ACADEMIC REGULATIONS

COURSE STRUCTURE

AND

DETAILED SYLLABI

OF

COMPUTER SCIENCE AND ENGINEERING
(DATA SCIENCE)
FOR
B.TECH REGULAR FOUR YEAR DEGREE PROGRAM
(For the batches admitted from 2020-2021)
&
FOR B.TECH LATERAL ENTRY PROGRAM
(For the batches admitted from 2021-2022)

CHOICE BASED CREDIT SYSTEM

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)
**(Affiliated to JNTUA, Ananthapuramu, Approved by AICTE, Programs Accredited by NBA,
Accredited by NAAC with 'A' grade)
SREE SAINATH NAGAR, A. Rangampet -517102:: NEAR TIRUPATI (A.P)**

VISION

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

MISSION

- ➢ To foster intellectual curiosity, pursuit and dissemination of knowledge.
- ➢ To explore students' potential through academic freedom and integrity.
- ➢ To promote technical mastery and nurture skilled professionals toface competition in ever increasing complex world.

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 ENGINEERING

VISION

To become a Centre of Excellence in Computer Science and Engineering by imparting high quality education through teaching, training and research

MISSION

➢ The Department of Computer Science and Engineering is established to provide undergraduate and graduate education in the field of Computer Science and Engineering to students with diverse background in foundations of software and hardware through a broad curriculum and strongly focused on developing advanced knowledge to become future leaders.

➢ Create knowledge of advanced concepts, innovative technologies and develop research aptitude for contributing to the needs of industry and society.

➢ Develop professional and soft skills for improved knowledge and employability of students.

➢ Encourage students to engage in life-long learning to create awareness of the contemporary developments in computer science and engineering to become outstanding professionals.

➢ Develop attitude for ethical and social responsibilities in professional practice at regional, National and International levels.

PROGRAM EDUCATIONAL OBJECTIVES

After few years of graduation, the graduates of B.Tech. CSE (DS) Program will be:

1. Pursuing higher studies in Data Science and relevant disciplines.

2. Employed in reputed Computer and I.T organizations and Government or have established start-up companies.

3. Able to demonstrate effective communication, engage in team work, exhibit leadership skills, ethical attitude, and achieve professional advancement through continuing education.

PROGRAM OUTCOMES

On successful completion of the Program, the graduates of B. Tech. CSE (DS) Program will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

On successful completion of the Program, the graduates of B.Tech.CSE(DS) Program will be able to:

PSO1: Use mathematical methodologies to model real-world problems, employ modern tools, platforms and hardware for efficient design and development of computer-based systems.

PSO2: Apply suitable statistical models, tools and techniques to perform data analysis and visualization for effective decision making.

PSO3: Apply adaptive algorithms and techniques to develop intelligent systems for solving problems from inter-disciplinary domains.

PSO4: Use appropriate Computer networking models, design and develop secured information systems using appropriate algorithms, standards and principles for efficient data security and communication.

B.Tech. Regular Four Year Degree Program
(For the batches admitted from the academic year 2020–21)
and
B.Tech. (Lateral Entry Scheme)
(For the batches admitted from the academic year 2021-22)

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

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 2020-2021 onwards. Any reference to "College" in these rules and regulations stands for SVEC.

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. It shall be ratified by the Academic Council in the forthcoming meeting. 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 in Engineering:

3.1.1.   Eligibility: A candidate seeking admission into the First Year of four year B.Tech. Degree Program should have:
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, Ananthapuramu) for admission as per the guidelines of Andhra Pradesh State Council of Higher Education (APSCHE).

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).

(c) By the Management (for 15% Supernumerary Quota) for Persons of Indian Origin (PIO)/Foreign Nationals (FN)/ Children of Indian Workers in Gulf Countries/ Overseas Citizen of India (OCI)

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

3.2.1. **Eligibility:** A candidate seeking admission into the Second Year of four year B.Tech. Degree Program (Lateral Entry) should have:

(i) Passed Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or equivalent Diploma recognized by JNTUA, Ananthapuramu).

(ii) 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:** 10% of the sanctioned strength in each Program of study as lateral entry students or as stipulated by APSCHE shall be filled in 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 leading to the award of B.Tech (Bachelor of Technology) Degree:

1) Civil Engineering

2) Electrical and Electronics Engineering

3) Mechanical Engineering

4) Electronics and Communication Engineering

5) Computer Science and Engineering

6) Electronics and Instrumentation Engineering

7) Information Technology

8) Computer Science and Systems Engineering

9) Computer Science and Business Systems

10) Computer Science and Engineering (Artificial Intelligence)

11) Computer Science and Engineering (Data Science)

5. Duration of the Program:

5.1   Minimum Duration: The program shall extend over a period of four years leading to the Degree of Bachelor of Technology (B.Tech) of the JNTUA, Ananthapuramu. The four academic years shall be divided into eight semesters with two semesters per year. Each semester shall normally consist of 22 weeks having - Continuous Internal Evaluation (CIE) and Semester End Examination (SEE), Choice Based Credit System (CBCS) and Credit Based Semester System(CBSS) as suggested by UGC and Curriculum/ Course Structure as suggested by AICTE/APSCHE are followed. Provision is made for lateral entry admission of students into the Second Year of the program in all the branches of study and they shall be required to satisfy the conditions of admissions thereto prescribed by the JNTUA, Ananthapuramu and Government of Andhra Pradesh.

5.2 Maximum Duration:

The student shall complete all the passing requirements of the B.Tech degree program within a maximum duration of 8 years (6 years for lateral entry), these durations reckoned from the commencement of the semester to which the student was first admitted to the program.

6.   Structure of the Program:

Each Program of study shall consist of:

(i)   HS (Humanities and Social Sciences) Courses

(ii)   BS (Basic Sciences) Courses

(iii) ES (Engineering Sciences) Courses

(iv) PC (Professional Core) Courses

(v) PE (Professional Electives)

(vi) OE (Open Electives) Courses

(vii) SO (Skill Oriented) Courses

(viii) Mandatory Courses (MC)

(ix) Audit Courses (AC)

(x)   Projects (PR) (Internship, Project Work)

S.No	Course Category	Course Type
1.	HS – Humanities and Social Sciences	Humanities, Social Sciences and Management.
2.	BS – Basic Sciences	Mathematics, Physics and Chemistry Courses, etc.
3.	ES – Engineering Sciences	Fundamental Engineering courses.
4.	PC – Professional Core	Core courses related to the Parent Discipline/ Branch of Engineering.
5.	PE – Professional Electives	Elective courses related to the Parent Discipline/ Branch of Engineering.
6.	OE – Open Electives	Electives from other technical and /or emerging courses
7.	SO (Skill Oriented) Courses	Basic and advanced skills related to the domain courses, soft skills course
8.	PR - Projects	Internship, Project Work
9.	MC - Mandatory Courses	Induction Program, Environmental Science, Universal Human Values
10.	AC - Audit Courses	Value Added Courses.

Contact Periods:

The contact periods per week are assigned depending on the complexity and volume of the course.

7.   Credit Courses:

All Courses are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Course in a L: T: P: C (Lecture Hours: Tutorial Hours: Practical Hours: Credits) Structure, based on the following general pattern.

- **Theory Courses:** One Lecture Hour (L) per week in a semester: 01 Credit
- **Practical Courses:** One Practical Hour (P) Per week in a semester: 0.5 Credit
- **Tutorial:** One Tutorial Hour (T) Per week in a semester: 01 Credit
- **Mandatory Courses:** No **CREDIT** is awarded.
- **Audit Courses:** No **CREDIT** is awarded.

Student activities like NCC, NSS, Sports, Study Tour and Guest Lecture etc. shall not carry ANY Credits.

For Internship and Project Work, where formal contact periods 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 a total of **160** credits. However the curriculum for students admitted under lateral entry shall have a total of **121** credits.

8. Choice Based Credit System (CBCS):

Choice Based Credit System (CBCS) is introduced in line with UGC guidelines in order to promote:

- Student centred learning
- Students to learn courses of their choice
- Interdisciplinary learning

A Student has a choice of registering for courses comprising program core, professional electives, open electives, value added, Skill oriented courses etc. Besides, choice is also offered to students for registering courses to earn Minor in Engineering/Honors degree.

9. Course Enrollment and Registration

9.1 Each student, on admission shall be assigned to a Faculty Advisor (Mentor) who shall advice and counsel the student about the details of the academic program and the choice of courses considering the student's academic background and career objectives.

9.2 Each student on admission shall register for all the courses prescribed in the curriculum in the student's first and second Semesters of study. The student shall enroll for the courses with the help of the student's Faculty Advisor (Mentor). The enrollment for the courses from II B.Tech I Semester to IV B.Tech I Semester shall commence 10 days prior to the last instructional day of the preceding semester for registration process. If the student wishes, the student may drop or add courses (vide clause 8) 10 days prior to commencement of the concerned semester and complete the registration process duly authorized by the Chairman, Board of Studies of concerned department.

9.3 If any student fails to register the courses in a semester, he shall undergo the courses as per the program structure.

9.4 After registering for a course, a student shall attend the classes, satisfy the attendance requirements, earn Continuous Assessment marks and appear for the Semester-end Examinations.

9.5 Elective courses shall be offered by a Department only if a minimum of 40 students register for that course.

10. Break of Study from a Program (Gap Year)

10.1 A student is permitted to go on break of study for a maximum period of two years either as two breaks of one year each or a single break of two years.

10.2 In case, a student wishes to extend the gap year for one more consecutive year, he shall be permitted with the prior approval of the Principal on the recommendations of the Head of the Department prior to the beginning of the semester in which he has taken break of study.

10.3 The student shall apply for break of study in advance, in any case, not later than the last date of the first assessment period in a semester. The gap year concept is introduced for start-up (or) incubation of an idea, National/International Internships, and professional Volunteering. The application downloaded from the website and duly filled in by the student shall be submitted to the Principal through the Head of the department. A committee shall be appointed by the Principal in this regard. Based on the recommendations of the committee, Principal shall decide whether to permit the student to avail the gap year or not.

10.4 The students permitted to rejoin the program after break of study shall be governed by the Curriculum and Regulations in force at the time of rejoining.

The students rejoining in new regulations shall apply to the Principal in the prescribed format through Head of the Department, at the beginning of the readmitted semester for registering additional/equivalent courses to comply with the curriculum in-force.

10.5 The two years period of break of study shall not be counted for the maximum Period of graduation (i.e the maximum period of graduation is 10 years for Regular admitted students and 8 years for Lateral Entry admitted students availing Gap Year).

