORTATION AND ASSIGNMENT PROBLEM (12 Periods)

Transportation Problem: Finding an initial basic feasible solution using North-West corner rule, Least cost Entry method, Vogel's Approximation Method. Degeneracy in Transportation Problem, Optimality test- MODI method Unbalanced Transportation Problem.

Assignment Problem: Hungarian method of Assignment Problem, Traveling salesman Problem and its restrictions.

UNIT-III: SEQUENCING PROBLEM AND REPLACEMENT PROBLEM (10 Periods)

Sequencing Problem: Optimal solution for processing n-jobs through two machines, n-jobs through three machines.

Replacement Problem: Introduction, Replacement of items that deteriorate when money value is constant and variable- Individual Replacement policy and group Replacement policy.

UNIT-IV: THEORY OF GAMES (10 Periods)

Theory of Games: Introduction, types of games, Optimal strategy, Maxmin-Minimax Principle, solution of games with saddle point, Rectangular games without saddle point, principle of dominance, graphical method for 2xn and mx2 games.

UNIT-V: INVENTORY MODELS AND PROJECT MANAGEMENT BY PERT/CPM (13 Periods)

Introduction of Inventory – Reasons for maintaining Inventory, Types of inventory costs, Deterministic Inventory Models: EOQ Models with and without shortages, Purchasing and Manufacturing Models with and without shortages, Project Management by PERT/CPM**:** Basic steps in PERT/CPM technique, rules of drawing network diagrams, Fulkerson's rule: Critical Path Method (CPM), Programme Evaluation and Review Technique (PERT).

Total Periods: 55

TEXT BOOKS:

1. S. D. Sharma, "Operations Research," Kedar Nath Ram Nath and Company: India, 15th Edition,2006-07.
2. S. Kalavathy, "Operations Research," Vikas Publishing House Pvt.Ltd, 2nd Edition, 2007.
3. Prem Kumar Gupta and D.S. HIRA, "Operations Research," S.Chand and Company Ltd.: New Delhi, 2008.

REFERENCE BOOKS:

1. P.K. Gupta and Man Mohan, "Problems in Operations Research," Sultan Chand and Sons:New Delhi,2007
2. Hamdy A. Taha, "Operations Research," 8th Edition, Pearson Publications, 2007.
3. J.K. Sharma, "Operations Research Theory and Applications," 4th Edition, Mc Millan India Ltd.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA III-SEMESTER

14MC30101: OBJECT ORIENTED ANALYSIS AND DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Courses on "Object Oriented Programming Through JAVA" and "Software Engineering"

COURSE DESCRIPTION:

This Importance of modeling; conceptual model of UML; understanding logical view of the application using class diagrams; behavioural modeling of the application using usecase and interaction diagrams; advanced behaviioural modeling using activity and state chart diagrams; architectural modeling using component and deploymnet diagrams.

COURSE OBJECTIVES:

I. To understand the principles of object orientation.
II. To analyze the behavior of an Application Software before deployment by using State Chart Diagrams.
III. To develop logical, behavioral and architectural models for real world applications.

COURSE OUTCOMES:

After successful completion this course, the student will be able to

1. Acquire the principles of Object Oriented Development.
2. Recognize the elements of Class, Use case, Activity, Sequence and State, diagrams and develop models using them.
3. Design the domain and application artifacts to construct the Logical, Behavioral and Architectural model of an Application Software.
4. Make use of UML to design Class, Use Case, Sequence, Collaboration, Activity, State Chart, Component and Deployment Diagrams for the an Application Software.
5. Communicate effectively with all the team members about various logical and behavioral objects of an Application Software.

DETAILED SYLLABUS

UNIT -I: INTRODUCTION TO UML (10 Periods)

The meaning of Object Orientation, object identity, Importance of modeling, principles of modeling, object oriented modeling, An overview of UML, conceptual model of the UML, Architecture.

Classes - Terms and concepts, Common Modeling Techniques.

Relationships - Modeling simple dependencies, single Inheritance and structural relationships, Common Mechanisms and UML Diagrams.

UNIT-II: STRUCTURAL MODELING (12 Periods)

Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Instances.

Class Diagrams - Terms, concepts, Modeling techniques for Class Diagram, Modeling Simple collaboration, Logical database Schema, Forward and Reverse Engineering.

Object Diagrams – Modeling object structures, Forward and Reverse engineering.

UNIT-III: BASIC BEHAVIORAL MODELING (11 Periods)

Use cases - Terms and Concepts, Common Modeling techniques.

Use case Diagrams - Terms and Concepts, Common Modeling Techniques.

Sequence Diagrams - Terms and Concepts, Modeling flows of control by time ordering;
Collaboration Diagrams – Terms and Concepts, Modeling flows of control by Organization, Forward and Reverse Engineering.

UNIT-IV: ADVANCED BEHAVIORAL MODELING (11 Periods)

Activity Diagrams - Terms and Concepts, Modeling a workflow, Modeling an operation, Forward and reverse Engineering.

Events and Signals, State Machines, State Chart Diagrams – Modeling Reactive Objects.

UNIT-V: ARCHITECTURAL MODELING (8 Periods)

Component, Deployment, **Component Diagrams** – Terms and Concepts, Modeling Source Code, Modeling Physical Database, Forward and Reverse Engineering; **Deployment Diagrams** – Terms and Concepts, Modeling Embedded System, Modeling Distributed System, Forward and Reverse Engineering.

Total Periods: 52

TEXT BOOK:

1. Grady Booch, James Rum Baugh and Ivar Jacobson, *"The Unified Modeling Language User Guide,"* Pearson Education, 1999.

REFERENCE BOOKS:

1. John W. Satzinger, Robert B Jackson and Stephen D Burd, *"Object-Oriented Analysis and Design with the Unified Process,"* Cengage Learning, 2004.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons and David Fado, *"UML 2: Toolkit,"* Wiley India Pvt. Ltd., 2004.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA III-SEMESTER

14MC30102: DATA WAREHOUSING AND DATA MINING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on *"Database Management Systems"*

COURSE DESCRIPTION:

Intoduction to Data Warehousing; Data Warehousing administration and management; Constructing data warehouse and modeling schemas; Functionalities of Data Mining; Pre-processing data & derivation of association rules; Classifying and grouping data; Analysis of Clustering Algorithms; Mining different data types and various applications.

COURSE OBJECTIVES:

I. To understand the concepts of Data Warehouse system, Data Warehouse system architecture, data mining principles and techniques.

II. To analyze and demonstrate data mining algorithms like Apriori, FP-growth, k-mediod and gaining better understanding of business trends.

III. To be relevant in applying critical thinking, problem-solving, and decision-making skills effectively.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Understand the role of data warehouse, architecture and its support for quality data.
2. Ability to identify the association rules, classifying by using decision tree algorithms and clustering large data sets using k-mediods, k-means, etc.
3. Design and implement Hierarchical Methods**-**Agglomerative clustering, divisive hierarchical clustering and Classification by Decision Tree to perform proactive analysis, predictive modeling, and identifying new trends and behaviors.
4. Investigate preprocessing of data and apply mining techniques on it.
5. Apply data mining algorithms like Apriori, FP-Growth, DBSCAN etc., and evaluate results for simple data sets.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION AND DATA WAREHOUSE COMPONENTS (10 Periods)

Introduction: The need for Data Warehousing, Paradigm Shift, Business Problem Definition, operational and informational Data Stores, Data Warehouse Definition and Characteristics, Data Warehouse Architecture.

Data Warehouse Components: Overall Architecture, Data Warehouse Database, Sourcing, Acquisition , Cleanup and Transformation tools, meta data, data marts, Data Warehouse Administration and Management.

UNIT-II: BUILDING A DATA WAREHOUSE AND INTRODUCTION TO DATA MINING (12 Periods)

Building A Data Warehouse: Business Consideration, Design considerations, Technical considerations, Implementation considerations,

integrated solutions, Benefits of Data Warehousing, Multidimensional Data Model-From tables and spread sheets to Data Cubes & Star, Snowflake and fact constellation Schemas

Introduction To Data Mining: Motivated Data Mining, Definition of Data Mining, Data Mining-On What Kind of Data?, Data mining Functionalities, classification of Data mining systems, Data mining primitives, Integration of Data mining Systems with a Database or Data Warehouse System, Major issues in Data Mining.

UNIT-III: DATA PREPROCESSING AND ASSOCIATION RULE MINING (11 Periods)

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

Association Rule Mining: Attribute Oriented Induction, Mining Frequent Patterns, Associations and Correlations- Basic Concepts, The Apriori algorithm for finding frequent itemsets using candidate generation, Generating association rules from frequent itemsets, Mining frequent itemsets without candidate generation.

UNIT-IV: CLASSIFICATION AND CLUSTERING (11 P*eriods)*

Classification: Definition of classification, Definition of prediction, issues in classification and prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation.

Clustering: Introduction to cluster Analysis**,** Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k-means and k-mediods methods, CLARANS

UNIT-V: ADVANCES IN CLUSTERING, MULTIMEDIA, TEXT & WEB DATA MINING AND APPLICATIONS (11 P*eriods)*

Advances in Clustering: Hierarchical Methods**-**Agglomerative and divisive hierarchical clustering, Constraint-Based Cluster Analysis, Outlier Analysis.

Multimedia, Text and Web Data Mining: Multimedia Data Mining, Text Mining, Mining the World Wide Web.

Data Mining Applications: Financial data Analysis, Retail Industry, Telecommunication Industry.

Total Periods: 55

TEXT BOOKS:

1. Jiawei Han, Micheline Kamber and Jian Pei, "*Data Mining–Concepts and Techniques*," 2nd Edition, Morgan Kaufmann Publishers, 2006
2. Berson Alex and Stephen J Smith, "*Data Warehousing, Data Mining and OLAP,"* Tata McGraw-Hill, 2004.

REFERENCE BOOKS:

1. Ralph Kimball, Margy Ross, Warren Thornthwaite and Joy Mundy, Bob Becker, "*The Data Warehouse Life cycle Tool kit,"* 2nd edition, John Wiley & Sons Inc, 2007.
2. William H Inmon, "*Building the Data Warehouse,*" 4th edition, John Wiley & Sons Inc, 2005.
3. Arun K Pujari, "*Data Mining Techniques,*" 2nd edition, Universities Press (India) Pvt. Ltd, 2001.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA III-SEMESTER

14MC30103: COMPUTER NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Essentials of Network and design issues; Data flow using protocols; indetify errors and correct errots; choose path for network; establish connection oriented and connection less connections; securing and providing services in application layer.

COURSE OBJECTIVES:

I. To acquire basic knowledge of network components, topologies, network models, protocols and algorithms.
II. To comprehend in-depth knowledge about the communication technologies like Domain Name Service, E-mail etc.,
III. To analyze techniques in designing network applications.

COURSE OUTCOMES: After successful completion of the course, the student able to

1. Understand the concept of networks, different topologies, network devices and OSI reference model.
2. Analyze Error detection and correction mechanisms to verify correct data.
3. Investigate congestion handling mechanisms and network security.
4. Design and develop a route to reach to the correct destination by using shortest path routing and Distance Vector Routing Techniques.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION & PHYSICAL LAYER (12 Periods)

Introduction: Uses of Computer Networks, Network Hardware: LAN, WAN, Mesh Topology, Wireless Network-system interconnection, Wireless LAN, Wireless WAN. Internetworks, Network Software-Protocol hierarchies, Design issues for the layers, Connection Oriented and Connection less Services, Service Primitives, Reference Models-OSI and TCP/IP.

The Physical Layer: Guided Transmission media-Magnetic Media, Twisted Pair, Coaxial Cable, Fiber Optics. Wireless Transmission-The Electromagnetic Spectrum, Radio Transmission & Microwave Transmission**.** Multiplexing-Frequency Division Multiplexing, Wavelength Division Multiplexing, Time Division Multiplexing.

UNIT-II: THE DATA LINK LAYER (12 Periods)

The Data Link Layer: Data Link layer design issues, Error Detection and Correction, Elementary Data Link protocols-Unrestricted simplex protocol, Simplex stop-and-wait protocol, Simplex protocol for a noisy channel. Sliding Window protocols-One-bit sliding window protocol, Protocol using Go back N**.** The Medium Access Control Sublayer-The Channel Allocation problem, Multiple access protocols-ALOHA, Pure ALOHA, Slotted ALOHA. Carrier Sense Multiple Access protocols- Persistent and Non persistent CSMA, CSMA with collision detection. Collision-Free protocols- Bit map protocol, Binary countdown, Limited Contention protocols**.**

UNIT-III: THE NETWORK LAYER (11 Periods)

Network layer design issues, Routing Algorithms-Optimality principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Congestion Control Algorithms-Congestion Prevention Policies, Jitter Control**,** Techniques for achieving good quality of service**,** Congestion control for multicasting, Internetworking, The Network layer in the Internet**.**

UNIT-IV: THE TRANSPORT LAYER (10 Periods)

The Transport services, Elements of Transport protocols-Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash recovery, A simple Transport protocol, The Internet Transport protocols-Introduction to UDP, Remote Procedure Call, Real time transport Protocol, Introduction to TCP, The TCP Service Model, TCP protocol and TCP Segment Header.

UNIT-V: THE APPLICATION LAYER AND NETWORK SECURITY (10 Periods)

The Application Layer: Introduction to Application Layer, DNS-The Domain name space, Resource records and Name servers. Electronic Mail-Architecture and services, the user agent, message formats, message transfer and Final Delivery**.**

Network Security: Cryptography-Introduction to cryptography, Substitution Ciphers, Transposition Ciphers, One-Time Pads, and Fundamental Cryptographic Principles. **Total Periods: 55**

TEXT BOOK:

1. Andrew S Tanenbaum, "*Computer Networks,*" 4th Edition, PHI publications, 2008.

REFERENCE BOOKS:

1. Forouzan, Behrouz A and Mosharraf Firouz, "*Computer Networks A Top-Down Approach,*" 1st Edition, TaTa McGraw Hill publications, 2012.
2. Stallings, William, "*Data & Computer Communications,*" 6th Edition, Pearson Education Asia, 2001.
3. Prakash C. Gupta, "*Data communications and Computer Networks*", 1st Edition, Prentice Hall of India, 2009.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA III-SEMESTER

14MC30121: OBJECT ORIENTED ANALYSIS AND DESIGN & NETWORKS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:

Courses on "Object Oriented Programming Through JAVA" and "Software Engineering"

COURSE DESCRIPTION:

Practical expertise on visual modeling language; Modeling business processes, analysis, design, and implementation; Implementation of the network applications; Implementation of data link protocols and routing algorithms.

COURSE OBJECTIVES:

I. To understand the principles of object orientation.
II. To understand the behavior of an Application Software before deployment by using State Chart Diagrams.
III. To analyze logical, behavioral and architectural models and apply for real world applications.
IV. To comprehend in-depth knowledge about the communication technologies like Domain Name Service, E-mail etc.,
V. To analyze techniques to design simple network.

