

**ACADEMIC REGULATIONS  
COURSE STRUCTURE  
AND  
DETAILED SYLLABI  
OF  
INFORMATION TECHNOLOGY  
FOR  
I B.TECH REGULAR FOUR YEAR DEGREE COURSE  
*(for the batches admitted from 2016-2017)*  
  
CHOICE BASED CREDIT SYSTEM**



**SREE VIDYANIKETHAN ENGINEERING COLLEGE  
(AUTONOMOUS)**

(Affiliated to JNTUA Anantapuramu, Approved by AICTE  
Accredited by NBA; NAAC with 'A' grade)

Sree Sainath Nagar, A.Rangampet, Near Tirupati - 517 102. 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 to face 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 INFORMATION TECHNOLOGY

## VISION

To become a nationally recognized quality education center in the domain of Computer Science and Information Technology through teaching, training, learning, research and consultancy.

## MISSION

- The Department offers undergraduate program in Information Technology and Post graduate program in Software Engineering to produce high quality information technologists and software engineers by disseminating knowledge through contemporary curriculum, competent faculty and adopting effective teaching-learning methodologies.
- Igniting passion among students for research and innovation by exposing them to real time systems and problems.
- Developing technical and life skills in diverse community of students with modern training methods to solve problems in Software Industry.
- Inculcating values to practice engineering in adherence to code of ethics in multicultural and multi discipline teams

### **PROGRAM EDUCATIONAL OBJECTIVES**

After few years of graduation, the graduates of B. Tech. (IT) Program would have:

1. Enrolled or completed higher education in the core or allied areas of Computer Science and Information Technology or management.
2. Successful entrepreneurial or technical career in the core or allied areas of Computer Science and Information Technology.
3. Continued to learn and to adapt to the world of constantly evolving technologies in the core or allied areas of Computer Science and Information Technology.

### **PROGRAM OUTCOMES**

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

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. 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. 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. 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. 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. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. 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. 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. 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 (IT) program will be able to:

1. Apply the knowledge of mathematics, computer science and information technology to solve complex computational tasks.
2. Analyze, design and develop solutions in the domains of database, networks and security, system software and system administration.
3. Conduct investigation to identify research gaps and address complex engineering problems in the domains of database, networks and security, system software and system administration.
4. Apply appropriate techniques, use modern programming languages, tools, and packages for quality software development by thorough understanding of needs under given constraints.

## ***The Challenge of Change***

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

**- Debashis Chatterjee**

**SREE VIDYANIKETHAN ENGINEERING COLLEGE**  
**(Autonomous)**  
**(Affiliated to J.N.T. University Anantapur,**  
**Anantapuramu)**

**ACADEMIC REGULATIONS**

**CHOICE BASED CREDIT SYSTEM**

**B.Tech. Regular Four Year Degree Program**  
**(for the batches admitted from the academic year**  
**2016–17)**  
**&**  
**B.Tech. (Lateral Entry Scheme)**  
**(for the batches admitted from the academic year**  
**2017–18)**

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

**1. Applicability :** All the rules specified herein, approved by the Academic Council, shall be in force and applicable to students admitted from the academic year 2016-2017 onwards. Any reference to "College" in these rules and regulations stands for SVEC (Autonomous).

**2. Extent:** All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. It shall be ratified by 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 of study in Engineering:**

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

(ii) secured a rank in the EAMCET examination conducted by APSCHE for allotment of a seat by the Convener, EAMCET for admission.

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

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

(b) By the Management (for Category-B Seats).

(c) Admissions to PIO and Foreign Nationals as per the guidelines and norms of MHRD, AICTE, APSCHE & Affiliating University.

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

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

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

1) B.Tech (Civil Engineering)

2) B.Tech (Computer Science & Engineering)

3) B.Tech (Computer Science & Systems Engineering)

4) B.Tech (Electrical & Electronics Engineering)

5) B.Tech (Electronics & Communication Engineering)

6) B.Tech (Electronics & Instrumentation Engineering)

7) B.Tech (Information Technology)

8) B.Tech (Mechanical Engineering)

**5. Duration of the Program:**

**5.1 Minimum Duration:** The program will 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 ( $\geq 90$  working days) 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 are followed. Provision is made for lateral entry of students in the Second Year of the program in all 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.

First Semester (22 weeks)	Instruction Period: I Spell : 7 weeks II Spell: 9 weeks	16 weeks
	Mid-term Examinations: I Mid : 1 week II Mid : 1 week	2 weeks
	Preparation & Practical Examinations	2 weeks
	Semester-end examinations	2 weeks
	<b>Semester Break</b>	2 weeks
Second Semester (22 weeks)	Instruction Period: I Spell : 7 weeks II Spell: 9 weeks	16 weeks
	Mid-term Examinations: I Mid : 1 week II Mid : 1 week	2 weeks
	Preparation & Practical Examinations	2 weeks
	Semester-end examinations	2 weeks
	<b>Summer Vacation</b>	6 weeks

6. Structure of the Program: Each Program of study shall consist of:
- (a) Foundation Courses,
  - (b) Core Courses and Elective Courses.
- ◆ Foundation Courses are further categorized as :
    - (i) HS (Humanities and Social Sciences),
    - (ii) BS (Basic Sciences) and
    - (iii) ES (Engineering Sciences).
  - ◆ Core Courses and Elective Courses are categorized as PS (Professional Courses), which are further subdivided as:
    - (i) PC (Professional Core) Courses,
    - (ii) PE (Professional Electives),
    - (iii) IDE (Inter Disciplinary Electives),
    - (iv) OE (Open Electives),
    - (v) Comprehensive Assessment
    - (vi) Seminar
    - (vii) PW (Project Work).

S.No	Broad Course Classification	Course Group/ Category	Course Type	Range of Credits
1.	Foundation Courses	HS – Humanities and Social Sciences	Humanities, Social Sciences and Management.	5% - 10%
2.		BS – Basic Sciences	Mathematics, Physics and Chemistry Courses, etc.	15% - 20%
3.		ES – Engineering Sciences	Fundamental engineering courses.	15% - 20%
4.	Core Courses	PC – Professional Core	Core courses related to the Parent Discipline/ Branch of Engg.	30% - 40%
5.	Elective Courses	PE – Professional Electives	Elective courses related to the Parent Discipline/ Branch of Engg.	10% - 15%
6.		IDE - Interdisciplinary Electives	Courses in an area outside the Parent Discipline / Branch of Engg.	5% - 10%
7.		OE – Open Electives	Common Elective courses offered for all programs / Branches of Engg.	5% - 10%
8.	Core Courses	Seminar	A course of study with discussion and report.	10% - 15%
9.		Comprehensive Assessment	A comprehensive review of foundations and key concepts of the courses studied.	
10.		Project Work	A course of planned minor research work.	

**Contact Periods:** Depending on the complexity and volume of the course, the number of contact periods per week shall be assigned.

**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 Periods: Tutorial Periods: Practical Periods: Credits) Structure, based on the following general pattern.

- ◆ One Credit - for One Period/ Week/ Semester for Theory/ Lecture (L) Courses;
- ◆ Two Credits - for Three Periods/ Week/ Semester for Laboratory/ Practical (P) Courses.

- ◆ Tutorials shall not carry Credits.
  - i) Other student activities like NCC, NSS, Sports, Study Tour, Guest Lecture etc. shall not carry Credits.
  - ii) For courses like Project/Seminar/Comprehensive Online Assessment, 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 a B. Tech Program of study shall have total of **180** credits (24 credits in each semester from I B. Tech. I Semester to IV B. Tech I Semester and 12 credits in IV B. Tech II Semester). However the curriculum for lateral entry students shall have a total of **132** credits (24 credits in each semester from II B. Tech. I Semester to IV B. Tech I Semester and 12 credits in IV B. Tech II Semester).

#### **8. Choice Based Credit System (CBCS):**

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

- ◆ Student centered learning
- ◆ Cafeteria approach
- ◆ Students to learn courses of their choice
- ◆ Learning at their own pace
- ◆ Interdisciplinary learning
- ◆ The total credits for the Programme is **180** for regular students and **132** for lateral entry students.
- ◆ A student has a choice of registering for credits from the theory courses offered in the program ensuring the total credits in a semester are between 21 and 27.
- ◆ From the II B.Tech I Semester to IV B.Tech I Semester, the student has the option of registering for additional theory courses from the latter semesters or dropping existing theory courses of the current semester within the course structure of the program. However the number of credits the student can register in a particular semester should not be below 21 (minimum) and should not exceed 27 (maximum).
- ◆ Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).

All the registered credits will be considered for the calculation of final CGPA.

## **9. Course Enrollment and Registration**

- 9.1** Each student, on admission shall be assigned to a Faculty Advisor (Mentor) who shall advise and counsel the student about the details of the academic programme 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 will 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) within Ten days before commencement of the concerned semester and complete the registration process duly authorized by the Chairman, Board of studies of concern 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** No course shall be offered by a Department unless a minimum of 40 students register for that course.
- 10. Massive Open Online Course (MOOC)**  
A Massive Open Online Course (MOOC) is an online course aimed at unlimited participation and open access via the web. MOOC is a model for delivering learning content online to any person who takes a course, with no limit on attendance.
- ◆ A student shall undergo a "Massive Open Online Course (MOOC)" for award of the degree besides other requirements.
  - ◆ A student is offered this Online Course at the beginning of his III B.Tech I Semester of study and the course has to be completed by the end of III B.Tech II Semester. If the student fails to complete the course by the end of III B.Tech II Semester, it shall be treated as a backlog and needs to be completed before completion of the program for the award of the degree.
  - ◆ The student shall confirm registration by enrolling the course within 10 days prior to the last instructional day of the II B. Tech. II Semester like other courses.
  - ◆ The courses will be approved by the Chairman, Academic Council, SVEC based on the recommendations of the Chairman, Board of Studies of concerned program considering current needs.
  - ◆ A student has a choice of registering for only one MOOC with the recommendation of Chairman, Board of studies of concerned program and duly approved by the Chairman, Academic Council, SVEC.