10.6 If a student has not reported to the college after completion of the approved period of break of study he is deemed to be detained in that semester. Such students are eligible for readmission into the semester when offered next.

11. Examination System:

11.1 All components in any Program of study shall be evaluated through internal evaluation and/or an external evaluation conducted as Semester-end examination.

Sl. No.	Course	Marks	Examination and Evaluation		Scheme of examination
1.	Theory	70		Semester-end examination for 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 **FIVEEITHER/OR** type questions, **ONE EITHER/OR** type question from each unit [totally ten questions from Q. No. 1 to 10)] of which student has to answer one from each EITHER/OR type question and shall be evaluated each for 14 marks.
		30	10	Assignments (Internal evaluation)	One Assignment shall be given to the student for 10 marks during the semester.
			20	Mid-term Examination of 2 hours duration (Internal evaluation)	Two mid-term examinations each for 20 marks shall be conducted. For a total of 20 marks, 80% of better one of the two and 20% of the other one are added and finalized, any fraction shall be rounded off to the higher integer number. The examination shall be conducted and evaluated for 40 marks and scaled down to 20 marks, any fraction shall be rounded off to the higher integer number. **Mid-I:** After first spell of instruction (I & II Units). **Mid-II**: After second spell of instruction (III, IV & V Units). The question paper shall of descriptive type with two parts i.e., Part-A and Part-B. Part-A shall contain 5 short answer questions [Q. No. 1 (a) to (e)] and evaluated each for 2 marks. Part-B shall contain three EITHER/OR type questions [totally six questions from Q. No. 2 to 7)] of which student has to answer one from each EITHER/OR type question and shall be evaluated each for 10 marks. Further, in the case of Part-B of Mid-I, one EITHER/OR type question from each unit and third either or type question from both the units; and for Mid-II, one EITHER/OR type question from each unit.
2	Laboratory	70		Semester-end Lab Examination for 3 hours duration (External evaluation)	The examination shall be conducted by the faculty member handling the laboratory (Examiner-2) and another faculty member (Examiner-1) appointed by the Chief Controller of Examinations.
		30	20	Day-to-Day evaluation for Performance in laboratory experiments and Record. (Internal evaluation)	Two laboratory examinations each for 30 marks which include Day-to-Day evaluation and Practical examination shall be evaluated by the faculty member. For a total of 30 marks 80% of better one of the two and 20% of the other one are added and finalized, any fraction shall be rounded off to the higher integer number.

Sl. No.	Course	Marks	Examination and Evaluation		Scheme of examination
			10	Practical Examination (Internal evaluation)	**Mid-I:** Shall be conducted just before FIRST mid-term theory examinations. **Mid-II:** Shall be conducted just before SECOND mid-term theory examinations.
3	Mandatory courses	30	Internal Evaluation		Shall be evaluated as given in 11.2.1
4	Audit Courses	-	-		As detailed in 11.2.2

11.2 Mandatory Course/ Audit Course Evaluation:

11.2.1 Mandatory Courses:

Mandatory courses carry **"ZERO"** credits. There shall be **NO Semester-end** examination. However, ATTENDANCE in Mandatory courses shall be considered while calculating aggregate attendance in a semester. The mid-term examination shall be conducted and evaluated similar to the THEORY courses. The student shall be declared to have passed the mandatory courses only when HE secures **40% marks in the internal evaluation.** If the student FAILS, a re-examination shall be conducted for FAILED candidates in the CONSECUTIVE semester. The performance of the student shall be indicated in the grade sheets "**SATISFACTORY" (or) "NOT SATISFACTORY"** as given in 14.1**.** The student should pass all the mandatory courses, for the award of B.Tech degree.

11.2.2 Audit Courses:

Audit courses carry "**ZERO**" credits. There shall be **NO mid-term** and **Semester-end examination**. However, ATTENDANCE in Audit courses shall be considered while calculating aggregate attendance in a semester. The student should study all the audit courses, and it shall be indicated in the GRADE Sheet.

11.3. Eligibility to appear for the Semester-End Examination (SEE):

11.3.1 A student shall be eligible to appear for semester-end examinations if he acquires a minimum of 40% in each subject and 75% of attendance in aggregate of all the courses in a semester.

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

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

11.3.4 Students whose shortage of attendance is not condoned in any semester are not eligible to take their semester-end examinations of that class and their registration shall stand cancelled.

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

11.3.6 A stipulated fee shall be payable to the College towards Condonation of shortage of attendance.

11.3.7 For the calculation of a student attendance in any semester, the total number of classes conducted shall be counted as scheduled in the class-work time table.

11.4. Evaluation:

Following procedure governs the evaluation.

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

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

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

11.5. Recounting /Revaluation/Personal Verification/ Challenging Evaluation:

Students shall be permitted to apply for **Recounting /Revaluation/Personal Verification/ Challenging Evaluation** of the Semester-end examination answer scripts within a stipulated period after payment of the prescribed fee. After completion of the process of **Recounting /Revaluation/Personal Verification/ Challenging Evaluation**, the 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.

11.6. Supplementary Examination:

In addition to the regular semester-end examinations conducted, the College may also schedule and conduct supplementary examinations for all the courses

of other semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

12. **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:

12.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory course, laboratory course, Internship and project work, if he secures not less than 35% 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.

12.2 A student shall be promoted from second year to third year of Program of study only if he fulfills the academic requirement of securing 40% credits (rounded off to lower integer number) from the following examinations (Irrespective of whether or no the candidate appears for the semester-end examinations as per the normal course of study):

  a. **One** regular and **two** supplementary examinations of I B.Tech I Semester.

  b. **One** regular and **one** supplementary examinations of I B.Tech II Semester.

  c. **One** regular examination of II B.Tech I Semester.

12.3 A student shall be promoted from third year to fourth year of Program of study only if he fulfills the academic requirements of securing 40% credits (rounded off to lower integer number)from the following examinations (Irrespective of whether or not the candidate appears for the semester-end examinations as per the normal course of study):

  a. **One** regular and **four** supplementary examinations of I B.Tech I Semester.

  b. **One** regular and **three** supplementary examinations of I B.Tech II Semester.

  c. **One** regular and **two** supplementary examinations of II B.Tech I Semester.

  d. **One** regular and **one** supplementary examinations of II B.Tech II Semester.

  e. **One** regular examination of III B.Tech I Semester.

  * In case of getting detained for want of credits by sections 12.2 and 12.3 above, the student may make up the credits through supplementary examinations.

12.4   A student shall register for all the 160 credits and earn all the 160 credits. Marks obtained in all the 160 credits shall be considered for the calculation of the CLASS based on CGPA.

12.5   A student who fails to earn 160 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 2021-2022):

12.6   A student shall be deemed to have satisfied the minimum academic requirements for each theory course, laboratory course, Internship and project work, if he secures not less than 35% 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.

12.7   A student shall be promoted from third year to fourth year of Program of study only if he fulfills the academic requirements of securing 40% credits (rounded off to lower integer number) from the following examinations (Irrespective of whether or not the candidate appears for the semester-end examinations as per the normal course of study):

   a. **One** regular and **Two** supplementary examinations of II B.Tech I Semester.

   b. **One** regular and **One** supplementary examinations of II B.Tech II Semester.

   c. **One** regular examination of III B.Tech 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.

12.8   A student shall register for all 121 credits and earn all the 121 credits. Marks obtained in all the 121 credits shall be considered for the calculation of the CLASS based on CGPA.

12.9   A student who fails to earn 121 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.

13. 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 shall 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.

14. Grades, Semester Grade Point Average and Cumulative Grade Point Average:

14.1. 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.

% of Marks obtained	Grade	Description of Grade	Grade Points (GP)
≥90	A+	Outstanding	10
≥80 to <90	A	Excellent	9
≥70 to < 80	B	Very Good	8
≥ 60 to < 70	C	Good	7
≥ 50 to < 60	D	Fair	6
≥ 40 to < 50	E	Satisfactory	5
< 40	F	Fail	0
Absent	N	Absent	0
For Mandatory Courses			
≥40	P	Satisfactory	-
<40	I	Not Satisfactory	-

Pass Marks:
A student shall be declared to have passed theory course, laboratory course, and project work if he secures minimum of 35% marks (Rounded off to lower integer number) in external examination, and a minimum of 40% marks in the sum total of internal evaluation and external examination taken together. Otherwise, he

shall be awarded fail grade - '**F**' in such a course irrespective of internal marks. '**F**' is considered as a fail grade indicating that the student has to pass the Semester-End Examination in that course in future and obtain a grade other than '**F**' and '**N**' for passing the course.

For the Mandatory Courses, if the student obtained 40% or more marks, then his performance shall be indicated as "P" (SATISFACTORY), otherwise the performance shall be indicated as "I" (NOT SATISFACTORY) in the grade sheet.

14.2. Semester Grade Point Average (SGPA): SGPA shall be calculated as given below on a "10 point scale" as an index of the student's performance:

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

Where "C" denotes the "credits" assigned to the courses undertaken in that semester and "GP" denotes the "grade points" earned by the student in the respective courses.

Note: SGPA is calculated only for the candidates who appeared in the semester-end regular examinations in a particular semester:

14.3. Cumulative Grade Point Average (CGPA):

The CGPA shall be calculated for a candidate who appeared in the Semester-end examination (including Regular & Supplementary) till that semester. The CGPA shall be displayed in the Grade sheet of the Regular Semester-end examinations and also in the consolidated Grade Sheet issued at the end of 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.

Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

As per AICTE regulations, conversion of CGPA into equivalent percentage as follows:

Equivalent Percentage = (CGPA – 0.50) x 10

15. **Grade Sheet:** A grade sheet (Marks Memorandum) shall be issued to each student indicating the SGPA and CGPA, provided if he passed all the courses registered in the regular semester-end examinations.

16. **Consolidated Grade Sheet:** After successful completion of the entire Program of study, a Consolidated Grade Sheet indicating performance of all academic years shall be issued as a final record. Duplicate Consolidated Grade Sheet shall also be issued, if required, after payment of requisite fee.

17. **Award of Degree**: <u>The Degree shall be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendations of the Chairman, Academic Council, SVEC (Autonomous).</u>

17.1. **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.

17.2. **Award of Class:** Awarding of Class is based on CGPA.

Awarding of Class

CGPA Secured	Class Awarded
≥7.5	First Class with Distinction
≥6.5 and <7.5	First Class
≥5.5 and <6.5	Second Class
≥5.0 and <5.5	Pass Class

18. Additional Academic Regulations:

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

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

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

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

19. Withholding of Results:

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

20. Re-Registration for Improvement of Internal Marks:

Following are the conditions to avail the benefit of improvement of internal marks.

