



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**INSTITUTE VISION**

To emerge as a Centre of Excellence for Learning and Research in the domains of Engineering, Computing and Management.

**INSTITUTE MISSION**

- Provide congenial academic ambience with state-art of resources for learning and research.
- Ignite the students to acquire self-reliance in the latest technologies.
- Unleash and encourage the innate potential and creativity of students.
- Inculcate confidence to face and experience new challenges.
- Foster enterprising spirit among students.
- Work collaboratively with technical Institutes / Universities / Industries of National and International repute

**DEPARTMENT VISION**

To impart innovative technical education with global standards, inculcate high pattern of discipline, thereby cultivating Electrical and Electronics Engineering students technologically prominent and ethically strong to meet the challenges of the society.

**DEPARTMENT MISSION**

- Provide congenial academic ambience with necessary infrastructure and learning resources.
- Inculcate confidence to face and experience new challenges from industry and society.
- Ignite the students to acquire self-reliance in State-of-the-Art Technologies.
- Foster Enterprising sprit among students.

**PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

After few years of graduation the, graduates of Electrical and Electronics Engineering shall

**PEO1:** To apply the technical knowledge in the field of Electrical and Electronics Engineering to pursue higher studies or in their professional career.

**PEO2:** To demonstrate technical knowledge to analyze, design, develop, optimize, and implement complex electrical systems.

**PEO3:** To gain multidisciplinary knowledge through projects and industrial training, providing a sustainable competitive edge in R&D and meeting industrial needs in the field of Electrical and Electronics Engineering.



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**PROGRAMME OUTCOMES (PO's)**

On Successful completion, the graduate will be able to,

- PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2. Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



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**PROGRAM SPECIFIC OUTCOMES (PSO's)**

On Successful completion, the graduate will be able to,

**PSO1:** Ability to design, analyze and solve problems in the field of Electrical & Electronics Engineering by applying knowledge acquired from Electrical Power Systems, Electrical Machines, Control Systems, Power Electronics and Field theory

**PSO2:** To excel in current technologies, important to Electrical Engineering, as well as probable future technological advances & contribute actively to the field by participating in professional societies, attending technical events, doing research, pursuing higher education.



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**ACADEMIC REGULATIONS (R-20) FOR B.TECH  
(Regular-Full Time)**

(Effective for the students admitted into I year from the Academic Year 2020-2021 and II year lateral entry from the Academic year 2021-2022 onwards)

**Curriculum for Regular and Honors/Minors B.Tech Program of all Branches**

**1. Eligibility for Admission**

- 1.1 Admission of the B.Tech program shall be made subjects to the eligibility qualifications and Specialization prescribed by the University for each Program from time to time and also as per the guidelines of Andhra Pradesh State Council of Higher Education (APSCHE).
- 1.2 Admission shall be made either on the basis of Merit / Rank Obtained by the Qualifying candidates in EAMCET/ECET or otherwise specified whichever is relevant.

**2. Award of the Degree: A student will be declared eligible for the award of B. Tech. degree if he/she fulfills the following:**

- i. For regular entry students, shall pursues a course of study in not less than four and not more than eight academic years.
- ii. For lateral entry students, shall pursue a course of study for not less than three academic years and in not more than six academic years.
- iii. For regular entry students, after eight academic years from the year of their admission, he/she shall forfeit their seat in B.Tech course and their admission stands cancelled.
- iv. For lateral entry students, after six academic years from the year of their admission, he/she shall forfeit their seat in B.Tech course and their admission stands cancelled.
- v. For regular entry students shall register for 160 credits and must secure all the 160 credits. For lateral entry students shall register for 121 credits and secure all 121 credits
- vi. A student shall be eligible for the award of B.Tech degree with Honors or Minor if he/she earns 20 credits in addition to the 160 credits for Regular entry students /121 credits for lateral entry students.
- vii. A student shall be permitted to register either for Honors or for Minor and not for both simultaneously.

**3. Structure of the Undergraduate Engineering program:**

All subjects / courses offered for the under graduate program in B.Tech. Degree programs are broadly classified as follows.



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S.No	Course Classification	Course Category	Course Code
1	Foundation Courses	Humanities and Social Science including Management Courses	HSM
		Basic Science Courses	BSC
		Engineering Science Courses	ESC
2	Core Courses	Professional Core Courses	PCC
3	Elective Courses	Professional Elective Courses	PEC
		Open Elective Courses	OEC
4	Employability Enhancement Courses	Internship, Seminar and Project Work	PROJ
		Skill Oriented Courses / Skill Advanced Courses	SOC/SAC
5	Audit Courses	Mandatory Audit Courses	MAC
6	Minor / Honor Courses	Minor Courses / Honor Courses	MR/HR

#### 4. Assigning of Credits:

- i. 1 Hr. Lecture (L) per week – 1 Credit
- ii. 1 Hr. Tutorial (T) per week – 1 Credit
- iii. 1 Hr. Practical (P) per week – 0.5 Credits
- iv. 2 Hours Practical (Lab) per week – 1 Credit

#### 5. Induction Program for I. B.Tech Program

- i. There shall be mandatory student induction program for fresher's, with a three-week duration before the commencement of first semester.
- ii. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Department / Branch and Innovations etc., shall be included in the guidelines issued by AICTE.

#### 6. Assessment

- i. The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory as well as for practical subject and project work.
- ii. The audit courses shall be evaluated for a maximum of 30 internal marks.
- iii. For theory and practical subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End Semester Examinations.
- iv. A student has to secure not less than 35% of marks in the end semester examination and minimum 40% of marks in the sum total of Internal Examination and End Semester Examinations marks to earn the credits



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allotted to each course.

**6.1 Internal Examination**

- 6.1.1 For theory subjects, during the semester, there shall be two Mid-Term Examinations will be conducted.
- 6.1.2 Each Mid-Term Examination consists of objective paper for 10 marks and subjective paper for 15 marks with the duration of 1 hour 50 minutes (20 minutes for objective and 90 minutes for subjective paper).
- 6.1.3 The subjective paper shall contain 3 either-or type questions with equal Weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 15 marks; any fraction shall be rounded off to the next higher mark.
- 6.1.4 If the student is absent for the any internal examination, no re-exam or make up exam shall be conducted and marks for that examination shall be considered as zero.
- 6.1.5 First Mid-Term Examination shall be conducted for I & II units of syllabus and second Mid-Term Examinations shall be conducted for III, IV & V units.
- 6.1.6 However 5 marks are awarded for 5 Assignments (unit-wise).
- 6.1.7 Final Internal marks shall be arrived at by considering the marks secured by the student in both the Mid-Term examinations with 80% weightage to the better mid exam and 20% to the other

For Example:

- Marks obtained in First Mid-Term: 25
- Marks obtained in Second Mid-Term: 25
- Internal Marks:  $(25 \times 0.8) + (25 \times 0.2) = 25$
- Final internal marks = Internal Marks + Assignment marks

- 6.1.8 If the student is absent for any one Mid-Term Examinations, the final internal marks shall be arrived at by considering 80% Weightage to the marks secured by the student in the appeared examination and zero to the other.

For Example:

- Marks obtained in First Mid-Term: Absent
- Marks obtained in Second Mid-Term: 25
- Internal Marks:  $(25 \times 0.8) + (0 \times 0.2) = 20$
- Final internal marks = Internal Marks + Assignment marks

- 6.1.9 For practical courses there shall be 30 internal marks. 15 marks allotted for Internal Practical Examination to be conducted before the last working day and 15 marks for Day-to-Day work in the laboratory shall be evaluated by



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the concerned laboratory teacher based on the regularity / record / viva-voce.

6.1.10 In a practical subject consisting of two parts (ex: Engineering Workshop & IT Workshop), Internal examination shall be evaluated as above for 30 marks in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

6.1.11 The evaluation of the practical courses is done based on the rubrics designed for that curriculum component.

### **6.2 Semester End Examination**

6.2.1 End examination of theory courses shall have the following pattern:

- i. There shall be two parts, Part-A and Part-B.
- ii. Part-A shall contain 10 compulsory short answer questions for a total of 20 marks such that each question carries 2 marks. There shall be 2 short answer questions from each unit.
- iii. Part-B Shall be either-or type questions of 10 marks each. Student shall answer any one of it.
- iv. Each of these questions from Part-B shall cover each unit of the syllabus.

6.2.2 End examination of practical courses shall have the following pattern:

- i. End Semester Examination shall be for 70 marks.
- ii. The end examination shall be conducted by the concerned laboratory teacher and senior expert in the same subject of the department.
- iii. In a practical subject consisting of two parts (ex: Engineering Workshop & IT Workshop), the End Semester Examination shall be conducted for 35 marks in each part.
- iv. The evaluation of the practical courses is done based on the rubrics designed for that curriculum component.

### **6.3 Drawing Courses**

6.3.1 For the subject having design and/or drawing, such as Engineering Drawing / Graphics.

6.3.2 The distribution shall be 30 marks for internal evaluation (15 marks for Day- to-Day work (unit wise chart work / Assignment) and for another 15 marks there shall be a two MID Term exams will be conducted) and 70 marks for semester end examinations.

6.3.3 There shall be two Mid-Term examinations in a semester for duration of 2hrs each for 15 marks with weightage of 80% to better mid marks and 20% for the other.

6.3.4 The internal subjective paper shall contain 3 either-or type questions with



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equal weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 15 marks; any fraction shall be rounded off to the next higher mark and there shall be no objective paper in internal examination.

6.3.5 The sum of Day-to-Day work evaluation / assignments and the internal MID Term test marks will be the final internal marks for the course.

6.3.6 In the end examination pattern for Engineering Drawing / Graphics there shall be 5 questions, either-or type, of 14 marks each.

#### **6.4 Mandatory Audit Courses**

6.4.1 Courses like Human Values and Ethics, Environmental Sciences, Constitution of India and Design Thinking for Innovation shall be included in the curriculum as non-credit mandatory audit courses.

6.4.2 However, attendance in the audit courses shall be considered while calculating aggregate attendance. A student has to secure 40% of the marks allotted in the internal evaluation for passing the course.

6.4.3 The Internal Marks will be calculated similar to that of Theory course.

6.4.4 In grade sheet the completion of the course indicated as Pass – “P”, and No marks or letter grade shall be allotted, for all non-credit mandatory audit courses.

6.4.5 Re-exam shall be conducted for failed candidates for every semester at a mutual convenient date of institution.

#### **6.5 Professional Elective Courses**

6.5.1 Students have to choose Professional Elective Courses PEC-I in V semester, PEC-II in VI semester and PEC-III, PEC-IV, PEC-V in VII semester, from the list of elective courses given.

6.5.2 Registration forms are invited from the students 10 days prior to the last instructional day of the preceding semester for registration process for offering the Professional Elective Courses.

6.5.3 There shall be a limit on the minimum and maximum number of registrations based on class/section strength.

6.5.4 The assessments of Professional Elective Courses are same as regular theory courses.

#### **6.6 Open Elective Courses**

6.6.1 A student shall opt for any 4 courses from the list given by the institute from time to time, complying with the requirement of the prerequisite course(s), if any.

6.6.2 Students have to choose Open Elective Courses OEC-I in V semester,





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OEC-II in VI semester and OEC-III, OEC-IV in VII semester, from the list of elective courses given.

- 6.6.3 All Open Elective Courses are offered to the students of across all branches in general.
- 6.6.4 Registration forms are invited from the students 10 days prior to the last instructional day of the preceding semester for registration process for offering the Open Elective Courses.
- 6.6.5 However, a student shall choose an open Elective from the list in such a manner that he/she has not studied the same course in any form during their Program.
- 6.6.6 There shall be a limit on the minimum and maximum number of registrations based on class/section strength.

**6.7 Massive Online Open Courses**

- 6.7.1 MOOC courses under Professional Elective / Open Elective
- 6.7.2 A student shall be permitted to pursue up to a maximum of two elective courses (Professional Elective Courses or Open Elective Courses) under MOOCs during the Program. Each of the courses must be of minimum 12 weeks in duration for 3 credits. Attendance will not be monitored for MOOC courses.
- 6.7.3 Student has to pursue and acquire a certificate for a MOOC course only from the organizations / agencies approved by the BoS in order to earn the 3 credits. The Head of the department shall notify the list of such courses at the beginning of the semester.

**6.8 Mandatory Internships**

- 6.8.1 Students shall undergo two mandatory summer internships for a minimum of four weeks duration at the end of second and third year of the Program.
- 6.8.2 The internship can be done by the students at Local Industries, Government Organizations, Public Sector Companies, Research Laboratories, Construction agencies, Power Plants and also in software MNCs.
- 6.8.3 A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the Department Evaluation Committee nominated by the Principal at the end of the semester for the evaluation of summer internship.
- 6.8.4 The performance of a student in each mandatory summer internships shall be evaluated with a maximum of 100 marks.



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6.8.5 The report and the oral presentation shall carry 40% and 60% weightage respectively.

**6.9 Project work and Internships**

6.9.1 In the final semester, the student should undergo Internship / Project Work with well-defined objectives.

6.9.2 Students Project Batch will have maximum of four students comprising the fast and slow learners.

6.9.3 Every student shall be required to undertake a Project Work in the Institution / Internship cum Project Work in Local Industries / Government Organizations / Public Sector Companies / Research Laboratories / Construction agencies / Power Plants and also in software MNCs in consultation with Head of the Department and Department Project Evaluation Committee.

6.9.4 The Department project evaluation committee continuously monitors and evaluates the progress of the Project Work / Internship cum Project Work by conducting three reviews including abstract review during the project period.

6.9.5 During the project review meetings, batch presentation and individual contributions are monitored to assess individual student performance and also team performance.

6.9.6 The evaluation of the project is done based on the rubrics designed for that curriculum component.

6.9.7 At the end of the semester the candidate shall submit an Internship cum Project completion certificate along with project report on the work carried out during the project work at the industry.

6.9.8 A student shall be permitted to submit project report on the work carried out during the project work at the institution/department.

6.9.9 The project work submitted to the department shall be evaluated for 100 marks, out of which 30 marks are for internal evaluation and 70 marks for external viva-voce.

6.9.10 The internal evaluation shall be made by the Department Project Evaluation Committee, on the basis of three reviews given by each students / batch on the topic of his/her project.

6.9.11 The final viva-voce shall be conducted by a committee consisting of HOD, Project Supervisor and an External Examiner nominated by the Principal at the end of the Semester.



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6.9.12 In case a student fails in viva voce he /she shall reappear as and when supplementary examinations are conducted.