- ◆ The student shall undergo MOOC without disturbing the normal schedule of regular class work.
  - ◆ One faculty member assigned by the Head of the Department shall be responsible for the periodic monitoring of the course implementation.
  - ◆ No formal lectures shall be delivered by the faculty member assigned to the students.
  - ◆ If any student wants to change the MOOC course already registered, he will be given the choice to register a new MOOC course in III B.Tech. only, with the recommendation of Chairman, Board of studies of concerned program and duly approved by the Chairman, Academic Council, SVEC.
  - ◆ Finally, the performance of the student in the course shall be evaluated as stipulated by the course provider. A certificate will be issued on successful completion of the course by the course provider.
  - ◆ The performance in the MOOC shall not be considered for the calculation of SGPA and CGPA of the student.
  - ◆ The MOOC course shall be listed in the grade sheet of the student.
- 11. Break of Study from a Programme (Gap Year)**
- 11.1** 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.
- 11.2** 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 application downloaded from website and duly filled by the student shall be submitted to the Head of the Department. In the case of start-up for incubation of idea only, the application for break of study shall be forwarded by the Head of the Department to the Principal, SVEC. A sub-committee appointed by the principal shall give recommendations for approval.
- 11.3** The students permitted to rejoin the programme 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, SVEC in the prescribed format through Head of the Department at the beginning of the readmitted semester itself for prescribing additional/equivalent courses, if any, from any semester of the regulations in-force, so as to bridge the curriculum in-force and the old curriculum.
- 11.4** The total period for completion of the programme reckoned from the commencement of the I B.Tech I Semester to which the student was admitted shall not exceed the maximum period specified in clause 5.2 irrespective of the period of break of study in order that the student may be eligible for the award of the degree (vide clause 18).
- 11.5** In case, if a student applies for break of study for one year and wishes to extend it for one more consecutive year, he shall be permitted with the prior approval of the Principal, SVEC through the concerned Head of the Department before beginning of the semester in which the student has taken break of study.

- 11.6** If a student has not reported to the department after approved period of break of study without any intimation, the student is treated as detained in that semester. Such students are eligible for readmission for the semester when offered next.
- 12. Examination System:** 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 of 3 hours duration (External evaluation)	The examination question paper in theory courses shall be for a maximum of 70 marks. The question paper shall be of descriptive type with 5 questions, taken one from each unit of syllabus, having internal choice and all 5 questions shall be answered. All questions carry equal marks.	
		30	Mid-term Examination of 2 hours duration (Internal evaluation).	The question paper shall be of descriptive type with 4 essay type questions out of which 3 are to be answered and evaluated for 24 marks and also 6 short answer questions out of which all are to be answered and evaluated for 6 marks. Two mid-term examinations each for 30 marks are to be conducted. For a total of 30 marks, 75% of better one of the two and 25% of the other one are added and finalized. <b>Mid-I:</b> After first spell of instruction (I to II Units). <b>Mid-II:</b> After second spell of instruction (III to V Units).	
2	Laboratory	50	Semester end Lab Examination for 3 hours duration (External evaluation)	50 marks are allotted for laboratory/drawing examination during semester end.	
		50	30	Day-to-Day evaluation for Performance in laboratory experiments and Record. (Internal evaluation).	Two laboratory examinations, each of which includes Day-to-Day evaluation and Practical test, for 50 marks are to be evaluated. For a total of 50 marks 75% of better one of the two and 25% of the other one are added and finalized.
			20	Practical test (Internal evaluation).	<b>Laboratory examination-I:</b> Shall be conducted just before I mid-term examinations. <b>Laboratory examination-II:</b> Shall be conducted just before II mid-term examinations.
3	a) Seminar	100	Semester-end Examination	100 marks are allotted for Seminar during semester-end evaluation by the Seminar Evaluation Committees (SECs) as given in 12.2.1.	
	b)Comprehensive Assessment	100	Semester-end Examination	Comprehensive Assessment shall be conducted as given in 12.2.2 as semester end evaluation for 100 marks.	
4	Project Work	200	100	External evaluation	Semester end Project Viva-Voce Examination by Committee as detailed in 12.2.3 for 100 marks.
			100	Internal evaluation	Continuous evaluation by the Project Evaluation Committees (PECs) as detailed in 12.2.3 for 100 marks.

- 12.2** Seminar/Comprehensive Assessment /Project Work Evaluation:
- 12.2.1** For the seminar, the student shall collect information through literature survey on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department just before presentation. The report and the presentation shall be evaluated at the end of the semester by the Seminar Evaluation Committees (SECs), each consisting of concerned supervisor and two senior faculty members. The SECs are constituted by the Principal on the recommendations of the Head of the Department.
- 12.2.2** Comprehensive Assessment shall be conducted by the Department through (i) online with 50 objective questions for 50 marks and (ii) viva-voce for the remaining 50 marks, covering all the courses from I B.Tech I Semester to IV B.Tech I Semester. The viva-voce will be conducted by Comprehensive Assessment Committees (CACs), each consisting of three faculty members (out of whom at least two are seniors). The CACs are constituted by the Principal on the recommendations of the Head of the Department. The HODs of the respective Departments are given the responsibility of preparing question bank/question paper for conducting the online examination.
- 12.2.3** The project Viva-Voce examination shall be conducted by a Committee consisting of External examiner (nominated by the Chief Controller of Examinations), HOD and concerned Supervisor. The evaluation of project work shall be conducted at the end of the IV B.Tech II Semester. The Internal Evaluation shall be made by the Project Evaluation Committees (PECs), each consisting of concerned supervisor and two senior faculty members on the basis of two project reviews conducted on the topic of the project. The PECs are constituted by the Principal on the recommendations of the Head of the Department.
- 12.3.** Eligibility to appear for the semester-end examination:
- 12.3.1** A student shall be eligible to appear for semester-end examinations if he acquires a minimum of 75% of attendance in aggregate of all the courses in a semester.
- 12.3.2** 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.
- 12.3.3** Shortage of Attendance below 65% in aggregate shall in no case be condoned.
- 12.3.4** Students whose shortage of attendance is not condoned in any semester is not eligible to take their end examination of that semester and their registration shall stand cancelled.

- 12.3.5** 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 will not be allowed to register for the courses of the semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.
- 12.3.6** A stipulated fee shall be payable to the College towards condonation of shortage of attendance.
- 12.4. Evaluation:** Following procedure governs the evaluation.
- 12.4.1.** Marks for components evaluated internally by the faculty shall be submitted to the Controller of Examinations one week before the commencement of the End examinations. The marks for the internal evaluation components shall be added to the external evaluation marks secured in the Semester-end examinations, to arrive at total marks for any course in that semester.
- 12.4.2.** 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.
- 12.4.3.** Student-wise tabulation shall be done and individual grade Sheet shall be generated and issued to the student.
- 12.5. Personal verification / Revaluation / Recounting:**  
Students shall be permitted for personal verification/request for recounting/ revaluation of the Semester-end examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records 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.
- 12.6. 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.
- 13. 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:**

- 13.1** A student shall be deemed to have satisfied the minimum academic requirements for each theory, laboratory course and project work, if he secures not less than 40% of marks in the semester-end examination and a minimum of 40% of marks in the sum total of the internal evaluation and Semester-end examination taken together. For the seminar and comprehensive Viva-Voce, he should secure not less than 40% of marks in the semester-end examination.
- 13.2** A student shall be promoted from second year to third year of Program of study only if he fulfills the academic requirement of securing 36 credits from
- Two regular and one supplementary examinations of I B.Tech I Semester.
  - One regular and one supplementary examinations of I B.Tech II Semester.
  - One regular examination of II B.Tech I Semester.  
Irrespective of whether or not the candidate appears for the semester-end examination as per the normal course of study.
- 13.3** A student shall be promoted from third year to fourth year of Program of study only if he fulfills the academic requirements of securing 60 credits from the following examinations,
- Three regular and two supplementary examinations of I B.Tech I Semester.
  - Two regular and two supplementary examinations of I B.Tech II Semester.
  - Two regular and one supplementary examinations of II B.Tech I Semester.
  - One regular and one supplementary examinations of II B.Tech II Semester.
  - 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 by sections 13.2 and 13.3 above, the student may make up the credits through supplementary examinations.
- 13.4** A student shall register for all the 180 credits and earn all the 180 credits. Marks obtained in all the 180 credits shall be considered for the calculation of the DIVISION based on CGPA.
- 13.5** A student who fails to earn 180 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 2017-2018):**

- 13.6** A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical course and project, if he secures not less than 40% of marks in the semester-end examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester-end examination taken together. For the seminar and comprehensive Viva-Voce, he should secure not less than 40% of marks in the semester-end examination.
- 13.7** A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing 36 credits from the following examinations.
- Two regular and one supplementary examinations of II B.Tech I Semester.
  - One regular and one supplementary examinations of II B.Tech II Semester.
  - 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.
- 13.8** A student shall register for all 132 credits and earn all the 132 credits. Marks obtained in all the 132 credits shall be considered for the calculation of the DIVISION based on CGPA.
- 13.9** A student who fails to earn 132 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.
- 14. Transitory Regulations:**  
Students who got detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the Program in earlier regulations (or) who have discontinued and wish to continue the Program are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent courses as and when courses are offered and they will be in the academic regulations into which they are presently readmitted.  
A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of eight years and a lateral entry student within six years for the award of B.Tech Degree.
- 15. Grades, Semester Grade Point Average and Cumulative Grade Point Average:**
- 15.1.** Grade System: After all the components and sub-components of any course (including laboratory courses) are evaluated, the final total marks obtained shall be converted into letter grades on a "10 point scale" as described below.

### Grades conversion and Grade points attached

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

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

**15.2. 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 at the end of each semester:

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

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 passed all the courses in that Semester.

**15.3. Cumulative Grade Point Average (CGPA):**

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

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

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.

16. **Grade Sheet:** A grade sheet (Marks Memorandum) shall be issued to each student indicating his performance in all courses registered in that semester indicating the **SGPA**.
17. **Consolidated Grade Sheet:** After successful completion of the entire Program of study, a Consolidated Grade Sheet containing performance of all academic years shall be issued as a final record. Duplicate Consolidated Grade Sheet will also be issued, if required, after payment of requisite fee.
18. **Award of Degree:** The Degree shall be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendations of the Chairman, Academic Council of SVEC (Autonomous).
- 18.1. **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.
- 18.2. **Award of Division:** Declaration of Division is based on CGPA.

**Awarding of Division**

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

19. **Additional academic regulations:**
- 19.1 A student may appear for any number of supplementary examinations within the stipulated time to fulfill regulatory requirements for award of the degree.
- 19.2 In case of malpractice/improper conduct during the examinations, guidelines shall be followed as given in the Annexure-I.

- 19.3** Courses such as Project, Seminar and Comprehensive Assessment may be repeated only by registering in supplementary examinations.
- 19.4** When a student is absent for any examination (Mid-term or Semester-end) he shall be awarded zero marks in that component (course) and grading will be done accordingly.
- 19.5** When a component is cancelled as a penalty, he shall be awarded zero marks in that component.
- 20. Withholding of Results:**  
If the candidate has not paid dues to the College/University (or) if any case of indiscipline is pending against him, the result of the candidate shall be withheld and he will not be allowed/promoted to the next higher semester.
- 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.
- 22.** Attendance for student development activity periods indicated in the class time tables shall be considered as in the case of a regular course for calculation of overall percentage of attendance in a semester.
- 23. General:**  
The words such as "he", "him", "his" and "himself" shall be understood to include all students irrespective of gender connotation.
- Note:** Failure to read and understand the regulations is not an excuse.