20.1 The candidate should have completed the 4 years of B.Tech course work and obtained examinations results from I B.Tech I Semester to IV B.Tech II semester.

20.2 Out of the courses the candidate has failed in the examinations due to internal evaluation marks secured being less than 40%, the candidate shall be given a chance for improvement of internal evaluation marks in the failed theory courses.

20.3 This provision is only for Theory courses. The candidate has to register for the chosen courses and fulfil the academic requirements (i.e. a student has to attend the classes regularly and appear for the mid-examinations and satisfy the attendance requirements to become eligible for appearing at the semester-end examinations).

20.4 For each course, the candidate has to pay a fee of Rs. 10,000/- and the amount is to be remitted in the form of D.D. in favor of the Principal, Sree Vidyanikethan Engineering College payable at Tirupati along with the requisition through the concerned Head of the Department.

20.5 In the event of availing the provision of Improvement of Internal evaluation marks, the internal evaluation marks as well as the Semester-end Examinations marks secured in the previous attempt(s) for the re-registered courses shall stand cancelled.

21.   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., with the recommendations of the concerned Board(s) of Studies.

21.   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.

**GUIDELINES 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. 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 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. The candidate is also debarred for four consecutive semesters from class work and all Semester-end examinations, if his involvement is established. Otherwise, The candidate is debarred for two consecutive semesters from class work and all Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out	Expulsion from the examination hall and cancellation of performance in that course and all the other

		the question paper during the examination or answer book or additional sheet, during or after the examination.	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. The candidate is also debarred for two consecutive semesters from class work and all 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. 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. The candidate is also debarred for two consecutive semesters from class work and all 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. 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 Semester-end Examinations in that course(s) consequently and has to fulfill all the norms required for the award of Degree.

SVEC20 CURRICULUM

Course Structure for B.Tech. Program
(Effective from the Academic year 2020-21 onwards)

COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

Mandatory Induction Program	03 weeks duration
Induction program offered before commencement of the I-Semester course work	Physical activity
	Creative Arts
	Universal Human Values
	Literary
	Proficiency Modules
	Lectures by Eminent People
	Visits to local Areas
	Familiarization to Department/Branch and Innovations

COURSE STRUCTURE

I B. Tech. – I Semester

Sl. No.	Course Code	Course Title	Contact Periods per week				C	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1.	20BT1BS01	Differential Equations and Multivariable Calculus	3	-	-	3	3	30	70	100
2.	20BT1BS03	Engineering Physics	3	-	-	3	3	30	70	100
3.	20BT1HS01	Communicative English	3	-	-	3	3	30	70	100
4.	20BT11201	Programming for Problem Solving	3	-	-	3	3	30	70	100
5.	20BT10201	Basic Electrical and Electronics Engineering	3	-	-	3	3	30	70	100
6.	20BT1BS32	Engineering Physics Lab	-	-	3	3	1.5	30	70	100
7.	20BT1HS31	Communicative English Lab	-	-	3	3	1.5	30	70	100
8.	20BT11231	Programming for Problem Solving Lab	-	-	3	3	1.5	30	70	100
9.	20BT1MC01	Universal Human Values (Mandatory Course)	2	-	-	2	-	30	-	30
		Total:	17	-	09	26	19.5	270	560	830

I B. Tech. – II Semester

Sl. No.	Course Code	Course Title	Contact Periods per week				C	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1.	20BT2BS01	Transformation Techniques and Linear Algebra	3	-	-	3	3	30	70	100
2.	20BT1BS02	Engineering Chemistry	3	-	-	3	3	30	70	100
3.	20BT20501	Digital Logic Design	3	-	-	3	3	30	70	100
4.	20BT21501	Object Oriented Programming through Java	3	-	-	3	3	30	70	100
5.	20BT10331	Computer Aided Engineering Drawing	-	1	4	5	3	30	70	100
6.	20BT1BS31	Engineering Chemistry Lab	-	-	3	3	1.5	30	70	100
7.	20BT10332	Engineering Workshop	-	-	3	3	1.5	30	70	100
8.	20BT21531	Object Oriented Programming through Java Lab	-	-	3	3	1.5	30	70	100
9.	20BT1HSAC	Spoken English (Audit Course)	2	-	-	2	-	-	-	-
		Total:	14	1	13	28	19.5	240	560	800

I B. Tech. - I Semester

(20BT1BS01) DIFFERENTIAL EQUATIONS AND MULTIVARIABLE CALCULUS

(Common to CE, ME, EEE, ECE, EIE, CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

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

PRE-REQUISITES:-

COURSE DESCRIPTION: Ordinary Differential Equations; Partial Differential Equations; Multivariable Calculus (Differentiation); Multivariable Calculus (Integration); Multivariable Calculus (Vector Calculus).

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

CO1. Formulate and solve differential equations by applying knowledge of calculus for engineering problems.

CO2. Demonstrate knowledge in multivariable calculus for evaluating multiple integrals through techniques of integration.

CO3. Identify scalar and vector valued functions and evaluate vector integrals through knowledge of vector integral theorems and techniques.

DETAILED SYLLABUS:

UNIT-I: ORDINARY DIFFERENTIAL EQUATIONS   (09 Periods)

Ordinary Differential Equation: Order and Degree of Differential Equation; Second and higher order linear differential equations with constant coefficients: Non-Homogeneous equations with R.H.S terms of the type e^{ax}, $\sin ax$, $\cos ax$, polynomials in x, $e^{ax}V(x)\ and\ xV(x)$; method of variation of parameters; Equations reducible to linear differential equations with constant coefficients: Cauchy's homogeneous and Legendre's linear equations; Applications to L-C-R Circuit problems.

UNIT-II: PARTIAL DIFFERENTIAL EQUATIONS   (09 Periods)

Formation of PDE, solutions of first order linear PDEs, Solution to homogenous and non-homogenous linear partial differential equations of second and higher order by complimentary function and particular integral method, method of Separation of variables in Cartesian coordinates.

UNIT-III: MULTIVARIABLE CALCULUS (DIFFERENTIATION)   (09 Periods)

Partial derivatives, Chain rule, Total derivative, Jacobian, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT-IV: MULTIVARIABLE CALCULUS (INTEGRATION)   (09 Periods)

Evaluation of Double integrals (Cartesian and polar coordinates), Change of order of integration (Cartesian form only); Evaluation of Triple integrals; Change of variables: double integration from Cartesian to polar coordinates, Triple integration from Cartesian to spherical polar coordinates; Areas enclosed by plane curves.

UNIT-V: MULTIVARIABLE CALCULUS (VECTOR CALCULUS)   **(09 Periods)**

Vector Differentiation: Scalar and Vector fields: Gradient of a scalar field, directional derivative, divergence of a vector field, solenoidal vector, curl of a vector field, irrotational vector, Laplacian operator. **Vector Integration:** Line integral - circulation-work done, Surface integral and Volume integral; Vector integral theorems: Theorems of Green, Gauss and Stokes (without proofs)-Problems related to theorems.

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. T. K. V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M. V. S. S. N. Prasad, *Engineering Mathematics, vol-1*, S. Chand and Company, 13th edition, 2014.

2. B. S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 44th edition, 2017.

REFERENCE BOOKS:

1. Dennis G. Zill and Warren S. Wright, *Advanced Engineering Mathematics*, Jones and Bartlett, 6th edition, 2011.

2. R. K. Jain and S. R. K. Iyengar, *Advanced Engineering Mathematics*, Alpha Science International Ltd., 6th edition, 2017.

3. Erwin kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th edition, 2006.

I B. Tech. – I Semester
(20BT1BS03) ENGINEERING PHYSICS
(Common to EEE, ECE, EIE, CSE(AI) and CSE(DS))

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

PRE-REQUISITES:-

COURSE DESCRIPTION: Wave Optics; Electromagnetic Waves; Fiber Optics; Semiconductors; Optoelectronic Devices; Dielectrics; Magnetic materials; Superconductors and Nanomaterials.

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

CO1. Apply the knowledge of light waves to interpret the concepts of Interference, Diffraction and Polarization.

CO2. Demonstrate the concepts of electromagnetic wave propagation in Optical fibers.

CO3. Apply the basic knowledge of semiconductors to understand the functioning of various optoelectronic devices.

CO4.Demonstrate the basic knowledge of dielectric and magnetic properties to understand the various dielectric polarizations and magnetic materials.

CO5. Understand the concepts of superconductors and nanomaterials to familiarize their applications in relevant fields.

DETAILED SYLLABUS:

UNIT-I: WAVE OPTICS (09 Periods)

Interference: Introduction- Interference of light - Theory of interference fringes - Conditions for sustained interference - Interference in thin films (reflected light) - Newton's rings - Determination of wavelength.

Diffraction: Fraunhofer diffraction - Single slit diffraction (qualitative) - Double slit diffraction (qualitative) -Diffraction grating.

Polarization: Polarization by reflection, refraction and double refraction - Nicol's prism - Half wave and Quarter wave plate - Engineering applications of interference, diffraction and polarization.

UNIT-II: ELECTROMAGNETIC WAVES AND FIBER OPTICS (09 Periods)

Divergence, Curl of Electric and Magnetic Fields - Maxwell's Equations (qualitative) - Electromagnetic wave propagation through non conducting medium

Introduction to fiber optics - Total Internal Reflection - Critical angle of propagation - Acceptance angle, Acceptance cone - Numerical Aperture - Classification of fibers based on Refractive index profile, modes - Propagation of electromagnetic wave through optical fiber - Block diagram of fiber optic communication - Applications of an optical fiber - Fiber optic Sensors (temperature, displacement).

UNI- III: SEMICONDUCTORS   AND OPTOELECTRONIC DEVICES   (10 Periods)

Introduction - Intrinsic semiconductors - Density of electrons in intrinsic semiconductor - Density of holes in intrinsic semiconductor (qualitative) - Intrinsic carrier concentration -

Fermi energy - Electrical conductivity of intrinsic semiconductors - Extrinsic semiconductors - Density of charge carriers in Extrinsic semiconductors (qualitative) - Drift and Diffusion currents -Direct and Indirect band gap semiconductors - Hall effect, Hall coefficient and Applications - pn junction

Optoelectronic devices : Light Emitting Diode(LED), Photodiode and Semiconductor diode laser.

UNIT-IV: DIELECTRICS AND MAGNETIC MATERIALS   (09 Periods)

Introduction - Electric polarization - Dielectric polarizability, susceptibility and dielectric constant - Types of polarizations (qualitative) - Frequency dependence of polarization - Lorentz (internal) field - Dielectric break down - Piezoelectricity - Applications of dielectrics.