6.9.13 The distribution of marks for the Internal assessment and End Semester Examination is given below:

Internal Assessment (30 Marks)			End Semester Examination (70 Marks)		
Review - I	Review - II	Review - III	Supervisor	Internal Examiner	External Examiner
10	10	10	20	25	25

**6.10 Eligibility to appear for Semester End Examinations**

6.10.1 A student shall be eligible to appear for Semester End Examinations if he/she acquires a minimum of 75% of attendance in aggregate of all the courses in a semester.

6.10.2 Condonation for 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. Shortage of Attendance below 65% in aggregate shall in NO case be condoned.

6.10.3 Students whose shortage of attendance is not condoned in any semester are not eligible to take their Semester End Examination of that class and their registration shall stand cancelled.

6.10.4 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester, as applicable. They may seek readmission for that semester when offered next.

6.10.5 A stipulated fee shall be payable towards condonation of shortage of attendance to the college.

**6.11 Issue of Photocopy of Answer Script**

6.11.1 A student can request for the photo copy of answer script of any theory examination within one week after the declaring the results by paying fee.

6.11.2 The examination section shall issue a notification inviting applications for the issue of photocopy of answer script after publishing the results.

6.11.3 The application forms can be obtained from the examination section.

**6.12 Revaluation**

6.12.1 A candidate can apply for revaluation of his / her end examination answer paper in a theory courses.

6.12.2 The examination section shall issue a notification inviting applications for the revaluation after publishing the results.



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6.12.3 The application forms can be obtained from the examination section.

6.12.4 A candidate can apply for revaluation of answer scripts in not more than 5 courses at a time.

6.12.5 No revaluation for practical courses, comprehensive viva-voce / Examination and project work.

**6.13 Challenge Valuation**

6.13.1 A student can apply for challenge valuation by prescribed fee.

6.13.2 Challenging valuation shall be carried out by an external subject expert.

6.13.3 The challenging valuation should be done strictly as per the scheme of valuation supplied by the examination section in the presence of Principal.

6.13.4 The examination section shall issue a notification inviting applications for the challenging valuation after publishing the revaluation results.

6.13.5 The application forms can be obtained from the examination section.

**7. Promotion Rules**

7.1 A student shall be promoted from first year to second year if he fulfills the minimum attendance requirements.

7.2 A student will be promoted from II year to III year if he fulfills the academic requirement of 40% of credits up to II year IV Semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in II year IV semester.

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

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

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

iv. **One** regular examination of II B.Tech IV semester.

7.3 A student shall be promoted from III year to IV year if he fulfills the academic requirements of 40% of the credits up to III year 6<sup>th</sup> semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year 6<sup>th</sup> semester.

i. **One** regular and **five** supplementary examinations of I B.Tech I Semester.



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- ii. **One** regular and **four** supplementary examinations of I B.Tech II Semester.
  - iii. **One** regular and **three** supplementary examinations of II B.Tech III Semester.
  - iv. **One** regular and **two** supplementary examinations of II B.Tech IV Semester.
  - v. **One** regular and **one** supplementary examinations of III B.Tech V Semester.
  - vi. **One** regular examination of III B.Tech VI Semester.
- 7.4 For Lateral entry student promoted from III year to IV year if he fulfills the academic requirements of 40% of the credits up to III year VI semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year VI semester.
- i. One regular and three supplementary examinations of II B.Tech III Semester.
  - ii. One regular and two supplementary examinations of II B.Tech IV Semester.
  - iii. One regular and one supplementary examinations of III B.Tech V Semester.
  - iv. One regular examination of III B.Tech VI Semester.

#### **8. Extra Curricular Activities**

- i. Students shall enroll, on admission, in any one of the personality and character development programs (NSS/YRC etc.,) and undergo training and attend a camp.
- ii. The training shall include classes on hygiene and health awareness and also training in first-aid.
- iii. National Service Scheme (NSS) and Youth Red Cross (YRC) will have social service activities in and around the Institution.
- iv. A student will be required to participate in an activity for an hour in a week during their second and third years.

#### **9. Skill Oriented / Skill Advanced Courses**

- i. There shall be 05 Mandatory Skill-Oriented Courses offered during III to VII semesters.
- ii. The list of such courses shall be included in the curriculum structure of each branch of Engineering.

#### **10. Curricular Framework for Honors Program**

- i. Under Graduate degree with Honors shall be issued by the Institution



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- to the students who fulfill all the academic eligibility requirements for the B.Tech program and Honors program.
- ii. Students of a Department are eligible to opt for Honors Program offered by the same Department / Discipline, subject to a maximum of two additional courses per semester.
  - iii. A student shall be permitted to register for Honors program at the beginning of IV semester provided that the student must have acquired a minimum average of 8.0 SGPA up to the end of II semester without any backlogs. In case of the declaration of the III semester results after the commencement of the IV semester and if a student fails to score the required minimum of 8.0 SGPA, his/her registration for Honors Program stands cancelled and he/she shall continue with the regular Program.
  - iv. Students can select the additional and advanced courses from their respective branch in which they are pursuing the degree and get an honors degree in the same. In addition to fulfilling all the requisites of a Regular B.Tech . Program, a student shall earn 20 additional credits to be eligible for the award of B.Tech (Honors) degree. This is in addition to the credits essential for obtaining the Under Graduate Degree in Major Discipline (i.e. 160/121 credits).
  - v. Of the 20 additional Credits to be acquired, and 16 credits (four courses) shall be earned by undergoing specified courses listed as pools (two courses per pool either theory course or theory with lab component), and each carrying 4 credits. The remaining 4 credits (two courses) must be acquired through two MOOCs, which shall be domain specific, each with 2 credits and with a minimum duration of 8/12 weeks as recommended by the Board of studies.
  - vi. The courses offered in each pool (two courses per pool) shall be domain specific courses and advanced courses.
  - vii. MOOC courses must be of minimum 8 weeks in duration. Attendance will not be monitored for MOOC courses. Students have to acquire a certificate from the agencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade to be assigned will be as decided by the academic council.
  - viii. It is the responsibility of the student to acquire/complete prerequisite before taking the respective course.
  - ix. The concerned BOS shall decide on the minimum enrolments for offering Honors program by the department. If minimum enrolments criteria are not met then the students shall be permitted to register for the equivalent



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MOOC courses as approved by the concerned Head of the department in consultation with BOS.

- x. The concerned BOS shall also consider courses listed under professional Elective Courses of the respective B.Tech programs for the requirements of B.Tech (Honors). However, a student shall be permitted to choose only those courses that he/she has not studied in any form during the Program.
- xi. If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. These additional courses will find mention in the transcript (but not in the degree certificate). In such cases, the student may choose between the actual grade or a "pass (P)" grade and also choose to omit the mention of the course as for the following: All the courses done under the dropped Honors will be shown in the transcript. None of the courses done under the dropped Honors will be shown in the transcript.
- xii. In case a student fails to meet the CGPA requirement for Degree with Honors at any point after registration, he/she will be dropped from the list of students eligible for Degree with Honors and they will receive regular B.Tech degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.
- xiii. Honors must be completed simultaneously with a major degree program. A student cannot earn Honors after he/she has already earned bachelor's degree.

#### **11. Curricular Framework for Minor Program**

- i. Under graduate Degree with Minor Program shall be issued by the Institution to the students who fulfill all the academic eligibility requirements for the B.Tech program and Minor Program.
- ii. Students who are desirous of pursuing their special interest areas other than the chosen discipline of Engineering may opt for additional courses in minor specialization groups offered by a department other than their parent department. For example, If Mechanical Engineering student selects subjects from Computer Science Engineering under this scheme; he/she will get Major degree of Mechanical Engineering with minor degree of Computer Science Engineering. Student can also opt for Industry relevant tracks of any branch to obtain the Minor Degree, for example, a B.Tech Mechanical student can opt for the industry relevant tracks like Data Mining track, IOT track, Machine learning track etc.
- iii. The concerned BOS shall identify as many tracks as possible in the areas of emerging technologies and industrial relevance / demand. For example, the minor tracks can be the fundamental courses in CSE, ECE, EEE, CE, ME etc



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- or industry tracks such as Artificial Intelligence (AI), Machine Learning (ML), Data Science (DS), Robotics, Electric vehicles, Virtual Realty, VLSI etc.
- iv. The list of disciplines/branches eligible to opt for a particular industry relevant minor specialization shall be clearly mentioned by the respective BOS.
  - v. The concerned BOS shall decide on the minimum enrolments for offering Minor program by the department. If a minimum enrolments criterion is not met, then the students may be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation with BOS.
  - vi. A student shall be permitted to register for Minors program at the beginning of IV semester subject to a maximum of two additional courses per semester, provided that the student must have acquired 8.0 SGPA (Semester Grade point average) up to the end of II semester without any history of backlogs. It is expected that the III semester results may be announced after the commencement of the IV semester. If a student fails to acquire 8.0 SGPA up to III semesters or failed in any of the courses, his registration for Minors program shall stand cancelled. An SGPA of 8.0 has to be maintained in the subsequent semesters without any backlog in order to keep the Minors registration active.
  - vii. A student shall earn additional 20 credits in the specified area to be eligible for the award of B.Tech degree with Minor. This is in addition to the credits essential for obtaining the Under Graduate Degree in Major Discipline (i.e. 160/121 credits).
  - viii. Of the 20 additional Credits to be acquired and 16 credits shall be earned by undergoing specified courses listed in course structure and each carrying 4 credits. The remaining 4 credits must be acquired through two MOOCs, which shall be domain specific, each with 2 credits and with a minimum duration of 8/12weeks as recommended by the Board of studies.
  - ix. Attendance will not be monitored for MOOC courses. Student has to acquire a certificate from the agencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade to be assigned as decided by the BOS.
  - x. A student shall be permitted to choose only those courses that he/she has not studied in any form during the Program.
  - xi. If a student drops or terminated from the Minor program, they cannot convert the earned credits into open or core electives; they will remain





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extra. These additional courses will find mention in the transcript (but not in the degree certificate). In such cases, the student may choose between the actual grade or a "pass (P)" grade and also choose to omit the mention of the course as for the following: All the courses done under the dropped Minors will be shown in the transcript. None of the courses done under the dropped Minor will be shown in the transcript.

- xii. In case a student fails to meet the CGPA requirement for B.Tech degree with Minor at any point after registration, he/she will be dropped from the list of students eligible for degree with Minors and they will receive B.Tech degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.
- xiii. Minor must be completed simultaneously with a major degree program. A student cannot earn the Minor after he/she has already earned bachelor's degree.

## 12. Grading

After each subject is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Marks Range	Level	Letter Grade	Grade Point
≥ 90	Outstanding	S	10
80-89	Excellent	A	9
70-79	Very Good	B	8
60-69	Good	C	7
50-59	Fair	D	6
40-49	Satisfactory	E	5
< 40	Fail	F	0
-	Absent	Ab	0

## 13. Calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

- i. The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$SGPA = \frac{\sum(C_i \times G_i)}{\sum C_i}$$

Where,  $C_i$  is the number of credits of the  $i^{\text{th}}$  subject and  $G_i$  is the grade point



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scored by the student in the  $i^{\text{th}}$  course

- ii. The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$$CGPA = \frac{\sum(C_j \times S_j)}{\sum C_j}$$

where ' $S_j$ ' is the SGPA of the  $j^{\text{th}}$  semester and  $C_j$  is the total number of credits in that semester

- iii. Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.
- iv. While computing the SGPA/CGPA, the subjects in which the student is awarded Zero grade points will also be included.
- v. **Grade Point:** It is a numerical weight allotted to each letter grade on a 10-point scale.
- vi. **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters S, A, B, C, D, E and F.
- vii. As per AICTE regulations, conversion of CGPA into equivalent percentage as follows:
- viii. Equivalent Percentage =  $(CGPA - 0.50) \times 10$ .

#### 14. Award of Class

After a student has satisfied the requirements prescribed for the completion of the program and are eligible for the award of B.Tech. Degree, he/she shall be placed in one of the following:

Class Awarded	CGPA Secured
First Class with Distinction	$\geq 7.5$
First Class	$\geq 6.5 < 7.5$
Second Class	$\geq 5.5 < 6.5$
Pass Class	$\geq 4.0 < 5.5$

#### 15. With-Holding the Result

If the candidate has any dues not paid to the institution or if any case of indiscipline or malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of awarding degree is liable to be withheld in such cases.

#### 16. Transitory Regulations and Gap – Year

- i. Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfillment of academic regulations. Candidates who have been detained for attendance shortage or not fulfilled academic requirements or who have failed after having undergone the



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course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered and they will be in the academic regulations into which they get readmitted.

- ii. Gap Year – concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I year/ II year/ III year to pursue entrepreneurship full time. This period shall be counted for the maximum time for graduation.
- iii. An evaluation committee at university level shall be constituted to evaluate the proposal submitted by the student and the committee shall decide on permitting the student for availing the Gap Year.
- iv. Candidates who were permitted with Gap Year shall be eligible for rejoining into the succeeding year of their B.Tech from the date of commencement of class work and they will be in the academic regulations into which the candidate is presently rejoining.

**17. Industrial Collaborations**

- i. Institution-Industry linkages refer to the interaction between firms and universities or public research centers with the goal of solving technical problems, working on R&D, innovation projects and gathering scientific as well as technological knowledge.
- ii. The Departments are permitted to design any number of Industry oriented minor tracks as the respective BoS feels necessary. In this process the departments can plan to have industrial collaborations in designing the minor tracks and to develop the content and certificate programs.

**18. Community Service Project**

- i. Community Service Project should be an integral part of the curriculum, as an alternative to the Internships, whenever there is an exigency when students cannot pursue their internships.
- ii. Every student should put in a minimum of 144 hours for the Community Service Project during the summer vacation. Each class/section should be assigned with a mentor.
- iii. Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, house-wives, etc
- iv. A log book has to be maintained by each of the student, where the



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activities undertaken/involved to be recorded. The log book has to be countersigned by the concerned mentor/faculty in-charge.

- v. Evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member. The final evaluation to be reflected in the grade memo of the student. The Community Service Project should be different from the regular programs of NSS/NCC/Green Corps/Red Ribbon Club, etc. Minor project report should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college. Award of marks shall be made as per the guidelines of Internship.
- vi. A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, so as to enable them to commute from their residence and return back by evening or so.
- vii. The Community Service Project is a twofold one – First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers; rather, it could be another primary source of data.
- viii. Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like – Agriculture, Health, Marketing and Cooperation Animal Husbandry, Horticulture, Fisheries, Sericulture, Revenue and Survey, Natural Disaster Management, Irrigation, Law & Order, Excise and Prohibition, Mines and Geology, Energy, Internet, Free Electricity, Drinking Water etc.,

#### **19. Transfer Details**

- i. Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh from time to time.