COURSE OUTCOMES:

After successful completion this course, the student will be able to

1. Acquire the principles of Object Oriented Development.
2. Recognize the elements of Class, Use case, Activity, Sequence and State, diagrams and develop models using them.
3. Design the domain and application artifacts to construct the Logical, behavioral and Architectural model of an Application Software.
4. Make use of UML Tool to design Class, Use Case, Sequence, Collaboration, Activity, State Chart, Component and Deployment Diagrams for an Application Software.
5. Analysis of logical and behavioral objects of an Application Software.
6. Understand the concept of networks, different topologies, network devices and OSI reference model.
7. Analyze Error detection and correction mechanisms to verify correct data.
8. Design and develop a route to reach to the correct destination by using shortest path routing and Distance Vector Routing Techniques.

LIST OF LAB PROGRAMS:

1. **a) Identification of Classes, Objects, Attributes, Operations and Subclasses**
   From your everyday experience identify 2 original classes of objects. Choose your second one carefully, with some computerized system in mind that it could fit into.
   For each class draw a graphical representation encapsulating seven major attributes and seven operations that apply to it.
   For each of your classes state at least four examples or instantiations of it.
   b) Introduction of Inheritance Choose a third class of object of any type suitable as a base class for a hierarchy of subclasses which will inherit all the attributes and operations of their super classes. In a tree diagram draw this class and (some of) its subclasses, at least one of which must be three levels of hierarchy below the base class. Include significant attributes and operations.
2. **Write a program for error detecting code using CRC-CCITT (16-bits).**
3. **Write a program for frame sorting technique used in buffers.**
4. **Noun-Verb Parsing**
   Apply a noun-verb parse to the following passage to identify classes and operations. Make a table listing the classes with their operations alongside, and use it to identify any subclasses which are present.
   The Blueberry Muffin Factory buys in raw ingredients, including flour, milk, eggs and blueberries. All the ingredients except the blueberries are made into a batter. The blueberries are washed and sorted (to remove any bad berries or foreign objects) and then added to the batter. The batter is then poured into baking tins and baked. The baked muffins are cooled and packaged. The packages are put in boxes and finally distributed.

5. **Write a program for distance vector algorithm to find suitable path for transmission.**
6. **a) Understanding the Logical View of the Application: Library Management System**
   a) Identification of Objects
   b) Identification of Attributes
   c) Identification of Behaviors
   d) Identification of Relationships

   The LMS would be used by the Librarian to keep track of books, Library Members and Borrowing activities. All members cannot borrow all books; few books may be available to review in the Library itself. These books are called as Reference Books.

   There are two kinds of Library Members namely, Student Members and Faculty Members. Faculty Members can check out Research papers and Magazines, where as a Student Member can check out only Books. The system need to send an Alert, whenever a book has not returned within a specific due date to both the Librarian and the Borrower through e-mail.

   The system maintains a Catalogue of having a description of each book available in the Library.

   b) Developing a Class Diagram: Library Management System
   a) Development of Class Diagram
   b) Applying Forward Engineering and Reverse Engineering of a Class Diagram.
7. **Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.**
8. **Understanding the Interaction between Objects: Library Management System / E-Banking System**
   a) Identification of Objects
   b) Identification of Messages
   c) Development of Sequence Diagrams
   d) Development of Collaboration Diagrams
9. **Write a program for Hamming Code generation for error detection and correction.**
10. **Write a program for congestion control using Leaky bucket algorithm**
11. **Understanding the Advanced Behavioral Model of the Application: Library Management System**
    a) Identification of Actions
    b) Identification of Activities
    c) Development of Activity Diagram
    d) Development of State Chart Diagram
12. **Design TCP concurrent Client and Server application to reverse the given input sentence**
13. **Understanding the Architectural Model of the Application: Library Management System**
    a) Identification of Components
    b) Development of Component Diagram
    c) Modeling a Library Management System as Distributed System

REFERENCE BOOKS:

1. Grady Booch, James Rum Baugh and Ivar Jacobson, *"The Unified Modeling Language User Guide,"* Pearson Education, 1999.
2. www.uml.org
3. Department Lab Manual.
4. Rational Software Development Training Manual.
5. Andrew S Tanenbaum, *"Computer Networks,"* 4th Edition, PHI publications, 2008.
6. Forouzan, Behrouz A and Mosharraf Firouz, *"Computer Networks A Top-Down Approach,"* 1st Edition, TaTa McGraw Hill publications, 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA III-SEMESTER

14MC30122: DATA WAREHOUSING AND DATA MINING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:

A course on "Database Management Systems"

COURSE DESCRIPTION:

Performing trnsformations; Knowledge extraction by applying data mining techniques.

COURSE OBJECTIVES:

I. To understand the concepts of Data Warehouse system, Data Warehouse system architecture, data mining principles and techniques.
II. To analyze and demonstrate data mining algorithms like Apriori, FP-growth, k-mediod and gaining better understanding of business trends.
III. To develop and apply critical thinking, problem-solving, and decision-making skills.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Understand the role of data warehouse, architecture and its support for quality data.
2. Ability to identify the association rules, classifying by using decision tree algorithms and clustering large data sets using k-mediods, k-means, etc.
3. Design and implement Hierarchical Methods**-**Agglomerative clustering, divisive hierarchical clustering and Classification by Decision Tree to perform proactive analysis, predictive modeling, and identifying new trends and behaviors.
4. Investigate preprocessing of data and apply mining techniques on it.
5. Apply data mining algorithms like J48,ID3,Random forest and evaluate results by using tool WEKA.

LIST OF LAB PROGRAMS

Using Open Source for Data Warehousing (Business Intelligence)
Integrating data from different databases to Extracting, Transformation
and Loading

1. To perform various commands given in PL/SQL in Oracle 8.0 (For brushing up.)
2. Knowing IDE of Open Source for Data Warehousing (Business Intelligence) for Integrating data from different databases to Extracting, Transformation and Loading
3.
   a. Construct a data acquisition process to perform the Source to target.
   b. Construct a data acquisition process to perform the Sorter Transformation and Aggregator Transformation form one data source to target.
4. a. Construct a data acquisition process to perform the Filter Transformation form one data source to target.
   b. Construct a data acquisition process to perform the Joiner Transformation from oracle data source to target.
   c. Construct a data acquisition process to perform the Aggregator Transformation form one data source to target.
5.
   a. Construct a data acquisition process to perform the Filter Transformation and Expression Transformation in source Qualifier form one data source to target.
   b. Construct a data acquisition process to perform the Joiner Transformation in source qualifier form one data source to target.
6.
   a. Construct a data acquisition process to perform the Router Transformation form one data source to a minimum of three target tables.
   b. Construct a data acquisition process to perform the Ranker Transformation form one data source to target.
   c. Construct a data acquisition process to perform the Expression Transformation form one data source to target.

Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA) Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters. To obtain practical experience using data mining techniques on real world data sets. Emphasize hands-on experience working with all real data sets.

7.

Introduction to the Weka machine learning toolkit

a. Create a Buys_Computer dataset in .arff format. The following are the fields: age, income student,credit_rating, buys_computer
b. Create a Student Results Data set in .CSV format(Minimum required fields should be seven)

Credit Risk Assessment- Data mining case study

Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application

The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data.

In spite of the fact that the data is German, you should probably make use of it for this assignment.(Unless you really can consult a real loan officer !)

A few notes on the German dataset

• DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).

• owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.

• foreign_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.

• There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

(Turn in your answers to the following tasks)

- List all the categorical (or nominal) attributes and the real-valued attributes separately.
- What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes
- One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
- Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
- Is testing on the training set as you did above a good idea ? Why or Why not One approach for solving the problem encountered in the previous question is using cross validation?
- Describe what cross-validation is briefly. Train a Decision Tree again using cross validation and report your results. Does your accuracy increase/decrease? Why?

- Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
- Another question might be, do you really need to input so many attributes to get good results?
- Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

8.
- Performing data preprocessing for data mining in Weka
- Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the mis-classifcations equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
- Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?
- You can make your Decision Trees simpler by pruning the nodes. One approach is to use
- Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?
- (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

9. Classification using the Weka toolkit
    - Classify a weather nominal dataset using J48 algorithm.
    - Classify a weather nominal dataset using ID3 algorithm.
10. Performing clustering in Weka.
11. Association rule analysis in Weka.
12. Verify ID3 classifier performance using Gain ration and Ranker method using a knowledge flow WEKA component.

REFERENCE BOOKS:

1. Ian H. Witten, Eibe Frank, and Mark, "A Data Mining: Practical Machine Learning Tools and Techniques," 3rd Edition, Hall Morgan Kaufmann, 2011.

2. Ralph Kimball, "The Data Warehouse Toolkit: The Complete Guide to Dimensional Modeling," 3rd Edition, John Wiley & Sons Inc, 2013.

Task Resources:
- Mentor lecture on Decision Trees
- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
    - Introduction to Weka (html version) (download ppt version)
    - Download Weka
    - Weka Tutorial
    - ARFF format
    - Using Weka from command line

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA III-SEMESTER

14MCHS02: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	-	3	-

PRE-REQUISITES: --

COURSE DESCRIPTION:

Software based learning and activities; English speech sounds and phonemic transcription; accent, rhythm and intonation; vocabulary building; tenses and voice; just a minute; elocution; role plays; listening skills and presentation skills.

COURSE OBJECTIVES:

I. To impart practical knowledge in segmental features, supra-segmental features and para-linguistic features.
II. To develop language skills for effective communication with clarity and precision in academic, professional and personal situations.
III. To apply the practical knowledge of Functional grammar and vocabulary enrichment in effective writing.
IV. To develop interest in English language so that the students use it effectively in various formal, informal and neutral situations.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to

1. Gain practical knowledge in
   . English Speech Sounds
   . Accent, Rhythm and Intonation
   . Vocabulary building
2. Analyze the functional part of the grammatical elements for writing grammatically corect English in various academic and personal practices.
3. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonlu used in various contexts.
4. Communicate effectively with clarity and precision in various formal, informal and neutral situations.
5. Demonstrate various language functions by participating in
   . Just A Minute
   . Elocution
   . Role Plays
   . Presentations
   . Public Speeking
6. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

DETAILED LIST OF EXPERIMENTS/ LAB PRACTICE SESSIONS

1. Introduction to Phonetics
2. Accent Rhythm and Intonation
3. Vocabulary Building
4. Idioms and Phrases
5. Functional English - Tenses and Voice
6. Conversation Practice / Role Plays
7. Just a Minute / Elocution
8. Public Speaking
9. Presentation Skills
10. Listening skills

Total Periods: 48 hours

REFERENCE BOOK:

1. Departmental Lab Manual

SUGGESTED SOFTWARE:

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in use 1, 2 & 3
4. Learning to Speak English 8.1, The Learning Company – 4 CDs.
5. English in mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let's Talk English, Regional Institute of English South India

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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40101: MANAGEMENT INFORMATION SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:
Courses on "Database Management System" and "Organizational Behavior and Human Resource Management"

COURSE DESCRIPTION:
Principles of Information Systems; Different types of planning and designing; Designing the procedure for implementation; Problems involved in designing of MIS to any organization.

COURSE OBJECTIVES:

I. To provide basic concepts in information system and the benefits with these systems in modern society.
II. To enhance the development of Information Systems and managing information system resources.
III. To improve proficiency in solving business problems using modern productivity tools like spreadsheets and databases.

COURSE OUTCOMES:
On successful completion of this course, the students will be able to

1. Acquire basic knowledge on different systems like Production/Operations system, Marketing information system, Finance information system, etc.,
2. Analyze and interpret information on contemporary IS management issues.
3. Recognize transaction processing system over functional areas of information system.
4. Develop awareness of the ethical, social, and security issues of information systems.
5. Balance time/resources to deliver a range of formally and informally assessed outcomes to an individual or a team.

DETAILED SYLLABUS

UNIT I: INTRODUCTION TO MIS (11 Periods)

The meaning and role of MIS: What is MIS? Systems approach, the systems view of business, MIS organization within the company.

Management, Organizational theory and the systems approach: Development of organizational theory, Management and organizational behavior, Management, Information, and the Systems approach.

UNIT II: DECISION MAKING AND PROJECT PLANNING FOR MIS (11 Periods)

Information systems for decision making: Evolution of an information system, **Basic information systems-** Finance information system, Production / Operations System, Marketing information system, Personnel information system, other information systems.

IS Management Issues: Decision making and MIS, MIS as a technique for making programmed decisions, decision-assisting information systems.

Strategic and project planning for MIS: General business planning, appropriate MIS response, MIS planning: General, detail.

UNIT III: CONCEPTUAL AND DETAILED SYSTEM DESIGN (13 Periods)

Conceptual system design: Define the problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternative conceptual designs and select one, document the system concept, prepare the conceptual design report.

Detailed system design : Inform and involve the organization, aim of detailed design, project management of MIS detailed design, identify dominant and trade-off criteria, define the subsystems, sketch the detailed operating subsystems and information flows, determine the degree of automation of each operation, Inputs, outputs and processing, Early system Testing, Software, Hardware and Tools, Propose an organization to operate the system, document the detailed design, revisit the manager-user.

UNIT IV: IMPLEMENTATION, EVALUATION AND MAINTENANCE OF THE MIS (10 Periods)

Implementation, evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files, test the system, cutover, document the system, evaluate the MIS, control and maintain the system.

UNIT V: PITFALLS IN MIS DEVELOPMENT (9 Periods)

Pitfalls in MIS development: Fundamental weaknesses, soft spots in planning, design problems, implementation: the TAR PIT. **Total Periods: 54**

TEXT BOOK

1. R.G. Murdick, J.E. Ross and J.R. Claggett, "*Information systems for Modern Management*," 3rd Edition, Prentice-Hall of India, 2004.

REFERENCE BOOKS

1. Laudon & Laudon and V. M. Prasad, "*Management Information Systems*," 9th Edition, Pearson Education, 2005.
2. Robert Schultheis and Mary Sumner, "*Management information Systems*," 4th Edition, Prentice-Hall of India, 2004.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40102: WEB PROGRAMMING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	--	3

PRE-REQUISITES:

A course on "Object Oriented Programming through JAVA".

COURSE DESCRIPTION:

Introduction to HTML and CSS; Creating interactive applications using Javascript and AJAX; Usage of XML technology; Features of Java servlets and its implementation; Java Server Pages standard tag library and life cycle; Features of server side scripting language PHP.

COURSE OBJECTIVES:

I. To provide fundamental knowledge on Web, Architectures, Application Servers and various technologies like HTML, DHTML and XML for web application development.
II. To understand different web application programming languages like Servlets, JSP and PHP.
III. To analyze the requirements for the development of web applications.
IV. To design and develop an efficient and user friendly web application.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Acquire Knowledge in various web related concepts and technologies like client side scripting, validation of forms and AJAX programming.
2. Ability to analyze user requirements and selection of suitable web components for the development of web applications.
3. Apply prototyping technique and architectures to design dynamic, scalable, platform independent and enterprise web applications.
4. Demonstrate skills by applying management principles for effective implementation of web applications.

DETAILED SYLLABUS

UNIT-I: HTML, JAVA SCRIPT and AJAX (10 Periods)

Introduction to HTML, structure of HTML, Lists, Tables, images, forms, Frames, Cascading Style sheets, Introduction to JavaScripts, Objects in Java Script, and Dynamic HTML with Java Script, Introduction to AJAX.