Introduction - Magnetic dipole moment, magnetization, magnetic susceptibility and permeability - Origin of magnetic moment - Classification of magnetic materials - Hysteresis loop - Soft and hard magnetic materials - Applications.

UNIT-V: SUPERCONDUCTORS AND NANOMATERIALS   (08 Periods)

Introduction – Properties of Superconductors - Critical parameters of Superconductors - Meissner effect - Penetration depth - Types of Superconductors - BCS Theory - Josephson effect (AC & DC) - High T_C Superconductors – Applications of Superconductors,.

Basic principles of nanomaterials - Synthesis of nanomaterials by Ball Milling and Pulsed Laser Deposition(PLD) methods - Properties of nanomaterials (Physics, Electrical, Magnetic, Mechanical and Optical) - Applications of nanomaterials.

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. M.N. Avadhanulu, P.G. Kshirsagar & T.V.S Arun Murthy, A Text book of Engineering Physics, S. Chand Publications, 11th edition, 2019.
2. P. K. Palaniswamy, Engineering Physics, Scitech Publications India Private Limited, 2nd edition, 2009.

REFERENCE BOOKS:

1. K. Thyagarajan, *Engineering Physics*, McGraw-Hill Education (India) Pvt. Ltd, 2016.
2. R.K. Gaur and S.L. Gupta, *Engineering Physics*, Dhanpat Rai Publications (P) Ltd, 2015.

I B. Tech. - I Semester
(20BT1HS01) COMMUNICATIVE ENGLISH
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

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

PRE-REQUISITES:-

COURSE DESCRIPTION: Introduction to Communication; Active Listening; Effective Speaking; Reading and Technical Writing.

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

CO1. Demonstrate knowledge of English language, examining and applying the aspects of Process of communication, Paralinguistic features, Skimming, Scanning, and Elements of style in writing.

CO2. Analyze the modes and techniques of listening, speaking, reading, writing and apply them appropriately to communicate effectively with the engineering community and society.

CO3. Apply reading and writing techniques in preparing documents by examining SQ3R Technique, Writer's Block, and Précis Writing.

CO4**.** Communicate effectively in Conferences, Symposia, Seminars and in formal and real time situations by applying appropriate speaking techniques learnt by examining different communication styles used in similar contexts.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO COMMUNICATION   (09 Periods)

Introduction – Language as a Tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Modes of Communication – Barriers to Communication (classification).

UNIT-II: ACTIVE LISTENING   (09 Periods)

Introduction – Traits of a Good Listener – Listening Modes – Types of Listening – Barriers to Effective Listening – Listening for General Content and Specific Information.

UNIT-III: EFFECTIVE SPEAKING   (09 Periods)

Introduction – Achieving Confidence, Clarity and Fluency – Paralinguistic Features – Barriers to Speaking – Types of Speaking – Conferences; significance, planning and preparation and procedure – Symposia and Seminars - Persuasive Speaking.

UNIT-IV: READING   (09 Periods)

Introduction – Reading and Interpretation – Intensive and Extensive Reading – Critical Reading – Techniques for Good Comprehension – SQ3R Reading Technique – Study Skills.

UNIT-V: TECHNICAL WRITING   **(09 Periods)**

Introduction – Language – Elements of Style – Techniques for Good Technical Writing – Paragraphs Construction – Essays: types, Steps to Essay Writing and Checklist – Précis Writing.

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:
1. Meenakshi Raman & Sangeetha Sharma, *Technical Communication*, Oxford University Press, New Delhi, 2012.
2. Ashraf Rizvi*, Effective Technical Communication*, McGraw-Hill Education (India) Pvt. Ltd., New Delhi, 2018.

REFERENCE BOOKS:
1. Sanjay Kumar &Pushp Lata, *Communication Skills*, Oxford University Press, New Delhi, 2013.
2. Rajendra Pal and J. S. Korlahalli, *Essentials of Business Communication*, Sultan Chand and Son, New Delhi, 2010.

ADDITIONAL LEARNING RESOURCES:
- https://www.skillsyouneed.com/ips/active-listening.html: A useful summary of what active listening skills are.
- https://en.wikipedia.org/wiki/Active_listening: Wikipedia entry about active listening.
- https://www.forbes.com/sites/womensmedia/2012/11/09/10-steps-to-effective-listening/#4b27a2503891: Ten steps to Active Listening (by Forbes magazine).
- https://goo.gl/t1Uqrt: 20 tips for organizing a conference.
- https://goo.gl/kPMr9u: 10 important issues for speakers at a conference.
- https://goo/gl/C5bDvv: Wikihow guide to organizing a conference.

I B. Tech. – I Semester
(20BT11201) PROGRAMMING FOR PROBLEM SOLVING
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

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

PRE-REQUISITES: A Course on Basic Mathematics.

COURSE DESCRIPTION: Introduction to C Programming; Operators and Expressions; Input and Output Functions; Control Structures; Problem Solving Aspects; Arrays and Strings; Functions; Pointers; Structures and Unions; File Handling.

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

CO1. Demonstrate knowledge on C programming constructs to develop programs.

CO2.Design algorithms using problem-solving techniques for given problems.

CO3. Apply functions and Arrays to enhance reusability and data manipulation.

CO4. Use pointers to manage the memory effectively.

CO5. Apply Structures, Unions and File handling concepts to develop societal applications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO C PROGRAMMING   (09 Periods)

Basics of C Programming: Introduction, Structure of a C program, Concept of a variable, Data types in C, Program statement, Declaration, Storing the data in memory, Tokens, Operators and expressions, Lvalues and Rvalues, Type conversion in C.

Input and Output: Basic screen and keyboard I/O in C, Non-formatted input and output, formatted input and output functions.

UNIT-II: CONTROL STATEMENTS AND INTRODUCTION TO PROBLEM SOLVING

(08 Periods)

Control Statements: Specifying test condition for selection and iteration, Writing test expression, Conditional execution and selection, Iteration and repetitive execution, goto statement, Special control statements, Nested loops.

Introduction to Problem Solving: Algorithms, Flowcharts, Problem solving aspect, Top-down design, Implementation of algorithms, program verification and efficiency of algorithms.

UNIT-III: ARRAYS AND STRINGS, FUNCTIONS   (10 Periods)

Arrays and Strings: One-dimensional array – Declaration, Initialization, Accessing elements, operations; Multi-dimensional arrays – Declaration, Initialization, Working with 2D arrays; Strings – Declaration, Initialization, Printing strings, String input, Character manipulation, String manipulation; Arrays of strings – Initialization, manipulating string arrays.

Functions: Concept of function, Using functions, Call by value mechanism, working with functions, passing arrays to functions, Scope and extent, Storage classes, Recursion.

UNIT-IV: POINTERS   **(08 Periods)**

Pointers in C: Understanding memory addresses, Address operator (&), Pointer – declaration, Initialization, Indirection operator and dereferencing, Void and Null pointers, Use of pointers, Arrays and pointers, Pointers and strings, Pointer arithmetic, Pointers to pointers, Array of pointers, Pointers to an array, Two-dimensional arrays and pointers, Pointers to functions, Dynamic memory allocation.

UNI- V: USER-DEFINED DATA TYPES   AND FILES   **(10 Periods)**

User-Defined Data Types: Structures - Declaration, Accessing the members, Initialization, typedef and its use, Arrays of structures, Arrays within structure, Structures and pointers, Structures and functions; Unions, Enumeration types, Bitfields.

Files in C: Using files in C, Working with text and binary files, Direct File Input and Output, Files of records, Random access to files of records.

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. Pradip Dey and Manas Ghosh, *Programming in C*, Second Edition, Oxford University Press, New Delhi, 2013.
2. R. G. Dromey, *How to Solve it by Computer*, First Edition, Pearson Education, 2013.

REFERENCE BOOKS:

1. Byron S Gottfried and Jitender Kumar Chhabra, Programming with C, Fourth Edition, McGraw Hill Education, 2019.
2. Yashavant Kanetkar, Let Us C, Fifteenth Edition, BPB Publications, 2017.
3. E. Balagurusamy, Programming in C, Seventh Edition, McGraw Hill Education Pvt, Ltd, New Delhi, 2017.
4. Behrouz A. Forouzan and Richard F. Gilberg, Computer Science: A Structured Programming Approach Using C, Third Edition, Cengage Learning, 2008.

ADDITIONAL LEARNING RESOURCES:

- Learn C Programming - https://www.programiz.com/c-programming
- Learn C Programming - https://www.tutorialspoint.com/cprogramming/index.htm
- C Programming Exercises, Practice, Solution - https://www.w3resource.com/c-programming-exercises/
- Basic programming exercises and solutions in C- https://codeforwin.org/2015/05/basic-programming-practice-problems.html

I B. Tech. – I Semester
(20BT10201) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to ME, EEE, ECE, EIE, CSE, CSSE, IT, CSE(AI) and CSE(DS))

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

PRE-REQUISITES: -

COURSE DESCRIPTION: Principles of Electrical Systems; AC & DC Machines; Semiconductor Devices and Op-Amps.

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

CO1. Analyze electrical circuits by applying the conceptual knowledge of circuit concepts.

CO2. Demonstrate knowledge on various generation technologies, protection devices, safety procedures and BEE standards.

CO3. Demonstrate knowledge on characteristics and applications of transformers and AC machines.

CO4. Demonstrate knowledge on characteristics and applications of diode, BJT and Op-amps.

DETAILED SYLLABUS:

UNIT-I: PRINCIPLES OF ELECTRICAL SYSTEMS-I   (09 Periods)

Basic electrical sources: DC-Battery, AC sources–Single loop generator; Single phase and three phase supply; Electrical circuit elements (R, L and C), Ohm's law, Kirchhoff's laws, Representation of sinusoidal waveforms, peak and RMS values, phasor representation, reactive power, apparent power, real power, energy and power factor.

UNIT-II: PRINCIPLES OF ELECTRICAL SYSTEMS-II   (09 Periods)

Significance of Power factor and power factor correction, most economical power factor. Typical layout of electrical grid; Typical layout and operation of Hydro, Thermal and Solar Power Plants; Fuse, circuit breaker (MCB, MCCB, RCCB, ELCB), relay (elementary treatment); Inverter and UPS. Energy Efficiency (Star rating) standards by BEE.

UNIT-III: TRANSFORMERS AND MACHINES   (10 Periods)

Construction and working of a single phase transformer, EMF Equation; Construction, working and applications of Permanent Magnet DC Motor, Brushless DC Motor, three phase induction motor; construction, working and applications of stepper motor, resistor start & capacitor start and run single phase induction motor.