#### **20. Preservation of Records**

- i. The laboratory records, internal test papers and end examination answer booklets shall be preserved for minimum of 2 years from the date of completion of their degree in the institution.

#### **21. Amendments to Regulations**

The Academic Council of SITAMS (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.



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**22. General**

- i. The academic regulations should be read as a whole for purpose of any interpretation. Malpractices rules- nature and punishments are appended.
- ii. Where the words "he", "him", "his", occur in the regulations, they also include "she", "her", "hers", respectively.

**23. Conduct and Discipline**

- i. Students shall conduct themselves within and outside the precincts of the Institute in a manner befitting the students of an Institute of National importance.
- ii. As per the order of the Hon'ble Supreme Court of India, ragging in any form is banned: acts of ragging will be considered as gross indiscipline and will be severely dealt with.
- iii. The following additional acts of omission and /or commission by the students within or outside the precincts of the college shall constitute gross violation of code of conduct and are liable to invoke disciplinary measures
  - a. Ragging
  - b. Lack of courtesy and decorum: indecent behaviour anywhere within or outside the campus.
  - c. Willful damages or stealthy removal of any property /belongings of the Institute / Hostel or of fellow students
  - d. Possession, consumption of distribution of alcoholic drinks or any kind of hallucinogenic drugs
  - e. Mutilation or unauthorized possession of library books
  - f. Hacking in computer systems
  - g. Furnishing false statements to the disciplinary committee, or willfully withholding information relevant to an enquiry
  - h. Organizing or participation in any activity that has potential for driving fellow students along lines of religion caste batch of admission hostel or any other unhealthy criterion.
  - i. Resorting to noisy and unseemly behavior, disturbing studies of students.
  - j. Physical or mental harassment of fresher through physical contact or oral abuse
  - k. Adoption of unfair means in the examination
  - l. Organizing or participating in any group activity except purely academic and scientific Programmers in company with others in or outside campus without prior permission of the Principal



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- m. Disturbing in drunken state or otherwise an incident in academic or students function or any other public event.
- n. Not obeying traffic rules in campus not following safety practices or causing potential danger to oneself or other persons in any way.
- o. Any other act or gross indiscipline
- iv. Commensurate with the gravity of the offence the punishment may be reprimand fine and expulsion from the hostel debarment from an examination rustication for a specified period or even outright expulsion from the College.
- v. The reprimanding Authority for an offence committed by students in the Hostel and in the Department or the classroom shall be respectively, the managers of the Hostels and the Head of the concerned Department
- vi. In all the cases of offence committed by students in jurisdictions outside the purview the Principal shall be the Authority to reprimand them.
- vii. All Major acts of indiscipline involving punishment other than mere reprimand shall be considered and decided by the Principal Students Disciplinary Committee appointed by the Principal.
- viii. All other cases of Indiscipline of Students like adoption of unfair means in the examinations shall be reported to the Vice-Principal for taking appropriate action and deciding on the punishment to be levied.
- ix. In all the cases of punishment levied on the students for any offence committed the aggrieved party shall have the right to appeal to the Principal who shall constitute appropriate Committees to review the case.



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<b>NATURE OF MALPRACTICES/ IMPROPER CONDUCT PUNISHMENT</b>	<b>PUNISHMENT</b>
<p>1. (a) possesses or keeps access 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 subject of the examination (theory/ practical) in which he/she 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 subject of the examination) Expulsion from the examination hall and cancellation of the performance in that subject only.</p>	<p>Expulsion from the examination hall and cancellation of the performance in that subject Only.</p>
<p>1. (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 inside or outside the exam hall in respect of any matter. Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he/she will be handed over to the police and a case is registered against him/her.</p>	<p>Expulsion from the examinations hall and cancellation of the performance in that subject only of all the candidates involved in case of an outsider He / She will be handed over to the police and a case is registered against him/her.</p>



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<p>2. Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.</p>	<p>Expulsion from the examinations hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and projects work and shall not be permitted to appear for the remaining examinations of the subjects of that semester/Year. The Hall Ticket of the candidate will be cancelled and retained by the CE.</p>
<p>3. Impersonates any other candidate in connection with the examination.</p>	<p>The candidate who has impersonated shall be expelled from examination hall and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</p>





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<p>4. Smuggles in the answer book or additional sheet or takes out or arranges to send out the question paper or answer book or additional sheet, during or after the examination.</p>	<p>If the imposter is an outsider, he/shewill be handed over to the police and a case is registered against him/her. Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidateis subject to the academic regulations in connection with forfeiture of seat.</p>
<p>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.</p>	<p>Cancellation of the performance in that subject.</p>
<p>6. Refuses to obey the orders of the Chief - Superintendent / Assistant- Superintendent / 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 officer-in charge or any person on duty in or outside the examination hall or causes any injury to his person or to any of his relatives whether by offensive words spoken or written or by signs or by visible representation or assaults the officer-in-charge, or any person on duty inside or outside the examination hall or any of his relatives, or indulges in any other act of misconduct or mischief which results in</p>	<p>In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates are also debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.</p>



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<p>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.</p>	
<p>7. Leaves the exam hall taking away answer script or intentionally tears off the script or any part thereof inside or outside the examination hall.</p>	<p>Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all the external examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</p>
<p>8. Possesses any lethal weapon or firearm in the examination hall.</p>	<p>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.</p>



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<p>9. Belongs to college, who is not a candidate for the particular examination or any person not connected with the college but indulges in any malpractice or improper conduct mentioned in clause 6 to 8.</p>	<p>Student of the college will be expelled from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.</p> <p>Person(s) who do not belong to the college will be handed over to police and, a Police case will be registered against them.</p>
<p>10. Comes in a drunken state to the examination hall.</p>	<p>Expulsion from the examination hall and cancellation of the performance.</p>
<p>11. Copying is detected on the basis of internal evidence, such as, during valuation or during special scrutiny</p>	<p>Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that Semester / year examinations.</p>
<p>12. If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Principal for further action to award suitable punishment.</p>	

Note: Failing to read the regulation is not considered as an excuse



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**B.Tech R20 – COURSE STRUCTURE AND SYLLABI (2021 Admitted batch)**

**Semester I (First Year)**

S.NO	COURSE CODE	COURSE TITLE	SCHEME OF INSTRUCTIONS HOURS PER WEEK				SCHEME OF EXAMINATION MAXIMUM MARKS			
			L	T	P	C	I	E	TOTAL	
1	20BSC111	Algebra and Calculus	2	1	0	3	30	70	100	
2	20BSC112	Applied Chemistry	3	0	0	3	30	70	100	
3	20BSC113	Applied Physics	3	0	0	3	30	70	100	
4	20ESC111	Engineering Graphics	1	0	4	3	30	70	100	
5	20CSE111	C and Data Structure	2	1	0	3	30	70	100	
6	20BSC114	Engineering Chemistry Lab	0	0	2	1	30	70	100	
7	20BSC115	Engineering Physics Lab	0	0	2	1	30	70	100	
8	20CSE112	C and Data Structure Lab	0	0	3	1.5	30	70	100	
9	20ESC112	Engineering Workshop & IT Workshop	0	0	2	1	30	70	100	
Contact Hours per week			11	2	13	-	-	-	-	
Total Hours per week			26				-	-	-	-
Total credits (5 Theory + 3 Labs)							19.5	-	-	-
Total Marks							270	630	900	

**Semester II (First Year)**

S.NO	COURSE CODE	COURSE TITLE	SCHEME OF INSTRUCTIONS HOURS PER WEEK				SCHEME OF EXAMINATION MAXIMUM MARKS			
			L	T	P	C	I	E	TOTAL	
1	20HSM111	Communicative English for Engineers	3	0	0	3	30	70	100	
2	20BSC121	Differential Equation and Transformation Techniques	2	1	0	3	30	70	100	
3	20EEE121	Electrical Circuit Analysis	2	1	0	3	30	70	100	
4	20EEE122	Generation of Electrical Power	3	0	0	3	30	70	100	
5	20ESC115	Programming with python	2	1	0	3	30	70	100	
6	20HSM112	English Language and soft skill lab	0	0	3	1.5	30	70	100	
7	20EEE123	Electrical Circuit Analysis lab	0	0	3	1.5	30	70	100	
8	20ESC118	Programming with Python lab	0	0	3	1.5	30	70	100	
9	20MAC121	Human Values and Ethics	2	0	0	0	P	-	-	
Contact Hours per week			14	3	9	-	-	-	-	
Total Hours per week			26				-	-	-	-
Total credits (5 Theory + 3 Labs)							19.5	-	-	-
Total Marks							240	560	800	



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**Semester III (Second Year)**

S.No	Course Code	Course Title	Scheme of Instructions Hours Per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	TOTAL
1	20BSC232	Special Functions and Complex Analysis	3	1	0	3	30	70	100
2	20ESC231	Fluid Mechanics and Machinery	2	1	0	3	30	70	100
3	20ECE236	Semiconductor Devices and Circuits	2	1	0	3	30	70	100
4	20ECE237	Switching Theory and Logic Design	2	1	0	3	30	70	100
5	20EEE231	Network Analysis	2	1	0	3	30	70	100
6	20HSM231	Soft Skills	0	1	2	2	30	70	100
7	20ESC232	Fluid Mechanics and Machinery Lab	0	0	3	1.5	30	70	100
8	20ECE238	Semiconductor Devices and circuits Lab	0	0	3	1.5	30	70	100
9	20EEE232	Network Analysis Lab	0	0	3	1.5	30	70	100
10	20MAC231	Environmental Science	2	0	0	0	P	-	-
Contact Hours per week			13	6	11	-	-	-	-
Total Hours per week			29			-	-	-	-
Total credits						21.5			
Total Marks							270	630	900

**Semester IV (Second Year)**

S.No	Course Code	Course Title	Scheme of Instructions Hours Per Week				Scheme of Examination Maximum Marks			
			L	T	P	C	I	E	TOTAL	
1	20BSC241	Electromagnetics	2	1	0	3	30	70	100	
2	20EEE241	Control System	2	1	0	3	30	70	100	
3	20EEE242	Electrical Machines -I	2	2	0	4	30	70	100	
4	20EEE243	Electrical Power Transmission	2	1	0	3	30	70	100	
5	20EEE244	Measurements and Instrumentation	3	0	0	3	30	70	100	
6	20ECE249	Electronic Circuits and IC Applications	0	1	2	2	30	70	100	
7	20EEE245	Control System Lab	0	0	3	1.5	30	70	100	
8	20EEE246	Electrical Machines -I Lab	0	0	3	1.5	30	70	100	
9	20EEE247	Measurements and Instrumentation Lab	0	0	3	1.5	30	70	100	
10		Internship During Summer Vacation	-	-	-	-	-	-	-	
Contact Hours per week			11	6	11	-	-	-	-	
Total Hours per week			27			-	-	-	-	
Total credits						22.5	-	-	-	
Total Marks							270	630	900	
1		Honors / Minor Courses*	HNR/ MNR	4	0	0	4	30	70	100



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**I B.Tech. – I Semester**

<b>20BSC111</b>	<b>ALGEBRA AND CALCULUS</b> <b>(Common to All Branches)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To familiarize the students with the theory of matrices.
2. To explain the series expansion using means value theorem and basic concepts of partial derivatives and its applications
3. To learn the methods of evaluation of double and triple integrals
4. To explain the concept of vector differentiation
5. To explain the concept of vector integration

**UNIT-1: MATRICES (9)**

Rank - Echelon form and Normal form - Solution of linear system of homogeneous and non-homogeneous equations - Direct method: Gauss elimination method - Eigen values and Eigen vectors of a matrix and properties (without proofs) - Cayley-Hamilton theorem (without proof): Inverse and powers of a matrix. - Diagonalization of a matrix using similarity transformation only.

**UNIT -2: DIFFERENTIAL CALCULUS AND ITS APPLICATIONS (9)**

Rolle's Theorem, Lagrange's Theorem(without proof) - Taylor's and Maclaurin's series for single variable (simple examples) - Functions of several variables - Jacobian - Taylor's and Maclaurin's series for two variables - Maxima and minima of functions of two variables - Lagrangian method of undetermined multipliers with three variables only.

**UNIT-3: MULTIPLE INTEGRALS (9)**

Double and triple integrals: Evaluation of Double integrals (Cartesian and polar coordinates), Change of order of integration (Cartesian form only), Change of variables: double integration from Cartesian to polar coordinates, Evaluation of Triple integrals (Cartesian coordinates).

**UNIT-4: VECTOR DIFFERENTIAL CALCULUS (9)**

Introduction to Vector Differentiation, Scalar and Vector point functions - Gradient of a Scalar function, directional derivative, Divergence of a Vector function, Solenoidal vector, Curl of a Vector function, Irrotational vector, Laplacian operator.

**UNIT-5: VECTOR INTEGRAL CALCULUS (9)**

Line Integral - Potential function - Surface and volume integrals - Green's, Stoke's and Gauss divergence theorem (without proofs) - Verification of Green's, Stoke's and Gauss divergence theorems.

**TOTAL HOURS: 45**



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to		POs
<b>CO1</b>	To solve system of homogenous and non-homogenous linear equations, find the Eigen values and Eigen vectors of a matrix and identify special properties of a matrix.	<b>PO1,PO2,PO3</b>
<b>CO2</b>	Illustrate series expansion of functions using mean value theorems, Interpret partial derivatives as a function of several variables, Apply Jacobean concept to deal with the problems in change of variables, Evaluate maxima and minima of functions.	<b>PO1,PO2,PO3</b>
<b>CO3</b>	To evaluate double and triple integrals of functions of several variables	<b>PO1,PO2,PO3</b>
<b>CO4</b>	To illustrate the physical interpretation of gradient, divergence and curl and apply operator del to scalar and vector point functions.	<b>PO1,PO2,PO3</b>
<b>CO5</b>	To find line, surface, volume integrals and the work done in moving a particle along the path over a force field and apply Green's, Gauss divergence and Stokes theorem in evaluation of line, surface and volume integrals.	<b>PO1,PO2,PO3</b>

**TEXT BOOKS:**

1. T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, "Engineering Mathematics-I", S. Chand and Company Ltd, New Delhi.
2. T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad . "Mathematical Methods", S. Chand and Company Ltd, New Delhi.
3. Dr. B. S. Grewa, "Higher Engineering Mathematics", Khanna Publishers, Delhi, , 44/e, 2017

**REFERENCE BOOKS:**

1. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill Publishers, New Delhi.
2. N.P.Bali, "A Text Book of Engineering Mathematics", Laxmi publications (P)Ltd, Delhi.
3. Dr. M. K. Venkata Ramana, "Higher Engineering Mathematics", National Pub, Madras
4. E.Rukmangadachari, E.Keshava Reddy, "Engineering Mathematics-I", Pearson Educations, Chennai.