UNIT-II: XML TECHNOLOGY (12 Periods)

Introduction to XML, XML Basics, DTD, Advanced XML: XML Namespaces, XML CDATA, XML Encoding, XML on the Server, XML Application, XMLHttpRequest Object, XML Technologies: XHTML, Java API for XML Processing, DOM, SAX, XSLT, Xpath.

UNIT-III: SERVLETS (10 Periods)

Introduction to Servlets, features of Java Servlets, exploring the servlet API, servlet life cycle, working with ServletConfig and ServletContext Objects, Creating a simple servlet, the HttpServletRequest and HttpServletResponse Interfaces, Session Tracking, JDBC, and Multitier Applications:Using JDBC from a Servlet.

UNIT-IV: JSP (10 Periods)

Introduction to JSP, Describing the JSP Life Cycle, Creating Simple JSP Pages, Working with JSP Basic Tags and Implicit Objects, Using JavaBeans and Action Tags in JSP, Using the JSP Standard Tag Library [JSTL], Describing JSTL Core Tags, Describing the JSTL SQL Tags.

UNIT-V: PHP (13 Periods)

Introduction to PHP, Working with Variables and Constants, Controlling Program Flow, Working with Functions and Arrays, Working with Files and Directories, Working with Forms and Database, Exploring Cookies and Sessions.

Total Periods: 55

TEXT BOOK:

1. Kogent Learning Solutions Inc., "*Web Technologies Black Book",* Dreamtech Press, 2011.

REFERENCE BOOKS:

1. H. M. Deitel, P.J. Deitel, and T. R. Nieto, "*Internet and World Wide Web – How to program",* Pearson Education, 2006.

2. Steven Holzner, "*The Complete Reference PHP*", 1st Edition, Tata McGraw-Hill Education Pvt. Ltd., 2007.

3. Uttam K Roy "*Web Technologies*", 1/e, Oxford University Press, 2010.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40103: BIG DATA ANALYTICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Courses on "Data warehousing and Data Mining and "Object Oriented Programming"

COURSE DESCRIPTION:

Evolution of Big data; Big data models; Application architecture of Big Data; terminology and methodology of Big Data; Overview of Big Data supporitng and administrative tools; setting up clusters of Hadoop applications and its maintenance.

COURSE OBJECTIVES:

I. To impart Knowledge on fundamentals, Large Data sets, dimensions of Big Data.
II. To provide knowledge on current Big Data trends, Data Analytics and Big Data Security.
III. To acquire skills on Big Data Tools such as SQOOP, PIG, Hive and Mahout.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Acquire knowledge of HDFS and MapReduce in Big Data Hadoop.
2. Solve problems in modern Data Analysis and Big Data Analytics.
3. Design, develop and analyze applications for Volume, Velocity and variety of Hadoop Framework based applications.
4. Design & Develop a large size system following the dimensions, practices, and methods for analyzing Big Data applications.
5. Effectively utilize the modern tools like HADDOP, HIVE, PIG etc.,
6. Follow ethical code of conduct in professional activities such as Data reports, evaluation and Data analytics.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION TO BIG DATA (11 Periods)

Introduction to Big data: The Evolution of Big Data, What Is Big Data, Why Big Data Matters, Big Data Sources, The Big data Revolution, Security, Compliance, Auditing and Protection.

Big Data in the Enterprise: New Business Models, New Revenue Growth Opportunities, What Technology Investments Can Enable the Analytics Capabilities? How Do You Get Started on the Big Data Journey?

UNIT-II: Application Architectures for Big Data and Analytics (10 Periods)

Big Data Warehouse and Analytics, Big Data Warehouse System Requirements and Hybrid Architectures, Enterprise Data Platform Ecosystem – BDW and EDW, How does Traditional Data Warehouse processes map to tools in Hadoop Environment?

Big Data AnalyticsMethodology: Challenges in Big Data Analysis, Big Data Analytics Methodology, Develop Business Hypotheses.

UNIT-III: HADOOP (11 Periods)

Meet Hadoop: Data Storage and Analysis, Comparison with Other Systems, A Brief History of Hadoop, Apache Hadoop and the Hadoop Ecosystem.

MapReduce: A Weather Dataset, Analyzing the Data with Unix Tools, Analyzing the Data with Hadoop, Scaling Out, Hadoop Streaming, Hadoop Pipes.

The Hadoop Distributed File system: The Design of HDFS, HDFS Concepts, The Command-Line Interface, Hadoop File systems.

UNIT – IV: APPLICATIONS OF HADOOP MAPREDUCE (11 Periods)

Hadoop I/O: Data Integrity, Compression, Serialization, File-Based Data Structures.

Developing a MapReduce Application: The Configuration API, Configuring the Development Environment, Writing a Unit Test, Running Locally on Test Data, Running on a Cluster.

How MapReduce Works: Anatomy of a MapReduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution.

MapReduce Types and Formats: MapReduce Types, Input Formats, Output Formats.

UNIT -V: FEATURES AND ADMINISRATION OF HADOOP (12 Periods)

MapReduce Features: Counters, Sorting, Joins, Side Data Distribution, MapReduce Library Classes.

Setting Up a Hadoop Cluster: Cluster Specification, Cluster Setup and Installation, SSH Configuration, Hadoop Configuration, YARN Configuration, Security, Benchmarking a Hadoop Cluster, Hadoop in the Cloud.

Administering Hadoop: HDFS, Monitoring, Maintenance.

Pig: Installing and Running Pig, Comparison with Databases, Pig Latin, User-Defined Functions.

Total Periods: 55

TEXT BOOKS:

1. Tom White"*Hadoop: The Definitive Guide*," Oreilly and Yahoo press, Third Edition, 2012.
2. Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivasta " Big Data Imperatives",Apress, First Edition, 2013.

REFERENCE BOOK:

1. Frank J. Ohlhorst**, "***Big Data Analytics: Turning Big Data into Big Money*," Wiley Publication, December 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40104: SERVICE ORIENTED ARCHITECTURE (ELECTIVE-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A Course on "Software Engineering"

COURSE DESCRIPTION:

Common characteristics of SOA; comparing SOA to various architectures; importance of web services framework; Service oriented analysis and design techniques; SOA support in J2EE and Dot Net technologies; Basic concepts on service oriented business process design and web services security measures.

COURSE OBJECTIVES:

I. To provide basic principles of service orientation, service oriented analysis techniques and service design.
II. To excel with advanced Web Service specification standards.
III. To develop customized software applications using SOA Platform.

COURSE OUTCOMES:

After the completion of the course, a successful student able to

1. Acquire the knowledge of software oriented architectures and the service composition.
2. Solve complex software applications using SOA principles.
3. Design and develop a modern software development project using SOA.
4. Apply prototype techniques in software development project using process oriented architectures and service oriented architectures.

DETAILED SYLLABUS

UNIT I: INTRODUCING SOA AND EVOLUTION OF SOA (10 Periods)

Fundamental SOA, Common Characteristics of Contemporary SOA, Common tangible benefits of SOA, Common pitfalls of adopting SOA. **The Roots of SOA:** Characteristics of SOA, Comparing SOA to client-server and distributed internet and hybrid Web Service architectures.

UNIT II: WEB SERVICES AND PRIMITIVE SOA, CONTEMPORARY SOA, SERVICE LAYERS (12 Periods)

The Web services framework, Services, Service descriptions, Messaging with SOAP, Message exchange patterns, Service activity, Coordination, Atomic Transactions, Business activities, Orchestration, Choreography, Service layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer.

UNIT III: SERVICE ORIENTED ANALYSIS AND DESIGN (12 Periods)

Introduction to service-oriented analysis, Benefits of a business-centric SOA, Deriving business services, Service Modeling. **Service Oriented Design:** Introduction to service-oriented design, WSDL basics, SOAP basics, Entity-centric business service design, Application service design, Task-centric business service design.

UNIT IV: SOA PLATFORM (11 Periods)

SOA platform basics. **SOA support in J2EE:** Platform overview, Primitive SOA support, Support for service oriented principles, Contemporary SOA support. **SOA support in .NET:** Platform overview, Primitive SOA support, Support for service oriented principles, Contemporary SOA support.

UNIT V: BUSINESS PROCESS DESIGN (10 Periods)

WS-BPEL language basics, WS-Coordination overview, Service oriented business process design, WS-Policy Language basics , WS Security language basics.

Total Periods: 55

TEXT BOOK:

1. Thomas Erl, "*Service-Oriented Architecture: Concepts, Technology, and Design*," Pearson Education, 2005.

REFERENCE BOOKS:

1. Newcomer, Lomow, *"Understanding SOA with Web Services"*, Pearson Education, 2005.
2. Sandeep Chatterjee, James Webber, *"Developing Enterprise Web Services, An Architect's Guide"*, Pearson Education, 2005.
3. Dan Woods and Thomas Mattern, *"Enterprise SOA Designing IT for Business Innovation,"* O'REILLY, First Edition, 2006.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
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SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40105: SOFTWARE PROJECT MANAGEMENT (ELECTIVE – I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Software Engineering"

COURSE DESCRIPTION:

Software models and process improvement; Principles of Software Management System and life cycle phases; Project planning; Scheduling and Work Breakdown Structure; Project environment; Project control and monitoring.

COURSE OBJECTIVES:

I. To present basic knowledge in conventional and modern software project management principles.
II. To identify the steps of project planning, management, quality assurance and their relationships.
III. To develop their skills for tracking, controlling software deliverables within schedule and budget.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Implement a project to manage the project schedule, quality and expenditure of an application.
2. Identify the resources required for a project and to produce a work plan, resource schedule and check points.
3. Design and develop project to address real-world management challenges.
4. Aware of project management theories, tools, techniques and methods to manage the software projects at each stage of software development life cycle.
5. Understand modern software project management principles as a member and leader in a team to manage the projects.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION TO CONVENTIONAL SOFTWARE MANAGEMENT & IMPROVING SOFTWARE ECONOMICS (10 Periods)

Conventional Software Management: The waterfall model, conventional software management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation through software environments, Achieving required quality, peer inspections: A Pragmatic view.

UNIT- II: PRINCIPLES, LIFE CYCLE PHASES AND ARTIFACTS OF THE PROCESS (12 Periods)

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process

Life cycle phases: Engineering and production stages, inception phase, Elaboration phase, construction phase, transition phase.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, pragmatic artifacts.

UNIT –III: SOFTWARE ARCHITECTURE, WORKFLOWS & CHECKPOINTS OF THE PROCESS (12 Periods)

Model based software architectures: A Management perspective and technical perspective.

Work Flows of the process: Software process workflows, Iteration workflows.

Checkpoints of the process: Major Milestones, Minor Milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, Planning guidelines, Cost and schedule estimating process, Iteration planning process, Pragmatic planning.

UNIT- IV: PROJECT ORGANIZATIONS & RESPONSIBILITIES, PROCESS AUTOMATION (9 Periods)

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, Evolution of Organizations.

Process Automation: Tools: Automation Building blocks, The Project Environment: Roundtrip Engineering, Change management, Infrastructures, Stakeholder Environments.

UNIT -V: PROJECT CONTROL & PROCESS INSTRUMENTATION, TAILORING THE PROCESS AND FUTURE SPM (10 Periods)

Project Control and Process instrumentation: The seven core Metrics, Management indicators, Quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

Tailoring the Process: Process discriminants.

Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.

Total Periods: 53

TEXT BOOK:

1. Walker Royce, "*Software Project Management*," 6th Edition, Pearson Education, 2007.

REFERENCE BOOKS:

1. Bob Hughes and Mike Cotterell, "*Software Project Management*," 4th Edition, Tata McGraw-Hill, 2006.

2. Joel Henry, "*Software Project Management"*, Pearson Education, 2004.

3. Pankaj Jalote, "*Software Project Management in practice*," Pearson Education, 2002.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40106: USER INTERFACE DESIGN (ELECTIVE – I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Software Engineering"

COURSE DESCRIPTION;

Factors of interactive software and design process; virtual environment; direct manipulations; human capabilities and interface technology; natural language and presentation styles; individual and multiple window strategies; computer supported cooperative work.

COURSE OBJECTIVES:

I. To Understand principles of Human-Computer Interaction and Design.

II. To Expertise in designing, implementing, managing, maintaining, training and refining the user interface of interactive systems.

III. To build an application by using menus, windows, interfaces, business functions, multiple-window design

COURSE OUTCOMES

After completion of this course, a successful student will be able to

1. Understand human factors of interactive software like Human Consideration in Screen, accommodation of human diversity design.
2. Design their own Human Computer Interaction design and effective use of a modern usability testing facility.
3. Develop interaction of people with machines.
4. Explain the role of knowledge of human information processing for interactive system design.
5. Apply knowledge and skills in interface design.

DETAILED SYLLABUS

UNIT-I: HUMAN FACTORS OF INTERACTIVE SOFTWARE, MANAGING DESIGN PROCESSES (10 periods)

Human Factors Of Interactive Software: goals of system engineering and user-interface design, motivations, accommodation of human diversity, Theories, principles, and guidelines of user-interface design.

Managing design processes: Support Usability, design pillars, development methodologies, ethnographic observation, Expert reviews, usability testing and laboratories, surveys acceptance tests, evaluation during active use, and controlled psychologically oriented experiments.

UNIT-II: SOFTWARE TOOLS, DIRECT MANIPULATION AND VIRTUAL ENVIRONMENTS, MENU SELECTION, FORM FILLIN, AND DIALOG BOXES: (10 periods)

Software tools: Specification methods, interface- building tools and evaluation and critiquing tools.

Direct manipulation and virtual environments: examples, explanations, programming, visual, thinking and icons Home automation, remote direct manipulation, visual environments.

Menu selection, form filling, and dialog boxes: Task–related organizations item presentation sequence, response time and display rate, fact movement through menus, menu layout, form fill in, and dialog boxes.

UNIT-III:COMMAND AND NATURAL LANGUAGES,RESPONSE TIME AND DISPLAY RATE,PRESENTATION STYLES: BALANCING FUNCTION AND FASHION (11 periods)

Command and natural languages: Functionality to support users tasks, command – organization strategies, the benefits of structure, naming and abbreviations, command menus, natural language in computing.

Response time and display rate: Theoretical foundations, expectations and attitudes, user productivity, variability.

Presentation styles: **Balancing function and fashion:** error messages, No anthropomorphic design, display design, color.

UNIT-IV: PRINTED MANUALS, ONLINE HELP AND TUTORIALS, MULTIPLE – WINDOW STRATEGIES (11 periods)

Printed manuals, Online Help and tutorials – Reading from paper versus from displays, preparation of printed manuals, and preparation of online facilities.

Multiple – Window strategies – Individual – Window design, multiple-window design, Coordinator by tightly – coupled windows. Image browsing and tightly –coupled windows.

UNIT – V: COMPUTER-SUPPORTED COOPERATIVE WORK

(12 periods)

Computer-supported cooperative work-goals of cooperation, Asynchronous Interaction: Different time and place, Synchronous Distributed: Different place, same time, face to face: same place, same time, Applying CSCW to Edition, Information search and visualization. Database Query and phrase search in textual documents, multimedia document searches, information visualization,. Advanced filtering. Importance of Hypermedia and the world wide web (www).

