SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

Sree Sainath Nagar, Tirupati

Department of Computer Science and System Engineering

Supporting Document for 1.1.3

Courses having focus on

Employability/ Entrepreneurship/ skill Development

Program: B.Tech.- Computer Science and System Engineering

Regulations : SVEC-14

The Courses (with course outcomes) under SVEC-14 Regulations which focus on *employability/ entrepreneurship/ skill development* are highlighted with the following colours.

Skill

Employability

Entrepreneurship

ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABI

OF

COMPUTER SCIENCE AND SYSTEMS
ENGINEERING

FOR

B.TECH REGULAR FOUR YEAR DEGREE COURSE

(for the batches admitted from 2014-2015)

for B.TECH LATERAL ENTRY COURSE

(for the batches admitted from 2015-2016)

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

**(Affiliated to JNTU Anantapur, Approved by AICTE
Accredited by NBA; NAAC with 'A' grade)**

Sree Sainath Nagar, A.Rangampet, Near Tirupati - 517 102. A.P.

SVEC14 - B.TECH - Computer Science and Systems Engineering

VISION

To be one of the Nation's premier Engineering Colleges by achieving the highest order of excellence in Teaching and Research.

MISSION

Through multidimensional excellence, we value intellectual curiosity, pursuit of knowledge building and dissemination, academic freedom and integrity to enable the students to realize their potential. We promote technical mastery of Progressive Technologies, understanding their ramifications in the future society and nurture the next generation of skilled professionals to compete in an increasingly complex world, which requires practical and critical understanding of all aspects.

QUALITY POLICY

Sree Vidyanikethan Engineering College strives to establish a system of Quality Assurance to continuously address, monitor and evaluate the quality of education offered to students, thus promoting effective teaching processes for the benefit of students and making the College a Centre of Excellence for Engineering and Technological studies.

DEPARTMENT OF
COMPUTER SCIENCE AND SYSTEMS ENGINEERING

<u>VISION</u>

To become a centre of excellence in Computer Sciences and Systems Engineering through teaching, training, research and innovation to produce high quality engineering professionals who can solve the growing complex problems of the society and Industry.

<u>MISSION</u>

1. Established with the cause of development of technical education in advanced computer sciences and engineering with applications to systems there by serving the society and nation.

2. Transfer of Knowledge through contemporary curriculum and fostering faculty and student development.

3. Create keen interest for research and innovation among students and faculty by understanding the needs of the society and industry.

4. Skill development among diversity of students in technical domains and profession for development of systems and processes to meet the demands of the industry and research.

5. Imbibing values and ethics in students for prospective and promising engineering profession and develop a sense of respect for all.

PROGRAM EDUCATIONAL OBJECTIVES

After few years of graduation:
1. Graduate will pursue advanced studies in Computer Science domain and Management.
2. Graduates will be employed in reputed Software Industries and develop Quality Software Systems.
3. Graduates will have career progression through professional skill development, continuing education with ethical attitude.

PROGRAM OUTCOMES

After the completion of the program, a successful student will be able to :
1. Acquire knowledge of mathematics, sciences and concepts of Computer Sciences and Engineering.
2. Ability to perform analysis of electronic systems, computer systems and software systems to meet the requirements.
3. Design and develop computer, software, mobile, embedded systems and high performance computing systems.
4. Skills to solve problems in hardware and software systems.
5. Use of computer science principles and modern tools to computing systems engineering practice.
6. Create solutions of social context the impact of Computer Science and Systems Engineering.
7. Practice computer sciences and engineering in compliance with environmental standards.
8. Follow ethical code of conduct in professional activities.
9. Achieve personal excellence and ability to work in groups.
10. Develop effective communication in professional transactions.
11. Life skills for effective project management.
12. Appreciate the significance and applications of computer science and engineering and to engage in lifelong learning for knowledge and skill upgradation.

PROGRAM SPECIFIC OUTCOMES

After the completion of the program, a successful student will be able to :
1. Acquire Knowledge of mathematics, computer science and systems engineering to solve complex engineering problems.
2. Identify, analyze, design among alternatives and develop software for applications and systems in the domain of computers and its based systems to meet the societal needs.
3. Use the research based knowledge and methods to solve real world problems in the fields of computer science and systems engineering.
4. Apply appropriate techniques, use modern programming languages, and packages to simulate and develop software by thoroughly understanding the requirements of the system and its constraints in computer science and engineering.

SVEC14 - B.TECH - Computer Science and Systems Engineering

The Challenge of Change

*"**M**astery of change is in fact the challenge of moving human attention from an old state to a new state. Leaders can shift attention at the right time and to the right place. The real crisis of our times is the crisis of attention. Those who lead are the ones who can hold your attention and move it in a purposeful way. Transformation is nothing but a shift in attention from one form to another. The form of a beautiful butterfly breaks free from a crawling caterpillar. If you pay enough attention, you would be able to see how the butterfly hides within the caterpillar. The leader points out a butterfly when the follower sees only a caterpillar".*

- Debashis Chatterjee

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.