**REFERENCE WEBSITE:**

1. <https://nptel.ac.in/courses/110/105/111105111/>
2. <https://www.youtube.com/watch?v=8D3WViAyJvc>
3. <https://www.youtube.com/watch?v=fKzDtjq0ks4>
4. <https://www.youtube.com/watch?v=wMd4YRyBmjA>
5. <https://www.youtube.com/watch?v=ArkDa6d5h9I>
6. <https://www.youtube.com/watch?v=KqItZSst2sU>
7. <https://www.youtube.com/watch?v=-I3HUeHi1Ys>
8. <https://www.youtube.com/watch?v=SZCsFS9izfQ>
9. <https://www.youtube.com/watch?v=ma1QmE1SH3I>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO3</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO4</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO5</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO*</b>	3	3	2	-	-	-	-	-	-	-	-	-



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**I B.Tech. – I Semester**

**20BSC112**

**APPLIED CHEMISTRY  
(Common to E.C.E, E.E.E, C.S.E, CSM, AI & DS)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To learn different purification methods and analyse the impurities present in water.
2. To develop skill to describe the mechanism and control of corrosion.
3. To train the students on the fundamentals and applications of polymers.
4. To understand and apply the concepts of electrochemistry effectively.
5. To introduce basic principles of spectroscopy and chromatography

**UNIT-1: WATER AND WATER FOR INDUSTRIAL PURPOSE (9)**

Water: Sources of water - Types of Impurities in Water - Hardness of water - Temporary and permanent hardness - Estimation of hardness by EDTA Method and numerical problems - Analysis of water - Dissolved oxygen - Disadvantages of hard water - Methods of treatment of water for domestic purpose - Sterilization - Chlorination , Ozonisation.

Water for industrial purpose: Water for steam making - Boiler troubles - Priming and foaming , Boiler corrosion , Scales and sludge ,Caustic embrittlement - Water treatment - Internal treatment - Colloidal , Phosphate ,Calgon , Carbonate and Sodium aluminate conditioning of water - External treatment - Ion - exchange process - Demineralization of brackish water – Reverse osmosis.

**UNIT -2: SCIENCE OF CORROSION (9)**

Definition - Types of corrosion - Dry corrosion(Direct chemical attack) - Wet corrosion - Theories of corrosion and mechanism - Electro chemical theory of corrosion - Galvanic corrosion - Concentration cell corrosion - Oxygen absorption type - Factors influencing the corrosion - Control of corrosion - Cathodic protection - Sacrificial anode and impressed current cathodic protection method.

**UNIT -3: POLYMERS (9)**

Polymerization reactions - Basic concepts - Types of polymerization - Addition polymerization with mechanism - condensation polymerization - Plastics - Thermosetting and thermoplastics - Composition, Properties and Engineering applications of teflon, bakelite, nylon and rubber - Processing of natural rubber and compounding .Elastomers: Buna S - Buna N - Polyurethane Rubber and Silicone Rubber.

**UNIT - 4: ELECTRO CHEMISTRY AND APPLICATIONS (9)**

Electrodes-concepts-Reference electrodes- (Standard hydrogen electrode and calomel electrode)- Nernst equation. Electro Chemistry: Conductance - Equivalent conductance - Molar conductance – Effect of dilution- Conduct metric titrations (Acid –Base titrations) - Conductivity Measurements. Photo voltaic cells - working and applications- Fuel cells-Introduction - Hydrogen oxygen fuel cell and methanol fuel cell

**UNIT - 5: FUNDAMENTAL ASPECTS OF INSTRUMENTAL METHODS (9)**

Chromatography:- Principle and methods of thin layer chromatography-separation of liquid of Paper chromatography. Electromagnetic spectrum-Absorption of radiation-Beer-Lamberts law-UV-Visible and IR spectroscopy-principle and instrumentation

**TOTAL HOURS: 45**





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**COURSE OUTCOMES:**

<b>On successful completion of the course the will be able to,</b>		<b>POs</b>
<b>CO1</b>	To understand the fundamentals of water technology and develop analytical skills in determining the hardness of water and to acquire awareness to societal issues on quality of water.	<b>PO1, PO2,PO6</b>
<b>CO2</b>	Acquire the knowledge in corrosion phenomenon and develop skills in the design of methods for control of corrosion	<b>PO1, PO2</b>
<b>CO3</b>	Acquire knowledge on polymeric materials and to prepare polymeric material for environmental safety and society need.	<b>PO1, PO2,PO6</b>
<b>CO4</b>	Understand and apply the concept of electrochemistry and analyse the standard Electrodes and different types of fuels cells	<b>PO1, PO2</b>
<b>CO5</b>	Demonstrate the basic knowledge of instrumental methods and their applications in the structural analysis of materials	<b>PO1, PO2,PO3</b>

**TEXT BOOKS:**

1. Prof. K. N. Jayaveera, Dr. G. V. Subba Reddy and Dr. C. Ramachandraiah, "Chemistry for Engineers", Tata McGraw Hill Publishers, New Delhi, 4/e, 2009.
2. Jain and Jain, "Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi.15/e, 2008
3. Text book of Engineering Chemistry, 18/e, 2008, S. S. Dara, S. Chand & Co, New Delhi.

**REFERENCE BOOKS:**

1. Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, Scitech Publications(India) Pvt. Ltd, Hyderabad,"Engineering Chemistry, 5/e, 2009.
2. B.Viswanath, M. Aulice Scibioh, "Fuel Cells Principles and Applications", Universities press, Hyderabad, 4/e, 2008.
3. Skoog and West, "Principles of Instrumental analysis",6/e Thomson,2007.
4. Glasston & Lewis, Dhanphtarai Publishers, Physical Chemistry, New Delhi ,12/e, 2009.
5. JC Kuriacose and J. Rajaram ,"Engineering Chemistry (Vol.1&2)", Tata McGraw Hill Publishers, New Delhi, 5/e, 2004, ,

**REFERENCE WEBSITE:**

1. <https://www.youtube.com/watch?v=zVZ9c6EXfTA>
2. <https://nptel.ac.in/courses/113/104/113104082/>
3. <https://nptel.ac.in/courses/104/105/104105039/>
4. <https://nptel.ac.in/courses/104/106/104106132/>
5. <https://www.digimat.in/nptel/courses/video/103108100/L01.html>

**CO-PO MAPPING:**

<b>CO-PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	2	2	-	-	-	2	-	-	-	-	-	-
<b>CO2</b>	2	2	-	-	-	-	-	-	-	-	-	-
<b>CO3</b>	2	2	-	-	-	2	-	-	-	-	-	-
<b>CO4</b>	2	2	-	-	-	-	-	-	-	-	-	-
<b>CO5</b>	2	2	2	-	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>2</b>	<b>2</b>	<b>2</b>	-	-	<b>2</b>	-	-	-	-	-	-



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**I B.Tech. – I Semester**

**20BSC113**

**APPLIED PHYSICS  
(Common to E.C.E, E.E.E, C.S.E, CSM, AI&DS)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To identify the importance and applications Wave Optics in various Streams of Engineering
2. To understand the working principle and applications of Lasers and Optical fibers.
3. To elucidate the importance, properties and applications of Magnetic materials and Dielectrics
4. To use ideas with mathematical solutions to Quantum mechanics and its applications in
5. Various atomic phenomena
6. To provide knowledge about semiconductors and Nanomaterials.

**UNIT-1 WAVE OPTICS**

**(7)**

**Interference-** Principle of superposition – Interference of light – Conditions for sustained interference - Interference in thin films (Reflection Geometry) – Colors in thin films – Newton’s Rings – Determination of wavelength and refractive index.

**Diffraction-** Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit – Grating spectrum.

**UNIT-2 LASERS & FIBER OPTICS**

**(9)**

**Lasers-**Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein’s coefficients – Population inversion – Lasing action – Pumping mechanisms – Nd-YAG laser – He-Ne laser – Applications of lasers.

**Fiber optics-**Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers – Applications.

**UNIT-3 DIELECTRIC MATERIALS & MAGNETIC MATERIALS**

**(9)**

**Dielectric Materials-**Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic, Ionic and Orientation polarizations (Qualitative) – Lorentz internal field – Clausius-Mossotti equation.

**Magnetic Materials-**Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and Permeability – Origin of permanent magnetic moment – Classification of magnetic materials: Dia,para & Ferro-Domain concept of Ferromagnetism (Qualitative) – Hysteresis – Soft and Hard magnetic materials.

**UNIT 4: QUANTUM MECHANICS, FREE ELECTRON AND BAND THEORY OF SOLIDES (10)**

**Quantum Mechanics-** Dual nature of matter – Schrodinger’s time independent and dependent wave equation – Significance of wave function – Particle in a one-dimensional infinite potential well

**Free Electron Theory-**Classical free electron theory (Merits and demerits only) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory – Fermi-Dirac distribution – Density of states – Fermi energy.

**Band theory of Solids-** Bloch’s Theorem (Qualitative) – Kronig-Penney model (Qualitative) – E vs K diagram – Classification of crystalline solids – Effective mass of electron –  $m^*$  vs K diagram – Concept of hole.

**UNIT 5: SEMICONDUCTOR PHYSICS & NANOMATERIALS**

**(10)**

Introduction- Intrinsic and extrinsic semiconductor (Qualitative Analysis) – Carrier transport in



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Semiconductors - Drift & Diffusion –Einstein Equation - Direct and indirect band Gap Semiconductors-Hall Effect and its applications.

**NANOMATERIALS** –Types of Nanomaterials (One dimensional, Two dimensional and Three-dimensional Nanomaterials) - Significance of Nanoscale - surface to, volume ratio –Quantum Confinement effect-Synthesis of Nanomaterials - Ball milling Method - Chemical vapour deposition methods –Optical, thermal, mechanical and electrical properties of Nanomaterials - Applications of Nanomaterials.

**TOTAL HOURS: 45**

**COURSE OUTCOME:**

On successful completion of the course the students will be able to		POs
<b>CO1</b>	Identify the importance and applications Wave Optics in various Streams of Engineering	<b>PO1, PO2</b>
<b>CO2</b>	Understand the working principle and applications of Lasers and Optical fibers	<b>PO1,PO2</b>
<b>CO3</b>	To elucidate the importance, properties and applications of Magnetic materials and dielectrics	<b>PO1, PO2</b>
<b>CO4</b>	Use ideas with mathematical solutions to Quantum mechanics and its applications in various atomic phenomena	<b>PO1,PO2,</b>
<b>CO5</b>	Provide knowledge about semiconductors and Nanomaterials	<b>PO1,PO2,PO12</b>

**TEXT BOOKS:**

1. Palanisamy ,“Engineering Physics”, Palanisamy, Scitech Publications
2. K.Thyagarajan ,“Engineering Physics”, McGraw Hill Publications
3. Maninaidu,“Engineering Physics”, Pearson Publications

**REFERENCE BOOKS:**

1. Kittel ,“Solid State Physics”, Wiley Publications
2. Gaur and Gupta , “Engineering Physics”, Dhanpatrai Publications

**REFERENCE WEBSITE:**

1. <https://www.youtube.com/watch?v=PEXSH8dB-Uk>
2. <https://www.youtube.com/watch?v=YvrwVK9ZqQY>
3. <https://www.digimat.in/nptel/courses/video/115107095/L01.html>
4. <https://www.youtube.com/watch?v=6QUFuZpCgGw>
5. <https://www.youtube.com/watch?v=etjZmdmrjSU>
6. <https://nptel.ac.in/courses/115/105/115105122/>
7. <https://nptel.ac.in/courses/108/108/108108122/>
8. <https://nptel.ac.in/courses/118/104/118104008/>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO3</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO4</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO5</b>	3	2	-	-	-	-	-	-	-	-	-	2
<b>CO*</b>	<b>3</b>	<b>2</b>	-	-	-	-	-	-	-	-	-	<b>2</b>



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – I Semester**

<b>20ESC111</b>	<b>ENGINEERING GRAPHICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to all branches)</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>3</b>

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To expose them to existing national standards related to technical drawings and develop knowledge of basic engineering curves.
2. To develop drawing skills for communication of concepts, ideas and design of projections of points, lines and planes.
3. To develop geometrical shapes and multiple views of projections of solids and sections of solids.
4. To develop drawing skills for communication of concepts, ideas and design the development of surfaces of objects and isometric views.
5. To develop geometrical shapes and multiple views of orthographic projections of solids and perspective views.

**CONCEPTS AND CONVENTIONS (Not for Examination) (3)**  
Importance of drawings in engineering applications - Use of drafting instruments - BIS conventions and specifications - Size, layout and folding of drawing sheets - Lettering, numbering and dimensioning - Basic geometrical constructions - Scales.

**UNIT – 1: ENGINEERING CURVES (9)**  
**Engineering Curves:** Conics – Construction of ellipse, parabola and hyperbola by eccentricity method and rectangular hyperbola – Construction of cycloid, epi cycloid and hypo cycloid – Involute of square, circle, pentagon and hexagon – Drawing of tangents and normal to the above curves

**UNIT – 2: PROJECTION OF POINTS, LINES AND PLANE SURFACES (12)**  
**Projection of Points:** Principles of orthographic projection – First angle and third angle projections – Projection of points. **Projection of Lines:** Projection of straight lines (only first angle projections) inclined to one and both the principal planes – Determination of true lengths, true inclinations by rotating line and trapezoidal method and traces. **Projection of Planes:** Planes (polygonal and circular surfaces) inclined to both the principal planes by change of position method.

**UNIT – 3: PROJECTION OF SOLIDS AND SECTION OF SOLIDS (12)**  
**Projection of Solids:** Projection of simple solids like prisms, pyramids, cylinder and cone, when the axis is inclined to one principal plane. **Section of Solids:** Sectioning of right regular solids like prisms, pyramids, cylinder and cone, solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other plane – Obtaining true shape of section.

**UNIT – 4: DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTIONS (12)**  
**Development of Surfaces:** Development of lateral surfaces of simple and sectioned solids like prisms, pyramids, cylinder and cone. **Isometric Projection:** Principles of isometric projection – Isometric scale – Isometric views of simple solids and truncated solids like prisms, pyramids, cylinder and cone – Combination of two solid objects in simple vertical positions.

**UNIT – 5: ORTHOGRAPHIC PROJECTIONS AND PERSPECTIVE PROJECTIONS (1)**  
**Orthographic Projections:** Visualization principles – Plane of projections – Representation of three dimensional objects – Layout of views – Sketching of multiple views from pictorial views of objects. **Perspective Projection:** Perspective projection of simple solids like prisms and pyramids by visual ray method.