Total Periods:54

TEXT BOOK:

1. Ben Shriderman, "*Designing the user Interface, strategies for effective human-Computer introduction*," Third Edition, Pearson Education, 2004.

REFERENCE BOOK:

1. Galitz, Wilbert O,"*It's Time to Clear Your Windows: Designing GUIs that Work*," John Wiley and Sons, New York, 1994.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40107:DESIGN PATTERNS (ELECTIVE – I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A Course on "Software Engineering"

COURSE DESCRIPTION:

Importance of design pattern; creational patterns and its methods; structural patterns and its responsibilities; behavioral patterns with states and strategies; designing a document editor and structure.

COURSE OBJECTIVES:

I. To understand importance of design patterns like Model View Controller, Catalog of Design Patterns.
II. To acquire Advanced knowledge by making use of Creational Patterns, Structural patterns, Behavioral patterns.
III. Design and Development of Object Oriented Systems using Decorator, Façade, Flyweight.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Interpret appropriate patterns for design problems.
2. Design patterns for reusable solution to a commonly occurring problem in software design.
3. Provides research based knowledge like Domain Object Factory, Object/Relational Map, Update Factory, Resource Management Patterns, Concurrency.
4. Analyze solutions for Design Patterns of a problem by using Behavioral Patterns like Visitor, Mediator, Memento,etc.
5. Make effective presentation by using Pattern Name and Classification, Intent, Participants, Consequences.etc.

DETAILED SYALLABUS

UNIT-I: INTRODUCTION OF DESIGN PATTERN (10 periods)

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT-II:CREATIONAL PATTERNS (10 periods)

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT-III:STRUCTURAL PATTERN: (10 periods)

Structural Pattern: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy, Discussion of Structural Pattern.

UNIT-IV: BEHAVIORAL PATTERNS (15 periods)

Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method ,Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns, A Brief History, The Pattern Community, An Invitation, A Parting Thought.

UNIT-V: DESIGNING A DOCUMENT EDITOR: (10 periods)

Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, and Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation.

Total Periods:55

TEXT BOOK:

1. Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides*,"Design Patterns-Elements of Reusable Object-Oriented Software,"* Sixth Edition, Pearson Education,2009.

REFERENCE BOOK:

1. Mark Grand, "*Pattern's in JAVA Vol-I*," Wiley DreamTech, 2nd Edition, 2002.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40108: ADVANCED DATABASE MANAGEMENT SYSTEMS (ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Database Management Systems".

COURSE DESCRIPTION:

Fundamental concepts of relational calculus; Object-Relational databases; Database security issues and advanced modeling; Query optimization; Distributed database models and emerging technologies.

COURSE OBJECTIVES:

I. To offer basic knowledge in designing and building object-relational database system.
II. To supply advanced knowledge in query processing optimization
III. To focus on key issues associated with database security and determining the levels of protection.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Apply the knowledge of object relational databases in query optimization, database protection and security.
2. Solve complex computing problems by applying tuple relational calculus and domain relational calculus techniques.
3. Design and develop an emerging distributed database on semi-structured data, unstructured data and XML documents.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION: OVERVIEW OF RELATIONAL DATABASE (11 Periods)

THE RELATIONAL ALGEBRA AND RELATIONAL CALCULUS: Unary Relational Operations–SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations-JOIN and DIVISION, Additional Relational Operations, The Tuple Relational Calculus, The Domain Relational Calculus.

OBJECT AND OBJECT-RELATIONAL DATABASES: Concepts for Object Databases: Overview of object oriented concepts, Object Identity, Object Structure, and Type Constructors, Encapsulation of Operations, Methods, and Persistence, Type and Class Hierarchies and Inheritance, Complex Objects.

UNIT- II: OBJECT DATABASE STANDARDS, OBJECT RELATIONAL AND EXTENDED-RELATIONAL SYSTEMS (10 Periods)

OBJECT DATABASE STANDARDS, LANGUAGES AND DESIGN: Object Model of ODMG, the Object Definition Language ODL, the Object Query Language OQL, Object Database Conceptual Design.

OBJECT-RELATIONAL AND EXTENDED-RELATIONAL SYSTEMS: SQL and Its Object-Relational Features, Evolution and Current Trends of Database Technology, The Informix Universal Server, Object-Relational Features of Oracle, Implementation and Related Issues for Extended Type Systems.

UNIT-III: SECURITY, ADVANCED MODELLING AND DISTRIBUTION (10 Periods)

DATABASE SECURITY: Security Issues, Discretionary Access Control Based on Granting and Revoking Privileges, Mandatory Access Control and Role-Based Access Control for Multilevel Security.

SECURITY, ADVANCED MODELING AND DISTRIBUTION: Introduction to Statistical Database Security, Flow Control, Encryption and Public Key Infrastructures, Privacy Issues and Preservation.

UNIT-IV: DISTRIBUTED DATABASE AND DESIGN (10 Periods)

DISTRIBUTED DATABASES: Introduction, Distributed DBMS Architecture, Architectural Models for Distributed DBMS.

DISTRIBUTED DATABASE DESIGN: Design Strategies, Distribution design issues, Fragmentation, Allocation.

UNIT- V: OPTIMIZATION OF DISTRIBUTED QUERIES AND EMERGING TECHNOLOGIES (11 Periods)

OPTIMIZATION OF DISTRIBUTED QUERIES: Query optimization, centralized query optimization, join ordering in fragment queries, Distributed Query optimization algorithms.

EMERGING TECHNOLOGIES – XML AND INTERNET DATABASES: Structured, Semi structured, and Unstructured Data, XML Hierarchical (Tree) Data Model, XML Documents, DTD, and XML Schema, XML Documents and Databases, Mobile Databases. **Total Periods: 52**

TEXT BOOKS:

1. R. Elmasri and S.B.Navathe, "*Fundamentals of Database Systems*," 5th Edition, Pearson Education, 2009.
2. M.Tamer Ozsu and Patrick Valduriez, "*Principles of Distributed Database Systems*," 2nd Edition, Pearson Education, 2008.

REFERENCE BOOKS:

1. C. J. Date, "*Database Systems*," 7th Edition, Addison Wilsey, 2003.
2. Peter Rob and Caros Coronel, "*Database Systems*," 5th Edition, Thomson, 2008.
3. Raghu Ramakrishna and Johannes Gehrke, "*Database Management systems*," 3rd Edition, McGraw Hill, 2003.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40109: SOCIAL MEDIA (ELECTIVE - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	--	3

PRE-REQUISITES:

A course on "Database Management System" , "Computer Networks".

COURSE DESCRIPTION:

Impact on business process; collaborating marketing; legal side of the social media; search engine optimization; security challenges and ethical issues.

COURSE OBJECTIVES:

I. Identify and critique instances of technological determinism in popular discourse on social media technologies.
II. Evaluate methodologies employed by studies of social media use.
III. Critically evaluate the potential for social media technologies to facilitate the formation of identities, communities, activist movements, and consumer markets.
IV. Articulate some of the ethical problems posed by emerging social media technologies.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

1. Understand the history of Social Media and recognize various platforms. Manage Social Media within recommended guidelines and Copyright/Trademark regulations.
2. Analyse Social Media through Content Management, Search Engine Optimization (SEO) and Collaborative Marketing.
3. Design metrics for measuring Social Media marketing success.
4. Identify major social media platforms and the role each play.
5. Understand social media used as a journalistic tool and its influence over news gathering and distribution to the society.
6. Separate fact from opinion and develop critical thinking skills.
7. Build networks and enhance job prospects.

DETAILED SYLLABUS

UNIT-I : INTRODUCTION TO SOCIAL MEDIA AND TRADITIONAL MEDIA (11 Periods)

Introduction To Social Media: Overview of Social Media, Social media literacy , Define Social Media, Differences between Traditional media and social media , How Social Media developed, Forming Relationships, Identity, Race, Ethnicity and Community through Social media. Managing Information: Aggregators, Google Alerts and Blogs.

UNIT-II :SOCIAL MEDIA IMPACT ON BUSINESS PROCESS, BLOGGING CULTURE, COLLABORATIVE MARKETING & CROWDSOURCING (12 Periods)

Social Media Impact On Business Process: Getting your Business Process ready for Social Media, Content Management ,Touch point analysis, Scheduling ,Creating content, Managing content programs, Planning and designing Worksheets.

Blogging culture: Presence, credibility, identity, reputation, authority, and influence. **Collaborative Marketing & Crowdsourcing:** Consumer-generated content, Metrics & Return Of Investment(ROI).

UNIT-III: THE LEGAL SIDE OF SOCIAL MEDIA, INFLUENCERS, POLITICS AND ACTIVISM (10 Periods)

In-house guidelines ,Copyright and Trademark Implications, Blogs , Blogger Tumbler Word press: Set-up , Services. **Influencers:** Who are they? How to find them? How to use them to benefit your Business Process. **Politics and Activism:** Can Social Media Enable, Social Movement, Political action, and Immigrant Rights. Role towards National Integrity.

UNIT-IV: SEARCH ENGINE OPTIMIZATION, VARIANTS, FACEBOOK, GOOGLE+, YOUTUBE, TWITTER, LINKEDIN, P INTEREST (12 Periods)

Definition, Importance, Techniques, Tools, Blog search engines, **Podcasting:** What is it? Where to find? Variants Video podcasts, Enhanced podcasts, podcast novels, Uses. **Facebook:** Creating groups and pages Tips and Guides Posts ,Paid Promotion ,Ads, Contests. **Google+:** Set-up and usage ,Company profile ,Hangouts, Authorship **YouTube:** Long-form video platforms ,Setting up a channel and Managing content. **Twitter:** Set-up and usage Tips. **LinkedIn:** Tips and Guides ,Review of profiles Pinterest: Visual social media and bookmarking and Set-up and management.

UNIT-V: SECURITY CHALLENGES ETHICAL ISSUES (14 Periods)

Privacy , Identity Regulation. Refusing Social Media. Inference Issues , Communal Rights, Region , Territorial Challenges, National Integrity Challenges, Racism Issues, Big Data challenges.

Total Periods: 59

TEXT BOOKS:

1. Hana S. Noor Al-Deen, John Allen Hendricks "Social Media: Usage and Impact Paperback," Lexington Books, 2013.
2. Knight, Megan "Social media for journalists : principles & practice", SAGE Publications Inc., 2013.

REFERENCE BOOK:

1. Lon Safko "The Social Media Bible: Tactics, Tools, and Strategies for Business Success, " Wiley Publications, 3rd Edition, 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40110: SEMANTIC WEB (ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A Course on "Data Warehousing and Data Mining".

COURSE DESCRIPTION:

Introduction and features of aritificial intelligence; Knowledge extraction from semantic web; Ontology engineering for semantic web; review of various semantic applications and its implementations; Analysis of social networks and building semantic web applications.

COURSE OBJECTIVES:

I. To understand principles of Semantic Web as an extension of the existing World Wide Web.
II. To acquire knowledge on Web Intelligence and Knowledge Representation for the Semantic Web.
III. To design and develop web ontology language for machines to understand hyperlinked information.

COURSE OUTCOMES:

After successful completion of this course, the student will be able to

1. Provide fine-grained mixing of diverse metadata.
2. Identify relevant domains for Semantic Web Applications, Services and Technology.
3. Design and develop universal medium for the exchange of structured data and Synthesize information to find, share and combine into a Semantic Web.
4. Investigate the impact of semantic web over Social Networks.
5. Adapt tools like RDF, XML, RDFS and OWL for Ontology Engineering over a specific domain.

DETAILED SYLLABUS

UNIT-I: WEB INTELLIGENCE (10 Periods)

Web Intelligence: Empowering the information Age-Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT-II: KNOWLEDGE REPRESENTATION FOR THE SEMANTIC WEB (11Periods)

Knowledge Representation For The Semantic Web: Resource Description Framework (RDF)-XML Language, RDF Language, Basic elements, RDF Schema. Ontology Web Language-Ontology language, Ontology Language requirements, Compatibility of OWL and RDF/RDFs, OWL language, elements, OWL Eample, Ontology Example, Applying OWL, OWL capabilities and Limitations.

UNIT-III: ONTOLOGY ENGINEERING (11 Periods)

Ontology Engineering: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic and Inference, Monotonic and Nonmonotonic Rules, Description Logic, Inference Engines, RDF Inference Engine.

UNIT-IV: SEMANTIC WEB APPLICATIONS, SERVICES AND TECHNOLOGY (11 Periods)

Web Applications, Services And Technology: Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base, XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods.

UNIT-V: SOCIAL NETWORK ANALYSIS AND SEMANTIC WEB (12 Periods)

Social Network Analysis And Semantic Web: Social Networks analysis, development of the social networks analysis, Key Concepts and measures in network analysis, Electronic Sources for Network Analysis– Electronic Discussion networks, Blogs and Online Communities, Web Based Networks, Building Semantic Web Applications with social network features. **Total Periods: 55**

TEXT BOOKS:

1. Berners Lee, Godel and Turing, "*Thinking on the Web*," 2nd Edition, Wiley India, 2009.
2. Peter Mika, "*Social Networks and the Semantic Web*," Springer, 2007

REFERENCE BOOKS:

1. J.Davies, Rudi Studer and Paul Warren, "*Semantic Web Technologies, Trends and Research in Ontology Based Systems,"* JohnWiley & Sons, 2006.
2. Heiner Stuckenschmidt and Frank Van Harmelen, "*Information sharing on the semantic Web,"* Springer Publications, 2005.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40111: INFORMATION RETRIEVAL SYSTEMS (ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Data Warehousing and Data Mining".

COURSE DESCRIPTION:

Fundamental concepts of Information Retrieval Systems; Search keyword stemming process; Automatic indexing; Search statement ranking and visualization; User search techniques; Text search process.

COURSE OBJECTIVES:

I. To understand information Retrieval system and various text retrieval (search, browse and Miscellaneous) capabilities.
II. To excel in finding relevant information and subsequently extract meaningful patterns.
III. To apply algorithms of textual document indexing, relevance ranking, text analytics, as well as their performance evaluations.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Aware of theoretical and practical aspects of information retrieval Systems.
2. Identify various research algorithms.
3. Design and develop the probabilistic retrieval methods, algorithms and ranking principles.
4. Effectively make use of many search engines using searching techniques.

DETAILED SYLLABUS

UNIT – I: INTRODUCTION AND INFORMATION RETRIEVAL SYSTEM CAPABILITIES (12 Periods)

Introduction to IRS: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses. **Information Retrieval System Capabilities**: **Search Capabilities**-Boolean logic, Proximity, contiguous word phrases, fuzzy searches, Term masking, **Browse Capabilities**-Ranking, Zoning, Highlighting, **Miscellaneous Capabilities**- vocabulary Browse, canned query.

UNIT – II: CATALOGING AND INDEXING AND DATA STRUCTURE (10 Periods)

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction.

Data Structure: Introduction to data structure, Stemming Algorithms: Introduction to stemming process, Porter stemming algorithm, Successor stemmers, Inverted file Structure, N-Gram Data Structures PAT Data Structure.