	Instruction Period: I Spell: 07 weeks II Spell : 12 weeks III Spell : 12 weeks	31 weeks
First Year B.Tech. (38 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:

Sl. No.	Course	Marks	Examination and Evaluation	Scheme of examination
1.	Theory	70	Year-end / Semester-end examination of 3 hours duration (External evaluation)	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.
		30	Mid-term Examination of 2 hours duration (Internal evaluation).	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.
				For I B.Tech: 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).
				For a Semester: 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).

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. O ne 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 performance at 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**: <u>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).</u>

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.*

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.

Rule No.	Nature of Malpractices/ Improper conduct	Punishment
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.

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 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

II Year – 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

II Year – 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

III Year – 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

III Year – 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

List of 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 Year – 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							
14BT71503	Kernel Programming							
14BT71504	Simulation and Modeling							
14BT70503	Advanced Computer Architecture	3	1	-	3	30	70	100
14BT81202	Cryptography and Network security							
14BT71204	Software Testing Techniques							
	Professional Elective - II							
14BT71505	Real-Time Systems							
14BT71506	Soft Computing							
14BT71507	Software Project Management	3	1	-	3	30	70	100
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

IV Year – II Semester

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							
14BT81502	Embedded Processors							
14BT81503	Human Computer Interaction							
14BT81504	Performance Evaluation of Computer Systems	3	1	-	3	30	70	100
14BT71201	Mobile Application Development							
14BT71205	Machine Learning							
	Professional Elective- IV							
14BT81505	Software Architecture							
14BT80502	Big Data							
14BT80533	Ad hoc Wireless Networks	3	1	-	3	30	70	100
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

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

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
14BT1BS04 : MATHEMATICAL METHODS
(Common to CSE, CSSE, IT, ECE, EIE and EEE)

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

L	T	P	C
3	1	-	6

PRE REQUISITE: 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/e, 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, 4/e, 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

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PREREQUISITE: 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

1. 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.
2. Analyze the problems and develop appropriate algorithms.
3. Implement various searching and sorting techniques
4. Apply basic data structures such as arrays, stacks and queues in application programs.
5. 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)

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

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L  T  P  C
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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:

Acquire analytical skills in

a) The estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.

b) Acquire analytical skills in the determination of PH of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.

c). 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

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:

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

1. Select the appropriate data structure and algorithm design method for a specified problem.
2. Design, code, test, debug, and execute programs in C.
3. 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) $2.5 \log x + \cos 32^0 + | x^2 + y^2 | + \sqrt{2xy}$

   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. 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.

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: $Sum = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
   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)

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.
   (e) Design document and presentations effectively.
   (f) Apply modern tools to develop IT based applications.
   (g) Gain effective communication skills through IT tools.
   (h) 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 <u>TWO</u> 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
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, 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 (07periods)

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 (08periods)

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 (09periods)

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   **(11periods)**

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 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, ð - 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. Demonstrate knowledge on
- Principles of Data Structures
- Linear and Non-linear Data Structures
- Sorting and hashing techniques

CO2. Analyze and Identify suitable data structure for computational problem solving.

CO3. Design solutions for complex engineering problems using linear and non-linear data structures

CO4. Develop solutions for Complex computational problems by conducting explorative analysis.

CO5. Apply appropriate data structure to provide solutions for real time problems by using C Language

CO6. Apply contextual knowledge of data structures to design applications for societal applications like payroll systems, web applications, banking and financial systems

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 Combinato rial Mathematics- an Applied Introduction", Pearson Educa tion, 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. Demonstrate practical knowledge on Stacks, Queues, Linked lists, Trees Sorting and Hashing Techniques.

CO2. Analyze suitable data structure to solve real world computing problems.

CO3. Design solutions for complex computational problems using linear and non-linear data structures.

CO4. Solve for Complex computational problems by conducting explorative analysis.

CO5. Use C language for implementing linear and non-linear data structures.

CO6. Apply contextual knowledge of data structures to design applications for societal requirements.

CO7. Communicate effectively using data structures with engineering community, being able to comprehend and write effective programs and Prepare Reports.

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.

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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 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 at a 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. Demonstrate knowledge on Operating system operations, services, file management, disk management, I/O management and protection

CO2. Identify the functionality involved in process management concepts like scheduling and synchronization

CO3. Design models for handling deadlock and perform memory management

CO4. Synthesize and apply programming API's to perform process management

CO5. Use appropriate protection tools to provide access control to Operating system users

CO6. Interpret the mechanisms adopted for 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 on instruction formats, addressing modes, instruction sets, I/O and programming.
CO2. Analyze one pass assemblers and multi pass assemblers through basic assembler functions
CO3. Design and develop bootstrap loaders, linkage editors and absolute loader using assembly language.
CO4. Acquire skills for programming macros, two-pass algorithm and a single-pass algorithm.
CO5. Use text editing tools for debugging and processing capabilities.
CO6. Learn and upgrade professionally in day-to-day practice while working with systems software.