**Total Hours: 60**



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**COURSE OUTCOMES:**

<b>On Successful Completion Of The Course, Students Will Be Able To</b>		<b>POS</b>
<b>CO1</b>	Construct the Engineering curves and generate tangent and normal for those curves.	<b>P01,P02,P03,P10</b>
<b>CO2</b>	Draw the projection of points, lines and plane surfaces.	<b>P01,P02,P03, P10</b>
<b>CO3</b>	Draw the projection of solids, sections of solids like prisms, pyramids, cylinder and cone.	<b>P01,P02,P03, P10</b>
<b>CO4</b>	Draw the isometric projections and views and also develop the development of surfaces.	<b>P01,P02,P03, P10</b>
<b>CO5</b>	Draw the orthographic and perspective projections of solids.	<b>P01,P02,P03, P10</b>

**TEXT BOOKS:**

1. N.D. Bhatt and V. M. Panchal , "Engineering Drawing" , Charotar Publishing House, 5th edition, 2010.
2. K.V.Natrajan, " A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2009.

**REFERENCES BOOKS:**

1. Luzzader, Warren.J and Duff,John M, "Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production", Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
2. K.Venugopal and V.Prabhu Raja , "Engineering Graphics", New Age International (P) Limited. 2008.
3. M.B.Shah and B.C.Rana , "Engineering Drawing", Pearson Education, 2/e, 2009.
4. Basant Agarwal and C.M.Agarwal , "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

**REFERENCE WEBSITE:**

1. <https://nptel.ac.in/courses/112/102/112102304/>
2. <https://nptel.ac.in/courses/112/105/112105294/>
3. <https://nptel.ac.in/courses/112/103/112103019/>
4. <https://nptel.ac.in/courses/112/104/112104172/>

**CO-PO MAPPING:**

<b>CO-PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	2	2	-	-	-	-	-	-	1	-	-
<b>CO2</b>	3	3	3	-	-	-	-	-	-	1	-	-
<b>CO3</b>	3	3	3	-	-	-	-	-	-	1	-	-
<b>CO4</b>	3	3	3	-	-	-	-	-	-	2	-	-
<b>CO5</b>	3	3	3	-	-	-	-	-	-	2	-	-
<b>CO*</b>	<b>3</b>	<b>2.8</b>	<b>2.8</b>	-	-	-	-	-	-	<b>1.4</b>	-	-



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – I Semester**

<b>20CSE111</b>	<b>C &amp; DATA STRUCTURES</b> (Common to ECE, EEE, CSE, CSM)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To provide knowledge on algorithm, flowchart for a given problem and introducing the C programming basics.
2. To impart adequate knowledge on conditional and iterative statements for problem solving.
3. To familiarize with the pointers, structures and union.
4. To understand basic data structures.
5. To familiarize with several sub-quadratic sorting and searching algorithms.

**UNIT -1: INTRODUCTION TO C**

**(9)**

**Overview of Computers:** Computer Software- Algorithm–Flowchart–Software Development Method.

**C Programming Basics:** Introduction to "C" Programming – Characteristics of C – Structure of a "C" program – Tokens – Constants- Variables – Data Types – Operators and their types- Expressions – Operator Precedence and Associativity.

**UNIT -2: CONTROL STATEMENTS AND FUNCTIONS**

**(9)**

**Conditionals:** If-Else- Constructs – Loop Structures/Iterative Statements – While Loop – For Loop – Break Statement - Arrays: Initialization–Declaration - One-Dimensional Arrays–Two-Dimensional Arrays– Function Call and Returning Values – Parameter Passing – Local and Global-Scope – Recursive Functions.

**UNIT -3: POINTERS, STRUCTURES AND UNIONS**

**(9)**

**Pointers:** Definition–Initialization–Pointers Arithmetic–Pointers and Arrays.

**Structures and Union:** Introduction – Need for Structure Data type – Structure Definition – Structure Declaration – Accessing Structure Members - Structure within a Structure – Copying and Comparing Structure Variables - Structures and Arrays – Union.

**UNIT-4: INTRODUCTION TO DATA STRUCTURES**

**(9)**

Overview and importance of algorithms and data structures, Definition- Abstract Data Type, - Classification of Data Structures - Linear and Non Linear-List ADT –Single Linked List - Applications. Dynamic Memory Allocation and Deallocation

**UNIT-5: SORTING AND SEARCHING TECHNIQUES**

**(9)**

**Sorting Techniques:** Insertion sort - Selection sort - Bubble sort - Quick sort - Merge sort.

**Searching Techniques:** Linear search - Binary Search

**TOTAL HOURS: 45**



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**COURSE OUTCOMES:**

On successful completion of the course the student will be able to,		POs
<b>CO1</b>	Understand the problem solving basics.	PO1, PO2
<b>CO2</b>	Identify and develop programs using control structures like selection control and iterative control statements.	PO1, PO2, PO3
<b>CO3</b>	Apply and Demonstrate knowledge on pointers, structure and union.	PO1,PO2, PO3, PO4
<b>CO4</b>	Categorize the basic data Structures and its applications	PO1, PO2,PO5
<b>CO5</b>	Illustrate different sorting and searching techniques to solve real-world problems	PO1, PO3, PO4

**TEXT BOOKS:**

1. PradipDey, and Manas Ghosh, "Programming in C", Oxford University Pres, 2018.
2. D. Samanta,"Classic Data Structure", Eastern Economy Edition, 2014
3. YashavantKanetkar,"Let us C", 15th Edition, BPB Publications, 2016.

**REFERENCE BOOKS:**

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education, 2010, Chennai.
2. 2.Data Structures Using C, ReemaThareja, Oxford University Press, 2011.
3. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2005.

**REFERENCE WEBSITES:**

1. [https://onlinecourses.swayam2.ac.in/cec22\\_cs11](https://onlinecourses.swayam2.ac.in/cec22_cs11)
2. [https://onlinecourses.nptel.ac.in/noc22\\_cs40](https://onlinecourses.nptel.ac.in/noc22_cs40)
3. <https://www.geeksforgeeks.org..>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO3</b>	3	3	2	2	-	-	-	-	-	-	-	-
<b>CO4</b>	3	3	-	-	2	-	-	-	-	-	-	-
<b>CO5</b>	3	-	2	2	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	-	-	-	-	-	-	-





**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – I Semester**

**20BSC114                      ENGINEERING CHEMISTRY LABORATORY                      L    T    P    C**  
**(Common to E.C.E, E.E.E, C.S.E, CSM, AI& DS)                      0    0    2    1**

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To provide solid foundation in chemistry laboratory to solve engineering problems.
2. To apply the theoretical principles and perform experiments on hardness of water
3. To apply the theoretical principles and perform experiments dissolved oxygen, alkalinity, and acidity.
4. To Illustrates the properties of analytical equipments like red wood, Viscometer and conductometry

**LIST OF EXPERIMENTS:**

1. Preparation of Standard EDTA solution and Estimation of Hardness of Water
2. Preparation of Standard EDTA and Estimation of Copper
3. Estimation of dissolved oxygen in given water sample
4. Estimation of alkalinity of water
5. Estimation of Acidity of water sample.
6. Preparation of Standard Potassium Dichromate and Estimation of Ferrous Iron
7. Preparation of Standard Potassium Dichromate and Estimation of Copper by Iodometry
8. Determination of strength of the given Hydrochloric acid against standard sodium hydroxide Solution by Conductometric titration
9. Conduct metric titration of BaCl<sub>2</sub> Vs Na<sub>2</sub>SO<sub>4</sub> (Precipitation Titration).
10. Determination of viscosity of the given oils through Redwood viscometer

**COURSE OUTCOMES:**

<b>On successful completion of the course the students will be able to</b>		<b>POs</b>
<b>CO1</b>	Prepare standard solutions	<b>PO1,PO3</b>
<b>CO2</b>	Acquire knowledge about volumetric analysis of estimation copper by EDTA and by Iodometry	<b>PO1,PO2,PO3</b>
<b>CO3</b>	Acquire analytical skills in estimation of hardness of water,Alkanility and Acidity of water, dissolved oxygen in water and estimation of iron through laboratory methods	<b>PO1,PO2,PO3,PO6,PO12</b>
<b>CO4</b>	Acquire skills to use instrumental techniques for the determination of electrical conductance of electrolytes and viscosity of lubricants	<b>PO1,PO2,PO3</b>
<b>CO5</b>	Provide solutions for environmental issues through determination of quality of water	<b>PO1,PO2,PO3,PO6,PO7</b>
<b>CO6</b>	Communicate verbally and in written form pertaining to results of the Experiments	<b>PO1,PO2,PO8,PO9,</b>
<b>CO7</b>	Learns to perform experiments involving chemistry in future years.	<b>PO1,PO2,PO8,PO9, PO10</b>
<b>CO8</b>	Communicate verbally and in written form, the understanding about the experiments.	<b>PO1,PO2,PO8,PO9,PO10</b>
<b>CO9</b>	Continue updating their skill related to chemistry laboratory.	<b>PO1,PO2,PO8, PO9,PO10</b>





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**CO-PO MAPPING:**

<b>CO-PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>
<b>CO4</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO5</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO6</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO7</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>
<b>CO8</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>
<b>CO9</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>
<b>CO*</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – I Semester**

**20BSC115**

**ENGINEERING PHYSICS LABORATORY  
(Common to E.C.E, E.E.E, C.S.E, CSM)**

**L T P C  
0 0 2 1**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To understand the concepts of interference, diffraction and their applications.
2. To understand the role of optical fiber parameters in communication.
3. Recognize the importance of energy gap in the study of conductivity
4. To illustrate the properties of Magnetic and their applications
5. To understand and evaluate the properties of materials and sounds

S. NO.	NAME OF THE EXPERIMENT
1	Diffraction grating - Measurement of wavelength of given Laser.
2	To determine the frequency of AC using Sonometer
3	Determination of magnetic field along the axis of a current carrying circular coil - Stewart Gees method
4	Determination of numerical aperture and acceptance angle of an optical fiber
5	Determination of particle size using a laser source
6	Parallel fringes – Determination of thickness of thin object using wedge method
7	Newton's rings – Determination of radius of curvature of given plano convex lens
8	B-H curve – Determination of hysteresis loss for a given magnetic material
9	Determination of Energy band gap of semiconductor
10	To find the rigidity modulus of the material using torsional pendulum

**COURSE OUTCOMES:**

On completion of the laboratory course the student will be able to		POs
CO1	Demonstrate Knowledge on measurement of various physical quantities using optical methods and fundamentals of magnetic fields	<b>PO1</b>
CO2	Identify different physical properties of materials like band gap, magnetic field intensity etc, for engineering and technological applications	<b>PO2</b>
CO3	Provide valid conclusions on phenomena Interference and Diffraction	<b>PO4</b>
CO4	Follow the ethical principles in implementing the programs	<b>PO8</b>
CO5	Do experiments effectively as an individual and as a team member in a group.	<b>PO9</b>
CO6	Communicate verbally and in written form, the understanding about the experiments.	<b>PO10</b>
CO7	Continue updating their skill related to loops, pointers and files implementing programs in future.	<b>PO12</b>



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**TEXT BOOKS:**

1. Palanisamy , "Engineering Physics", Palanisamy, Scitech Publications
2. K.Thyagarajan , "Engineering Physics", McGraw Hill Publications
3. Maninaidu, "Engineering Physics", Pearson Publications

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	<b>3</b>	-	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	-	<b>3</b>	-	-	-	-	-	-	-	-	-	-
<b>CO3</b>	-	-	-	<b>3</b>	-	-	-	-	-	-	-	-
<b>CO4</b>	-	-	-	-	-	-	-	<b>3</b>	-	-	-	-
<b>CO5</b>	-	-	-	-	-	-	-	-	<b>3</b>	-	-	-
<b>CO6</b>	-	-	-	-	-	-	-	-	-	<b>3</b>	-	-
<b>CO7</b>	-	-	-	-	-	-	-	-	-	-	-	<b>3</b>
<b>CO*</b>	<b>3</b>	<b>3</b>	-	<b>3</b>	-	-	-	<b>3</b>	<b>3</b>	<b>3</b>	-	<b>3</b>



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – I Semester**

**20CSE112**

**C AND DATA STRUCTURE LAB  
(Common to CSE, ECE, EEE, CSM, AI&DS)**

**L T P C  
0 0 3 1.5**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To provide knowledge on flowchart and algorithm to the given problem
2. To exercise conditional and iterative statements to Write C programs
3. To develop the skill of C programs using arrays, strings and functions.
4. To understand C programs using pointers and allocate memory using dynamic memory management functions.
5. To familiarize with sorting and searching techniques.

**EXERCISES:**

1. a. Write a C Program to Calculate the Simple Interest.  
b. Write a C Program to Convert the Temperature Unit from Fahrenheit to Celsius using the Formula  $C = (F-32)/1.8$ .  
c. Assume that any Month is of 30 Days. Now you are given Total Days. Write a C Program to find out the exact Number of Years - Months & Days.
2. 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  $\leq$  Rs. 10000.
  - iii) Commission is 5% for Sales Amount >Rs. 10000.  
c. Write a C Program to find the Roots of Quadratic Equation.
3. a. Write a Program, which takes two integer Operands and one Operator from the User, Performs the Operation and then Prints the Result. (Consider the Operators +, -, \*, /, %, use switch Statement).  
b. A Character is entered through Keyboard. Write a Program to determine whether the Character Entered is a Capital Letter, a Small Case Letter, a Digit or a Special Symbol. The Following Table shows the Range of ASCII values for various Characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97 - 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91 - 96, 123 - 127.
4. a. Write a C 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 C Program to Generate the first n terms of the Sequence.
5. a. i) A Perfect Number is a Number that is the Sum of all its Divisors Except Itself. Six is the Perfect Number. The only Numbers that Divide 6 evenly are 1, 2, 3 and 6 (i.e.,  $1+2+3=6$ ).  
ii) An Abundant Number is one that is Less than the Sum of its Divisors  
(Ex:  $12 < 1+2+3+4+6$ ).  
iii) A Deficient number is one that is Greater than the Sum of its Divisors (Ex:  $9 > 1+3$ ).  
Write a Program to Classify N Integers (Read N from keyboard) each as Perfect, Abundant or Deficient.  
b. An Armstrong Number is a Number that is the Sum of the Cubes of its Individual Digits. Write a C Program to Print Armstrong Numbers below 1000.