UNIT -III: AUTOMATIC INDEXING (10 Periods)

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing-probabilistic weighting, Vector weighting, Natural Language, Concept Indexing, Hypertext Linkages.

Document and Term Clustering: Introduction to clustering, Thesaurus Generation, Automatic term clustering- complete term relation method, clustering using existing clusters, one pass assignments**.**

UNIT – IV: USER SEARCH TECHNIQUES AND INFORMATION VISUALIZATION (11 Periods)

User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the Internet and Hypertext.

Information Visualization: Introduction, Cognition and Perception, Information Visualization Technologies.

UNIT – V: TEXT SEARCH ALGORITHMS AND INFORMATION SYSTEM EVALUATION (12 Periods)

Text Search Algorithms: Introduction to text search techniques, Software Text Search Algorithms, Hardware Text Search Systems

Information System Evaluation: Introduction to information system evaluation, Measures Used in System Evaluations, Measurement Example– TREC Results. **Total periods: 55**

TEXT BOOK:

1. Gerald J. Kowalski and Mark T. Maybury, "*Information Storage and Retrieval Systems,"* 2nd Edition, Springer International Edition, 2009.

REFERENCE BOOKS:

1. Ricardo Baeza – Yates, Berthier Ribeiro-Neto, "*Modern Information Retrieval,"* Pearson Education, 2004.
2. Robert R. Korfhage, "*Information Storage and Retrieval*," John Wiley and Sons, 1997.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC4HS01: BUSINESS COMMUNICATION AND PRESENTATION SKILLS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION:

Nature and scope of communication; Non-verbal communication; Writing business messages; Presentation skills and public speaking:Career skills and résumé.

COURSE OBJECTIVES:

I. To impart knowledge of business communication and presentation skills.
II. To hone communication, career and presentation skills for professional practice and management.
III. To apply the acquired skills in real time professional environment.
IV. To enhance self confidence and instill apt attitude and flair for life- long learning.

COURSE OUTCOMES:

After completion of the course the students will be able to

1. Broaden their knowledge of business communication, career and presentation skills.
2. Identify requirements of various business scenarios and analyze appropriate professional mode of interaction to be adopted.
3. Apply the acquired skills in real time scenarios of professional context.
4. Function effectively as a member or a leader in teams and multidisciplinary settings with expertise in public speaking and presentation skills.
5. Communicate effectively in interviews, group discussions and business communication.
6. Passionately involve in independent and life-long learning of evolving professional communication.

DETAILED SYLLABUS

UNIT – I : NATURE AND SCOPE OF COMMUNICATION

Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks - InformalCommunication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication.

UNIT – II : NON-VERBAL COMMUNICATION

Introduction - Significance of Non-verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non-verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross-cultural Communication Strategies - Corporate Communication: Introduction - Crisis Management / Communication - Case Study.

UNIT – III : WRITING BUSINESS DOCUMENTS

Business Writing: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters - Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT – IV : BUSINESS PRESENTATIONS AND PUBLIC SPEAKING Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non-functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT – V : CAREERS AND RESUME

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - Résumé Writing: Résumé Formats; Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non-verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

TEXT BOOK

1. *Business Communication*, Meenakshi Raman and Prakash Singh, Oxford University Press, New Delhi, Second Edition, 2012.

REFERENCE BOOKS

1. *Business Communication*, M K Sehgal and Vandana Khetarpal, Excel Books, New Delhi, 2011.
2. *Effective Technical Communication*, M Ashraf Rizvi, Tata McGraw–Hill, 2009.
3. *Business Communication*, P D Chaturvedi and Mukesh Chaturvedi, Pearson Education Pvt. Ltd, New Delhi, 2006.
4. *Business Communication*, R K Madhukar, Vikas Publishing House Pvt Ltd., 2005.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40121: WEB PROGRAMMING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PRE-REQUISITES:

A course on "Object Oriented Programming through JAVA".

COURSE DESCRIPTION:

Introduction to HTML and CSS; Creating interactive applications and validating forms by using Javascript and AJAX; Usage of XML technology; Features of Java servlets, lifecycle and its implementation; Java Server Pages standard tag library and life cycle; Features of server side scripting language PHP.

COURSE OBJECTIVES:

I. To understand different web application programming languages like Servlets, JSP and PHP.
II. To analyze the requirements for the development of web applications.
III. To design and develop an efficient and user friendly web application.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to

1. Acquire Knowledge in various web related concepts and technologies like client side scripting, validation of forms and AJAX programming.
2. Ability to analyze user requirements and selection of suitable web components for the development of web applications.
3. Apply prototyping technique and architectures to design dynamic, scalable, platform independent and enterprise web applications.
4. Demonstrate skills by applying management principles for effective implementation of web applications.
5. Adapt tools like Apache Tomcat Server and XAMPP Control Panel for implementing Web Applications.

LIST OF LAB PROGRAMS:

1. Develop static pages of an online Book Store by only using HTML (the pages should resemble: www.amazon.com). The website should consist the following pages.

a. Home Page

b. Registration and User Login

c. Books Catalog

2.

a. Design and develop a Feedback form using JavaScript.

b. Validate the Registration and User Login pages of program–1.

3. Create a web page with all types of Cascading style sheets.
4. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
5. Programs using XML Schema, XSLT/XSL
6. Program using DOM / SAX.
7.

a. Write a java program to get IP Address, Host Name and Port Numbers of a Local System

b. Write a Java Program using Datagram Communication.

8. Write a basic Servlet program that must display information like

a. Request method used by the client and

b. Current system date

9. Generate JSP pages to

a. Current system date

b. Page should include two files (either html or jsp files) by using include directive.

c. Page should include two files (either html or jsp files) by using include action.

d. Any mathematical table by using Scriptlet Elements (Declaration, Expression and Scriptlet tags).

e. Page must perform forward action.

10. Write a JSP program for finding total number of visitors in a site to keep track of active users at a given instance of time, and also display the user session starting time.

11. Write a JSP program that creates a cookie on username which is send from html file and display the cookie value as a response. The cookie must be active based on the maximum active interval time.

12. Develop java program for following SQL operations using JDBC.

a. Create

b. Insert

c. Update and

Delete

Consider the following schema:

Employee (EmpName, EmpNo Primary Key, Department, Salary)

13. Generate a JSP page that will retrieve the Employee information from the database. The page should display the employee records in a tabular format.

14.

a. Write a PHP program to demonstrate GET and POST method of passing the data between pages.

b. Write a PHP program to demonstrate Array, Key-pair values.

c. Write a PHP program to read and write the Data from the Database.

15.

a. Implementing the OOPs concept in PHP.

b. Create a PHP page that uses Session and cookies.

c. File Handling in PHP.

REFERENCE BOOK:

1. Kogent Learning Solutions Inc., "*Web Technologies Black Book",* Dreamtech Press, 2011.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA IV-SEMESTER

14MC40122: MINI PROJECT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	-	2

PRE-REQUISITES: —

COURSE DESCRIPTION:

Identification of topic for the Mini Project; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Implementation of the Mini project; Writing of thesis and presentation.

COURSE OBJECTIVES:

I. To gain access to advanced knowledge on a chosen topic in the Programme domain and interdisciplinary areas through literature survey.

II. To develop analytical, problem solving, programming, design and development skills for effective project implementation.

III. To apply knowledge and skills to develop research competence in core and interdisciplinary areas.

IV. To provide opportunity to work with a strong sense of professionalism in a specific area.

COURSE OUTCOMES:

On completion of Mini project the student will be able to

1. Acquire knowledge in the areas of interest.
2. Analyze critically chosen project topic for conducting research.
3. Apply knowledge gained through Programme, self learning and experience for solution of a given problem efficiently.
4. Undertake research confidently in the project domain.
5. Use the techniques, skills and modern engineering tools necessary for Mini project.
6. Perform harmonically in multi-disciplinary, multi-cultural groups, and develop a high level of interpersonal skills.
7. Manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.
8. Develop communication skills, both oral and written for preparing and presenting reports.
9. Engage in lifelong learning to improve knowledge and competence continuously.
10. Understand professional and ethical responsibility for sustainable development of society.
11. Develop independent and reflective learning.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50101: INFORMATION SECURITY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Computer Networks".

COURSE DESCRIPTION:

Knowledge on security architecture, types of services, mechanisms followed to counter the attacks; various encryption techniques and the process of encryption and decryption; authentication mechanisms and its applications; need of security in communication such as electronic mail security; performing electronic transactions in the web securely; protecting the system from threats.

COURSE OBJECTIVES:

I. To create awareness about the values of Information and how the Information security practices are meticulously implemented in IT Industry.
II. To understand the importance of physical security for a network, to describe various encryption techniques and have a knowledge on designing a secured computer network.

COURSE OUTCOMES:

On completion of this course, a successful student will be able to:

1. Understand the principles and practices of Cryptography and Network Security.
2. Realize the role played by Cryptographic techniques in enhancing Network and System Security.
3. Identify and explain the concepts, protocols and technologies associated with a secure communication across the Network and the Internet.
4. Confer the objectives of authentication and access control methods and describe how the available methods are implemented in the defense of a network.

DETAILED SYLLABUS

UNIT-I: INTRODUCTION TO SECURITY, CLASSIC ENCRYPTION TECHNIQUES (9 Periods)

Introduction: Introduction to Security - Security Trends, The OSI Security Architecture, Security Attacks, Security Services and Mechanisms. A model for Network security, Internet Standards and the Internet Society.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques – Caser Cipher, Monoalphabetic Ciphers, Play fair Cipher, Hill Cipher, Polyalphabetic Ciphers and One – Time pad. Transposition Techniques, Introduction to Steganography.

Block Ciphers and the Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Multiple Encryption and Triple DES.

UNIT-II: CONFIDENTIALITY USING CONVENTIONAL ENCRYPTION TECHNIQUES (10 Periods)

Advanced Encryption Standard: AES Cipher, Block Cipher Modes of Operation, Stream Ciphers and RC4, Placement of Encryption Function, Traffic Confidentiality, Key Distribution.

Public-Key Cryptography: Principles of Public-Key Cryptosystems, Public-Key Cryptography algorithms - The RSA Public-Key Encryption Algorithm, Diffie – Hellman Key Exchange, Key Management.

UNIT-III: MESSAGE AUTHENTICATION AND HASH FUNCTIONS (11 Periods)

Message Authentication: Authentication Requirements, Authentication Functions, Message Authentication Codes.

Hash Functions: Hash Functions, Secure Hash Algorithm – SHA-512 Logic and Round Function, HMAC, Digital Signatures, Digital Signature Standard.

Authentication Applications: Kerberos, X.509 Authentication Service.

UNIT-IV: ELECTRONIC MAIL SECURITY AND IP SECURITY (13 Periods)

Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT-V: WEB SECURITY AND SYSTEM SECURITY (13 Periods)

Web Security: Web Security Considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction.

System Security: Intruders, Intrusion Detection systems, Viruses and Related Threats, Virus Countermeasures, Firewall Design Principles, Trusted Systems. **Total Periods: 56**

TEXT BOOK:

1. William Stallings, "*Cryptography and Network Security*", Pearson Education, 4th Edition, 2009.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "*Cryptography and Network Security*", Tata McGraw-Hill, 2007.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "*Network Security - Private Communication in a Public World*", Pearson Education, 2nd Edition, 2005.
3. Michael E. Whitman, Herbert J. Mattord, "*Principles of Information Security*", Cengage Learning, 2008.
4. William Stallings, "*Network Security Essentials (Applications and Standards)*", Pearson Education, 3rd Edition, 2009.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50102: SOFTWARE TESTING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Software Engineering".

COURSE DESCRIPTION:

Fundamentals of software testing; test life cycle; software testing terminology; test techniques; test levels; test types; test metrics, test process; test management; software test automation; overview of automated tools; generation of test scripts.

COURSE OBJECTIVES:

I. To introduce the students about the importance of testing, methods and various test types.
II. To enrich the need for automated software testing tools.
III. To test the various applications requirements like functional, non-functional using automated test tools.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Analyze the problem definitions by using the system requirement specifications.
2. Design and develop various test condition and test cases for unit, integration, system test level.
3. Apply various research methodologies on testing approaches, bug reporting.
4. Apply different automated testing tools like QTP, LoadRunner, Rational Functional Tester.
5. Create detailed test cases and an effective test plan.
6. Test the code as well as artifacts in a better way.

DETAILED SYLLABUS

UNIT – I: TESTING METHODOLOGY (9 Periods)

Introduction to software Testing: Introduction, Evolution of software Testing, Software Testing-Myths and Facts, Goals of software Testing, Software testing definitions Effective software Testing Vs Exhaustive Software Testing, Software Testing as a process

Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life cycle (STLC), Software Testing Methodology.

UNIT – II: TESTING TECHNIQUES (10 Periods)

Dynamic Testing: Black-box Testing Techniques: Boundary Value Analysis (BVA), Equivalence Class Testing, State Table-based testing, Decision table-based testing, cause-effect Graphing Based testing

White-box Testing Techniques: Need of white-box testing, Logic coverage criteria, basis path testing**,** Loop testing, Data flow testing, Mutation Testing.

UNIT – III: STATIC TESTING, SOFTWARE METRICS & NEED FOR AUTOMATION(9 Periods)

Static Testing: Inspections, Walkthroughs, Technical reviews.

Software Metrics: Definition of software metrics, Classification of software metrics, Entities to be measured, Size metrics.

Need for Automation: Introduction, Categorization of Testing tools, selection of testing tools, costs incurred in testing tools, Guidelines for automated testing.

UNIT -IV: TESTING FOR SPECIALIZED ENVIRONMENTS AND FUNCTIONAL TEST TOOL (14 Periods)

Testing for specialized Environment: Object-oriented Testing software and web-based software, challenges in testing for web-based software, Testing of web-based systems.

FUNCTIONAL TEST TOOL: Overview of Functional test tool (QTP/RFT/Selenium), Test Recording, Test Running, Synchronization of test cases, creating checkpoints, testing with parameterization.

UNIT – V: REGRESSION TESTING AND PERFORMANCE TEST TOOL (12 Periods)

Regression Testing: Progressive vs. regressive Testing, Objectives of Regression Testing, When is Regression testing Done? Regression testing types, Defining regression Test problem, Regression testing techniques

PERFORMANCE TEST TOOL: Overview of performance test tool (LoadRunner/ OpenSTA/ Load UI), Creating Vuser script using virtual user Generator, Creating virtual users using Load Controller**. Total periods: 54**

TEXT BOOKS:

1. Naresh Chauhan, "*Software testing principles and practices*," Oxford higher education,2010.
2. Dr. K.V.K.K Prasad, "*Software Testing tools*," Dreamtech Press, Reprint Edition, 2007.

REFERENCE BOOK:

1. Boris Beizer, "*Software Testing Techniques,"* Dreamtech Press, Second edition, 2006.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50103: CLOUD COMPUTING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Courses on "Computer Networks" and "Database Management System".

COURSE DESCRIPTION:

Objective of virtualization and its technologies;cloud computing and assessing the value proposition; cloud architecture andcapacity planning;exploring platform as a service;managing cloud and microsoft cloud services; cloud security service and mapping data.