#### Annexure-I

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

Rule No.	Nature of Malpractices/ Improper conduct	Punishment
	<i>If the candidate:</i>	
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 the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. 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.

**SREE VIDYANIKETHAN ENGINEERING COLLEGE**  
(Autonomous)  
**COURSE STRUCTURE (2016-2017)**  
**INFORMATION TECHNOLOGY**  
**I B.Tech. (I Semester)**

S. No.	Course code	Course Title	Contact Periods/ Week				Credits (C)	Scheme of Examination Max. Marks		
			L	T	P	Total		Internal Marks	External Marks	Total Marks
<b>I Year - I Semester</b>										
1.	16BT1HS01	Technical English	3	1	0	4	3	30	70	100
2.	16BT1BS01	Engineering Chemistry	3	1	0	4	3	30	70	100
3.	16BT1BS03	Matrices and Numerical Methods	3	1	0	4	3	30	70	100
4.	16BT1BS04	Multi-Variable Calculus and Differential Equations	3	1	0	4	3	30	70	100
5.	16BT10501	Programming in C	3	1	0	4	3	30	70	100
6.	16BT1HS31	English Language Lab	0	0	3	3	2	50	50	100
7.	16BT1BS31	Engineering Chemistry Lab	0	0	3	3	2	50	50	100
8.	16BT10331	Computer Aided Engineering Drawing	0	1	6	7	3	50	50	100
9.	16BT10531	Programming in C Lab	0	0	3	3	2	50	50	100
<b>Total:</b>			<b>15</b>	<b>06</b>	<b>15</b>	<b>36</b>	<b>24</b>	<b>350</b>	<b>550</b>	<b>900</b>

**I B.Tech. (II Semester)**

S. No.	Course code	Course Title	Contact Periods/ Week				Credits (C)	Scheme of Examination Max. Marks		
			L	T	P	Total		Internal Marks	External Marks	Total Marks
<b>I Year - II Semester</b>										
1.	16BT1BS02	Engineering Physics	3	1	0	4	3	30	70	100
2.	16BT2BS01	Transformation Techniques and Partial Differential Equations	3	1	0	4	3	30	70	100
3.	16BT20441	Basic Electronic Devices and Circuits	3	1	0	4	3	30	70	100
4.	16BT21201	Object Oriented Programming through C++	4	1	0	5	4	30	70	100
5.	16BT21501	Digital Logic Design	3	1	0	4	3	30	70	100
6.	16BT1BS32	Engineering Physics Lab	0	0	3	3	2	50	50	100
7.	16BT20451	Analog and Digital Electronics Lab	0	0	3	3	2	50	50	100
8.	16BT21231	IT Workshop	0	0	3	3	2	50	50	100
9.	16BT21232	Object Oriented Programming Lab	0	0	3	3	2	50	50	100
<b>Total:</b>			<b>16</b>	<b>5</b>	<b>12</b>	<b>33</b>	<b>24</b>	<b>350</b>	<b>550</b>	<b>900</b>

**I B.Tech. - I Semester**  
**(16BT1HS01) TECHNICAL ENGLISH**  
(Common to CSE, CSSE, IT, CE & ME)

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

**PREREQUISITES:** English at Intermediate level

**COURSE DESCRIPTION:**

Introduction to Communication; Active Listening; Effective Speaking; Reading; and Writing.

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

1. Demonstrate knowledge in:
  - Process of communication
  - Modes of listening
  - Paralinguistic features
  - Skimming and Scanning
  - Elements of style in writing
2. Analyze the possibilities and limitations of language for understanding.
  - Barriers to Communication
  - Barriers to Effective Listening
  - Barriers to Speaking
  - Formal and metaphorical language
3. Design and develop functional skills for professional practice.
4. Apply writing skills in preparing and presenting documents.
5. Function effectively as an individual and as a member in diverse teams.
6. Communicate effectively with the engineering community and society in formal and informal situations.

**DETAILED SYLLABUS:**

**UNIT-I: INTRODUCTION TO COMMUNICATION**

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**

Introduction – Reasons for poor Listening – 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**

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

**UNIT-IV - READING**

Introduction and Reading Rates – Reading and Interpretation – Intensive and Extensive Reading – Critical Reading – Reading for Different Purposes – SQ3R Reading Technique – Study Skills.

**UNIT-V: WRITING**

Introduction – Language – Elements of Style – Techniques for Good Technical Writing – Referencing and Styling – Right Words and Phrases – Sentences.

**TEXT BOOK:**

1. Meenakshi Raman & Sangeetha Sharma, *Technical Communication*, Oxford University Press, New Delhi, 2012.

**REFERENCE BOOKS:**

1. Ashraf Rizvi, *Effective Technical Communication*, McGraw-Hill Education (India) Pvt.Ltd., New Delhi, 2015.
2. Sanjay Kumar & Pushp Lata, *Communication Skills*, Oxford University university press 2012 University Press, New Delhi, 2013.
3. Teri Kwai Gamble and Michael Gamble, *Communication Works*, Tata Mc Graw-Hill, New Delhi, 2010.
4. Rajendra Pal and J.S. Korlahalli, *Essentials of Business Communication*, Sultan Chand and Sons (P) Ltd, New Delhi, 2010.

**I B.Tech. - I Semester**  
**(16BT1BS01) ENGINEERING CHEMISTRY**  
(Common to CSE, CSSE, IT, CE & ME)

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

**PRE REQUISITE:** Intermediate/Senior Secondary Chemistry

**COURSE DESCRIPTION:** Water technology, Chemistry of Engineering materials, Nanochemistry, Green Chemistry, Electro chemical cells, Sensors, Corrosion and Lubricants.

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

- 1: Acquire basic knowledge in water technology, engineering plastics, conducting polymers, composites, Electro chemical cells, Nano Chemistry, principles of Green Chemistry, corrosion phenomenon and lubricants.
- 2: Develop analytical skills in:
  - a. Determination of hardness of water.
  - b. Determination of viscosity, flame and fire points, cloud and pour points.
- 3: Develop designing skills in:
  - a. Synthesis of engineering plastics.
  - b. Chemical methods for the synthesis of Nano materials.
- 4: Develop skills for providing solutions through:
  - a. Mitigation of hardness of water.
  - b. Newer Nanomaterials and engineering plastics for specific applications
- 5: Acquire awareness to practice engineering in compliance to modern techniques such as:
  - a. Nalgonda technique for defluoridation of water
  - b. Electroplating technique for control of corrosion.
- 6: Acquire awareness to societal issues on:
  - a. Quality of water.
  - b. Bio-diesel
  - c. Chemical materials utility and their impact.

## **DETAILED SYLLABUS:**

### **UNIT–I: WATER TECHNOLOGY (9 periods)**

**Introduction:** Types of water, impurities in water and their consequences, types of hardness of water, units of hardness of water, disadvantages of hardness of water, estimation of hardness of water by EDTA method, Boiler troubles: Scales and Sludges, Caustic embrittlement, Boiler corrosion and Priming and Foaming.

**Softening of water:** Zeolite process and Ion exchange process, advantages and disadvantages. Desalination of brackish water by Reverse Osmosis, Numerical problems on estimation of hardness of water.

**Fluorides in water:** Effects on human health, defluoridation method-Nalgonda method; comparison of merits and demerits of various defluoridation methods (Nalgonda, Bone Charcoal, Activated Alumina, Contact precipitation, Brick, Reverse osmosis).

### **UNIT – II: CHEMISTRY OF ENGINEERING MATERIALS (9 periods)**

**Engineering Plastics:** Definition, general properties, synthesis, properties and applications of PC, PTFE, and PMMA.

**Conducting polymers:** Definition, types of conducting polymers: Intrinsic and extrinsic conducting polymers with examples, engineering applications of conducting polymers.

**Biodegradable polymers:** Definition, properties, classification, mechanism of degradation of biodegradable polymers and their applications.

**Composites** – Introduction, types of composites: fiber reinforced particulate and layered composites with examples, advantages of composites and applications.

### **UNIT– III: NANOCHEMISTRY AND GREEN CHEMISTRY (9 periods)**

**Nanochemistry:** Introduction, classification, properties and applications of Nano materials (nano particles, nano tubes, nano wires, nano composites, dendrimers); synthesis of Nano materials – Sol-gel process.

**Green Chemistry:** Introduction, principles of green chemistry, Tools of Green Chemistry with Examples, Applications of Green Chemistry in science and technology.

**Biodiesel:** Introduction, Synthesis (Trans esterification method), advantages, disadvantages and applications.

#### **UNIT–IV: ELECTROCHEMICAL CELLS AND SENSORS**

**(9 periods)**

**Electrochemical cell:** Introduction, EMF of an electrochemical cell.

**Batteries:** Introduction, types of Batteries: primary and secondary batteries with examples, Ni-Cd batteries, Lithium-ion batteries, Lithium- Polymer batteries, Applications of batteries.

**Fuel Cells:** Definition, examples: H<sub>2</sub> – O<sub>2</sub> Fuel cell, solid oxide fuel cell, Bio-fuel cell and applications of fuel cells.

**Sensors** - Introduction, Types of Sensors, electrochemical sensor: construction and working principle of potentiometric sensor, and applications of electrochemical sensors.

#### **UNIT–V: CORROSION AND LUBRICANTS**

**(9 periods)**

**Corrosion:** Introduction, Definition, types of corrosion (dry and wet corrosion), galvanic corrosion, concentration cell corrosion, Factors influencing corrosion, Corrosion control: cathodic protection; sacrificial anodic protection and impressed current cathodic protection; protective coatings: Galvanizing and Electroplating (Nickel).

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

**Total periods: 45 periods**

#### **TEXT BOOKS:**

1. P.C.Jain & Monika Jain, **Engineering Chemistry**, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 16<sup>th</sup> edition, 2013.
2. K.N. Jayaveera, G.V. Subba Reddy & C. Ramachandraiah **Engineering Chemistry**, Mc. Graw-Hill Higher Education, Hyderabad, 1<sup>st</sup> edition, 2015.

#### **REFERENCE BOOKS:**

1. A.K. Bandyopadhyay, **Nano Materials**, New Age international publishers, 2<sup>nd</sup> edition, 2014.
2. Paul T. Anastas and John C Warner, **Green Chemistry: Theory and practice**, Oxford University Press, 2000.

**I B.Tech. - I Semester**  
**(16BT1BS03) MATRICES AND NUMERICAL**  
**METHODS**

(Common to all Branches)

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

**PRE-REQUISITES:** Intermediate /Senior secondary mathematics

**COURSE DESCRIPTION:** Fundamentals of matrix theory; numerical solutions of equations, curve fitting; interpolation; numerical differentiation and integration; numerical solutions of ordinary differential equations.