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6. a. Write a C Program to generate all the Prime Numbers between 1 And N, Where N is a Value Supplied by the User.  
b. Write a C Program to Calculate the Following Sum:  $\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
7. a. Write a C Program to find both the Largest and Smallest Number in a List of Integers using Arrays.  
b. Write a C Program to Perform the Following:  
i) Addition of Two Matrices. ii) Multiplication of Two Matrices.
8. a. Write C Programs that use both Recursive and Non-Recursive Functions to find the Factorial of a given Integer.  
b. Write C Programs that use both Recursive and Non-Recursive Functions to find the GCD (Greatest Common Divisor) of two given integers.  
c. Write C Program to solve Towers of Hanoi Problem using recursive function.
9. a. Write C Programs for Swap/Exchange values of two Integer variables using Call by Reference.  
b. Write a C Program using Pointers to Read in an Array of Integers and Print its Elements in Reverse Order.
10. Write a C Program using Dynamic Memory Allocation.
11. You are supposed to generate a Result Table which Consists of Student Id - Student Name - Marks of three Subject and Total Marks. Write a Program which takes Input for Five Students and Displays Result Table. Also Display Student Information Separately Who Got the Highest Total? Use Structures to do it.
12. Write C programs to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search
13. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort
14. Write a C Program that Implements the Following Sorting Methods to Sort a Given List of Integers in Ascending Order i) Quick sort ii) Merge sort

**COURSE OUTCOMES:**

After the successful completion of this course, the students able to:		POs
<b>CO1</b>	Design the algorithm and flowchart for the given problem.	<b>PO1, PO2, PO3</b>
<b>CO2</b>	Develop the programs on control statements and arrays.	<b>PO1, PO2, PO3</b>
<b>CO3</b>	Analyze the concepts on functions	<b>PO1, PO2</b>
<b>CO4</b>	Solve the memory access problems by using pointers and design the programs on structures and unions.	<b>PO1, PO2, PO4</b>
<b>CO5</b>	Analyze the dynamic memory allocation and deallocation.	<b>PO1, PO2</b>
<b>CO6</b>	Follow the ethical principles in implementing the programs	<b>PO8</b>
<b>CO7</b>	Do experiments effectively as an individual and as a team member in a group.	<b>PO9</b>
<b>CO8</b>	Communicate verbally and in written form, the understanding about the experiments.	<b>PO10</b>
<b>CO9</b>	Continue updating their skill related to loops, pointers and files implementing programs in future.	<b>PO12</b>



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**REFERENCE BOOKS:**

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education, 2010, Chennai.
2. Let us C, YashavantKanetkar, BPB, Thirteenth Revised and Updated edition (2013).
3. Programming in C and Data Structures, E.Balaguruswamy, Tata McGraw Hill, 2nd edition.
4. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education.
5. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
7. Computer Basics and C Programming, V. Rajaraman, PHI Publications.

**REFERENCE WEBSITES:**

1. [https://onlinecourses.swayam2.ac.in/cec22\\_cs11](https://onlinecourses.swayam2.ac.in/cec22_cs11)
2. [https://onlinecourses.nptel.ac.in/noc22\\_cs40](https://onlinecourses.nptel.ac.in/noc22_cs40)
3. <https://www.geeksforgeeks.org>.

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>C01</b>	3	3	3	-	-	-	-	-	-	-	-	-
<b>C02</b>	3	3	3	-	-	-	-	-	-	-	-	-
<b>C03</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>C04</b>	3	3	-	3	-	-	-	-	-	-	-	-
<b>C05</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>C06</b>	-	-	-	-	-	-	-	3	-	-	-	-
<b>C07</b>	-	-	-	-	-	-	-	-	3	-	-	-
<b>C08</b>	-	-	-	-	-	-	-	-	-	3	-	-
<b>C09</b>												3
<b>CO*</b>	<b>3</b>	<b>3</b>	3	<b>3</b>	-	-	-	<b>3</b>	<b>3</b>	<b>3</b>		<b>3</b>



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – I Semester**

<b>20ESC112</b>	<b>ENGINEERING WORKSHOP AND IT WORKSHOP</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to all branches)</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**COURSE EDUCATIONAL OBJECTIVES:**

1. To provide exposure to the students with hands on experience on various basic engineering practices in civil, mechanical and electrical engineering.
2. To include training on PC Hardware, Internet & World Wide Web and Productivity Tools including Word, Excel and Power Point.

**ENGINEERING WORKSHOP**

**TRADES FOR EXERCISES:**

- 1. Carpentry:** Two exercises from: Middle T lap joint – Dove tail lap joint – Mortise and tenon joint from out of 300 x 50 x 35 mm soft wood stock.
- 2. Sheet Metal:** Two exercise from: Square tray – Open scoop – Frustum of pyramid from out of 22 or 20 gauge G.I. sheet.
- 3. Fitting:** Two exercises from: Square joint – V joint – Dove tail joint from out of 50 x 50 x 5 mm M.S. flat piece.
- 4. House Wiring:** Two exercise from: Two lamps controlled by one switch in series and parallel – One lamp controlled by 2 two way switches (stair case) – Wiring for fluorescent lamp.
- 5. Plumbing:** Two exercise from: Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.
- 6. Machining:** Exercise on drilling and tapping.

**TRADES FOR DEMONSTRATION:**

- a. Lathe machine.
- b. Grinding machine.
- c. Arc and gas welding.

**COURSE OUTCOMES (ENGINEERING WORKSHOP):**

<b>On successful completion of the course, students will be able to</b>		<b>POs</b>
<b>CO1</b>	Demonstrate the knowledge on different tools used in carpentry, fitting, sheet metal, house wiring and plumbing sections and also basic machining process	<b>PO1</b>
<b>CO2</b>	Analyze the basic pipeline connection using different joints	<b>PO2</b>
<b>CO3</b>	Design and develop simple components by using different materials includes wood, GI sheet and MS plates	<b>PO3</b>
<b>CO4</b>	Apply basic electrical engineering tools on the house wiring practice	<b>PO5</b>
<b>CO5</b>	Follow the ethical principles in while doing the exercises.	<b>PO8</b>
<b>CO6</b>	Do the exercises effectively as an individual and as a team member in a Group	<b>PO9</b>
<b>CO7</b>	Communicate verbally among team members and in written form, the understanding about the trade exercises.	<b>PO10</b>
<b>CO8</b>	Continue updating their skill related to trades.	<b>PO12</b>



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**TEXT BOOKS:**

1. Lab manual provided by the department.

CO-	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	-	2	-	-	-	-	-	-	-	-	-	-
<b>CO3</b>	-	-	2	-	-	-	-	-	-	-	-	-
<b>CO4</b>	-	-	-	-	2	-	-	-	-	-	-	-
<b>CO5</b>	-	-	-	-	-	-	-	3	-	-	-	-
<b>CO6</b>	-	-	-	-	-	-	-	-	3	-	-	-
<b>CO7</b>	-	-	-	-	-	-	-	-	-	3	-	-
<b>CO8</b>	-	-	-	-	-	-	-	-	-	-	-	3
<b>CO*</b>	<b>3</b>	<b>2</b>	<b>2</b>	-	<b>2</b>	-	-	<b>3</b>	<b>3</b>	<b>3</b>	-	<b>3</b>

**IT WORKSHOP**

**PC HARDWARE**

1. Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.
2. Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video shall be given as part of the course content.
3. Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.
4. Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva
5. **Hardware Troubleshooting:** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva
6. **Software Troubleshooting:** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

**LATEX AND WORD**

7. Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.
8. Using LaTeX and Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.





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**EXCEL**

9. Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.
10. Creating a Scheduler - Features to be covered: - Gridlines, Format Cells, Summation, auto fill, Formatting Text.

**LATEX AND MS/EQUIVALENT (FOSS) TOOL POWER POINT**

11. Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and PowerPoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).
12. Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

**INTERNET & WORLD WIDE WEB**

13. **Internet & World Wide Web -Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.  
**Web Browsers, Surfing the Web:** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.
14. **Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated by the student to the satisfaction of the instructors. Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computers to be safe on the internet. They need to first install an antivirus software, configure their personal firewall and windows update on their computer.

**COURSE OUTCOMES (IT WORKSHOP):**

<b>On the successful completion of this course, the student should be able to,</b>		<b>POs</b>
<b>CO1</b>	Acquire knowledge on computer system such as system unit, input devices, and output devices connected to the computer.	<b>PO1</b>
<b>CO2</b>	Demonstrate the booting process that includes switching on the system, execution of POST routine, then bootstrap loader, and loading of the operating system, and getting it ready for use.	<b>PO2</b>
<b>CO3</b>	Demonstrate the working of the internet that include the use of protocols, domains, IP addresses, URLs, web browsers, web servers, mail-servers, etc.	<b>PO3</b>
<b>CO4</b>	Familiarize with parts of MS Office, To create and save a document, To set page settings, create headers and footers, To use various formatting features such as bold face, italicize, underline, subscript, superscript, line spacing, etc.	<b>PO5</b>



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<b>C05</b>	Follow the ethical principles in implementing the programs	<b>P08</b>
<b>C06</b>	Do experiments effectively as an individual and as a team member in a group.	<b>P09</b>
<b>C07</b>	Communicate verbally and in written form, the understanding about the experiments and	<b>P010</b>
<b>C08</b>	Continue updating their skill related to MS Office, Internet and Computer in future.	<b>P012</b>

**REFERENCE BOOKS:**

1. Vikas Gupta, "Comdex Information Technology course tool kit" , WILEY Dream tech, New Delhi, 2003.
2. Cheryl A Schmidt, "The Complete Computer upgrade and repair book", WILEY Dream Tech, New Delhi, 3/e, 2008.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, New Delhi, 2008
4. Kate J. Chase , "PC Hardware and A+ Handbook", Microsoft press, 2004.
5. Leslie Lamport, Addison Wesley, LaTeX Companion, New Delhi, 2/e, 2002
6. David Anfinson and Ken Quamme , "IT Essentials PC Hardware and Software Companion Guide", CISCO Press, Pearson Education, New Delhi, 3/e, 2008.
7. Patrick Regan , "IT Essentials PC Hardware and Software Labs and Study Guide", CISCO Press, Pearson Education, New Delhi, 3/e, 2008,
8. S.J. Bigelow , "Troubleshooting, Maintaining and Repairing PCs", TMH, New Delhi, 5/e, 2008.

CO-PO	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
<b>C01</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>C02</b>	-	3	-	-	-	-	-	-	-	-	-	-
<b>C03</b>	-	-	3	-	-	-	-	-	-	-	-	-
<b>C04</b>	-	-	-	3	-	-	-	-	-	-	-	-
<b>C05</b>	-	-	-	-	3	-	-	-	-	-	-	-
<b>C06</b>	-	-	-	-	-	-	-	3	-	-	-	-
<b>C07</b>	-	-	-	-	-	-	-	-	3	-	-	-
<b>C08</b>	-	-	-	-	-	-	-	-	-	3	-	-
<b>C09</b>	-	-	-	-	-	-	-	-	-	-	-	3
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	-	-	<b>3</b>	<b>3</b>	<b>3</b>	-	<b>3</b>



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – II Semester**

<b>20HSM111</b>	<b>COMMUNICATIVE ENGLISH FOR ENGINEERS</b>	<b>L T P C</b>
	<b>(Common to All Branches)</b>	<b>3 0 0 3</b>

**PRE-REQUISITES: Nil**

**EDUCATIONAL OBJECTIVES:**

1. To Provide Knowledge on developing Vocabulary and communicating in a verbal manner.
2. To understand in using of technology for societal aspects.
3. To recognize the importance on constructing Entrepreneurship Skills.
4. To Execute Contextual knowledge to recognize the need of ability to engage in independent and life- long learning in the broadest context of technological change.
5. To support and identify the earlier Medical Life Sciences used in India

**UNIT-1: COMMUNICATION SKILLS FOR PROFESSIONALS (9)**

**Listening:** Identifying the topic, specific pieces of information by listening by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions; introducing one self and others. **Reading:** Skimming to get the main idea of a text, scanning to look for specific information. **Reading for writing:** Beginnings and endings of paragraphs Grammar and Vocabulary: Articles and prepositions and word formation. Content words and function words.

**UNIT-2: TECHNOLOGY WITH A HUMAN FACE A LECTURE BY E.F.SCHUMACHER (9)**

**Listening:** Answering a series of questions about main idea and supporting ideas after listening to audio texts. **Speaking:** Discussion in pairs/small groups on specific topics. **Reading:** Identifying sequence of ideas recognizing verbal techniques. **Writing:** Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writings. **Grammar and Vocabulary:** Word formation (Derivtion, Borrowing-coinage-compounding) Tenses.

**UNIT-3: AZIM PREMJI-AN ENTREPRENEUR (9)**

**Listening:** Identifying the topic, specific pieces of information by listening by listening to short audio texts. **Speaking:** Discussing daily routine activities. **Reading:** Phrasal verbs often used in daily conversations. **Writing:** Beginnings and endings of paragraphs **Grammar and Vocabulary:** Letter writing (official) - voice of verbs

**UNIT-4: REFLECTIONS OF FUTURE THE YEAR –BY THEODORE J.GORDON (9)**

**Listening:** Identifying the topic, specific pieces of information by listening by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions; introducing one self and others. **Reading:** Skimming to get the main idea of a text, scanning to look for specific information. **Reading for writing:** Beginnings and endings of paragraphs Grammar and Vocabulary: Direct and Indirect speech-Email writing.

**UNIT-5: Y.SUBBA ROW (9)**

**Listening:** Identifying the topic, specific pieces of information by listening by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions; introducing one self and others. **Reading:** Skimming to get the main idea of a text, scanning to look for specific information. **Reading for writing:** Beginnings and endings of paragraphs introducing the topic summarizing the main idea and providing a transition to the next paragraph. **Grammar and Vocabulary:** Subject verb agreement- Report writing.