COURSE OBJECTIVES:

I. To provide knowledge on importance of Cloud computing, Cloud Security, Disaster Recovery and Cloud vendors.
II. To acquire skills on Virtualization Technologies such as VMware, Hyper-V.
III. To apply knowledge & skills of Cloud Computing programming in developing service oriented applications.
IV. To create attitude for maintaining security in different Cloud based applications.

COURSE OUTCOMES:

On the successful completion of this course, the student will be able to

1. Acquire knowledge on services and types of infrastructural models in Cloud.
2. Gain problem solving to assess & improve quality attributes security, privacy concerns, and performance in Cloud Computing.
3. Apply the cloud architectures in design and deploy common standard principles, practices and methods for building Cloud based applications.
4. Inculcate ethical code of conduct in performing professional activities such as Storage, Services and Deploying of Cloud Computing applications.

DETAILED SYALLABUS

UNIT-I: INTRODUCTION TO VIRTUALIZATION (10 Periods)

Virtualization: Introduction to Virtualization, objectives of virtualization, benefits of virtualized technology, Adding guest Operating system. **Virtualization Technologies:** Ubuntu, VMware, Microsoft Hyper-V.

UNIT-II: DEFINING CLOUD COMPUTING (11 Periods)

Defining Cloud Computing: Defining Cloud Computing, Cloud Types- The NIST model, The Cloud Cube Model, Deployment models, Service models, Examining the Characteristics of Cloud Computing, Paradigm shift, Benefits of cloud computing, Disadvantages of cloud computing, Assessing the Role of Open Standards.

Assessing the Value Proposition: Measuring the Cloud's Value, Early adopters and new applications, The laws of cloudonomics, Cloud computing obstacles, Behavioral factors relating to cloud adoption, Measuring cloud computing costs, Avoiding Capital Expenditures, Right-sizing, Computing the Total Cost of Ownership, Specifying Service Level Agreements, Defining Licensing Models.

Understanding Cloud Architecture: Exploring the Cloud Computing Stack, Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud, The Jolicloud Netbook OS, Chromium OS: The Browser as an Operating System.

UNIT-III: UNDERSTANDING SERVICES AND APPLICATIONS BY TYPE (11 Periods)

Understanding Services And Applications By Type : Defining Infrastructure as a Service (IaaS), IaaS workloads, Pods, aggregation, and silos, Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS), SaaS characteristics, Open SaaS and SOA, Salesforce.?com and CRM SaaS, Defining Identity as a Service (IDaaS), What is an identity? Networked identity service classes, Identity system codes of conduct, IDaaS interoperability Defining Compliance as a Service (CaaS).

Understanding Abstraction and Virtualization: Using Virtualization Technologies, Load Balancing and Virtualization, Advanced load balancing, The Google cloud Understanding Hypervisors, Virtual machine types, VMware vSphere, Understanding Machine Imaging, Porting Applications, The Simple Cloud API, AppZero Virtual Application Appliance.

Capacity Planning: Capacity Planning, Defining Baseline and Metrics, Baseline measurements, System metrics, Load testing, Resource ceilings, Server and instance types, Network Capacity, Scaling.

UNIT-IV: EXPLORING PLATFORM AS A SERVICE (11 Periods)

Exploring Platform as a Service: Defining Services, Salesforce.com versus Force.com: SaaS versus PaaS, Application development, Using PaaS Application Frameworks, Drupal, Eccentex AppBase 3.0, LongJump, Squarespace, WaveMaker, Wolf Frameworks.

Using Google Web Services: Exploring Google Applications, Surveying the Google Application Portfolio, Indexed search, The dark Web, Aggregation and disintermediation, Productivity applications and services, Enterprise offerings, AdWords, Google Analytics, Google Translate, Exploring the Google Toolkit, The Google APIs, Working with the Google App Engine.

Using Amazon Web Services: Understanding Amazon Web Services, Amazon Web Service Components and Services, Working with the Elastic Compute Cloud (EC2), Amazon Machine Images, Pricing models, System images and software, Creating an account and instance on EC2, Working with Amazon Storage Systems, Amazon Simple Storage System (S3), Amazon Elastic Block Store (EBS), CloudFront, Understanding Amazon Database Services, Amazon SimpleDB, Amazon Relational Database Service (RDS), Choosing a database for AWS.

UNIT-V: USING MICROSOFT CLOUD SERVICES (11 Periods)

Using Microsoft Cloud Services: Exploring Microsoft Cloud Services, Defining the Windows Azure Platform, The software plus services approach, The Azure Platform, The Windows Azure service, Windows Azure AppFabric, Azure Content Delivery Network, SQL Azure, Windows Azure pricing, Windows Live services, Using Windows Live, Windows Live Essentials, Windows Live Home, windows live for mobile.

Managing the Cloud: Administrating the Clouds, Management responsibilities, Lifecycle management, Cloud Management Products, Emerging Cloud Management Standards, DMTF cloud management standards, Cloud Commons and SMI.

Understanding Cloud Security: Securing the Cloud, The security boundary, Security service boundary, Security mapping, Securing Data, Brokered cloud storage access, Storage location and tenancy, Encryption, Auditing and compliance, Establishing Identity and Presence, Identity protocol standards, Windows Azure identity standards, Presence. **Total Periods: 54**

TEXT BOOKS:

1. Barrie Sosinsky, *"Cloud Computing Bible,"* Wiley India Pvt Ltd, 1st Edition, 2011.
2. Ivanka Menken Ivanka Menken, *"Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book",* Emereo Publishing, 2nd Edition, 2012.

REFERENCE BOOKS:

1. Anthony T. Velte, Toby J. Velte Robert Elsenpeter, *"Cloud Computing: A practical Approach"*, Tata Mc Graw Hill, 1st Edition, 2010.
2. John W. Rittinghouse, James F. Ransome, *"Cloud Computing implementation, Management and Security"*, CRC Press, Taylor & Francis group, 1st Edition, 2010.
3. George Reese, *"Cloud Application Architectures",* Oreilly publishers, 1st Edition, 2010.
4. David S. Linthicum, *"Cloud Computing and SOA Convergence in your Enterprise",* Addison- Wesley, 1st Edition, 2010.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50104: MOBILE APPLICATION DEVELOPMENT

(ELECTIVE – III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Courses on "Computer Networks", "Web Programming" and "Database Management systems".

COURSE DESCRIPTION:

Development of applications on mobile and wireless computing platforms; J2ME Architecture and development,;J2ME database concepts; Java API and tools necessary for developing J2ME applications.

COURSE OBJECTIVES:

I. To provide the basic knowledge on J2ME and Wireless Technology.
II. To impart training in J2ME Development Environment and Wireless tool kit Software.
III. To solve real time applications by implementing MIDlet Programming.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Acquire the basic knowledge on J2ME and Wireless Technology.
2. Identify the real time problems in mobile and solve them using MIDlet.
3. Design and develop the MIDlet for real-time mobile applications.
4. Analyze the various mobiles information and synthesize valid information to implement mobile applications.
5. Select appropriate technologies (like MIDlet) for J2ME Development Environment and Wireless tool kit software.
6. Independently develop own mobile applications by using this knowledge.
7. Communicate effectively about complex computing activities by understanding Mobile applications.
8. Develop security alerts for betterment of individual and society.

DETAILED SYLLABUS

UNIT I: J2ME OVERVIEW (10 Periods)

Introduction to J2ME: Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices.

Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants.

J2ME Architecture and Development Environment: J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit.

UNIT II: J2ME PRACTICES, PATTERNS, EVENTS AND SCREENS (12 Periods)

J2ME Practices and Patterns: The Reality of Working in a J2ME World, Best Practices. **Commands, Items, and Event Processing:** J2ME User Interfaces, Display Class, the Palm OS Emulator, Command Class, Item Class, Exception Handling.

High-Level Display-Screens*:* Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class.

UNIT III: CANVAS AND RECORD MANAGEMENT SYSTEM (10 P*eriods*)

Low-Level Display-Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation.

Record Management System : Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.

UNIT IV: J2ME DATABASE CONCEPTS AND JDBC OBJECTS (10 Periods)

J2ME Database Concepts: Data, Databases, database schema, the art of indexing.

JDBC Objects: Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions.

UNIT V: EMBEDDED SQL AND GENERIC CONNECTION FRAMEWORK (11 P*eriods*)

JDBC and Embedded SQL: Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data form a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Sub queries, VIEWs.

Generic Connection Framework: The Connection, Hypertext Transfer Protocol, Communication Management Using HTTP Commands, Session Management, Transmit as a Background Process.

Total Periods: 53

TEXT BOOK:

1. James Keogh**,"***J2ME: The Complete Reference*, " Tata McGraw-Hill, 2003.

REFERENCE BOOKS:

1. Ray Rischpater, "*Beginning Java ME Platform*," Apress, 2009.
2. Brian Fling, "Mobile Design and Development: Practical concepts and techniques for creating mobile sites and web apps," O'Reilly,2009

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50105 :UNIX INTERNALS

(ELECTIVE – III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Courses on "Operating systems" and "Computer Networks",

COURSE DESCRIPTION:

System administrator responsibilities and monitoring security; working with Linux file system and disk management; optimizing internet services; understand backup methods; monitoring the performance; security implementation with kerberas; solving problems related to file system, network, NFC etc; basics of shell scripting.

COURSE OBJECTIVES:

I. To provide an introduction to Linux system Administration.
II. To give advanced knowledge in managing the resources and security of a computer running under Linux environment.
III. To recognize roles and responsibilities of a Linux system administrator.
IV. To manage simple TCP/IP network services on a Linux system.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Acquire the roles and responsibilities of a Linux system administrator.
2. Recognize the techniques to configure and manage simple TCP/IP network services on a Linux system.
3. Make use of Linux operating system effectively.
4. Communicate effectively with the resources in between system calls and kernel and I/O devices.

DETAILED SYLLABUS

UNIT - I: SYSTEM ADMINISTRATOR DUTIES (12 Periods)

Duties of System Administrator: The Linux system Administrator, Installing and configuring servers, Installing and configuring application software, creating and maintain user accounts, Backing up and restoring files, Monitoring and tuning performance, Configuring a secured system, Using tools to monitor Security.

Planning for Network: Deciding how your network will be used, Planning and implementing security, planning from recovery of disasters.

UNIT - II: FILE SYSTEM AND NETWORK SERVICES (10 Periods)

The File System Explained: Understanding File System Structure, Working with Linux File System, Memory and Virtual File System, Linux Disk Management.

Network services: Managing X- Windows system, creating VNC server, providing additional network services, Optimizing network services.

UNIT - III: INTERNET SERVICES, BACKUP AND RESTORING (10 Periods)

Internet services: Learning about secure servers, less secure servers, using your Linux Machine as server, Optimizing internet services.

Backup and restoring the file system: creating a backup plan, choosing media for backup, understand backup methods, tape rotation, using backup tools, advanced tools.

UNIT - IV: PERFORMANCE MONITORING AND IMPLEMENTING NETWORK SECURITY (9 Periods)

Performance Monitoring: system performance monitoring tools, measuring memory usage, viewing running tasks, Monitoring I/O activity, using star.

Implementing Network Security: Creating Firewall, Installing, configuring and using LDAP, Installing, configuring using Kerberos.

UNIT - V: TROUBLE SHOOTING, PROBLEM SOLVING and BASH SHELL SCRIPTING (10 Periods)

Trouble Shooting and Problem Solving: Trouble shooting Techniques, Trouble shooting Resources, Solving common problems, solving file system problems, solving network problems, solving NFS problems.

Bash Shell Scripting: Wild cards and special characters, variables, bash operators, understand flow of control, shell functions, processing input and output, process and job control. **Total Periods: 51**

TEXT BOOK:

1. Collings Terry and Wall Kurt, "*Red Hat Linux Networking & System Administration*," 3rd Edition, Wiley Indian, 2009.

REFERENCE BOOKS:

1. Petersen Richard, "*The Complete Reference: Fedora 7 & Red Hat Enterprise Linux*," Tata McGraw Hill, 2007.
2. Richard Peterson,"*Redhat 6: Desktop and Administration,"* Surfing Turtle press, 2010.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50106 : MIDDLEWARE TECHNOLOGIES

(ELECTIVE – III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A Course on "Object Oriented Programming".

COURSE DESCRIPTION:

Basic knowledge on .NET framework and C# programming; applying object oriented principles with C# and importance of exception handling; understanding the concepts of interfaces; generics, delegates and events in C#; ADO.NET web application development using web forms and web controls.

COURSE OBJECTIVES:

I. To understand the principles of C#, Microsoft Visual C# and Visual Studio to build .NET Framework applications.
II. To excel with advanced C# programming concepts like delegates and events.
III. To develop ADO.NET and ASP.NET applications using Visual Studio.

COURSE OUTCOMES:

On successful completion of this course, a student will be able to

1. Understand the usage of .NET Framework and Visual Studio.
2. Analyze to solve problems using C# Programming Language.
3. Develop and execute various windows and web applications using Visual Studio.
4. Analyze and interpret data while designing applications.
5. Adapt and design applications using .NET Framework 4.0.

DETAILED SYLLABUS

UNIT I: INTRODUCING C# AND .NET PLATFORM (11 Periods)

Benefits of the .NET platform, Building blocks of the .NET platform, Overview of .NET assemblies, Common type system, Common language specification, Common language runtime, Platform-independent nature of .NET, Introduction to Visual Studio.

The role of the .NET framework 4.5 SDK, Building .NET application using visual studio, Anatomy of a simple c# program, System. Console class, System data types and corresponding c# keywords. Working with string data, C# iteration constructs Decision constructs and the Relational/equality operators.

UNIT II: CORE C# PROGRAMMING & OOP WITH C# AND EXCEPTION HANDLING (10 Periods)

Understanding **C#** arrays**,** Introducing the C# class type, Constructors, The role of the this keyword, The static keyword, Pillars of OOP, C# access modifiers, C# encapsulation services, Understanding automatic properties, The basic mechanics of inheritance, C#'s polymorphic support.

The role of .NET Exception Handling, The simplest possible example, System-level exceptions, Application level exceptions, Processing multiple exceptions.

UNIT III: INTERFACES, GENERICS, DELEGATES AND EVENTS (12 Periods)

Understanding interface types, Defining custom interfaces, Implementing an interface, Implementing an interfaces using visual studio, Role of generic type parameters , Creating custom generic methods, Creating custom generic structures and classes, Understanding the .NET delegate type, Delegate example, Generic delegate, and C #events, Understanding operator overloading.

UNIT IV: ADO.NET (12 Periods)

High level definition of ADO.NET, ADO.NET data provider, ADO.NET namespaces, Connected layer of ADO.NET, Data Readers , Database transactions, Disconnected layer of ADO.NET, Role of the dataset, Working with DataColumns, Data Rows, DataTable , Binding DataTable objects to windows forms GUIs, DataAdapters.