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

- 1: Acquire basic **knowledge** in
  - (a) Finding the rank of matrices and analyzing them.
  - (b) Solving algebraic and transcendental equations by various numerical methods.
  - (c) Fitting of various types of curves to the experimental data.
  - (d) Estimating the missing data through interpolation methods.
  - (e) Identification of errors in the experimental data
  - (f) Finding the values of derivatives and integrals through various numerical methods.
  - (g) Solving differential equations numerically when analytical methods fail.
- 2: Develop skills in **analyzing** the
  - (a) methods of interpolating a given data
  - (b) properties of interpolating polynomials and derive conclusions
  - (c) properties of curves of best fit to the given data
  - (d) algebraic and transcendental equations through their solutions
  - (e) properties of functions through numerical differentiation and integration
  - (f) properties of numerical solutions of differential equations

- 3: Develop skills in **designing** mathematical models for
- Fitting geometrical curves to the given data
  - Solving differential equations
  - Constructing polynomials to the given data and drawing inferences.
- CO4: Develop numerical skills in **solving the problems** involving
- Systems of linear equations
  - Fitting of polynomials and different types of equations to the experimental data
  - Derivatives and integrals
  - Ordinary differential equations
- CO5: Use relevant numerical **techniques** for
- Diagonalising the matrices of quadratic forms
  - Interpolation of data and fitting interpolation polynomials
  - Fitting of different types of curves to experimental data
  - obtaining derivatives of required order for given experimental data
  - Expressing the functions as sum of partial fractions

#### **DETAILED SYLLABUS:**

**UNIT-I : MATRICES (11 periods)**  
 Rank of a matrix, echelon form, normal form, inverse of a matrix by elementary row operations. Solutions of linear system of equations. Eigen values, Eigen vectors and properties (without proof), Diagonalization. Quadratic form (QF), reductions to canonical form using orthogonal transformation and nature of QF.

**UNIT-II NUMERICAL SOLUTIONS OF EQUATIONS AND CURVE FITTING (8 periods)**  
 Solutions of Algebraic and Transcendental equations by bisection method, Regula-Falsi method, Newton – Raphson’s method. Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves.

**UNIT-III INTERPOLATION (8 periods)**  
 Interpolation, difference operators and their relationships, Newton’s forward and backward formulae, Lagrange’s interpolation formula. Partial fractions using Lagrange’s interpolation formula.

**UNIT-IV NUMERICAL DIFFERENTIATION AND INTEGRATION (8 periods)**  
 Numerical differentiation using Newton’s forward and backward formulae. Numerical integration using Trapezoidal rule, Simpson’s 1/3<sup>rd</sup> rule and 3/8<sup>th</sup> rule.

**UNIT- V NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS (10 periods)**

Numerical solutions of first order Initial value problems using Taylor series method, Euler's method, modified Euler's method, Runge – Kutta method (4<sup>th</sup> order only) and Milne's predictor – corrector method.

**Total no. of periods: 45**

**TEXT BOOK:**

1. T.K.V. Iyenger, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N.Prasad, **Mathematical Methods**, S.Chand and Company, 8/e, 2013

**REFERENCE BOOKS:**

1. B.S. Grewal, **Higher engineering mathematics**, Khanna Publishers, 42<sup>nd</sup> Edition. 2012
2. S.S.Sastry, **Introductory methods of Numerical Analysis**, Prentice Hall of India, 5/e, 2013

**I B.Tech. - I Semester**  
**(16BT1BS04) MULTI-VARIABLE CALCULUS AND**  
**DIFFERENTIAL EQUATIONS**  
(Common to all Branches)

<b>Int. Marks</b>	<b>Ext. Marks</b>	<b>Total Marks</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
30	70	100	3	1	-	3

**PRE-REQUISITES:** Intermediate /Senior secondary mathematics

**COURSE DESCRIPTION:** First order differential equations; higher order linear differential equations; functions of several variables; applications of integration; multiple integrals; vector calculus.

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

- 1: Acquire knowledge in
  - (a) Higher order Differential equations
  - (b) Maximum and minimum values for the functions of several variables
  - (c) Double and triple integrals
  - (d) Differentiation and integration of vector functions.
  - (e) Line and surface volume
  - (f) transforming integrals from three dimensional surfaces and volumes on to plane surfaces
- 2: Develop skills in analyzing the
  - (a) methods for differential equation for obtaining appropriate solutions,
  - (b) Properties of oscillatory electrical circuits and heat transfer in engineering systems
  - (c) The variations in the properties of functions near their stationary values
  - (d) Flow patterns of fluids, electrical and magnetic flux and related aspects
- 3: Develop skills in designing mathematical models for
  - (a) R-C and L-R-C oscillatory electrical circuits
  - (b) Heat transfer and Newton's law of cooling
  - (c) Engineering concepts involving lengths of curves and areas of planes, Flux across surfaces
- 4: Develop analytical skills in solving the problems involving
  - (a) Newton's law of cooling
  - (b) non homogeneous linear differential equations
  - (c) maximum and minimum values for the functions

- (d) lengths of curves, areas of surfaces and volumes of solids in engineering
  - (e) transformation of integrals from three dimensional surfaces and volumes on to plane surfaces
- 5: Use relevant mathematical techniques for evaluating
- (a) various types of particular integrals in differential equations
  - (b) stationary values for multi variable functions
  - (c) multiple integrals in change of variables
  - (d) integrations of vector functions.

**DETAILED SYLLABUS:**

**UNIT-I: FIRST ORDER DIFFERENTIAL EQUATIONS**

**(6 periods)**

Linear and Bernoulli type, exact equations and reducible to exact. Orthogonal trajectories (Both Cartesian and polar forms). Newton's law of cooling.

**UNIT II: HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS**

**(9 periods)**

**Method for solution of linear equations-** Differential operator  $D$ , Solution of second order linear homogeneous equations with constant coefficients, Solution of Higher order homogeneous linear equations with constant coefficients, **Solution of Non homogeneous linear equations**-Operator methods for finding particular integrals- for cases –  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ ,  $x^n$ ,  $e^{ax} V(x)$ ,  $xV(x)$ . Method of Variation of parameters. Applications to oscillatory electrical circuits.

**UNIT-III: FUNCTIONS OF SEVERAL VARIABLES**

**(8 periods)**

**Functions of Two Variables:** Limits, Continuity; **Partial Derivatives:** Total Differential and Derivatives, Jacobian, Functional dependence, Taylor's Theorem, maxima and minima of functions of two variables with and without constraints – Lagrange's method of undetermined multipliers.

**UNIT-IV: APPLICATIONS OF INTEGRATION AND MULTIPLE INTEGRALS**

**(10 periods)**

Applications of integration to – lengths of curves, areas of surfaces of revolution, Double and Triple integrals – change of order of integration, change of variables in integrals. Area enclosed by plane curves, volumes of solids.

**UNIT-V: VECTOR CALCULUS (12 periods)**

**Vector differentiation:** Gradient of a scalar field and Directional Derivative, Divergence and Curl of a Vector field

**Line integrals:** Line integrals independent of path – work done.

**Surface area and Surface Integrals:** Surface Area, Surface Integrals, Flux across a surface.

**Green's Theorem:** Green's Theorem (without proof)- verification- applications

**Gauss Divergence Theorem and Stoke's Theorem:** Gauss Divergence theorem (without proof), Stokes's Theorem (without proof) –verifications and applications.

**Total no. of periods: 45**

**TEXT BOOK:**

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, **Engineering Mathematics, Vol-1**, S. Chand & Company, 13/e, 2014

**REFERENCE BOOKS:**

1. Grewal, B.S., **Higher engineering mathematics**, Khanna publishers, Delhi, 42/e. 2012.
2. Kreyszig, E., **Advanced Engineering Mathematics**, John Wiley and Sons, Inc., 9/e. 2012.

**I B.Tech. - I Semester**  
**(16BT10501) PROGRAMMING IN C**  
(Common to all Branches)

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

**PRE-REQUISITES:** NIL

**COURSE DESCRIPTION:**

Program design; Operators and Expressions; Data Input and Output; Control Statements; Functions; Arrays; Strings; Pointers; Structures & Unions and File handling Techniques;

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

- 1: Demonstrate knowledge in:
  - o Elements of C Language
  - o Selection and Repetition statements.
  - o Arrays, Strings and Functional statements.
  - o Derived data types, Files and Pointers
- 2: Analyze complex engineering problems to develop suitable solutions
- 3: Design algorithms for specified engineering problems
- 4: Use appropriate 'C' language constructs for solving engineering problems
- 5: Write programs using 'C' language to implement algorithms

**DETAILED SYLLABUS:**

**UNIT I – INTRODUCTION TO C PROGRAMMING, OPERATORS & EXPRESSIONS (08 periods)**

**Introduction to C Programming:** The C Character set, Writing First Program of C, Identifiers and Keywords, Data types, Constants, Variables and Arrays, Declarations, Expressions, Statements and Symbolic Constants.

**Operators and Expressions:** Arithmetic Operators, Unary Operators, Relational and Logical Operators, Assignment Operators, the Conditional Operators.

**UNIT II – DATA INPUT AND OUTPUT & CONTROL STATEMENTS (08 periods)**

**Data Input and Output:** Single Character Input and Output, Input Data & Output data, The gets and puts Function.

**Control Statements:** Branching: The if-else Statement, Looping: The while Statement, More Looping: The do-while

Statement, Still More Looping: The for Statement, Nested Control Statement, The switch Statement, The break & continue Statements, The goto Statement.

**UNIT III – FUNCTIONS, PROGRAM STRUCTURES & ARRAYS**  
**(11 periods)**

**Functions:** A Brief Overview, Defining a Function, Accessing a Function, Function Prototypes, Parsing Argument to a Function, Recursion.

**Program Structure:** Storage Classes, Automatic Variables, External (Global) Variables, Static Variables, Multi file Programs,

**Arrays:** Defining an Array, Processing an Array, Processing Array to function, Multidimensional Arrays. Linear search, Binary search, Fibonacci search, Bubble sort and Insertion sort

**UNIT IV – STRINGS & POINTERS** **(09 periods)**

**Strings:** Defining a String, NULL Character, Initialization of Strings, Reading and Writing a String, Processing a Strings, Character Arithmetic, Searching and Sorting of Strings, Library Functions for Strings.

**Pointers:** Pointer Declaration, Passing Pointers to a Function, Pointers and One-dimensional Arrays, Dynamic Memory Allocation, Operations on Pointers, Pointers and Multidimensional Arrays, Arrays of Pointers.

**UNIT V – STRUCTURES AND UNIONS & FILE HANDLING**  
**(09 periods)**

**Structures and Unions:** Defining a Structure, Processing a Structure, User-Defined Data types (typedef), Structures and Pointers, Passing Structures to Function, Self –Referential Structures, Unions

**File Handling:** Files introduction, Opening and Closing a Data File, Reading and Writing a Data File, Processing a Data File, Unformatted Data File, Concept of Binary Files, Accessing the File Randomly.