UNIT-IV: SEMICONDUCTOR DEVICES   (09 Periods)

PN Junction diode, Characteristics, applications - half wave and full wave rectifier. Zener diode, characteristics, application – Regulator. BJT - operation, configurations, characteristics.

UNIT-V: OP-AMPS (08 Periods)

Operational Amplifier: Block diagram of Op-Amp, equivalent circuit, Op-Amp AC and DC Characteristics, Inverting and Non-Inverting modes. Applications - Adder, Comparator, Integrator and Differentiator.

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. Ashfaq Hussain, Fundamentals of Electrical Engineering, Dhanpatrai & Co. (P) Ltd., 3rd edition, New Delhi, 2009.
2. R. L. Boylestad and Louis Nashelsky, Electronics Devices and Circuits, PHI, 11th edition, 2009.

REFERENCE BOOKS:

1. M.S. Naidu, S. Kamakshaiah, Introduction to Electrical Engineering, Tata McGraw-Hill Education, New Delhi, 2007.
2. D. Roy Chowdhury, Linear Integrated Circuits, New Age International Pvt. Ltd., 4th edition, 2011.

I B. Tech. – I Semester
(20BT1BS32) ENGINEERING PHYSICS LAB
(Common to EEE, ECE, EIE, CSE(AI) and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: -

COURSE DESCRIPTION: Estimation of thickness of the wire using wedge shape method; Wavelength of monochromatic light source by diffraction grating; Newton's ring method; numerical aperture and acceptance angle of optical fiber; Characteristics of p-n junction diode; Photodiode and LED; Experimental determination of carrier concentration and energy gap of a semiconductor material; Determination resistivity of semiconductor by Four probe method and magnetic field along axial line of a current carrying coil.

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

CO1. Apply the basic knowledge of light waves and semiconductors to demonstrate the functioning of optoelectronic devices.

CO2. Understand the experimental procedures to calculate the thickness of a thin film, Hall coefficient, and acceptance angle of an optical fiber.

CO3. Determine the experimental values of magnetic field induction, wave length of a light source, energy gap of a semiconductor.

CO4. Apply skills to plot characteristic curves to determine the various parameters of semiconductor diodes.

CO5. Work independently and in teams to solve problems with effective communication.

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

1. Determine the thickness of the wire using wedge shape method.
2. Determination of wavelength of light source by Newton's ring method.
3. Determination of wavelength by plane diffraction grating using spectrometer by minimum deviation method
4. Estimation of magnetic field along the axis of a circular coil carrying current.
5. Determination the numerical aperture of a given optical fiber and hence to estimate its acceptance angle.
6. Determination of number of charge carriers and Hall coefficients of a given semiconductor using Hall Effect.
7. Determine the energy gap of a semiconductor.
8. Study the I-V characteristics of pn junction diode.
9. Estimation of threshold voltages of different LED's.
10. Study the characteristics of Photodiode.
11. Determination of wavelength of laser by using diffraction grating.
12. Determine the resistivity of semiconductor by Four probe method

TEXT BOOK:

1. Engineering Physics Lab Manual (SVEC-20)

REFERENCE BOOKS:

1. S. Balasubramaniah and M.N. Srinivasan, A Text book of practical physics, S Chand Publications, 2017.
2. http://vlab.amrita.edu/index.php - Virtual Labs, Amrita University

I B. Tech. - I Semester
(20BT1HS31) COMMUNICATIVE ENGLISH LAB
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		-	-	3	1.5

PRE-REQUISITES:-

COURSE DESCRIPTION: Just a Minute, Elocution/Impromptu; Phonetics; Vocabulary Building; Grammar; Giving Directions; Role Plays; Public Speaking; Letter Writing; Describing Objects; Listening Comprehension; Information Transfer and Reading Comprehension.

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

CO1.Demonstrate knowledge of Phonetics by examining and applying sounds of English through Phonetics.

CO2.Analyze sentence structures by applying and demonstrating knowledge of Vocabulary and Grammar.

CO3.Apply appropriate listening and reading skills by analyzing the context, and demonstrate through listening comprehension and reading comprehension.

CO4.Function effectively as an individual and as a member in diverse teams examining and applying speaking skills in Just A Minute and Role Play.

CO5. Communicate effectively applying appropriate writing and speaking techniques by examining and demonstrating knowledge through Describing Objects, Information Transfer and Letter Writing in formal and real time situations.

FIRST TEN EXERCISES ARE MANDATORY AMONG THE FOLLOWING:
LIST OF EXERCISES:

1. Just a Minute, Elocution/Impromptu
Steps to be followed – Useful tips – Dos & Don'ts – Preparation – Examples

2. Phonetics
Sounds of English – Consonants – Vowels – Speech Organs – Phonetic Transcription – Word Accent – Basics of Intonation

3. Vocabulary Building
Prefixes & Suffixes – Synonyms & Antonyms – Phrasal verbs – Idioms – One word substitutes – Words often confused

4. Grammar
Tenses –Nouns – Word order and error correction

5. Giving Directions
Useful phrases – Sample conversations - Exercises

6. Role Plays
Useful tips – Dos & Don'ts – Exercises – Role Plays for practice

7. Public Speaking
Stage presence – Voice control – Body Language – Rehearsals – Audience – Delivery - Dos & Don'ts – Project Submission

8. **Letter Writing**

Introduction – Objective – Formats – Types – Exercises

9. **Describing Objects**

Jargon – Useful Phrases – Do's & Don'ts – Exercises

10. **Listening Comprehension**

Introduction – Types of listening – Practice – Benefits of listening – Exercises

11. **Information Transfer**

Tables – Pie Charts – Venn Diagrams – Graphs – Flow Charts – Steps to be followed – Exercises

12. **Reading Comprehension**

Introduction – Types of reading – Inferring – Critical analysis – Exercises

TEXT BOOK:

1. Communicative English Lab, SVEC

REFERENCE BOOKS:

1. D. Sudha Rani, *A Manual for English Language Laboratories*, Pearson, Noida, 2010.
2. Nira Kumar, English *Language Laboratories*, PHI Learning Pvt. Ltd., New Delhi, 2011.

SUGGESTED SOFTWARES:

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

ADDITIONAL LEARNING RESOURCES:

- https://goo.gl/IjE45p: Amazon India site – with thousands of different product descriptions
- https://goo.gl/3ozeO6: 15 ways to calm your nerves before giving a presentation.
- https://goo.gl/p20ttk: useful site for more language about introducing yourself.
- https://goo.glsvMHZ1: information and advice about describing line graphs
- https://goo.gl/NqFJuc: an informative presentation about using line graphs

I B. Tech. – I Semester
(20BT11231) PROGRAMMING FOR PROBLEM SOLVING LAB
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		-	-	3	1.5

PRE-REQUISITES: A Course on Programming for Problem Solving.

COURSE DESCRIPTION: Hands on practice in developing and executing programs using C Programming concepts include control statements, arrays, functions, strings, pointers structures and file handling.

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

CO1. Analyse problems to design suitable algorithmic solutions.

CO2. Apply C programming constructs to develop solutions to the engineering problems.

CO3. Work effectively as an individual to develop solutions based on the user requirements.

CO4. Write and present a substantial technical report/document effectively.

LIST OF EXERCISES:

1. a) Write a C program to perform the arithmetic operations on two integer numbers.

    b) Write a program to evaluate the following expressions by reading the necessary values from the keyboard.

    i. $(ax + b)/(ax - b)$ $\qquad$ ii. $2.5 \log x + \cos 32^0 + | x^2 + y^2|$

    iii. $ax^5 + bx^3 + c$ $\qquad$ iv. ae^{kt}

2. a) Write a C program to find the roots of a quadratic equation.

    b) In a town, the percentage of men is 52. The percentage of total literacy is 48 and the total percentage of literate men is 35 of the total population. Write a C program to find the total number of illiterate men and women if the population of the town is 7000.

    c) The total distance travelled by a vehicle in *t* seconds is given by the distance $ut+at^2/2$
        where *u* and *a* are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of *u* and *a*. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of *u* and *a.*

3. a) Write a C Program to compute an electricity bill based on the following slab rates.

Consumption units	Rate (in Rupees/unit)
0-100	4.0
101-150	4.6
151-200	5.2
201-300	6.3
Above 300	8.0

(**Hint**: Take current and old meter readings from the user to get consumption units)

b) An insurance company computes the premium amount based on the following;

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 the premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lakhs.

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 lakh.

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.

In all other cases the person is not insured.

Write a C 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.

c) Write a C Program to find the grade for a student using a Switch case. The user needs to enter a subject score (varies from 0 to 100)and then display the grade as described below.

Score	Grade	Score	Grade
> = 90	O	>=50 to < 60	D
>=80 to < 90	A	>=40 to < 50	E
>=70 to < 80	B	< 40	Fail
>=60 to < 70	C		

4. a) A Fibonacci sequence is defined as follows:

The first and second terms in the sequence are 0 and 1. Sub-sequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

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

c) Write a C program to read two numbers x and n, and then compute the sum of the geometric progression: $1+x+x^2+x^3+\ldots\ldots\ldots+x^n$. Show appropriate error message for $n<0$. (*Example*: if n is 3 and x is 5, then the sum is: 1+5+25+125)

d) Write a C program to print the following pattern.

```
                1
            1   2   1
        1   2   3   2   1
    1   2   3   4   3   2   1
1   2   3   4   5   4   3   2   1
```

5. a) Write a C program to generate all the prime numbers between 1 and *n*, where *n* is a value entered by the user. Define a separate function to generate prime numbers.

    b) Irite C program that uses recursive function to find the following.
        i) Factorial of a given integer   ii) GCD of two given integers

6. a) Irite a C program to find both the largest and smallest numbers in a list of integers.

    b) Irite a C program that uses function to perform the following:

        i) Addition of Two Matrices   ii) Multiplication of Two Matrices

7. a) Irite a C program to insert a sub-string in to a main string at a given position.

    b) Irite a C program to count the lines, words and characters in a given text.

8. a) Write a C program to print the elements of an array in reverse order using pointers.

    b) Write a C program to count the number of vowels and consonants in a string using pointers.

    c) Write a C program to store *n* elements in an array and print the elements in sorted order using pointers.

9. a) Write a C program that performs the following operations:

        i. Reading a complex number   ii. Writing a complex number

        iii. Addition of two complex numbers   iv. Multiplication of two complex numbers

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

    b) Define a structure to store employee details include *Employee-Number, Employee-Name, Basic-pay, Date-of-Joining.* Write a C program for the following.

        i. A function to store 10 employee details.

        ii. A function to implement the following rules while revising the basic pay.

            If Basic-pay<=Rs.5000 then increase it by 15%.