UNIT V: ASP.NET WEB FORMS AND WEB CONTROLS, STATE MANAGEMENT TECHNIQUES (10 Periods) Introduction to ASP.NET, ASP.NET web forms, Role of http, Web applications and web servers, Role of client side scripting, Posting back to the web server, Overview of ASP.NET API, Building a single file ASP.NET web page, building an ASP.NET webpage using Code Files, ASP.NET web sites vs. ASP.NET Web applications, ASP.NET web site directory structure, The life cycle of an ASP.NET web page, Role of the web.config file, Understanding the nature of web controls, Major categories of ASP.NET web control , The Role of validation controls, Maintaining session data , Cookies.

Total Periods: 55

TEXT BOOK:

1. Andrew Troelsen, *"Pro C# 5.0 and the .NET 4.5 Framework,"* 6th Edition, Apress, 2013.

REFERENCE BOOKS:

1. Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson, Morgan Skinner, *"Professional C# 4 and .NET 4,"* Wrox Publications, 2010.
2. Mathew Mac Donald "*The Complete Reference ASP.NET," TATA McGraw Hill, 2010.*

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50107: NETWORK MANAGEMENT

(ELECTIVE-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Course on "Operating Systems" and "Computer Networks".

COURSE DESCRIPTION:

Knowledge on communication protocols; organization, functions and modes of network management; SNMP management its model; system architecture of SNMPV2 and SNMPV3 applications of SNMP and acess control; remote monitoring and conceptual model of TMN; standards and management service architecture of TMN; ATM network management using broad band, web based management.

COURSE OBJECTIVES:

I. To impart the knowledge of Network Management principles and Architectural Models.
II. To enhance skills in Remote Monitoring and Managing the Network.
III. To apply Network Management in typical Distributed Application.

COURSE OUTCOMES:

On successful completion of this course, a student will be able to

1. Gain Knowledge on SNMP, Telecommunications Networks and Remote monitoring.
2. Analyze Traffic Management Problems in Network through Remote Monitoring.
3. Apply JMX Architectures, JIRO platforms in web based Applications.

DETAILED SYLLABUS

UNIT-I: NETWORK MANAGEMENT OVERVIEW & BASIC FOUNDATIONS (12 Periods)

Network Management Overview: Analogy of Telephone Network Management, Communication Protocols and standards, Case histories of Networking and Management, Network Management – Goals, Organization and functions, Network Management Architecture and Organization, Network Management Perspectives.

Basic Foundations: Network Management Standards, Network Management Models, Organization Model, Information Model, Communication Model, Functional Model, Abstract Syntax Notation ONE:ASN.1, Encoding Structure.

UNIT-II: SNMPV1 NETWORK MANAGEMENT AND COMMUNICATION MODEL (10 Periods)

SNMPV1: History of SNMP Management, Internet Organizations and Standards, SNMP Model, Organization model and Information model, System overview, Communication and Functional model.

UNIT-III: SNMPV2 & SNMPV3 NETWORK MANAGEMENT (12 Periods)

SNMPV2: Major changes in SNMPV2, System Architecture, and SNMPV2 structure of Management Information, SNMPV2 Management Information Base, and SNMPV2 protocol.

SNMPV3: Key features, SNMPV3 architecture, applications, Management Information Base, User based security model, Access control.

UNIT-IV: RMON and TMN (10 Periods)

Remote Monitoring (RMON): What is Remote monitoring? RMON Structure of Management Information and Management Information Base, RMON1,RMON2, ATM Remote monitoring and Case study on Internet Traffic using RMON.

Tele Communications Management Network (TMN): Why TMN? Operations Systems, TMN conceptual model, TMN Standards, TMN Architecture, TMN Management Service Architecture, TMN integrated view.

UNIT-V: BROADBAND AND WEB-BASED MANAGEMENT (11 Periods)

Broadband Network Management: Broadband Network and Services, ATM Technology, ATM Network Management, MPLS Network Technology.

Web-based Management: Web Interface to SNMP Management, Embedded Web-based Management, Desktop Management Interface, Web-based Enterprise Management, Java Management extensions, Management of a Storage Area Network:JIRO platform.

Total Periods : 55

TEXT BOOK:

1. Mani Subramanian, "*Network Management: Principles and practice*", Pearson Education,2nd Edition, 2011.

REFERENCE BOOKS:

1. Mani Subramanian, "*Network Management: Principles and practice*", Pearson Education,2nd Edition, 2008.
2. Stephen B Morris, "*Network Management, MIB'S and MPL'S: Principles, Design and Implementation*", Pearson Education, 2008.
3. William Stallings , "*SNMP, SNMPV2, SNMPV3, RMON 1 and 2*", Pearson Education,3rd Edition, 2009.
4. Mark Burges, "*Principles of Network and System Administration*", Wiley Dreamtech, 2nd Edition, 2008.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50108: BUSINESS INTELLIGENCE (ELECTIVE -IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Data Warehousing and Data Mining".

COURSE DESCRIPTION:

Fundamentals of Decision Support Systems(DSS); framework of BI;characteristics, capabilities of DSS; models of management support systems; advanced data miniing concepts; knowledge management practices; intelligence systems.

COURSE OBJECTIVES

I. Understand the foundations and key issues of managerial decision making.
II. Learn the major frameworks of computerized decision support (DSS) and Business Intelligence (BI).
III. Gain familiarity with the process, methods and applications of text and web mining.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Apply the various domains knowledge like banking, finance and insurance.
2. Understand the concepts and methods designed to improve the business decision making process.
3. Design & Develop a large size system following the dimensions, practices, and methods for analyzing Data reports.
4. Apply a BI meta model to data, Analyzing a BI maturity model to identify critical attributes and mapping operational data to data warehouse.

DETAILED SYLLABUS

UNIT – I: DECISION SUPPORT AND BUSINESS INTELLIGENCE (12 Periods)

Decision support systems and Business Intelligence: Introduction, Changing business environments and computerized decision support, Managerial Decision making, Computerized support for decision making, An early framework for computerized decision support, the concept of decision support systems, A framework for business intelligence

Computerized Decision Support: Introduction and definitions, Models, Phases of decision-making process, Decision-making Phases**.**

UNIT – II: DECISION SUPPORT SYSTEMS CONCEPTS, METHODOLOGIES AND TECHNOLOGIES (10 Periods):

Decision support system configurations, Decision support system description, Decision support system characteristics and capabilities, Decision support system classifications, components of Decision support system.

Modeling and Analysis: Management support systems modeling, Structure of mathematical models for decision support, Certainty, uncertainty and risk.

UNIT -III: DATA MINING FOR BUSINESS INTELLIGENCE (10 Periods)

Data mining concepts and applications, Data mining applications, Data mining process, data mining methods, Data mining software tools

Text and web mining: Text mining concepts and definitions, Natural language processing, Text mining applications, text mining process, Text mining tools, web mining overview

UNIT – IV: BUSINESS PERFORMANCE MANAGEMENT AND KNOWLEDGE MANAGEMENT (10 Periods)

Business performance management: Business Performance Management (BPM) overview**,** Performance measurement, BPM methodologies, BPM Technologies and Applications, Performance dashboards and scorecards

Knowledge Management: Introduction to Knowledge Management, Organizational learning and transformation, Knowledge management activities, Approaches to knowledge Management, Information technology in knowledge management

UNIT – V: INTELLIGENT SYSTEMS (12 Periods)

Concepts and definitions of artificial intelligence, Basic concepts of expert systems, Applications of Expert systems, Structure of Expert systems, Knowledge Engineering**,** Machine Learning techniques, case-based reasoning, Genetic algorithms and Developing GA applications, Fuzzy logic and Fuzzy inference systems, Support vector machines

Total Periods: 54

TEXT BOOK:

1. Efraim Turban, E.Aronson, Teng-Peng Liang, and Ramesh Sharda, "*Decision Support and Business Intelligence Systems*," 9th Edition, Pearson Education, 2009.

REFERENCE BOOK:

1. David Loshin*, Business Intelligence,* Morgan Kaufmann Publishers, 2003.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50109: ENTERPRISE RESOURCE PLANNING

(ELECTIVE- IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Courses on "Database Management Systems and Management Information Systems".

COURSE DESCRIPTION:

Architecture of Enterprise Resource Planning (ERP); evolution, benefits and implementation issues; ERP base technologies; funtional and technical modules; pre-implementation challenges; post-implementation and criteria of blue-print.

COURSE OBJECTIVES:

I. To be aware of basic concepts of ERP systems for manufacturing or service companies, and the differences among MRP, MRP II, and ERP systems.
II. To acquire advance knowledge on principles of ERP systems, major components, relationships among these components and its Business Process Re-engineering.
III. Develop an application by making use of SAP AG's enterprise resource planning software.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Understand systematically planning mechanisms in an enterprise; identify all components in an ERP system and the relationships among the components.
2. Know how, process chains in materials management, production, controlling and sales are implemented in an ERP system.
3. Plan, implement and customize an ERP system using appropriate modeling methods such as Entity Relationship Modeling (ERM) and Event-Driven Process Chains (EPC).
4. Demonstrate on production planning in an ERP system, and systematically develop plans for an enterprise.
5. Understand the clear difficulties of manufacturing execution system, select a suitable performance measure report for different objectives, and apply priority rules to system**.**
6. Customize essential parts of materials management, production, controlling and sales in SAP ECC.

DETAILED SYLLABUS

UNIT – I: INTRODUCTION TO ERP (10 Periods)

Introduction, Business Functions & Business Processes, Integrated Management Information, The Role of enterprise, Business Modeling, Integrated Data Model, Definition of ERP, Common ERP Myths, History of ERP, Reasons for the growth of ERP Market, The advantages of ERP, Risks of ERP: Process Risks, Technological Risks, Implementation issues, Benefits of ERP.

UNIT – II: ERP & TECHNOLOGY (10 Periods)

Business Process Re-engineering (BPR): Introduction, BPR- Different Phases, Product Life Cycle Management: Introduction, Product Design and Development, Product Data Management (PDM), Product Life Cycle Phases, Product Life Cycle Management (PLM), Supply chain Management (SCM): Evolution of SCM, Advantages of Supply chain Management, Customer Relationship Management (CRM):Function of CRM, Components of CRM, Uses of CRM, Features & Functions of CRM .

UNIT-III: ERP IMPLEMENTATION (10 Periods)

ERP Implementation Challenges, ERP Implementation (Transition) Strategies: Big bang, Phased, Parallel, Process Line, Hybrid, ERP Implementation Life Cycle: Objective of ERP Implementation, Different phases in ERP Implementation, Pre-implementation tasks: Importance of Preparation, before you Leap, Requirement Definition, Process Definition, ERP Post implementation Activities.

UNIT – IV: THE BUSINESS MODULES (10 Periods)

Finance (Fi), Manufacturing (Production), Human Resources (HR), Plant Maintenance (PM), Material Management (MM), Quality Management (QM), Marketing, Sales, Distribution and Services (SD).

UNIT-V: THE ERP MARKET (10 Periods)

ERP Marketplace & Marketplace Dynamics: Market Overview, Marketplace Dynamics, SAP-AG: Company Profile, SAP Business Applications & Solutions, Oracle Corporation: Company Profile, Oracle Application Lines, PeopleSoft, JD Edwards.

Total Periods : 50

TEXT BOOK:

1. Alexis Leon, "*ERP (Demystified Hrs), 2/E*," Tata McGraw-Hill - NewDelhi, 2008. Ninth Reprint 2011.

REFERENCE BOOK:

1. Sinha, "*Enterprise Resource Planning*," Cengage Learning, New Delhi, 2008.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50110: E-Commerce

(ELECTIVE – IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Courses on *"Database Management Systems", "Computer Networks", and "Web Programming".*

COURSE DESCRIPTION:

Basics concepts of E-Commerce, WWW; knowledge on consumer oriented E-Commerce;knowledge on Electronic Data Interchange(EDI) application;digital libray; consumer search; multimedia and digital video.

COURSE OBJECTIVES:

I. To study basic knowledge of e-commerce from a business perception.
II. By underlying various e-commerce business models, how companies use e-commerce to gain competitive advantages, can be identified.
III. Recognize the business impact and potential of e-Commerce.

COURSE OUTCOMES:

After successful completion of E-Commerce, the student will be able to

1. Analyze the impact of E-commerce on business models and strategy.
2. Design and develop e-Commerce concepts in platform based domains.
3. Demonstrate the foundations and importance of E-commerce.
4. Appraise the opportunities and potential to apply and synthesize a variety of E-Commerce concepts and solutions to create business value for organizations, customers, and business partners.
5. Undertake planning, organizing, and implementing of E-Commerce initiatives to effectively respond to dynamic market environments.

DETAILED SYLLABUS

UNIT-I: ELECTRONIC COMMERCE (11 Periods)

Electronic Commerce: Electronic Commerce Framework, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce Organisation Applications.

Electronic commerce and World Wide Web: Architectural Framework for E-Commerce, WWW as the Architecture, Technology behind the Web, Security and the Web.

UNIT-II: CONSUMER ORIENTED ELECTRONIC COMMERCE (12 Periods)

Consumer Oriented Electronic commerce: Mercantile Process models, Mercantile Models from Consumer's Perspective, Mercantile Models from Merchant's Perceptive.

Electronic payment systems: Types of Electronic Payment Systems: Digital Token-Based, Smart Cards, Credit Cards, and Risks in Electronic Payment systems, Designing Electronic payment System.

UNIT-III: INTERORGANIZATIONAL COMMERCE AND ELECTRONIC DATA NTERCHANGE(EDI) (10 Periods)

Interorganizational Commerce and Electronic Data Interchange (EDI): EDI, EDI Applications in Business, EDI: Legal, Security and Privacy Issues, EDI and Electronic Commerce.

Intraorganizational Electronic Commerce: Macro forces and internal commerce, Work Flow Automation and Coordination, Supply Chain Management.

UNIT-IV: CORPORATE DIGITAL LIBRARY (10 Periods)

Corporate Digital Library: Document Library, digital Document types, corporate Data Warehouses.

Advertising and Marketing: Information based marketing, advertising on Internet, on-line marketing process, market research.

UNIT-V: CONSUMER SEARCH AND RESOURCE DISCOVERY (10 Periods)

Consumer Search and Resource Discovery: Information search and Retrieval, Commerce Catalogues, Information Filtering.

Multimedia and Digital Video: Key Multimedia concepts, Digital Video and electronic Commerce, Desktop video conferencing.

Total Periods: 53

TEXT BOOK:

1. Ravi Kalakota and Andrew B. Whinston, "*Frontiers of electronic commerce,"* Pearson Education, 2008

REFERENCE BOOKS:

1. Marilyn Greenstein and ToddMFeinman, "*ElectronicCommerce,"* Tata McGraw-Hill, 2000
2. Brenda Kienan, "*Managing E-Commerce Business,"* PHI, 2001
3. Vivek Sharma and Rajiv Sharma,"*Developing E-Commerce Sites*,"Pearson Education Asia, 2000.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50111: MULTIMEDIA APPLICATION DEVELOPMENT

(ELECTIVE –IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	--	3

PRE-REQUISITES:

A course on "Web Programming".

COURSE DESCRIPTION:

Introduction to Multimedia software tools; computing and running a program using Action Script; dynamic Action Script and its scope; basic video and audio compression techniques; Multimedia network communications and applications.