**Total Periods: 45**

**TEXT BOOK:**

1. Byron Gottfried and Jitender Kumar C *"Programming with C,"* Third Edition, McGraw Hill Education (India) Pvt, Ltd, New Delhi, 2016.

**REFERENCE BOOKS:**

1. PradipDey and Manas Ghosh, *"Programming in C",* Second Edition, Oxford University Press, NewDelhi, 2007.
2. E. Balagurusamy, *"Programming in C",* Seventh Edition, Mc Graw Hill Education (India) Pvt, Ltd, New Delhi, 2014.

**I B.Tech. - I Semester**  
**(16BT1HS31) ENGLISH LANGUAGE LAB**  
(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

**PREREQUISITES:** English at intermediate or equivalent level.

**COURSE DESCRIPTION:** Phonetics Vocabulary Building; Functional Grammar; Just a Minute; Elocution/Impromptu; Giving Directions/Conversation Starters; Role Play; Public Speaking; Describing People, Places, Objects and Events; Reading Comprehension; Listening Comprehension; Information Transfer.

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

1. Demonstrate knowledge in
  - Phonetics
  - Information Transfer
2. Analyze the functional knowledge in
  - Vocabulary
  - Grammar
3. Design and develop functional skills for professional practice.
4. Apply the techniques of Listening and Reading skills to comprehend Listening and Reading comprehension.
5. Function effectively as an individual and as a member in diverse teams to demonstrate
  - Extempore talk and
  - Role Play
6. Communicate effectively in public speaking in formal and informal situations.
7. Recognize the need to engage in lifelong learning to upgrade competence of knowledge and communication.

**LIST OF EXERCISES:**

1. Phonetics
2. Vocabulary Building
3. Functional Grammar
4. Just a Minute
5. Elocution/Impromptu
6. Giving Directions/Conversation Starters
7. Role Play
8. Public Speaking
9. Describing People, Places, Objects and Events.
10. Reading Comprehension
11. Listening Comprehension
12. Information Transfer

**TEXT BOOK:**

1. Department Lab Manual

**REFERENCE BOOKS:**

1. D. Sudha Rani, *A Manual for English Language Laboratories*, Pearson Education.
2. D. Sudha Rani, *Advanced Communication Skills Laboratory Manual*, Pearson Education.
3. R. Manivannan and G. Immanuel, *Communication Skills Laboratory*, VK Publications, Sivakasi, 2013
4. Nira Kumar, *English Language Laboratories*, PHI Learning Pvt. Ltd., New Delhi, 2011.

**SUGGESTED SOFTWARE:**

1. ETNL Language Lab Software Version 4.0
2. GEMS - Globarena E- Mentoring System.
3. Speech Solutions.
4. English Pronunciation Dictionary by Daniel Jones.
5. Learn to Speak English 8.1, The Learning Company - 4 CDs.
6. Mastering English: Grammar, Punctuation and Composition.
7. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
8. Dorling Kindersley Series - Grammar.
9. Language in Use 1, 2 & 3.
10. Cambridge Advanced Learner's Dictionary - 3rd Edition.
11. Centronix - Phonetics.
12. Let's Talk English, Regional Institute of English South India.
13. The Ultimate English Tutor.

**I B.Tech. - I Semester**  
**(16BT1BS31) ENGINEERING CHEMISTRY LAB**  
(Common to CSE, CSSE, IT, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

**PRE REQUISITE:** Intermediate/Senior Secondary Chemistry

**COURSE DESCRIPTION:** Estimation of hardness, alkalinity, dissolved oxygen of water samples and estimation of Iron by volumetric methods, determination of effect of P<sup>H</sup> on rate of corrosion, measurement of viscosity of lubricants; Instrumental methods like potentiometer, conductivity meter, P<sup>H</sup> meter and colorimeter; synthesis of Polymers and Nano materials.

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

- 1: Acquire basic Knowledge about the volumetric analysis and synthesis of materials used for engineering applications.
- 2: Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of Iron through wet laboratory methods.
- 3: Develop designing skills for the synthesis of polymers and Nanomaterials.
- 4: Acquire skills to use instrumental techniques for the determination of Electrical conductance of electrolytes, EMF of a cell, PH of a solution, determination of viscosity of lubricants and estimation of iron in cement.
- 5: Provide solutions for environmental issues through determination of quality of water.

**List of Experiments:**

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

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
3. Estimation of Dissolved Oxygen in water.
4. Estimation of Ferrous Iron by Dichrometry.
5. Preparation of Novalac Resin.
6. Synthesis of Nano metal-oxide using sol– gel process.
7. Conductometric titration of strong acid Vs strong base
8. Estimation of Ferrous ion by Potentiometry.
9. Determination of amount of corrosion of metals in different medium
10. Measurement of viscosity of lubricants by Ostwald viscometer.
11. Determination of P<sup>H</sup> of a given solution by P<sup>H</sup>metry.
12. Estimation of Ferric iron in cement by Colorimetric method.

**Total Time Slots: 12**

**I B.Tech. - I Semester**  
**(16BT10331) COMPUTER AIDED ENGINEERING**  
**DRAWING**

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

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	1	6	3

**PRE-REQUISITES:** *None*

**COURSE DESCRIPTION:**

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

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

- 1: Understand, write and read the language of engineering drawing in industry through International System of Standards.
- 2: Develop the imagination and mental visualization ability for interpreting the geometrical details of engineering objects.
- 3: Produce different views and projection in drawing.
- 4: Use modern CAD software for design and drafting of drawings.
- 5: Create multi-view drawings suitable for presentation to Engineering community.
- 6: Introduce and communicate universally accepted conventions and symbols for their usage in technical drawing.

**DETAILED SYLLABUS:**

**UNIT : I - BASICS OF ENGINEERING DRAWING PRACTICE, GEOMETRICAL CONSTRUCTIONS, CONICS AND SPECIAL CURVES (18 periods)**

Introduction, drawing instruments and its uses, sheet layout, BIS conventions, lines, lettering and dimensioning practices. Geometrical constructions: Construction of regular polygons: Pentagon, Hexagon, Heptagon and Octagon. Conic sections: Introduction, construction of ellipse: rectangular method, eccentricity method. Construction of parabola: rectangular method, eccentricity method. Construction of hyperbola: eccentricity method. Special curves: cycloid, involute.

**UNIT: II – INTRODUCTION TO COMPUTER AIDED SKETCHING  
(18 periods)**

Computer screen, layout of the software, creation of 2D/3D environment, selection of drawing size and scale, Standard tool bar/menus, Coordinate system, description of most commonly used toolbars, navigational tools: commands and creation of lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity.

**UNIT: III – PROJECTION OF POINTS, STRAIGHT LINES AND PLANES  
(21 periods)**

Introduction, method of projection, planes of projection, reference line and notations. Projection of points: Points in all the four quadrants. Projection of straight lines: lines inclined to HP / VP plane, inclined to both HP and VP planes (straight lines are assumed to be in first quadrant only). Projection of planes: projection of triangle, square, rectangle, rhombus, pentagon, hexagon and circular plane for the condition inclined to HP / VP by change of position method.

**UNIT IV – PROJECTION OF SOLIDS AND SECTION OF SOLIDS  
(21 Periods)**

**Projections of Solids:** Introduction, projection of solids: prisms, pyramids, cylinders and cones with axis perpendicular to VP/HP and axis inclined to VP/HP only. **Sections of solids:** Introduction, Cutting plane, sectional views of right regular solids resting with base on HP: prisms, pyramids, cylinder and cone and true shapes of the sections.

**UNIT V – ORTHOGRAPHIC AND ISOMETRIC PROJECTIONS AND DEVELOPMENT OF SURFACES  
(22 periods)**

**Orthographic projection:** simple exercises. **Isometric projection:** Simple exercises.

**Development of surfaces:** prisms, pyramids, cylinders, cone and miscellaneous surfaces

**Total Periods: 100**

**Note:** Student shall practice Unit-I using sketch book only and remaining units using sketch book first and later CAD package.

**TEXT BOOKS:**

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 Bhat & V M Panchal, Engineering Drawing, Charotar Publishing House, Gujarat, 51<sup>st</sup> edition, 2013.

**REFERENCE BOOKS:**

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, 4<sup>th</sup> Edition, 2012.
3. T.Jeyapoovan, Engineering Drawing and Graphics Using AutoCAD, Vikas Publishing House, 3<sup>rd</sup> Edition, 2010.
4. Jolhe, Engineering Drawing, Tata McGraw Hill Education Private Limited, 1<sup>st</sup> Edition, 2007.
5. Basant Aggarwal, Engineering Drawing, Tata McGraw Hill Education Private Limited, 1st Edition, 2008.

**I B.Tech - I Semester**  
**(16BT10531) PROGRAMMING IN C LAB**  
(Common to all Branches)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

**PRE-REQUISITES:** A course on "Programming in C"

**COURSE DESCRIPTION:** Hands on practice in developing and executing simple programs using C Programming constructs— Conditional statements, Loops, Arrays, Strings, Functions, Structures, Pointers and Functions.

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

1. Demonstrate practical knowledge of using C language constructs:
  - Selection and Repetition statements.
  - Arrays, Strings and Functional statements.
  - Derived data types, Files and Pointers
2. Analyze problems to develop suitable algorithmic solutions
3. Design Solutions for specified engineering problems
4. Use appropriate 'C' language constructs for solving engineering problems
5. Implement and execute programs using 'C' language
6. Document programs and communicate effectively while conducting Professional transactions.

**List of Exercises:**

1. a. Let a and b are two integer variables whose values are 10 and 13 respectively. Write a program to evaluate the following arithmetic expressions.
  - i)  $a + b$
  - ii)  $a - b$
  - iii)  $a * b$
  - iv)  $a / b$
  - v)  $a \% b$
- b. Write a program to evaluate the following algebraic expressions after reading necessary values from keyword.
  - i)  $(ax + b) / (ax - b)$
  - ii)  $2.5 \log x + \cos 32^\circ + |x^2 + y^2|$
  - iii)  $x^5 + 10x^4 + 8$  and  $x^3 + 4x + 2$
  - iv)  $ae^{kt}$

2. a. Mr. Gupta deposited Rs.1000 in a bank. The bank gives simple interest at the rate of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula  $I = P T R / 100$ )
- b. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.
- c. In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population; write a program to find the total number of illiterate men and women if the population of the town is 8000.
3. a. Write a program that prints the given 3 integers in ascending order using if - else.
- b. Write a program to calculate commission for the input value of sales amount.  
Commission is calculated as per the following rules:
  - i) Commission is NIL for sales amount Rs. 5000.
  - ii) Commission is 2% for sales when sales amount is >Rs. 5000 and <= Rs. 10000.
  - iii) Commission is 5% for sales amount >Rs. 10000.
- c. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.
 