            If Basic-pay> Rs.5000 and <=Rs.25000 then it increase by10%.

            If Basic-pay>Rs.25000 then there is no change in Basic-pay.

        A function to print the details of employees whohave completed 20 years of service from the Date-of-Joining.

10 a) Write a C program to reverse the first *n* characters of a given text file.

    b) Write a C program to merge two files into a new file.

REFERENCE BOOKS:

1. Byron S Gottfried and Jitender Kumar Chhabra, *Programming with C*, Fourth Edition, McGraw Hill Education, 2019.

2. YashavantKanetkar, *Let Us C*, Fifteenth Edition, BPB Publications, 2017.

3. E. Balagurusamy, *Programming in C*, Seventh Edition, McGraw Hill Education Pvt, Ltd, New Delhi, 2017.

4. PradipDey and Manas Ghosh, *Programming in C*, Second Edition, Oxford University Press, New Delhi, 2013.

5. Behrouz A. Forouzan and Richard F. Gilberg, *Computer Science: A Structured Programming Approach Using C*, Third Edition, Cengage Learning, 2008.

SOFTWARE/TOOLS USED:

1. Turbo C++/Dev C++

ADDITIONAL LEARNING RESOURCES:

- C Programming Exercises, Practice, Solution - https://www.w3resource.com/c-programming-exercises/
- Basic programming exercises and solutions in C- https://codeforwin.org/2015/05/basic-programming-practice-problems.html

I B. Tech. - I Semester
(20BT1MC01) UNIVERSAL HUMAN VALUES
(Mandatory Course)

(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	-	30	2	-	-	-

PRE-REQUISITES:-

COURSE DESCRIPTION: Value education; Human being and self; Family, the society and the nations; Harmony with the nature and Harmony with professional ethics.

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

CO1. Understand Values and skills for sustained happiness and prosperity.

CO2. Analyse realistic implications of a Holistic understanding of ethical human conduct, trustful and mutually fulfilling human behaviour.

CO3. Apply holistic approach in personal life and profession through a positive understanding of the Human reality and existence.

DETAILED SYLLABUS:

UNIT-I: VALUE EDUCATION   **(06 Periods)**

Human Values-Introduction; Self-Exploration - Natural Acceptance; Human Aspirations-Right understanding- the current scenario: understanding and living in harmony.

UNIT-II: HUMAN BEING AND SELF   **(06 Periods)**

Understanding human being - I' and the material 'Body'; needs of Self ('I') and 'Body'-happiness and physical facility; Body as an instrument of 'I' - characteristics and activities of 'I' and harmony in 'I'; harmony of I with the Body.

UNIT-III: FAMILY, THE SOCIETY AND THE NATIONS   **(06 Periods)**

Values in human relationship (nine universal values) - foundational values of relationship; Difference between intention and competence; Difference between respect and differentiation; harmony in the society; Universal harmonious order in society.

UNIT-IV: HARMONY WITH THE NATURE   **(06 Periods)**

Harmony in the Nature; Interconnectedness and mutual fulfilment - the four orders of nature - Recyclability and Self-regulation; Existence as Co-existence; Holistic perception of harmony and existence.

UNIT-V: HARMONY WITH PROFESSIONAL ETHICS   **(06 Periods)**

Acceptance of human values; Ethical Human Conduct; Basis for Humanistic Education; Competence in professional ethics; Case studies: Holistic technologies, Management Models and Production Systems; Socially and ecologically responsible engineers, technologists and managers - enriching institutions and organizations.

Total Periods: 30

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books,New Delhi, 2010

REFERENCE BOOK:

1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.

I B. Tech. - II Semester
(20BT2BS01) TRANSFORMATION TECHNIQUES AND LINEAR ALGEBRA
(Common to CE, ME, EEE, ECE, EIE, CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

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

PRE-REQUISITES:-

COURSE DESCRIPTION: Fourier Series and Fourier Transforms; Laplace Transforms; Inverse Laplace Transforms; Linear Algebra-I (Matrices); Linear Algebra-II (Vector Spaces).

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

CO1. Apply the knowledge of Fourier and Laplace transform techniques to solve differential equations.

CO2. Analyze linear transformations and associated matrices to solve engineering problems by applying the knowledge of linear algebra.

DETAILED SYLLABUS:

UNIT-I: FOURIER SERIES AND FOURIER TRANSFORMS   (09 Periods)

Fourier series: Determination of Fourier coefficients, Euler's formulae, convergence of Fourier series (Dirichlet's conditions), Fourier series in $(0,2\pi),(-\pi,\pi)$; Fourier series of even and odd functions; Half-range Fourier sine and cosine expansions in $(0,\pi)$; Fourier integral theorem (statement only), Fourier sine and cosine integrals; Fourier transforms, Fourier sine and cosine transforms, Inverse Fourier transforms.

UNIT-II: LAPLACE TRANSFORMS   (09 Periods)

Definition of Laplace transforms, existence conditions, Laplace transforms of standard functions, Properties of Laplace transforms (without proofs), Laplace transforms of derivatives, Laplace transforms of integrals, multiplication by t^n, division by t, Laplace transforms of periodic functions, Laplace transforms of unit step function and unit impulse function.

UNIT-III: INVERSE LAPLACE TRANSFORMS   (09 Periods)

Inverse Laplace transforms by different methods; Convolution theorem (without proof), inverse Laplace transforms by convolution theorem; Applications of Laplace transforms to ordinary differential equations of first and second order with constant coefficients.

UNIT-IV: LINEAR ALGEBRA-I (MATRICES)   (09 Periods)

Rank of a matrix: echelon form; Linear systems of equations: solving system of Homogeneous and Non-Homogeneous equations; Eigen values and Eigen vectors of a matrix and properties (without proofs), Diagonalization of a matrix by orthogonal transformation.

UNIT-V: LINEAR ALGEBRA-II (VECTOR SPACES)   **(09 Periods)**

Vector spaces, Linear dependence and independence of vectors, basis, dimension, Linear transformations (maps), range and kernel of a linear map, rank and nullity, inverse of a linear transformation, rank-nullity theorem (without proof).

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. T. K. V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M. V. S. S. N. Prasad, *Engineering Mathematics-II*, S. Chand & Company, 10th edition, 2016.

2. B. S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 44th edition, 2017.

3. David Poole, *Linear Algebra: A Modern Introduction*, Brooks/Cole, 2nd edition, 2005.

REFERENCE BOOKS:

1. B. V. Ramana, *Higher Engineering Mathematics*, Tata McGraw hill, 1st edition, 2017.

2. V. Krishna Murthy, Mainra and Arora: *An Introduction to Linear Algebra*, Affiliated East-West Press, 1993.

I B. Tech. - II Semester
(20BT1BS02) ENGINEERING CHEMISTRY
(Common to EEE, ECE, EIE, CSE(AI) and CSE(DS))

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

PRE-REQUISITES:-

COURSE DESCRIPTION: Water Treatment; Atomic Structure and Bonding Theories; Electrochemistry and Applications; Corrosion; Instrumental Methods and Applications; Fuel chemistry and Lubricants.

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

CO1. Analyze and solve problems associated with hardness of water, boiler troubles and address the societal, health and safety issues related to quality of water.

CO2. Apply the basic knowledge of quantum mechanical approach to atomic structure and bonding theories to identify shapes of different molecules

CO3. Apply the basic knowledge of corrosion phenomenon to identify solutions for control of corrosion and demonstrate competency in the basic concepts of electrochemical cells.

CO4. Demonstrate the basic knowledge of instrumental methods and their applications in the structural analysis of materials.

CO5. Apply the basic knowledge of fuel chemistry and lubricants to identify the quality of fuels and lubricants.

DETAILED SYLLABUS:

UNIT-I: WATER TREATMENT   **(10 Periods)**

Introduction, types of water, Impurities in water and their consequences. Hardness of water, units of hardness, disadvantages of hardness, measurement of hardness by EDTA method, numerical problems on measurement of hardness of water; Boiler troubles; softening of water– Ion exchange process, zeolite process, desalination of brackish water by reverse osmosis, specifications of potable water as per WHO and BIS standards. Fluoride in ground water: Effects on human health, defluoridation method – Nalgonda method; merits and demerits of various defluoridation methods.

UNIT-II: ATOMIC STRUCTURE AND BONDING THEORIES   **(09 Periods)**

Quantum-mechanical model of atom, Schrodinger wave equation, significance of Ψ and Ψ^2 , applications to particle in a box; Molecular orbital theory – bonding in homo and hetero nuclear diatomic molecules – energy level diagrams of N_2, O_2, NO and CO; Π-molecular orbitals of butadiene and benzene; VSEPR theory and molecular shapes.

UNIT-III:ELECTROCHEMISTRY AND APPLICATIONS   **(09 Periods)**

Introduction, Electrode potential, Nernst equation, reference electrode-Calomel electrode, electrochemical cell; Battery– Leclanche cell, lithium ion batteries; Fuel cells-Hydrogen-oxygen fuel cell, Solid-oxide fuel cell.

Corrosion: Introduction, Definition, types of corrosion- wet (galvanic corrosion, concentration cell corrosion) and dry corrosion, Factors influencing corrosion, control of corrosion- sacrificial anodic protection, Impressed current cathodic protection, electroplating method (Nickel).

UNIT-IV: INSTRUMENTAL METHODS AND APPLICATIONS   (09 Periods)

Introduction to spectroscopy–types of energy present in molecules, types of spectra, UV-Vis spectroscopy – principle (Beer-lamberts Law), types of electronic transitions, chromophore, auxochrome, Bathochromic shift, Hypsochromic shift, Instrumentation of UV-Vis spectrophotometer, applications; Infrared spectroscopy – principle, types of vibrational modes, group frequencies, Instrumentation of IR spectrophotometer, applications; principle and applications of physicochemical methods (SEM, TEM, X-ray diffraction).

UNIT-V: FUEL CHEMISTRY AND LUBRICANTS   (08 Periods)

Fuel chemistry: Types of fuels, calorific value, numerical problems based on calorific value; Liquid fuels - cracking of oils (Thermal and Fixed-bed catalytic cracking), knocking and anti-knock agents, Octane and Cetane values, Synthetic petrol: Fischer-Tropsch method and Bergius process.

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

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. P. C. Jain & Monika Jain*, Engineering Chemistry*, DhanpatRai Publishing Company (P) Ltd, New Delhi, 16th edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy and C. Ramachandriah, *Engineering Chemistry,* Mc.Graw Hill Publishers, New Delhi.