COURSE OBJECTIVES:

I. To provide fundamental knowledge on visualization and web design skills.
II. To analyze the requirements for the development of multimedia applications.
III. To design and develop a website from the perspective of visual designer.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to

1. Acquire Knowledge in various web related concepts and technologies like java script, validation of forms and action script programming.
2. Analyze the role and importance of critical experimentation and innovation in the development process and multimedia application.
3. Apply a variety of creative techniques like sequential, hierarchical search and MPEG in the visual design of online media.
4. Demonstrate competency with graphic software, scanning and digital photography to create original images.

DETAILED SYLLABUS

UNIT I:MULTIMEDIA AUTHORING AND DATA REPRESENTATIONS (11 Periods)

Multimedia Authoring and Data Representations: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT II: ACTION SCRIPT (12 Periods)

Action Script: Core Concepts, Conditionals and Loops, Instance Methods Revisited, Static Variables and Static Methods, Functions, Inheritance, Compiling and Running a program, Data types and Type Checking, Interfaces.

UNIT-III:DISPLAY AND INTERACTIVITY (12 Periods)

Display and Interactivity:Events and Event Handling, Exceptions and Error Handling**,** Dynamic Action Script, Scope**,** Events and Display Hierarchies, Interactivity. Screen Updates, Programmatic Animation, Drawing with Vectors, Bitmap Programming, Text Display and Input.

UNIT-IV: BASIC VIDEO COMPRESSION TECHNIQUES (10 Periods)

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG video coding I- MPEG-1 and 2, Basic Audio Compression Techniques: ADPCM in Speech Coding, G.726 ADPCM, Vocoders.

UNIT-V:MULTIMEDIA COMMUNICATION AND RETRIEVAL (10 Periods)

Multimedia Communication and Retrieval: Computer and Multimedia Networks**:** Basics of Computer and Multimedia Networks, Multiplexing Technologies, LAN and WAN, Access Networks. Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-On- Demand (MOD).

Total Periods: 55

TEXT BOOKS:

1. Ze-Nian Li, and Mark S. Drew *," Fundamentals of Multimedia"*, Pearson Education,2008.
2. Colin Moock, SPD O, REILLY*, "Essentials ActionScript 3.0"*, 1st Edition, 2007.

REFERENCE BOOKS:

1. Nigel chapman, and jenny chapman, "*Digital Multimedia"*, Wiley-Dreamtech, 2005.
2. Fred Halsall, "*Multimedia Communications: Applications, Networks, Protocols and Standards"*, Pearson Education, 2001.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50121: INFORMATION SECURITY LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:

A course on "Computer Networks".

COURSE DESCRIPTION:

Practical knowledge on security aspects of Web and internet using cipher techniques; substution and transposition techniques; implementation of confidentiality mechanism using classical and conventional encryption & decryption techniques; implementation of authentication techniques through hash code and HMAC.

COURSE OBJECTIVES:

I. To create awareness about the values of Information and how the Information security practices are meticulously implemented in IT Industry.

II. To understand the importance of physical security for a network, to describe various encryption techniques and have a knowledge on designing a secured computer network.

COURSE OUTCOMES:

On completion of this course, a successful student will be able to

1. Understand the principles and practices of Cryptography and Network Security.
2. Realize the role played by Cryptographic techniques in enhancing Network and System Security.
3. Identify and explain the concepts, protocols and technologies associated with a secure communication across the Network and the Internet.
4. Confer the objectives of authentication and access control methods and describe how the available methods are implemented in the defense of a network.

LIST OF LAB PROGRAMS:

1. Write a program for the implementation of encryption and decryption using one time pad.
2. Write a program for the implementation of encryption and decryption using mono alphabetic cipher.
3. Write a program for the implementation of encryption using Substitution and Transposition techniques for the following message:
   "PLEASETRANSFERONEMILLIONDOLLARSTOMYSWISSBANKACCOUNTSIXTWOTWO"
4. Write a program for the implementation of Playfair and Caser ciphers.
5. Write a program for the implementation of Vigenere cipher (Polyalphabetic substitution).
6. Write a program for the implementation of Hill cipher and Gauss cipher.
7. Write a program for the implementation of Rail Fence cipher.
8. Write a program for the implementation of S-DES algorithm for data encryption and decryption.
9. Write a program for the implementation of encryption and decryption using RSA algorithm.
10. Write a program for the implementation of Diffie-Hellman key exchange algorithm.
11. Write a program to generate digital signature using Hash code.
12. Write a program to generate digital signature using MAC code.
13. Write a program for the implementation of Elliptic Curve point addition for polynomial basis form.

REFERENCE BOOKS:

1. William Stallings, "*Cryptography and Network Security"*, Pearson Education, 4th Edition, 2009.
2. Behrouz A. Forouzan, "*Cryptography and Network Security*", Tata McGraw-Hill, 2007.
3. Michael E. Whitman, Herbert J. Mattord, "*Principles of Information Security"*, Cengage Learning, 2008.
4. Bruce Schneier, "*Applied Cryptography* – Protocols, Algorithms and Source Code in C", John Wiley & Sons, Inc., 2nd Edition.
5. Christof Paar, Jan Pelzl, "*Understanding Cryptography*", Springer, 2009.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50122: SOFTWARE TESTING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:

A Course on "Software Engineering".

COURSE DESCRIPTION:

Practical knowledge on implementing test techniques; writing the test plans; test conditions; test cases; execution of test cases; reporting the bugs; preparing test summary reports and generating the test scripts using test automation tools.

COURSE OBJECTIVES:

I. To introduce the students about the importance of testing, methods and various test types.
II. To understand the need for automated software testing tools.
III. To test the various applications requirements like functional, non-functional using automated test tools.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Analyze the problem definitions by using the system requirement specifications.
2. Design and develop various test condition and test cases for unit, integration, system test level.
3. Apply various research methodologies on testing approasches, bug reporting.
4. Apply different automated testing tools like QTP, LoadRunner, Rational Functional Tester.
5. Learn the many domains of testing like cloud, security, big data etc.. testing.
6. Manage the supporting and development projects.
7. Create detailed test cases and an effective test plan.

LIST OF LAB PROGRAMS

1. Identify Test Conditions for
   a) Automatic Cool drink vending machine
   b) Ceiling Fan
   c) Bank Account to Account Money Transfer
   d) Gmail-Registration
   e) Gmail- Compose mail
2. Design Test Cases for
   a) Bank Account to Account Money Transfer
   b) Gmail-Registration
   c) Gmail- Compose mail
3. a) Apply Normal, Analog and Low level recording modes for CALCULATOR Application.
   b) Apply Normal, Analog and Low level recording modes for FLIGHT Application.
4.
   a) Create a new project
   b) Create a new action
   c) Set action properties
   d) Splitting actions
5. Analyze
   a) Local Object repository
   b) Shared Object repository
6. Work on below check point mechanisms on FLIGHT application
   a) Standard check point
   b) Bitmap check point
   c) Image check point
   d) Database check point
7. Apply various types (Data Table, Test/Action, Environment Variable) of rameterization
8. Apply Synchronization point (Data driven) on any application.
9. Apply object spying on FLIGHT application
10. Creation of virtual user Generation for various applications (Eg: Ez School)
11. Work with Load Generator on any of two applications
12. Create new project, Test Plan using Load Distribution
13. Track defects using two open source tools

REFERENCE BOOK:

1. Dr. K.V.K.K Prasad, "*Software Testing tools*," Dreamtech Press, Reprint Edition, 2007.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA V-SEMESTER

14MC50123: CLOUD COMPUTING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	-	3	-

PRE-REQUISITES:

Courses on "Computer Networks" and "Database Management System".

COURSE DESCRIPTION:

Installation and configuration of virtual machines; managing virtual networks and switches;assessing the value proposition; assigning host name, IP address.

COURSE OBJECTIVES:

I. To provide knowledge on importance of Cloud computing, Cloud Security, Disaster Recovery and Cloud vendors.
II. To acquire skills on Virtualization Technologies and Cloud architectures.
III. To apply knowledge & skills of Cloud Computing programming in developing service oriented applications.
IV. To create attitude for maintaining security in different Cloud based applications.

COURSE OUTCOMES:

On the successful completion of this course, a student will be able to

1. Acquire knowledge on services and types of infrastructural models in Cloud.
2. Gain problem solving to assess & improve quality attributes security, privacy concerns, and performance in Cloud Computing.
3. Apply the cloud architectures to design and deploy common standard principles, practices and methods for building cloud based applications.
4. Inculcate ethical code of conduct in performing professional activities such as Storage, Services and Deploying of Cloud Computing applications.

LIST OF LAB PROGRAMS:

1. Installation of ESXi Hosts
   a. What is ESXi Server? Installation steps of ESXi Server.
   b. Assigning hostname, ip address, DNS & gateway.
2. Architecture of ESXi Host
   a.Architecture of ESXi Host.
3. Installation and Configuration of VSphere
   a. What is VSphere Client? Installation steps of VSphere Client.
   b. How to shutdown and Reboot ESXi Host from vSphere Client?
4. How to check syslog files?
5. Monitoring various tabs like summary, virtual machines, configuration, performance, events, local users, groups and ntp client
6. Installation and Configuration of Virtual Machines
   a. Creation of Virtual Machines.
   b. Installation of guest OS in Virtual Machines(VM's).
7. Installing VM Tools
8. Editing & Virtual Machine settings
9. Enabling Thin & Thick provision
10. Understanding about Storage Devices
    a.Understanding DAS, NAS, SAN Storage Devices
11. Managing Virtual Networks and Switches
    a. Creation of standard switches.
    b. Create port groups and vm kernel port
12. Installation and Configuration of Virtual Center Server (vCenter Server)
    a. Installation of Windows 2008 Server on ESXi.
    b. Installation and Configuration of vCenter Server.
13. Data Center & Clustering
    a. Demonstration of High Availability
    b. Demonstration of V Motion
    c. Demonstration of Fault Tolerance
14. Demonstration of Distributed Resource Scheduler
15. Understanding and Managing Resource pool

REFERENCES:

www.vmware.com
www.softlayer.com

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA VI-SEMESTER

14MC60121: SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
0	50	50	-	-	-	2

PRE-REQUISITES: --

COURSE DESCRIPTION:

Identification of seminar topic; Literature survey; Preparation of technical report and Presentation.

COURSE OBJECTIVES:

I. To impart knowledge on an advanced topic in the Programme domain and interdisciplinary area through literature survey.

II. To facilitate students to explore and develop the following skills:
   a. Analysis
   b. Problem solving
   c. Research methodologies, tools and techniques and
   d. Management and costing.

IV. To acquire knowledge and skills required for undertaking project work.

V. To provide opportunity to work with a strong sense of professionalism in a specific area.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to

1. Acquire in-depth knowledge in core and allied areas of interest.
2. Analyze and synthesize information related to the areas.
3. Conceptualize and construct research problems.
4. Extract information pertinent to a specific area through literature survey to conduct research.
5. Identify the applicability of modern software and tools.
6. Contribute positively to multidisciplinary groups in emerging areas with objectivity and rational analysis.
7. Plan, organize, prepare and present effective written and oral technical reports.
8. Engage in lifelong learning to improve competence.
9. Acquire awareness on professional code of conduct in the chosen area.
10. Develop independent and reflective learning.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

SREE SAINATH NAGAR, TIRUPATI - 517 102.

MCA VI-SEMESTER

14MC60122: PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
80	120	200	-	-	-	12

PRE-REQUISITES: —

COURSE DESCRIPTION:

Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Implementation of the project work; Writing of thesis and presentation.

COURSE OBJECTIVES:

I. To gain access to advanced knowledge on a chosen topic in the Programme domain and interdisciplinary areas through literature survey.

II. To develop analytical, problem solving, programming, design and development skills for effective project implementation.

III. To apply knowledge and skills to develop research competence in core and interdisciplinary areas.

IV. To provide opportunity to work with a strong sense of professionalism in a specific area.

COURSE OUTCOMES:

On completion of project work the student will be able to

1. Acquire in-depth knowledge in the areas of interest.
2. Analyze critically chosen project topic for conducting research.
3. Apply knowledge gained through Programme, self learning and experience for solution of a given problem efficiently.
4. Undertake research confidently in the project domain.
5. Use the techniques, skills and modern engineering tools necessary for project work.
6. Perform harmonically in multi-disciplinary, multi-cultural groups, and develop a high level of interpersonal skills.
7. Manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.
8. Develop communication skills, both oral and written for preparing and presenting reports.
9. Engage in lifelong learning to improve knowledge and competence continuously.
10. Understand professional and ethical responsibility for sustainable development of society.
11. Develop independent and reflective learning.

Annexure-I

The following are the guidelines for disciplinary action in case of Malpractice/Improper Conduct during the Examinations.

GUIDELINES FOR DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

Rule No.	Nature of Malpractices/ Improper conduct If the candidate:	Punishment
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the course of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the course of the examination)	Expulsion from the examination hall and cancellation of the performance in that course only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that course only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the courses of the examination (including labs and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all Year-end/Semester-end examinations, if his involvement is established. Otherwise, The candidate is debarred for two consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that course only.

Rule No.	Nature of Malpractices/ Improper conduct	Punishment
6.	Refuses to obey the orders of the Chief Controller of Examinations/Controller of Examinations/any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the Controller of Examinations or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the Controller of Examinations, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester/year. If the candidate physically assaults the invigilator/Controller of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that course only or in that course and all other courses the candidate has appeared including practical examinations and project work of that semester/year examinations, depending on the recommendation of the committee.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Chairman, Academic Council, SVEC (Autonomous) for further action to award suitable punishment.	

Note: Whenever the performance of a student is cancelled in any course(s) due to Malpractice, he has to register for Year-end/Semester-end Examinations in that course(s) consequently and has to fulfill all the norms required for the award of Degree.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)

Sree Sainath Nagar, A.Rangampet, Near Tirupati - 517 102. A.P.

Salient Features of Prohibition of Ragging in Educational Institutions Act 26 of 1997

- Ragging within or outside the College is prohibited.
- Ragging means doing an act which causes or is likely to cause insult or annoyance or fear or apprehension or threat or intimidation or outrage of modesty or injury to a student

Nature of Ragging	Punishment
Teasing Embarrassing and humiliating	Imprisonment upto 6 months or fine upto Rs.1,000/- or both
Assaulting or using criminal force or criminal intimidation	Imprisonment upto 1 year or fine upto Rs.2,000/- or both
Wrongfully restraining or confining or causing hurt	Imprisonment upto 2 year or fine upto Rs.5,000/- or both
Causing grievous hurt, kidnapping or rape or committing unnatural offence	Imprisonment upto 5 year or fine upto Rs.10,000/- or both
Causing death or a betting suicide	Imprisonment upto 10 year or fine upto Rs.50,000/- or both

Note:

1. A student convicted of any of the above offences, will be expelled from the College.
2. A student imprisoned for more than six months for any of the above offences will not be admitted in any other College.
3. A student against whom there is prima facie evidence of ragging in any form will be suspended from the College immediately.
4. The full text of Act 26 of 1997 **and** UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009 **(Dated 17th June, 2009) are placed in the College library for reference.**