<b>Characters ASCII values</b>	
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 - 127
4. a. If cost price and selling price of an item is input through the keyboard, write program to determine whether the seller has made profit or incurred loss. Also determine how much profit or loss he incurred in percentage.
- b. An insurance company calculates premium as follows:
  - i. If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lakhs.
  - ii. If a person satisfies all the above conditions and is female then the premium is Rs.3 per thousand and the policy amount cannot exceed Rs.1 lakh.

- iii. If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then premium is Rs.6 per thousand and the policy cannot exceed Rs. 10000.
  - iv. In all other cases the person is not insured.  
Write a program to determine whether the person should be insured or not, his/her premium rate and maximum amount for which he/she can be insured.
5. a. Write a program, which takes two integer operands and one operator as input from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, %. Use switch statement)
- b. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following rules:
- i. If the student gets first class and the number of subjects failed is  $>3$ , then no grace marks are awarded. If the number of subjects failed is less than or equal to '3' then the grace is 5 marks per subject.
  - ii. If the student gets second class and the number of subjects failed in is  $>2$ , then no grace marks are awarded. If the number of subjects failed in less than or equal to '3' then the grace is 4 marks per subject.
  - iii. If the student gets third class and the number of subjects failed in is  $>1$ , then no grace marks are awarded. If the number of subjects failed in is equal to '1' then the grace is 5 marks per subject.
6. a. Write a program to find the sum of individual digits of a positive integer.
- b. A Fibonacci sequence is defined as follows:  
The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence.  
Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.
7. a. Write a program to find the largest and smallest number in a given list of integers.
- b. Write a program to perform the following:
- i. Addition of two matrices.
  - ii. Multiplication of two matrices.

8. a. Write a program that uses functions to perform the following operations:
    - i. To insert a sub-string in main string at a specified position.
    - ii. To delete N characters from a given string from a specified position.
  - b. Write a program to determine whether the given string is palindrome or not.
  - c. Write a program to display the position or index in the main string S where the sub string T begins. Display -1 if S does not contain T.
  - d. Write a program to count the number of lines, words and characters in a given text.
9. a. Write a program to read list of student names and perform the following operations using functions.
    - i. to print list of names
    - ii. to sort them in ascending order
    - iii. to print the list after sorting.
  - b. Write a menu driven program to read list of student names and perform the following operations using array of character pointers.
    - i. to insert a student name
    - ii. to delete a name
    - iii. to print the name
10. Write a program that uses functions to perform the following operations:
    - i. Reading a complex number
    - ii. Writing a complex number
    - iii. Addition of two complex numbers
    - iv. Multiplication of two complex numbers

**(Note:** Represent complex number using a structure.)
  11. a. Write a program to accept the elements of the structure as:
 

Employee-name, Basic pay

Display the same structure along with the DA, CCA and Gross salary for 5 employees.

Note: DA=51% of Basic pay, CCA=Rs.100.consolidated.
  - b. Define a structure to store employee's data with the following specifications:
 

Employee-Number, Employee-Name, Basic pay, Date of Joining

    - i. Write a function to store 10 employee details.
    - ii. Write a function to implement the following rules while revising the basic pay.

If Basic pay  $\leq$  Rs.5000 then increase it by 15%.

If Basic pay  $>$  Rs.5000 and  $\leq$  Rs.25000 then it increase by 10%.

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

Write a function to print the details of employees who have completed 20 years of service from the date of joining.

12. a. Write a program which copies one 'text file' to another 'text file'.
- b. Write a program to reverse the first N characters of a given text file.

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

13. Write a program to print the output by giving the Customer\_ID as an input.

**REFERENCE BOOKS:**

1. Byron Gottfried and Jitender Kumar C, *Programming with C*, 3<sup>rd</sup> Edition, McGraw Hill Education(India) Pvt. Ltd, 2016.
2. Pradip Dey and Manas Ghosh, *Programming in C*, 2<sup>nd</sup> Edition, Oxford University Press, 2007.

**I B.Tech. - II Semester**  
**(16BT1BS02) ENGINEERING PHYSICS**  
(Common to CSE, CSSE, IT, CE & ME)

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

**PREREQUISITES:** Intermediate / senior secondary Physics

**COURSE DESCRIPTION:** Lasers; optical fibers; principles of quantum mechanics; band theory of solids; semiconductors; dielectric properties of materials; acoustics of buildings; superconductors; crystallography and nanomaterials.

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

1. Acquire basic knowledge of lasers, optical fibers, quantum mechanics, dielectrics, semiconductors, and superconductors, acoustic of buildings, crystallography and nanomaterials.
2. Analyze the construction and working of various laser systems, semiconductor devices, various types of optical fibers and its communication system and nano materials properties.
3. Gain skills in designing lasers, optical fiber cable, semiconductor devices, acoustically good halls and nanomaterials.
4. Develop problem solving skills in engineering context.
5. Use relevant techniques for assessing ball milling, pulsed laser deposition, p-n junction and Laser.

**DETAILED SYLLABUS:**

**UNIT-I: LASERS AND FIBER OPTICS**

**Lasers:** Introduction, characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein's coefficients – condition for amplification, population inversion, Nd: YAG laser, Helium-Neon laser, semiconductor laser and applications of lasers.

**Fiber optics:** Introduction, principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, classification of optical fibers, optical fiber communication system and applications of optical fibers.

## **UNIT-II: PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS**

**Principles of Quantum Mechanics:** Introduction, de-Broglie's hypothesis, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment).

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

## **UNIT-III: SEMICONDUCTORS AND DIELECTRIC PROPERTIES OF MATERIALS**

**Semiconductors:** Introduction, types of semiconductors, intrinsic carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect and its applications, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, LED, photo diode and Solar cell.

**Dielectric Properties of Materials:** Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, frequency dependence of polarizability (qualitative treatment), ferroelectricity.

## **UNIT-IV: ACOUSTICS OF BUILDINGS AND SUPERCONDUCTIVITY**

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

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

## **UNIT-V: CRYSTALLOGRAPHY AND NANOMATERIALS**

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

**Nanomaterials:** Introduction, principles of nanomaterials, properties of nanomaterials, synthesis of nanomaterials by ball milling and pulsed laser deposition and applications of nanomaterials.

**TEXT BOOK:**

1. P. K. Palaniswamy, *Engineering Physics*, Scitech Publications India Private Limited, 2<sup>nd</sup> Edition, 2009.

**REFERENCE BOOKS:**

1. Dr. S. Mani Naidu, *Engineering Physics*, Pearson Education, 1<sup>st</sup> Edition, 2013.
2. M.N. Avadhanulu, P.G. Kshirsagar, *A textbook of Engineering Physics*, S.Chand & Company Ltd. Revised Edition 2014.
3. K. Thyagarajan, *Engineering Physics-I*, McGraw-Hill Education (India) Pvt.Ltd. 2015.

**I B.Tech. - II Semester**  
**(16BT2BS01) TRANSFORMATION TECHNIQUES**  
**AND PARTIAL DIFFERENTIAL EQUATIONS**  
(Common to all Branches)

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

**PRE REQUISITE:** Intermediate /Senior secondary mathematics

**COURSE DESCRIPTION:** Fourier series; Fourier integrals and transforms; Laplace transforms; z –transforms; partial differential equations.

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

- 1: Acquire basic knowledge in
  - (a) Fourier series and Fourier transforms
  - (b) Fourier integrals
  - (c) Laplace transforms and their applications
  - (d) z- transforms and their applications
  - (e) solving partial differential equations
- 2: Develop skills in analyzing the
  - (a) Properties of Fourier series for a given function
  - (b) Partial differential equations through different evaluation methods
  - (c) Difference equations through z – transforms
  - (d) Engineering systems and processes involving wave forms and heat transfer
- 3: Develop skills in designing mathematical models for
  - (a) Problems involving heat transfer and wave forms
  - (b) Engineering concepts involving, Fourier transforms, Fourier integrals, Laplace transforms, z-transforms and difference equations
- 4: Develop analytical skills in solving the problems involving
  - (a) Fourier series and Fourier transforms
  - (b) Laplace transforms
  - (c) Z-transforms and difference equations
  - (d) Heat transfer and wave motion
- 5: Use relevant transformation techniques for
  - (a) Obtaining Fourier transforms for different types of functions
  - (b) Laplace transforms
  - (c) Z- transforms
  - (d) Partial differential equations

## DETAILED SYLLABUS

### UNIT- I : FOURIER SERIES (7 periods)

Fourier series: Determination of Fourier coefficients, convergence of Fourier series (Dirichlet's conditions), Fourier series of even and odd functions, Half-range Fourier sine and cosine expansions.

### UNIT- II: FOURIER INTEGRALS AND FOURIER TRANSFORMS (8 periods)

Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms –properties, Inverse transform and finite Fourier transforms.

### UNIT-III: LAPLACE TRANSFORMS (12 periods)

Laplace transforms of standard functions. Properties of Laplace transforms. First and second shifting Theorems. Laplace transforms of derivatives and integrals. Inverse transforms. Convolution theorem (without proof), inverse Laplace transforms by convolution theorem. Laplace transform of periodic functions, Applications of Laplace transforms to ordinary differential equations of first and second order with constant coefficients.

### UNIT-IV: Z- TRANSFORMS (9 periods)

Z – transforms, inverse Z– transforms, damping rule, shifting rule, initial and final value theorems. Convolution theorem (without proof), solution of difference equations by Z– transforms.

### UNIT – V: PARTIAL DIFFERENTIAL EQUATIONS (9 periods)

Formation of Partial differential equations – Solutions of first order linear equations by method of grouping. First and second order equations by method of separation of variables – Solutions of one dimensional Wave equation, Heat equation.

**Total no. of periods: 45**

#### TEXT BOOKS:

1. T.K.V. Iyengar, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N. Prasad, **Engineering Mathematics, vol-1**, S. Chand & Company 13/e, 2014.
2. T.K.V. Iyengar, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N. Prasad, **Mathematical Methods**, S. Chand and Company, 8/e, 2013.

#### REFERENCE BOOKS:

1. Grewal, B.S., **Higher Engineering Mathematics**, Khanna publishers, Delhi, 42/e, 2012.
2. Kreyszig, E., **Advanced Engineering Mathematics**, John Wiley and Sons, Inc., 9/e, 2013.

**I B.Tech. - II Semester**  
**(16BT20441) BASIC ELECTRONIC DEVICES AND**  
**CIRCUITS**

(Common to CSE, CSSE & IT)

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

**PREREQUISITES:** A course on Engineering Physics.

**COURSE DESCRIPTION:**

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

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

- 1: Gain in-depth knowledge in
  - p-n junction diode and its characteristics
  - Zener diode and its characteristics
  - Rectifiers and Filters
  - Characteristics of BJT, FET, MOSFET and special purpose electronic devices.
  - FET amplifiers
  - Feedback amplifiers and Oscillators
- 2: Analyze numerical and analytical problems in
  - Rectifiers using Filters
  - Transistor biasing circuits
  - FET biasing circuits and amplifiers
  - Feedback amplifiers and oscillators
- 3: Design electronic circuits such as
  - Rectifiers with and without filters
  - BJT and FET biasing circuits
  - FET amplifiers
  - Feedback amplifiers and oscillators
- 4: Solve engineering problems and arrive at solutions pertaining to electronic circuits.
- 5: Select appropriate technique for transistor biasing.