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**COURSE OUTCOMES:**

<b>On successful completion of the course, student will be able to</b>		<b>POs</b>
<b>CO1</b>	Understand the concepts on developing vocabulary and communicating in a verbal manner.	<b>PO1</b>
<b>CO2</b>	Understand and develop knowledge on the use of Technology for social aspects.	<b>PO5</b>
<b>CO3</b>	Understand Acquiring skills to become an able Entrepreneur	<b>PO2</b>
<b>CO4</b>	Understand contextual knowledge to recognize the need of ability to engage in independent and life-long learning in the broadest context of technological change.	<b>PO6</b>
<b>CO5</b>	Understand the importance of Medical advancement and its uses on Human life in India..	<b>PO4</b>

**TEXT BOOKS:**

1. V.N.Sudheer, S.Riyaz Ahammed, N.R Tulasi Prasad, N.Lakshmi Sailaja, "Functional English 1" The Department of English of SITAMS ,1/e. 2016
2. V.N.Sudheer, S.Riyaz Ahammed, N.R Tulasi Prasad, N.Lakshmi Sailaja, "Functional English 2" The Department of English of SITAMS ,1/e. 2016

**REFERENCE BOOKS:**

1. K.Srinivasa Krishna , B.Kuberudu , "Business communication and softskills", Excel Books ,1/e 2008.
2. K.R. Lakshminarayana , "English for Technical communication" ,Scitech Publishers, 2/e, 2009
3. R.K. Bansal ,J.B. Harrison, "Spoken English", Orient Longman, Mumbai, 2/e,2009
4. Raymond Murphy ,Murphys English Grammar, Raymond Murphy Publishers , 2/e, 2006 Cambridge English Dictionary for advanced Learners.
5. Inspiring Lives by Dr. Jandhyala Ravindranath,Dr.M.Sarath Babu

**REFERENCE WEBSITES:**

- 1.[www.englishclub.com](http://www.englishclub.com)
- 2.[www.languageguide.org/english/](http://www.languageguide.org/english/)
- 3.[www.bbc.co.uk/learningenglish](http://www.bbc.co.uk/learningenglish)
- 4.[www.eslpod.com/index.html](http://www.eslpod.com/index.html)
- 5.[www.myenglishpages.com](http://www.myenglishpages.com)

**CO-PO MAPPING**

<b>CO-PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	-	-	-	-	3	-	-	-	-	-	-	-
<b>CO3</b>	-	3	-	-	-	-	-	-	-	-	-	-
<b>CO4</b>	-	-	-	-	-	3	-	-	-	-	-	-
<b>CO5</b>	-	-	-	3	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>3</b>						





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**COURSE OUTCOMES:**

<b>On successful completion of the course, students will be able to</b>		<b>POs</b>
<b>CO1</b>	To identify whether the given differential equation of first order is linear or Bernoulli and to solve the higher order linear differential equations with constant coefficients.	<b>PO1,PO2,PO3</b>
<b>CO2</b>	Apply a range of techniques to find solutions of standard PDE's and outline the basic properties of standard PDE's	<b>PO1,PO2,PO3</b>
<b>CO3</b>	To understand the concepts of Laplace transform and elementary functions, general functions using its properties and special functions.	<b>PO1,PO2,PO3</b>
<b>CO4</b>	To understand finding Fourier series expression of the given function.	<b>PO1,PO2,PO3</b>
<b>CO5</b>	Understand Fourier transforms and properties of Fourier transforms	<b>PO1,PO2,PO3</b>

**TEXT BOOKS:**

1. K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, "Engineering Mathematics-I", T, S. Chand and Company Ltd, New Delhi.
2. T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, "Mathematical Methods", S. Chand and Company Ltd, New Delhi.
3. Dr. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, Delhi, 44/e, 2017.

**REFERENCE BOOKS:**

1. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill Publishers, New Delhi.
2. Dr. M. K. Venkata Ramana, "Higher Engineering Mathematics", National Pub & Co, Madras.
3. N.P.Bali , "A Text Book of Engineering Mathematics", Laxmi publications (P)Ltd, New Delhi.
4. E.Rukmangadachari, E.Keshava Reddy, "Engineering Mathematics-II", Pearson Educations, Chennai.

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/111/106/111106100/>  
<https://www.youtube.com/watch?v=OBhZvyhc8JQ&t=982s>  
<https://nptel.ac.in/courses/111/106/111106100/>  
<https://www.youtube.com/watch?v=3zCdNO2xp3s>  
<https://www.youtube.com/watch?v=XU5hUrh6-18&t=948s>  
<https://nptel.ac.in/courses/111/106/111106139/>  
[https://www.youtube.com/watch?v=LGxE\\_yZYigI](https://www.youtube.com/watch?v=LGxE_yZYigI)  
<https://www.youtube.com/watch?v=6spPyJH6dkQ>  
<https://www.youtube.com/watch?v=GFKggEkKtLM>

**CO-PO MAPPING:**

<b>CO-PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO3</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO4</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO5</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>2</b>	-	-	-	-	-	-	-	-	-



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – II Semester**

**20EEE121**

**ELECTRICAL CIRCUIT ANALYSIS**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

- 1:** Impart knowledge on fundamentals of electrical circuits
- 2:** Analyzing different factors of various periodic waveforms
- 3:** introduce phenomenon of Magnetically coupled Circuits and Resonance Circuits
- 4:** Inculcate skill on investigating the DC electrical circuits through different network theorems.
- 5:** Inculcate skill on investigating the AC electrical circuits through different network theorems.

**UNIT-1: FUNDAMENTAL CONCEPTS OF ELECTRICAL CIRCUITS (9)**

Circuit concept, RLC parameters - Voltage and Current sources, Independent and dependent sources, source transformation - Kirchoff's laws - network reduction techniques, series, parallel, series parallel, star-to-delta transformation - Nodal and Mesh analysis.

**UNIT-2: SINGLE PHASE AC CIRCUITS (9)**

R.M.S, Average values and form factor for different periodic waveforms - phase and phase difference of sinusoidal alternating quantities - steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation - concept of reactance, impedance, susceptance and admittance - Power triangle, power factor-Locus diagrams.

**UNIT-3: MAGNETIC CIRCUITS & RESONANCE (9)**

Faraday's laws of electromagnetic induction - Concept of self and mutual inductance - dot convention-coefficient of coupling - Magnetic circuits, composite magnetic circuit-Analysis of series and parallel magnetic circuits. Resonance - series & parallel circuits, concept of bandwidth and Q-factor.

**UNIT-4: NETWORK THEOREMS FOR DC EXCITATION (9)**

Thevenin's, Norton's, Maximum power transfer, Millman's, Tellegen's, superposition, reciprocity and compensation theorem for DC and Simple Problems.

**UNIT-5: NETWORK THEOREMS FOR AC EXCITATION (9)**

Thevenin's, Norton's, Maximum power transfer, Millman's, Tellegen's, superposition, reciprocity and compensation theorem for AC and Simple Problems.

**Total hours: 45**

**COURSE OUTCOMES:**

<b>On successful completion of the course the student will be able to,</b>		<b>Pos</b>
<b>CO1</b>	Analyse electrical circuits	PO1, PO2, PO3,PSO12
<b>CO2</b>	Investigate different various periodic waveforms	PO1, PO2, PO3,PSO12
<b>CO3</b>	Analyse the magnetically coupled circuits and evaluate the resonance condition for series and parallel RLC network.	PO1, PO2, PO3,PSO12
<b>CO4</b>	Apply circuit theorems for DC circuits	PO1, PO2, PO3,PO12
<b>CO5</b>	Apply circuit theorems for AC circuits	PO1, PO2, PO3,PO12





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**TEXT BOOKS:**

1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, edition, New Delhi, 2013.
2. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, 2013.
3. Allan H. Robbins, Wilhelm C. Miller, "Circuit Analysis Theory and Practice", Cengage Learning India, 2013.

**REFERENCE BOOKS:**

1. Chakrabarti A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, 1999.
2. Jegatheesan, R., "Analysis of Electric Circuits," McGraw Hill, 2015.
3. Joseph A. Edminister, Mahmood Nahri, "Electric circuits", Schaum's series, McGraw-Hill, New Delhi, 2010.
4. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", McGraw Hill, 2015.

**REFERENCE WEBSITE:**

1. <https://nptel.ac.in/courses/108/105/108105053/>

**CO-PO Mapping:**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	-	-	-	-	-	2
CO2	3	3	2	-	-	-	-	-	-	-	-	2
CO3	3	2	2	-	-	-	-	-	-	-	-	2
CO4	3	3	2	-	-	-	-	-	-	-	-	2
CO5	3	3	2	-	-	-	-	-	-	-	-	2
CO*	<b>3</b>	<b>2.6</b>	<b>2</b>									<b>2</b>





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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – II Semester**

<b>20EEE122</b>	<b>GENERATION OF ELECTRICAL POWER</b>	<b>L T P C</b>
		<b>3 0 0 3</b>

**COURSE EDUCATIONAL OBJECTIVES:**

- 1:** To acquire knowledge on Thermal power station
- 2:** To impart knowledge on Hydro power station
- 3:** To acquire knowledge on Nuclear power station
- 4:** To acquire knowledge on solar and wind Energy
- 5:** To attain the knowledge on different methods of tariffs

**UNIT 1: THERMAL POWER STATIONS (9)**

Line Diagram of Thermal power station (TPS) - Showing paths of coal, steam, water, air, ash and flue gases-Brief discussion of TPS components: Economizers - Boilers - Super heaters - Turbines- Condensers - Chimney and cooling towers.

**UNIT 2: HYDRO AND NUCLEAR POWER STATIONS (9)**

Selection of site - classification - layout - description of main components: penstock, surge tank, forebay, types of turbines. Run off river plant with and with outpondage. Advantages and disadvantages.

**UNIT 3: NUCLEAR POWER STATIONS (9)**

Nuclear Fission and chain Reaction-Nuclear Fuels-Principle of Operation of Nuclear Reactor- Reactor Components: Moderators - Control Rods - Reflectors and Coolents-Radiation Hazards: Shielding and Safety precautions-Types of Nuclear Reactors and Brief Description of PWR - BWR and FBR.

**UNIT 4: BASICS OF SOLAR AND WIND ENERGY (9)**

Role and Potential of Solar Energy Options - Principles of Solar Radiation - Flat plate and Concentrating Solar Energy Collectors - Different methods of Solar energy Storage- Solar applications: Heating Energy - Cooling - Distillation and Drying-Economic aspects. Role and Potential of wind energy, horizontal vertical axis wind mills- performance characteristics- Betz criterion-applications.

**UNIT 5: ECONOMIC ASPECTS OF POWER GENERATION AND TARIFF METHODS (9)**

Load Curve- Load duration and integrated load duration curves-Load - Demand- Diversity - Capacity - Utilization and Plant Use factors- Numerical Problems - Costs of generation and their division into Fixed-Semi-fixed and Running Costs. Desirable characteristics of a tariff method-Tariff method: Flat rate- Block-Rate -Two-Part - Three-Part and Power factor Tariff methods and Numerical Problems.

**TOTAL HOURS: 45**



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**COURSE OUTCOMES:**

<b>On successful completion of the course the student will be</b>		<b>POs</b>
<b>CO1</b>	Able to understand working of thermal power plant	PO1, PO2, PO3, PSO12
<b>CO2</b>	Able to understand working of hydro power station	PO1, PO2, PO3, PSO12
<b>CO3</b>	Able to understand working of Nuclear power station.	PO1, PO2, PO3, PSO12
<b>CO4</b>	Implement the design development of solar and wind energy	PO1, PO2, PO3, PO12
<b>CO5</b>	Able to understand the methods of tariffs.	PO1, PO2, PO3, PO12

**TEXT BOOKS:**

1. A Text Book on Power System Engineering-1/e 1998 M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakrabarthy - DhanpatRao and Co Pvt. Ltd - New Delhi.
2. Non-Conventional Energy Sources-2/e Edition 2002 G.D.Rai - Khanna publishers - New Delhi.

**REFERENCE BOOKS:**

1. Principles of Power systems, 4/e 2005, V.K.Mehta, S.Chand Publications - New Delhi.
2. Generation of Electrical Energy, 6/e 2010, B.R. Gupta, S.Chand Publications - New Delhi.
3. Generation, Distribution and Utilization of Electrical Energy, 3/e 2011, C.L.Wadhwa, New Academic Science - England - New Delhi.
4. A Course in Power Systems, 11/e 2013, J.B.Gupta, S.K.Kataria and Sons - New Delhi.
5. Power Generation handbook, 2/e, 2013, Philip Kiameh, Tata Mcgraw Hill Publishing Co Ltd - New Delhi.

**REFERENCE WEBSITE**

<https://nptel.ac.in/courses/108/102/108102047/>  
<https://nptel.ac.in/courses/112/107/112107291/>

**CO-PO MAPPING**

<b>CO-PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO3</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO4</b>	3	2	-	2	-	-	-	-	-	-	-	-
<b>CO5</b>	3	2	2	-	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>								



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – II Semester**

**20ESC115**

**PROGRAMMING WITH PYTHON  
(Common to All Branches)**

**L T P C  
2 1 0 3**

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

- 1:** To impart the basics of python and its IDEs.
- 2:** To understand the basic data structure in python.
- 3:** To familiarize with python GUI and files.
- 4:** To develop broad understanding of various object-oriented concepts in python.
- 5:** To introduce the python libraries for solving real-time problems.

**UNIT 1: BASICS OF PYTHON**

**(9)**

**Python programming language:** About Python- Introduction to various IDEs- IDLE- PyCharm, Spyder- Sublime text- Jupyter Notebook.

**Literals:** Numeric literals - String literals- Variables and Identifiers: Variable assignment and keyboard input – Identifiers - keywords and other predefined identifiers.

**Control Structures:** Sequential control- Selection control- Iterative control statements.

**UNIT 2: LISTS, DICTIONARIES AND SETS**

**(9)**

**Lists:** List structures - Common list operations - List traversal - Lists in Python - Python list type –Tuples – sequences - Nested lists - Iterating over lists in python.

**Dictionaries and Sets:** Dictionary types in Python - Set data type- Strings and its operations.

**UNIT 3: FUNCTIONS AND TEXT FILES**

**(9)**

**Functions:** Function declaration- Category of Functions- Parameter Passing -Keyword Arguments in Python - Default Arguments in Python - Variable Scope, Lambda function.

**Files:** Fundamentals – opening, reading and writing text files, .csv and .xlsx files.

**UNIT 4: OBJECT-ORIENTED CONCEPTS USED IN PYTHON**

**(9)**

Features of object-oriented programming-Fundamental concepts- Class- Encapsulation- Inheritance- Polymorphism. Object references - Turtle graphics - creating a Turtle Graphics Window - the "Default" Turtle - Fundamental Turtle Attributes and Behavior - Additional Turtle Attributes - Creating Multiple Turtles.

**UNIT 5: INTRODUCTION TO PYTHON LIBRARIES**

**(9)**

Python Libraries- Introduction to Libraries- Creating and Exploring Packages-Numpy, SciPy, matplotlib, Pandas, Scikit-learn- seaborn.

**Total hours: 45**

**COURSE OUTCOMES:**

<b>On successful completion of the course the student will be able to,</b>		<b>POs</b>
<b>CO1</b>	Identify and apply the appropriate control statements for solving problems.	<b>PO1, PO2, PO5</b>
<b>CO2</b>	Demonstrate knowledge of basic data structures and functions.	<b>PO1, PO3, PO4</b>
<b>CO3</b>	Analyse and apply the appropriate file handling mechanism.	<b>PO1, PO2, PO5</b>
<b>CO4</b>	Identify and implement the suitable object-oriented concepts.	<b>PO1, PO2, PO5</b>
<b>CO5</b>	Evaluate the real-world problems using python packages.	<b>PO1, PO4, PO5</b>



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**TEXT BOOKS:**

1. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus", Wiley India Edition, 2016.
2. John V. Guttag., "Introduction to computation and programming using python: with applications to understanding data", PHI Publisher, 2016.
3. John Hunt, "A Beginners Guide to Python 3 Programming", Springer Publisheers, 2020.