REFERENCE BOOKS:

1. J. D. Lee, *Concise Inorganic Chemistry*, Oxford University Press, 5th edition 2010.
2. Skoog and West, *Principles of Instrumental Analysis*, Thomson, 6th edition, 2007.
3. Peter Atkins, Julio de Paula and James Keelar, *Atkins' Physical Chemistry*, Oxford University Press, 10th edition, 2010.

I B. Tech. – II Semester
(20BT20501) DIGITAL LOGIC DESIGN
(Common to CSE, CSSE, IT, CSE(AI) and CSE(DS))

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

PRE-REQUISITES:-

COURSE DESCRIPTION: Foundation in design and analysis of the operation of digital gates; Concepts of Boolean algebra, Minimization of logic circuits; Design and implementation of combinational and sequential logic circuits; Analysis and design of flip-flops, registers, and counters and comparison of their behavior and characteristics; Design digital systems using Programmable logic.

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

CO1.   Apply knowledge of binary systems, logic gates and Boolean functions to represent a given problem using Boolean logic.

CO2.   Minimize and implement Boolean functions to build combinational logic circuits.

CO3.   Design combinational and sequential logic circuits for digital systems.

CO4.   Design digital systems using programmable logic to solve engineering problems.

DETAILED SYLLABUS:

UNIT-I: BINARY SYSTEMS AND BOOLEAN ALGEBRA   (10 Periods)

Introduction, Binary Numbers, Number Base Conversions, Error Detection and Correction, Complements of Numbers, Signed Binary Numbers, Binary Codes, Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates.

UNIT-II: GATE LEVEL MINIMIZATION   (09 Periods)

The Map Method, Four Variable K-Map, Product-of-Sums and Sum-of-Products Simplification, Don't Care Conditions, NAND and NOR Implementations, Other Two Level Implementations, Exclusive–OR function.

UNIT-III: COMBINATIONAL LOGIC   (09 Periods)

Combinational Circuits, Analysis of Combinational Circuits, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-Multiplexers.

UNIT- IV: SEQUENTIAL LOGIC   (10 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: PROGRAMMABLE LOGIC   (07 Periods)

Programmable Memories – RAM, ROM, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices.

Total Periods: 45

Topics for self-study are provided in the lesson plan

TEXT BOOK:

1. M. Morris Mano, Michael D. Ciletti, *Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog*, 6th edition, Pearson, 2018.

REFERENCE BOOKS:

1. A.Anand Kumar, *Switching Theory and Logic Design*, 3rd edition, PHI Learning Private Limited, India, 2016.
2. Charles H. Roth, Jr. and Larry L. Kinney, *Fundamentals of Logic Design*, 7th edition, Cengage Learning, 2015.
3. Alan B. Marcovitz, *Introduction to Logic Design*, 3rd edition, McGraw Hill, 2010.

ADDITIONAL LEARNING RESOURCES:

- https://nptel.ac.in/courses/106/108/106108099/
- Donald P Leach, Albert Paul Malvino, Goutam Saha, *Digital Principles and Applications*, 8th Edition, McGraw Hill, 2014.
- Brock J. LaMeres, *Introduction to Logic Circuits & Logic Design with VHDL,* Springer, 2015.

I B. Tech. – II Semester
(20BT21501) OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

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

PRE-REQUISITES: A course on Programming for Problem Solving

COURSE DESCRIPTION: Introduction to Object Oriented Programming, Classes and Objects; Inheritance, Packages, Interfaces; Exception handling, Multithreading; Collection Classes; Swings, Event handling.

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

CO1. Apply object oriented programming constructs to solve programming problems.

CO2. Design solutions to the problems by using control statements, interfaces, utility classes and Packages.

CO3. Solve real time problems using object oriented programming features – polymorphism, inheritance, exception handling and multithreading.

CO4. Apply multithreading mechanism to enhance the performance of a system.

CO5. Develop user interfaces using GUI programming techniques.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION   (09 Periods)

Introduction to Object Oriented Programming, Java Buzzwords, Java Environment, Java Components, Programming Paradigms, Naming Conventions.

Classes and Objects: Introduction to classes, objects, Constructors, Garbage Collection, this keyword, Access Control, Features of Object Oriented Programming.

UNIT-II: DATA TYPES, CONTROL STATEMENTS, POLYMORPHISM   (09 Periods)

Data Types, Variables, Type Conversions (Boxing and Unboxing/Wrapping and Unwrapping) and Casting, Arrays, Operators, Decision Making Statements, Looping Statements, Methods, Recursion, Method Overloading, Constructor Overloading, Parameter Passing, String Class, Final Keyword.

Utility Classes: String Tokenizer, Scanner, Random, Bit Set.

UNIT-III: INHERITANCE, PACKAGES, INTERFACES   (10 Periods)

INHERITANCE: Introduction, Classification, Abstract Classes, Final keyword with Inheritance.

PACKAGES: Basics, Creating and Accessing a package, CLASSPATH, Importing packages.

LAMBDA PACKAGE: Lambda Expression Fundamentals, Functional Interfaces, Block Lambda Expressions, Generic Functional Interfaces, Passing Lambda Expression as Arguments.

INTERFACES: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces.

UNIT-IV: EXCEPTION HANDLING, MULTITHREADING, COLLECTION FRAMEWORK
(09 Periods)

EXCEPTION HANDLING: Exception, Types of Exception, Keywords: try, catch, throw, throws and finally, Built-in Exceptions, User Defined Exceptions.

MULTITHREADING: Process, Thread, Thread Model, Creating a thread, Priorities, Thread Synchronization, Inter-thread Communication.

COLLECTION FRAMEWORK: Frame work Hierarchy, Array List, Linked List, HashSet.

UNIT-V: SWINGS, EVENT HANDLING   (08 Periods)

SWINGS: Introduction, Features, Hierarchy, Swing GUI Components, Packages in Swings, Swing Control Classes and Methods.

EVENT HANDLING: Event Classes, Event Listener Interfaces - Mouse and Key, Adapter Classes.

Total Periods: 45

Topics for self-study are provided in the lesson plan

TEXT BOOK:
   1. Herbert Schildt, *Java the Complete Reference*, 9th edition, Oracle Press, 2014.

REFERENCE BOOKS:
   1. Sachin Malhotra and Saurab Choudhary, *Programming in Java*, 2nd edition, Oxford University press, 2014.
   2. Y. Daniel Liang, *Introduction to Java Programming,* Pearson Education.
   3. T. Budd, Understanding Object-Oriented Programming with Java, Pearson Education.

ADDITIONAL LEARNING RESOURCES:
   1. https://docs.oracle.com/javase/tutorial/index.html

I B.Tech. - II Semester
(20BT1BS31) ENGINEERING CHEMISTRY LAB
(Common to EEE, ECE, EIE, CSE(AI) and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: -

COURSE DESCRIPTION: Estimation of hardness ground water sample, alkalinity, dissolved oxygen of water samples, Iron, residual chlorine in drinking water and Strength of an acid in Pb-Acid battery by volumetric methods; Instrumental methods like conductivity meter, potentiometer, P^H meter and colorimeter; Measurement of viscosity of lubricants; and Determination of the influence of pH on metallic corrosion.

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

CO1. Apply analytical skills for the quantitative estimation of materials through volumetric methods of analysis and address the societal, health issues related to quality of water.

CO2. Develop analytical skills for the quantitative estimation of materials through instrumental methods of analysis.

CO3. Work independently and in teams to solve problems with effective communication.

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

1. Determination of hardness of ground water sample
2. Determination of alkalinity of Water sample
3. Estimation of Dissolved Oxygen in water by Winkler's method.
4. Estimation Fe (II) by Dichrometry
5. Estimation of residual chlorine in drinking water
6. Conductometric titration of strong acid Vs strong base
7. Estimation of Ferrous ion by Potentiometry
8. Determination of percentage of Iron in Cement sample by colorimetry
9. Determination of strength of acid by pH metric method
10. Determination of Viscosity of liquids by Ostwald's viscometer
11. Determination of Strength of an acid in Pb-Acid battery
12. Determination of the influence of pH on metallic corrosion

TEXT BOOK:
1. Engineering Chemistry lab Manual (SVEC-20)

REFERENCE BOOKS:
1. K. Mukkanti, *Practical Engineering Chemistry*, BS Publications, 2013.
2. K.N. Jayaveera, K.B. Chandra Sekhar, *Chemistry laboratory manual*, S.M. Enterprises Limited, 2013.

I B. Tech. – II Semester
(20BT10331) COMPUTER AIDED ENGINEERING DRAWING
(Common to CSE, CSSE, IT, CSE(AI) and CSE(DS))

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		-	1	4	3

PRE-REQUISITES:-

COURSE DESCRIPTION: Engineering drawing conventions; Importance of engineering drawing; fundamental concepts of sketching; computer aided drafting and different types of projections of geometric entities (both 2D and 3D) through computer aided drafting packages.

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

CO1. Apply the principles of engineering drawing, Methods and CAD tools to draw the Geometries, Curves and Orthographic projections used to communicate in engineering field.

CO2. Develop lateral surfaces of solids and draw Isometric views of given objects for engineering communication using principles of engineering drawing and CAD tools.
CO3. Work independently / in groups & communicate effectively in oral and written forms.

DETAILED SYLLABUS:

Introduction to Engineering Graphics and Design:

Principles, significance -Conventions in drawing-lettering - BIS conventions-Dimensioning principles and conventional representations.

Exercises:
1. Practice exercise on Basic Lettering and Dimensioning
2. Practice exercise on Conventional representations

Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets, arrays, dimensions.

Exercises:
1. Practice exercise using basic drawing commands
2. Practice exercise using editing commands

CONICS, CURVES, PROJECTION OF POINTS, LINES AND PLANES

Conics & Special Curves: Conic sections including the rectangular hyperbola-eccentricity method only; Cycloid, Epicycloid and Hypocycloid, Involutes.

Exercises:
1. Practice exercises on Ellipse, Parabola, Hyperbola and Rectangular Hyperbola
2. Practice exercises on Cycloid, Epicycloid, Hypocycloid and Involutes
3. **Projection of points, lines and planes:** Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line, Projections of regular plane surfaces.

Exercises:
1. Practice exercises on Projection of points
2. Practice exercises on projection of lines inclined to one plane
3. Practice exercises on projection of lines inclined to both planes
4. Practice exercises on Projections of regular plane surfaces

PROJECTION OF SOLIDS AND SECTION OF SOLIDS

Projection of solids: Projection of regular solids inclined to one plane.

Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone, True shapes of the sections.