## **DETAILED SYLLABUS**

### **UNIT-I: P-N JUNCTION DIODE AND RECTIFIERS**

**(10 Periods)**

#### **P-N JUNCTION DIODE**

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

#### **RECTIFIERS**

Halfwave rectifier and Fullwave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter,  $\pi$  - section filter, Problems on rectifier circuits.

### **UNIT-II: BIPOLAR JUNCTION TRANSISTOR AND BIASING**

**(11 Periods)**

#### **CHARACTERISTICS:**

Transistor construction, BJT Operation, Transistor as an amplifier, Transistor currents and their relations, Input and Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications, transistor hybrid model for CE configuration – analytical expressions for transistor characteristics.

#### **BIASING:**

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

### **UNIT-III: FIELD EFFECT TRANSISTOR**

**(10 Periods)**

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

### **UNIT-IV: FEEDBACK AMPLIFIERS AND OSCILLATORS**

**(8 Periods)**

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

**UNIT-V: SPECIAL PURPOSE ELECTRONIC DEVICES**

**(6 Periods)**

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

**Total Periods: 45**

**TEXT BOOK:**

1. J. Millman, Christos C. Halkias and Satyabrata Jit, *Electronic Devices and Circuits*, 3<sup>rd</sup> Edition, TMH, 2010.

**REFERENCE BOOKS:**

1. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits*, 10<sup>th</sup> Edition, PHI, 2009.
2. S. Salivahana, N. Suresh Kumar, *Electronic Devices and Circuits*, 3<sup>rd</sup> Edition, Mc-Graw Hill, 2013.
3. David A. Bell, *Electronic Devices and Circuits*, 5<sup>th</sup> Edition, Oxford University press, 2014.

**I B.Tech. - II Semester**  
**(16BT21201) OBJECT ORIENTED**  
**PROGRAMMING THROUGH C++**  
(Common to CSE, CSSE & IT)

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

**PREREQUISITES:** A Course on "Programming in C".

**COURSE DESCRIPTION:**

Introduction to Object Oriented concepts and Fundamental Concepts of C++; Decision Making Statements, Looping Statements and Functions; Arrays, Pointers & References and Strings; Classes & Objects and Overloading Operators; Composition & Inheritance, Templates, Iterators & Generics and File Handling;

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

- 1: Demonstrate knowledge on object oriented programming concepts - Object, Class, Inheritance, Polymorphism, Encapsulation, Abstraction and Message passing.
- 2: Identify object oriented concepts for code reusability and optimization.
- 3: Design and develop solutions for given specifications.
- 4: Demonstrate problem solving skills to provide software solutions to real world problems.
- 5: Develop C++ programming to provide solutions to complex engineering problems using object oriented concepts.

**DETAILED SYLLABUS:**

**UNIT-I: INTRODUCTION AND FUNDAMENTAL CONCEPTS**

**(Periods: 10)**

**An introduction to object technology:** Objects and methods, Object: A practical example, Classes, Declaring classes and objects.

**Key Object Orientation concepts and Elementary C++ programming:** Abstraction, Encapsulation, Aggregation/ composition, Inheritance, Some simple programs, The output operator, Characters and literals, Variables and their declarations, Program tokens, Initializing variables, Objects, variables and constants, The input operator.

**Fundamental types:** Numeric data types, The Boolean types, Enumeration types, Character types, Integer types, Arithmetic operators, The increment and decrement operators, composite Assignment operators, Floating –point types, Type conversions, Numeric overflow, Round-off error, The format for floating – point values, Scope.

**UNIT-II: DECISION MAKING STATEMENTS, LOOPING STATEMENTS AND FUNCTIONS (Periods: 10)**

**Decision making statements:** The if statement, The if-else statement, Keywords, Comparison operators, Statement blocks, Compound Conditions, Short- circuiting, Boolean expressions, Nested selection statements, The else-if statement, The switch statement, The conditional expression operator.

**Looping Statements:** The while statements, Terminating a loop, the do-while statement, the for statement, the break statement, the continue statement, the goto statement, Generating pseudo-random numbers

**Functions:** Introduction, Standard c++ library functions, User-defined functions, Test drivers, function declarations and definitions, Local variables and functions, void functions, Boolean functions, I/O functions, passing by reference, passing by constant reference, Inline functions, Scope, Overloading, The main () function, Default arguments

**UNIT-III: ARRAYS, POINTERS & REFERENCES AND STRINGS (Periods: 12)**

**Arrays:** Introduction, processing arrays, initializing an array, Array index out of bounds, passing an array to a function, the linear search algorithm, the bubble sort algorithm, the binary search algorithm, Using arrays with enumeration types, Type definitions, Multidimensional arrays.

**Pointers and References:** The reference operator, References, Pointers, the dereference operator, Derived types, Objects and lvalues, Returning a reference.

**C++ Strings:** Introduction, working with strings in C++, String manipulation, Strings and arrays, miscellaneous string functions, String streams

**UNIT-IV: CLASSES & OBJECTS AND OVERLOADING OPERATORS (Periods: 12)**

**Classes and objects:** Introduction, Class declarations, Constructors, Constructor initialization lists, Access functions, Private member functions, The copy constructor, The class destructor, Constant Objects, Structures, Pointers to object, Static data members, static function members, predefined classes, Data hiding and encapsulation, Exception handling

**Overloading Operators:** Introduction, Overloading the assignment operator, The this operator, Overloading Arithmetic operator, Overloading the arithmetic assignment operator, Overloading the relational patterns, Overloading the stream operators, Conversion operators, Overloading the increment and decrement operators, Overloading the subscript operator

**UNIT-V: COMPOSITION & INHERITANCE, TEMPLATES, ITERATORS & GENERICS AND FILE HANDLING**

**(Periods: 11)**

**Composition and inheritance:** Introduction, Composition, Inheritance, protected class members, Overriding and dominating inherited members, private access versus protected access, virtual functions and polymorphism, virtual destructors, Virtual functions, pure virtual functions, Abstract classes, object-oriented programming.

**Templates, iterators and Generics:** Introduction, Function templates, Class templates, Container classes, Subclass templates, passing template classes to template parameters, Iterator classes, Generic programming

**C++ File Handling:** File I/O

**(Total Periods: 55)**

**TEXT BOOKS:**

1. John R Hubbard, *Programming with C++*, 3<sup>rd</sup> Edition, Tata McGraw-Hill, 2010.
2. P. B. Mahapatra, "Thinking in C++", 1<sup>st</sup> Edition, Galgotia Publications Pvt. Ltd, 2005.

**REFERENCE BOOK:**

1. Sourav Sahay, *Object Oriented Programming with C++*, 2<sup>nd</sup> Edition, Oxford University Press, 2012.

**I B.Tech. - II Semester**  
**(16BT21501) DIGITAL LOGIC DESIGN**  
(Common to CSE, CSSE & IT)

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

**PRE-REQUISITES: -NIL-**

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

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

1. Demonstrate knowledge on Boolean algebra, Minimization of Boolean functions using Map Reduce method.
2. Identify appropriate simplification techniques for Boolean functions.
3. Design combinational and sequential logic circuits, memory and programmable logic for digital systems.
4. Select and Apply Boolean algebra and gate level minimization techniques for designing combinational and sequential logic circuits.
5. Learn independently new concepts, new techniques and advanced subject knowledge in the area of combinational and sequential logic circuits.

**DETAILED SYLLABUS:**

**UNIT I – BINARY SYSTEMS AND BOOLEAN ALGEBRA**

**(10 periods)**

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

**UNIT II – GATE LEVEL MINIMIZATION** **(9 periods)**

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

**UNIT III – COMBINATIONAL LOGIC (9 periods)**

Combinational Circuits, Analysis procedure, Design procedure, Binary Adder-Subtractor, BCD Adder, Carry- Look- ahead adder, Binary multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-Multiplexers.

**UNIT IV – SEQUENTIAL LOGIC (9 periods)**

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

**UNIT V – MEMORY AND PROGRAMMABLE LOGIC (8 periods)**

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

**Total Periods: 45**

**TEXT BOOK:**

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

**REFERENCE BOOKS:**

1. David J Comer, "Digital Logic and State Machine Design", Third Edition, Oxford University Press, 2012.
2. Charles H.Roth Jr, "Fundamentals of Logic Design", Fifth edition, Cengage Learning, 2008.
3. A. Anand Kumar, "Switching Theory and Logic Design", Prentice-Hall of India Pvt. Limited, 2010.

**I B.Tech. - II Semester**  
**(16BT1BS32) ENGINEERING PHYSICS LAB**

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

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

**PRE-REQUISITES:** Intermediate / senior secondary Physics.

**COURSE DESCRIPTION:**

Characteristics of p-n junction diode, Photodiode, LED, and semiconductor laser diode. Experimental determination of carrier concentration and energy gap of a semiconductor material, wave length of a laser source, size of fine particle, numerical aperture and acceptance angle of optical fiber. Determination of frequency of electrically vibrating tuning fork and A.C source using A.C sonometer, magnetic field along axial line of a current carrying coil and rigidity modulus of material of a wire using torsional pendulum.

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

- 1: Acquire basic knowledge about semiconductor materials, magnetic materials and lasers.
- 2: Acquire analytical skills in the estimation of carrier concentration of semiconductor materials and characterization of p-n junction.
- 3: Develop skills in designing electronic circuits using semiconductor components.
- 4: Acquire skills to use instrumental techniques in A.C sonometer and Melde's experiment.
- 5: Apply diffraction techniques for determination of size of tiny particles and wave length of lasers.

**ENGINEERING PHYSICS LAB**

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

1. Determination of wavelength of a laser source using Diffraction Grating.
2. Determination of particle size by using a laser source.
3. Determination of Numerical aperture and acceptance angle of an optical fiber.
4. Melde's experiment - transverse & longitudinal modes.
5. Magnetic field along the axis of a current carrying coil- Stewart and Gee's method.
6. Calculation of A.C frequency using sonometer.
7. I-V Characteristics of a p-n Junction diode.
8. Energy gap of a material of a p-n Junction.
9. Characteristics of LED source.
10. Characteristics of Photo diode.
11. Hall Effect.
12. Determination of rigidity modulus of the material of the wire using torsional pendulum.