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

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 Publish ers, 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 slecting 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. Illustrate the use of Java Scripts in dynamic WebPages.
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.
CO5. To explore different web extensions and web services standards.
CO6. Incorporate best practices in navigation, usability and written content to design websites that give users easy access to the information they seek

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.

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, .AI-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 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 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 management, 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 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 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.
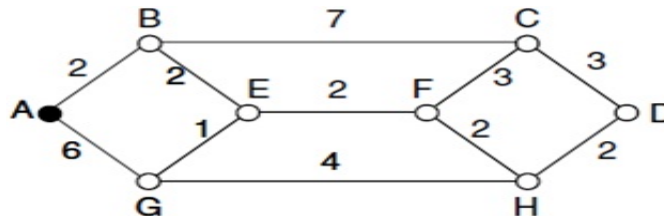
4. Design a program to obtain routing table for each node using distance vector routing algorithm by considering the given subnet with weights indicating delay between nodes.
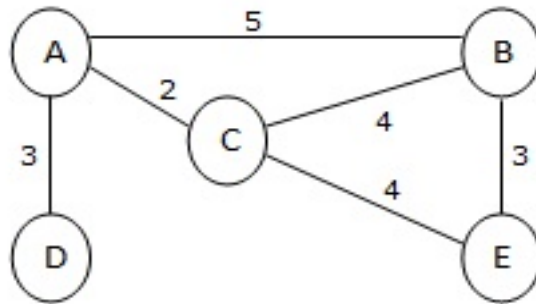
5. Simulate the Random Early Detection congestion control algorithm.
6. Encrypt the message "COMPUTER NETWORKS LAB" using caesar cipher with a key of 20. Ignore the space between words. Decrypt the message to get the original plain text.
7. Design a Lexical analyzer for the given language. The Lexical 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′ | ∈
    T→FT′
    T′→*FT′ | ∈
    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 retirement benefit 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.

Logo	Name of the Book Store			
Home	About Us	Collections	Contact Us	Cart
Computer Electrical Electronic Bio-Tech	User ID: [_____] Password: [_____] Submit Reset New User? Sign Up			

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: Design and develop Client Server network applications
CO4: Apply programming skills to solve problems relevant to client server architectures.
CO5: Demonstrate systematic and critical understanding of network programming principles
CO6: Build client server applications using network programming constructs.

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 its variants; 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

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

CO1.   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.

System calls for the File System: open, read, write, File and Record locking, adjusting the position of file I/O, close, file creation, creation of special files, change directory and change root, change owner and change mode, stat and fstat, pipes, dup, mounting and unmounting file systems, link, unlink, file system abstractions, file system maintenance.

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

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 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 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# AND EXCEPTION   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, Morgan Skinner, "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. Identify the suitable parallel processing approaches to achieve optimum computation.
CO3. Design Parallel Computing algorithms.
CO4. Acquire Skills in Parallel Programming to achieve high performance computing
CO5. Solve shared memory problems using OpenMP and Distributed memory problems using MPI
CO6. Create optimal solutions for complex problems using Parallel programming.

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," ARM 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: Demonstrate knowledge on principles, characteristics, tools and devices of Human Computer Interaction

CO2: Analyze the user requirements, technological and physical characteristics of users for better interface design.

CO3: Design appropriate user interface for desktop and web applications.

CO4: Conduct investigations on User requirements to provide an effective user interface.

CO5: Utilize user interface mockup tools and input, output and pointing devices for designing user interfaces.

CO6: Apply Contextual knowledge to develop interfaces for differently abled people.

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. Undertake research and solve real world problems in the project domain.

CO5. Use the appropriate techniques, resources and modern engineering tools necessary for mini-project work.

CO6. Apply project results for sustainable development of society.

CO7. Understand the impact of project results in the context of environmental sustainability.

CO8. Understand professional and ethical responsibilities for sustainable development of society in chosen field of project.

CO9. Perform harmonically in multi-cultural groups, and develop a high level of interpersonal skills.

CO10. Develop communication skills, both oral and written for preparing and presenting reports.

CO11. Manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.

CO12. Engage in lifelong learning to improve knowledge and competence continuously.

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 up to 6 months or fine up to Rs. 1,000/- or Both
Assaulting or using criminal force or criminal intimidation	Imprisonment up to 1 year or fine up to Rs. 2,000/- or Both
Wrongfully restraining or confining or causing hurt	Imprisonment up to 2 years or fine up to Rs. 5,000/- or Both
Causing grievous hurt, Kidnapping or rape or committing unnatural offence	Imprisonment up to 5 years or fine up to Rs. 10,000/-
Causing death or abetting suicide	Imprisonment up to 10 years or fine up to Rs. 50,000/-

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.**