Exercises:
1. Practice exercises on Projections of regular solids
2. Practice exercises on Sections of solids

DEVELOPMENT OF SURFACES

Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Exercises:
1. Practice exercises on Development of surfaces of right regular solids

ORTHOGRAPHIC AND ISOMETRIC PROJECTIONS

Orthographic Projections: Systems of projections, conventions and application to orthographic projections.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

Exercises:
1. Practice exercises on Orthographic Projections
2. Practice exercises on Isometric Projections

TEXTBOOKS:
1. D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, *Engineering Graphics with AutoCAD*, PHI Learning Private Limited, New Delhi, Revised edition, 2010.
2. N. D. Bhatt and V. M. Panchal, *Engineering Drawing*, Charotar Publishing House, Gujarat, 51st edition, 2013.

REFERENCE BOOKS/LABORATORY MANUALS:
1. Sham Tickoo, *AutoCAD 2013 for Engineers and Designers*, Dreamtech Press, 2013.
2. M. H. Annaiah&Rajashekar Patil, *Computer Aided Engineering Drawing*, New Age International Publishers, 4th edition, 2012.

I B. Tech. – II Semester
(20BT10332) ENGINEERING WORKSHOP
(Common to CSE, CSSE, IT, CSE(AI) and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES:-

COURSE DESCRIPTION: Knowledge on various workshop hand and power tools; hands on experience in different manufacturing trades such as fitting, carpentry, sheet metal forming and foundry; Demonstration on dismantling and assembling of various two wheeler parts, power tools in machining and metal joining, basics of plumbing and working of 3D printer.

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

CO1. Design and model various basic prototypes in the trade of fitting such as square/half round mating, V- mating and dovetail mating from the given MS work pieces using fitting tools.

CO2. Develop different prototypes in the carpentry trade such as cross lap joint, dovetail / bridle joints and Mortise and Tenon joint using carpentry tools.

CO3. Design and model different prototypes in the sheet metal forming trade such as rectangular tray, square vessel/cylinder, Funnel as per the dimensions using sheet metal forming tools.

CO4. Develop sand mould using single piece pattern and split piece pattern in the foundry trade using foundry tools.

CO5. Develop electric circuits for series and stair case connections.

CO6. Demonstrate the knowledge on power tools, plumbing operation, 3D printing technology involved in different engineering applications.

CO7. Work independently / in groups & communicate effectively in oral and written forms.

DETAILED SYLLABUS:

FITTING: Conduct a detailed study on various aspects in fitting trade which includes the details of fitting operations, safety precautions, types of tools, tool holders, miscellaneous tools, care and maintenance of hand tools, marking and measurement tool, and finishing tool.

List of Exercises :

1. Make a square/half round mating from the given MS work pieces
2. Make a V- mating from the given MS work pieces

CARPENTRY: Conduct a detailed study on various aspects in carpentry trade which includes the details of types of wood, carpentry tools, wood working techniques, types of joints, safety precautions, and care and maintenance of tools.

List of Exercises:

1. Prepare a cross lap joint
2. Prepare dovetail / bridle joints

SHEET METAL FORMING: Conduct a detailed study on various aspects in sheet metal forming which includes the details of sheet materials, hand tools, sheet metal fabrication, and safety and precautions

List of Exercises:

1. Fabricate a rectangular tray as per the dimensions
2. Fabricate square vessel/cylinder as per the dimensions

FOUNDRY: Conduct a detailed study on various aspects in foundry which includes the details of moulding sand, properties of moulding sand, types of patterns and pattern, materials, foundry tools, and safety and precautions

List of Exercises:

1. Prepare a sand mould, using the given single piece pattern (stepped pulley/cube)
2. Prepare a sand mould, using the given split piece pattern (pipe bent/dumbbell)

Electrical wiring: Prepare electrical wiring with associated devices such as switches, distribution boards, sockets, and light fittings in a structure considering safety standards for design and installation.

List of Exercises:

1. Prepare electrical circuits with Series.
2. Prepare electrical circuits with Stair case connections.

DEMONSTRATION:

1. Demonstrate the usage of power tools.
2. Demonstrate the plumbing operation and identify the essential tool and materials required for plumbing.
3. Demonstrate the working of 3D printer

Note: Student shall perform any **Twelve Exercises**

REFERENCE BOOKS/LABORATORY MANUALS:

1. P. Kannaiah and K. L. Narayana, Workshop Manual, SciTech Publishers, 2009.
2. K. Venkata Reddy, Workshop Practice Manual, BS Publications, 2008.
3. V. Ramesh Babu, Engineering Workshop Practice, V R B Publishers Private Limited, 2009.

ADDITIONAL LEARNING RESOURCES:

- R. K. Jain, *Production Technology*, Khanna Publishers, 17th edition, 2012.
- Kalpakjian, Serope, *Manufacturing Engineering and Technology*, Pearson Education, 7th edition, 2014.

I B. Tech. – II Semester
(20BT21531) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: A course on OOPS through Java.

COURSE DESCRIPTION: Hands-on experience on Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling; swings.

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

CO1. Apply syntactic constructs of JAVA to solve logic based problems
CO2. Develop application programs using object oriented programming features.
CO3. Solve real time problems using interfaces, packages, Exception Handling, Collection framework and Multithreading.
CO4. Develop GUI Applications using Swings, Event handling mechanisms.
CO5. Work independently and in team to solve problems with effective communication

LIST OF EXERCISES:

COMMAND-LINE ARGUMENTS

1. Demonstrate the following programs using command line arguments:
    A Write a program that computes the sum of all its integer arguments
    B Write a program to input n integers and perform sorting between them

RECURSIVE FUNCTIONS AND OVERLOADING

2. A The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 0, 1. Every subsequent value is the sum of the 2 values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the nth value of the Fibonacci sequence?

    B Write and test overloaded methods to find sum of three integers, sum of three double values and sum of four integers.

    C Write a program to define a class student with name, registration number and marks for three subjects as instance variables and describe a constructor to initialize them. Also define a method display to print all the values.

DATA TYPES (ARRAYS AND STRINGS)

3. A Write a program to print the element of an array that has occurred highest number of times.

    B Write a program to count tokens- number of words and characters in a string.

SCANNER AND ABSTRACT CLASSESS

4. A Write a program that displays a menu with options 1. Add 2. Sub. Based on the options chosen, read 2 numbers and perform the relevant operation. After performing the operation, the program should ask the user if he wants to continue. If the user presses y or Y, then the program should continue displaying the menu else the program should terminate. [Use Scanner class]

    Write a program to create an abstract class named Shape that contains an

B	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 contains only the method number Of Sides ( ) that shows the number of sides in the given geometrical figures

5. PACKAGES AND INTERFACES

A	Write a program that imports the User-defined package P1 and access the member variables and methods of classes that contained in the package P1.
B	Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box

INTERACTIVE DRIVER CLASS

6. A University awards some grace marks to students who participate in the Inter University games. Therefore, total marks awarded = Exam_Marks +Sports_Grace_Marks. If total marks scored are greater than maximum marks, then the final marks awarded will be equal to the maximum marks. An Object Oriented based implementation will contain a class called Results, which extends a class called Exam, which itself extends a class called Student. It will also contain an interface called Sports, which is implemented by the Results class. The Results class will be responsible for computing the final marks scored by the students. Write a Java program along with an interactive driver class.

EXCEPTION HANDLING

7.	A	Write a program to handle Arithmetic Exception, Array Out Of Bounds Exception using try and multiple catch statements.
	B	Write a java program to throw a user defined exception called Negative, if the entered input is a negative number.

MULTI-THREADING

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.
	C	Write a java program to implement multithreading using lambda expression

HASHSET (COLLECTION FRAMEWORK)

9. Write a program create a class "Book" with name, id, author, publisher and quantity as instance variables and a constructor to initialize them. Create a HashSet object of type Book and three Book instances b1, b2 and b3. Add these instances into HashSet and display them.

EVENT HANDLING

10.	A	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.
	B	Write a java program that handles all mouse and key events and shows the event name at the center of the window when mouse event is fired (Use Adapter classes).

REFERENCE BOOKS:

1. Herbert Schildt, *Java the Complete Reference*, Ninth Edition, Oracle Press, 2014.
2. SachinMalhotra and SaurabChoudhary, *Programming in Java*, Second Edition, Oxford University Press, 2014.

SOFTWARES/TOOLS USED:

1. Java SE 12.0.1

ADDITIONAL LEARNING RESOURCES:

1. Problems to be considered from Hackerearth and CodeChef platforms

I B.Tech. - II Semester
(20BT1HSAC) SPOKEN ENGLISH
(Audit Course)

(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	2	-	-	-

PRE-REQUISITES: -

COURSE DESCRIPTION: Grammar; Functional English; Paragraph writing; Letter writing and Email writing.

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

CO1. Demonstrate knowledge of grammar and vocabulary in writing effective formal letters and e-mails.

CO2. Communicate effectively by applying appropriate speaking and writing techniques by examining and applying functional English.

DETAILED SYLLABUS:

UNIT-I: GRAMMAR   (06 Periods)

Active voice and Passive voice – Auxiliary modals - Question Forms:Wh-word, Embedded, Yes/No - Disjunctive/Tags - Spotting Errors.

UNIT-II: FUNCTIONAL ENGLISH   (06 Periods)

Vocabulary Building: (Vegetables, groceries, fruits, Parts of human body, relations) Greetings - Introduction - Self and others - Story telling - Speaking Activities.

UNI- III: PARAGRAPH WRITING   (06 Periods)

Topic sentence - cohesion and coherence - Unity - adequate development - Introduction to types -Compare-Contrast - Problem & Solution, Cause & Effect, Classification & Illustrative.

UNIT-IV: LETTER WRITING   (06 Periods)

Components of an Effective Letter - Communication in everyday life - Personal Correspondence, Internal Communication - Career and Employment Letters.

UNIT-V: EMAIL WRITING   (06 Periods)

Do's & Don'ts - Tips for email effectiveness - Email Jargon - Sample Emails

Total Periods: 30

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. L. Adinarayana and V. Prakasam, *Spoken English*, Neelkamal Publications Pvt. Ltd., New Delhi, 2008

2. Ram Bhasker Raju, *The Complete Book on Spoken English*, Goutham Buddha Publications, Hyderabad, 2002.

REFERENCE BOOKS:

1. Sabina Pillai, *Spoken English for my World,* Oxford University Press, New Delhi, 2016.

2. K. R. Lakshminarayanan, *Speak in English,*Scitech Publications, Chennai, 2009.

ADDITIONAL LEARNING RESOURCES:

1. https://www.britishcouncil.in/programmes/english-partnerships/state/skills-projects/AP-English-Skills.

2. https://www.fluentu.com/blog/english/websites-to-learn-english/