**I B.Tech II semester**  
**(16BT20451) ANALOG AND DIGITAL**  
**ELECTRONICS LAB**  
(Common to CSE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

**PREREQUISITES:** Courses on “Basic Electronic Devices & Circuits and Digital Logic Design”

**COURSE DESCRIPTION:** Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; BJT and FET characteristics; UJT and SCR characteristics; BJT Amplifiers; Realization of FFs, Combinational Circuits, sequential Circuits; Demonstration on VHDL Programme.

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

1. Demonstrate knowledge in different electronic devices, analog and digital circuits
2. Analyze the characteristics of different electronic devices and circuits like
  - Diodes p-n Junction Diodes, Zener Diodes, SCR
  - Transistors-BJT,FET,UJT
  - Flip Flops-JK FF, D FF
  - Combinational Circuits-HA, FA
  - Sequential Circuits -Counters
3. Design electronic circuits like FET Amplifiers, Feedback amplifiers, Oscillators, Combinational Circuits and Sequential Circuits.
4. Solve engineering problems by proposing potential solutions through Design of better electronic circuits.
5. Model an electronic circuit which fulfil the needs of the society.
6. Function effectively as an individual and as a member in a group
7. Communicate effectively in verbal and written form.

## **DETAILED SYLLABUS:**

### **PART A**

#### **ELECTRONIC WORKSHOP PRACTICE (Only for Viva-Voce)**

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

### **PART B**

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

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

### **PART C**

#### **DIGITAL CIRCUITS**

##### **Realization of**

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

##### **Demonstration of**

VHDL Programme

**I B.Tech. - II Semester**  
**(16BT21231) IT WORKSHOP**  
(Common to IT & CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

**PREREQUISITES:** —Nil—

**COURSE DESCRIPTION:**

Practice sessions on PC hardware, Internet, World Wide Web, LibreOffice Suite. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

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

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

**LIST OF EXERCISES:**

1. PC Hardware
  - a. Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.
  - b. Demonstrating assembling and disassembling of the Personal Computer.
  - c. Introduction to Operating Systems, components of OS, installation of Microsoft Windows-XP Operating System.

## 2. Operating System

- a. Introduction to LINUX OS, installation of LINUX OS, Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc
  - b. Introduction to DOS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit.
3. Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software troubleshooting steps, PC diagnostic tools.

## 4. Libre Office:

### a. Libre Writer

Introduction to Writer, importance of Writer as Word Processor, overview of toolbars, saving, accessing files, using help and resources.

- i). Create a document using the features: Formatting fonts, drop cap, bullets and numbering, text effects, character spacing, borders and shading, tables, text direction, hyperlink, headers and footers, date and time.
- ii). Create a document in using the features: picture effects, clipart, auto shapes & grouping, page setup, paragraph indentation, wrap text, footnote and equations.

### 5. Libre Calc

- a. Introduction to Calc as a spreadsheet tool, overview of toolbars, accessing, saving Calc files, using help and resources.
- i). Create a spreadsheet using the features: gridlines, format cells, auto fill, formatting text, formulae, table and charts.
- ii). Create a spreadsheet using the features: split cells, text to columns, sorting, filter, conditional formatting, freeze panes, pivot tables, data validation.

### 6. Libre Impress:

- a. Demonstration on Impress, utilities, overview of toolbars, PPT orientation, slide layouts, types of views.
- i). Create a Presentation using the features: slide layouts, inserting text, formatting text, bullets and numbering, auto shapes, hyperlinks, pictures, clip art, audio, video, tables and charts.
- ii). Create a Presentation using the features: slide design, slide hiding, slide transition, animation, rehearse timings and custom slideshow.

7. Libre Draw: Draw vector graphics and flowcharts using Libre draw tools.
8. LibreBase: Create a sample database using Libre Base(Ex: Student database).
9. Introduction LaTeX Tool. Create a document using the features: formatting fonts, applying text effects, insert pictures and images, using date and time option.
10. Internet & Computer Security  
Introduction to computer networking, demonstration on network components, drivers loading and configuration settings, mapping of IP addresses, configuration of Internet and Wi-Fi.
11. Search Engines and Cyber Hygiene:  
Working of search engine, Awareness of various threats on Internet, types of attacks and how to overcome. Installation of antivirus software, configuration of personal firewall and Windows update on computers.
12. Students should implement exercises 6 to 9 using MS- Office tool.

**REFERENCE BOOKS:**

1. Vikas Gupta, *Comdex Information Technology Course Tool Kit*, 2<sup>nd</sup> Edition, WILEY Dreamtech, New Delhi, 2006.
2. IITL Education, *Introduction to Information Technology*, 2<sup>nd</sup> Edition, Pearson Education, New Delhi, 2005.
3. Leslie Lamport, *A Document preparation system LATEX users guide and reference manual*, 2<sup>rd</sup> Edition.
4. IT Workshop Laboratory Manual, 2014.
5. [www.libreoffice.org](http://www.libreoffice.org).

**I B.Tech. - II semester**  
**(16BT21232) OBJECT ORIENTED**  
**PROGRAMMING LAB**  
(Common to CSE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

**PREREQUISITES:** A Course on "OOPS through C++".

**COURSE DESCRIPTION:**

Hands-on experience on creating Virtual machines on Windows and Linux platforms, Development of Service based web applications & their deployment and Mobile app development.

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

1. Demonstrate practical knowledge on Object oriented programming concepts - Object, Class, Inheritance, Polymorphism, encapsulation, Abstraction, message passing.
2. Apply object oriented programming concepts to develop real world applications.
3. Demonstrate Problem solving skills using basic and advanced concepts of C++.
4. Work individually and in teams collaboratively in implementing the applications.
5. Demonstrate communication skills both oral and written for preparing and presenting reports.

**LIST OF EXERCISES:**

1. a. Write a C++ program that takes length as input in feet and inches. The program should then convert the lengths in centimeters and display it on screen. Assume that the given lengths in feet and inches are integers.  
b. Write a C++ program to find the sum for the given variables using function with default arguments.
2. Implement the Number Guessing Game in C++ with the given instructions. In this game the computer chooses a random number between 1 and 100, and the player tries to guess the number in as few attempts as possible. Each time the player enters a guess, the computer tells him whether the guess is too high, too low, or right. Once the player guesses the number, the game is over.

3. Write a program to perform arithmetic operations on two numbers. The program must be menu driven, allowing to select the operation (+, -, \*, or /) and input the numbers. Furthermore, the program must consist of following functions:
  - i) Function showChoice: This function shows the options and must explain how to enter data.
  - ii) Function add: This function accepts two number as arguments and returns sum.
  - iii) Function subtract: This function accepts two number as arguments and returns their difference.
  - iv) Function multiply: This function accepts two number as arguments and returns product.
  - v) Function divide: This function accepts two number as arguments and returns quotient.
4. Write a menu driven C++ program with following option
  - a. Accept elements of an array
  - b. Display elements of an array
  - c. Sort the array using bubble sort method
 Write C++ functions for all options. The functions should have two parameters name of the array and number of elements in the array.
5. X, Y, Z are arrays of integers of size M, N, and M + N respectively. The numbers in array X and Y appear in descending order. Write a user-defined function in C++ to produce third array Z by merging arrays X and Y in descending order.
6.
  - a. Write a program to enter any number and find its factorial using constructor.
  - b. Write a program to generate a Fibonacci series using copy constructor.
7. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imaginary parts to equal values and third which takes two argument is used to initialize real and imaginary to two different values.
8.
  - a. Write a program to overload unary increment (++) operator.
  - b. Write a program to overload binary + operator.

9. a. Define a class TEST in C++ with following description:

**Private Members**

TestCode of type integer

Description of type string

NoCandidate of type integer

CenterReqd (number of centers required) of type integer

A member function CALCNTR() to calculate and return the number of centers as  $(\text{NoCandidates}/100+1)$

**Public Members**

- A function SCHEDULE() to allow user to enter values for TestCode, Description, NoCandidate & call function CALCNTR() to calculate the number of Centres

- A function DISPTTEST() to allow user to view the content of all the data members

- b. Define a class REPORT with the following specification:

**Private members :**

adno                    4 digit admission number

name                    20 characters

marks                    an array of 5 floating point values

average                    average marks obtained

GETAVG()                    a function to compute the average obtained in five subject

**Public members:**

READINFO()                    function to accept values for adno, name, marks. Invoke the function GETAVG()

DISPLAYINFO()                    function to display all data members of report on the screen.

You should give function definitions.

10. a. Create a base class basic\_info with data members name ,rollno, gender and two member functions getdata and display. Derive a class physical\_fit from basic\_info which has data members height and weight and member functions getdata and display. Display all the information using object of derived class.

b. Create a class called LIST with two pure virtual function store() and retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.

11. a. Write a program to define the function template for swapping two items of the various data types such as integer, float, and characters.  
b. Write a program to define the class template for calculating the square of given numbers with different data types.
12. a. Write a C++ program to write number 1 to 100 in a data file NOTES.TXT.  
b. Write a program to read a set of lines from the keyboard and to store it on a specified file.  
Any one of the following mini projects are to be implemented by a group of 4-5 students.
  1. Mini Project : Banking System  
Develop an application on BANKING SYSTEM which has account class with data members like account number, name, deposit, withdraw amount and type of account. Customer data is stored in a binary file. A customer can deposit and withdraw amount in his account. Must support the features of creation, modifying and deletion account any time.
  2. Mini Project : Library Management System  
Develop an application on LIBRARY MANAGEMENT SYSTEM which has book and student class with data members like book no, bookname, authername. Books records is stored in a binary file. A student can issue book and deposit it within 15 days. Student is allowed to issue only one book. Student Records are stored in binary file. Administrator can add, modify or delete record.
  3. Mini Project : Supermarket Billing System  
Develop a simple console application for SUPERMARKET BILLING SYSTEM which has product class with data members like product no, product name, price, quantity, tax, discount. Product details is stored in a binary file. A customer can purchase product and his invoice generated. Administrator can create, modify, view and delete product record.

**REFERENCE BOOKS:**

1. John R Hubbard, *Programming with C++*, 3<sup>rd</sup> Edition, Tata McGraw-Hill, 2010.
2. Sourav Sahay, *Object Oriented Programming with C++*, 2<sup>nd</sup> Edition, Oxford University Press, 2012.

## SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

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

### Salient Features of Prohibition of Ragging in Educational Institutions Act 26 of 1997

- Ragging within or outside the College is prohibited.
- Ragging means doing an act which causes or is likely to cause insult or annoyance or fear or apprehension or threat or intimidation or outrage of modesty or injury to a student

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

**Note:**

1. A student convicted of any of the above offences, will be expelled from the College.
2. A student imprisoned for more than six months for any of the above offences will not be admitted in any other College.
3. A student against whom there is prima facie evidence of ragging in any form will be suspended from the College immediately.
4. The full text of Act 26 of 1997 **and** UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009 **(Dated 17<sup>th</sup> June, 2009)** are placed in the College library for reference.