**REFERENCES:**

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", SecondEdition,Shroff/O'ReillyPublishers,(<http://greenteapress.com/wp/thinkpython/>), 2016
2. Charles Severance, "Python for everybody: exploring data in Python 3", Creative Commons Attribution-Non Commercial Share Alike 3.0 Unported License, 2016.

**REFERENCE WEBSITES:**

1. [https://onlinecourses.swayam2.ac.in/aic20\\_sp33](https://onlinecourses.swayam2.ac.in/aic20_sp33)
2. [https://onlinecourses.nptel.ac.in/noc22\\_cs32](https://onlinecourses.nptel.ac.in/noc22_cs32)
3. <https://spoken-tutorial.org>
3. <https://www.w3schools.com/python>.
4. <https://www.geeksforgeeks.org>.

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	3	-	-	2	-	-	-	-	-	-	-
<b>CO2</b>	3	-	3	2	-	-	-	-	-	-	-	-
<b>CO3</b>	3	3	-	-	2	-	-	-	-	-	-	-
<b>CO4</b>	3	3	-	-	2	-	-	-	-	-	-	-
<b>CO5</b>	3	-	-	2	2	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>							



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – II Semester**

<b>20HSM112</b>	<b>COMMUNICATIVE ENGLISH LANGUAGE LAB</b> <b>(Common to All Branches)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To provide Knowledge on developing Soft Skills and its techniques.
2. To understand Knowledge on the use of technology for giving Presentations.
3. To apply gained information in Preparing Resume.
4. To analyze the use of body language while participating in Group Discussions.
5. To execute the complete knowledge on facing Job Interviews.

**LIST OF TOPICS:**

1. Introduction and importance of Soft Skills
2. Attributes of Soft Skills
3. Categories of Soft Skills- (Social, Thinking, Negotiating)
4. Exhibiting, Identifying, and Improving your Soft Skills
4. Acquiring Soft Skills (Train yourself)
5. Soft Skills practicing tips
6. Power Point presentation on Scientific/Technical Topics.
7. Designing a Resume
8. Resume Styles
9. Preparing Model Resumes
10. Group Discussion
11. Group Discussion strategies
12. Mock GDs.
13. Job Interviews
14. Interview Techniques
15. Model Interview questions – Mock Interview



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**COURSE OUTCOMES:**

At the end of the course, students will able to		Pos
<b>CO1</b>	Remembering the concepts on developing Soft Skills and its techniques. (Topics from 1 to 5)	<b>PO1</b>
<b>CO2</b>	Understand and Develop Knowledge on the use of technology in giving presentations. (Topic No:6)	<b>PO5</b>
<b>CO3</b>	Apply one's skills in Preparing a Resume before applying for a job.(Topic 7 to 9)	<b>PO6</b>
<b>CO4</b>	Analyze and execute body language while participating in Group Discussions. (Topics 10 to 12)	<b>PO2</b>
<b>CO5</b>	Evaluate by weighing one's communicative skills in facing Job Interviews through Mock Interviews. (Topics 13 to 15)	<b>PO10</b>

**SOFT WARE SUGGESTED:** Walden –Hyderabad.

**REFERENCES:**

1. Dr.K.Alex,"Soft Skills- Know yourself and know the world", S. Chand Publications, New Delhi, 2010
2. T.Vijayakumar, K.Durga Bhavani,English in Action 1<sup>st</sup> Edition, 2019, Mac millan Publications, Guntur.
3. Rout ledge, "Bailey Stephen Academic Writing – A Hand book for international students", 2014.
4. Chase, Becky Tarver," Pathways: Listening, Speaking and Critical Thinking. Heinley ELT", 2e/ 2018.
5. Hewings, Martin, "Cambridge Academic English (B2)". CUP, 2012

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	-		-	-	-	-	-	-	-	-	-
<b>CO2</b>	-	-		-	3	-	-	-	-	-	-	-
<b>CO3</b>	-	-	-	-	-	3	-	-	-	-	-	-
<b>CO4</b>	-	3	-	-	-	-	-	-	-	-	-	-
<b>CO5</b>	-	-	-	-	-	-	-	-	-	3	-	-
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>



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**I B.Tech. – II Semester**

**20EEE123**

**ELECTRICAL CIRCUIT ANALYSIS LAB**

L	T	P	C
0	0	3	1.5

**PRE-REQUISITES: Nil**

**COURSE OBJECTIVES:**

- 1:** Gain practical experience on fundamental electric laws.
- 2:** Gain practical experience on verification of theorems.
- 3:** Evaluate the phase angle of RLC circuits practically.
- 4:** Introduce the practical approach on identifying the resonance circuits
- 5:** Evaluate the key parameters of mutually coupled coils through experimentation.

**ANY TEN OF THE FOLLOWING**

1. Verification of KCL and KVL.
2. Mesh & Nodal Analysis
3. Verification of Thevenin's Theorem.
4. Verification of Norton's Theorem.
5. Determination of Self, Mutual Inductances and Coefficient of Coupling.
6. Verification of Superposition Theorem.
7. Verification of Maximum Power Transfer Theorem.
8. Series and Parallel Resonance for RLC Circuit.
9. Verification of Compensation Theorem.
10. Verification of Reciprocity Theorem.
11. Verification of Millman's Theorem.
12. Verification of Tellegen's Theorem.
13. Phase Angle Calculation of RL, RC and RLC Circuits
14. Phase Angle Calculation of Parallel RL, RC and RLC Circuits.

**COURSE OUTCOMES:**

<b>At the end of the course, students will able to</b>		<b>POs</b>
<b>CO1</b>	Understand the fundamental electrical laws in engineering applications.	<b>PO1</b>
<b>CO2</b>	Verify different network theorems practically.	<b>PO2</b>
<b>CO3</b>	Design electrical circuits for measuring complicated electrical parameters.	<b>PO3</b>
<b>CO4</b>	Approach the electrical circuits practically for identifying the resonance condition.	<b>PO4</b>
<b>CO5</b>	Evaluate the self-inductance, mutual inductance and coefficient of coupling of mutually coupled coils through experimentation.	<b>PO4</b>
<b>CO6</b>	Follow the ethical principles in implementing the experiments.	<b>PO8</b>
<b>CO7</b>	Do experiments effectively as an individual and as a team	<b>PO9</b>



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	member in a group.	
<b>CO8</b>	Communicate verbally and in written form, the understanding about the experiments.	<b>PO10</b>
<b>CO9</b>	Continue updating their skill related to electrical circuits	<b>PO12</b>

**TEXT BOOKS:**

1. A Text Book on Power System Engineering-1/e 1998M.L.Soni, P.V.Gupta ,U.S.Bhatnagar and A.Chakrabarthy - DhanpatRao and Co Pvt. Ltd - New Delhi.
2. Non-Conventional Energy Sources-2/e Edition 2002 G.D.Rai - Khanna publishers - New Delhi.

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/108/104/108104139/>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	-	3	-	-	-	-	-	-	-	-	-	-
<b>CO3</b>	-	-	3	-	-	-	-	-	-	-	-	-
<b>CO4</b>	-	-	-	3	-	-	-	-	-	-	-	-
<b>CO5</b>	-	-	-	3	-	-	-	-	-	-	-	-
<b>CO6</b>	-	-	-	-	-	-	-	3	-	-	-	-
<b>CO7</b>	-	-	-	-	-	-	-	-	3	-	-	-
<b>CO8</b>	-	-	-	-	-	-	-	-	-	3	-	-
<b>CO9</b>												3
<b>CO*</b>	<b>3</b>	<b>3</b>	3	<b>3</b>	-	-	-	<b>3</b>	<b>3</b>	<b>3</b>		<b>3</b>





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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – II Semester**

<b>20ESC118</b>	<b>PROGRAMMING WITH PYTHON LAB (Common to All Branches)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

- 1: To understand the basic IDEs in python.
- 2: To gain expertise for problem solving using control structures in python
- 3: To develop the python programs using functions.
- 4: To solve various engineering problems using different data structures.
- 5: To gain knowledge on python libraries.

**RECOMMENDED SYSTEMS/SOFTWARE REQUIREMENTS:**

- For Windows: IDLE/ Spyder python development environment.
- For Linux: Default python version installed/ higher version.

**LIST OF TASKS:**

**TASK-1: BASICS**

- a) Develop a simple python scripts to illustrate numeric literals and string literals.
- b) Write a Python Program to Convert Kilometres to Miles

**TASK-2: LOOPS**

- a) Write a python Program to Make a Simple Calculator
- b) Write a python program that reads a rating from the user and indicates whether the performance was unacceptable, acceptable or meritorious. The amount of the employee's raise should also be reported. Your program should display an appropriate error message if an invalid rating is entered. (The amount of an employee's raise is \$2400.00 multiplied by their rating).

Rating	Meaning
0.0	Unacceptable performance
0.4	Acceptable performance
0.6 or more	Meritorious performance

**TASK-3: LOOPS**

- a) Write a program containing a pair of nested while loop that displays the integer values 1–100. Ten numbers per row - with the columns aligned as shown below

```
1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
```

.  
.

```
91 92 93 94 95 96 97 98 99 100
```

- b) Display the integer values 1–100 as given in question 3a) using only *one* while loop.

**TASK-4: DICTIONARIES**

- a) Write a Python script to generate all the possible spellings of the last four digits of any given phone number – use Dictionaries.

**TASK-5: STRINGS**

- a) Write a program to figure out if the register number format is correct or not using a Python code. (Hint: sample register number format- 20751A0500). Use string methods to solve the above problem.



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**TASK-6: FUNCTIONS**

- a) Write a function that generates a random password. The password should have a random length of between 7 and 10 characters. Each character should be randomly selected from positions 33 to 126 in the ASCII table. Your function will not take any parameters. It will return the randomly generated password as its only result. Display the randomly generated password in your file's main program. Your main program should only run when your solution has not been imported into another file.

**TASK-7: PATTERN PRINTING**

- a) Write a python program to print half pyramid pattern with star (asterisk)

```
*
* *
* * *
* * * *
* * * * *
```

- b) Write a python program to print the characters/alphabets in right-angled triangle pattern.

```
A
B C
D E F
G H I J
K L M N O
P Q R S T U
V W X Y Z
```

**TASK-8: TURTLE**

- a) Write a python program to draw the basic shapes using turtle (Hint: Square, circle, triangle).

**TASK-9: FILES**

- a) Write a python script to create a simple text file. Write the contents into the created file and read the contents from the file and display the same on to the console screen.  
b) Write a python script to Create and write on excel file using `xlsxwriter` module.  
c) Write a python script to write the contents into a csv file.

**TASK 10: FILE HANDLING**

Write a python program to perform the following tasks:

- a) Copy the contents of one file into another file.  
b) Count number of lines in a file.  
c) Count number of characters in a file.  
d) Count number of words in a file.

**TASK 11: INHERITANCE**

- a) Write a python program to illustrate the inheritance concept.

**TASK-12: MATH LIBRARIES**

- a) Write a python program to calculate area of a circle. Use the pi constant in the math module in your calculations. (of the circle =  $\pi r^2$  )  
b) Write a python program to calculate Volume of a sphere. Use the pi constant in the math module in your calculations. (ie of a sphere =  $\frac{4}{3} \pi r^3$  ).

**TASK-13: PANDAS**

- a) Write a Pandas program to create a line plot of the historical stock prices of a company between two specific dates.

**TASK-14: PANDAS**

- a) Write a Pandas program to create a bar plot of the trading volume of a company stock between two specific dates.



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**COURSE OUTCOMES:**

<b>On successful completion of this course the students should be able to:</b>		<b>POs</b>
<b>CO1</b>	Learn various problem solving approaches and ability to identify an appropriate approach to solve the problem	<b>PO1, PO2, PO3, PO5</b>
<b>CO2</b>	Implement conditionals and loops to design the python programming	<b>PO1, PO2, PO3, PO5</b>
<b>CO3</b>	Implement lists, set, tuples and dictionaries to develop python program.	<b>PO1, PO2, PO3, PO5</b>
<b>CO4</b>	Able to modulate the given problem using structural approach of programming	<b>PO1, PO2, PO3, PO5</b>
<b>CO5</b>	Build Python Programs using packages to solve real-time problems.	<b>PO1, PO2, PO3, PO4, PO5</b>
<b>CO6</b>	Follow the ethical principles in implementing the programs	<b>PO8</b>
<b>CO7</b>	Do experiments effectively as an individual and as a team member in a group.	<b>PO9</b>
<b>CO8</b>	Communicate verbally and in written form, the understanding about the experiments.	<b>PO10</b>
<b>CO9</b>	Continue updating their skill related to lists, tuples and dictionaries implementing programs in future.	<b>PO12</b>

**REFERENCE BOOKS:**

1. John V. Guttag., "Introduction to computation and programming using python: with applications to understanding data", PHI Publisher, 2016.
2. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus", Wiley India Edition, 2016.
3. John Hunt, "A Beginners Guide to Python 3 Programming", Springer Publisheers, 2020.

**REFERENCE WEBSITES:**

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2. [https://onlinecourses.nptel.ac.in/noc22\\_cs32](https://onlinecourses.nptel.ac.in/noc22_cs32)
3. <https://spoken-tutorial.org>
4. <https://www.w3schools.com/python.>
5. <https://www.geeksforgeeks.org.>

**CO-PO Mapping:**

<b>CO-PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	3	3	-	2	-	-	-	-	-	-	-
<b>CO2</b>	3	3	3	-	2	-	-	-	-	-	-	-
<b>CO3</b>	3	3	3	-	2	-	-	-	-	-	-	-
<b>CO4</b>	3	3	3	-	2	-	-	-	-	-	-	-
<b>CO5</b>	3	3	3	3	2	-	-	-	-	-	-	-
<b>CO6</b>	-	-	-	-	-	-	-	3	-	-	-	-
<b>CO7</b>	-	-	-	-	-	-	-	-	3	-	-	-
<b>CO8</b>	-	-	-	-	-	-	-	-	-	3	-	-
<b>CO9</b>	-	-	-	-	-	-	-	-	-	-	-	3
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	-	-	<b>3</b>	<b>3</b>	<b>3</b>		<b>3</b>



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STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech. – II Semester**

**20MAC121**

**HUMAN VALUES AND ETHICS  
(Mandatory Audit Course)**

**L T P C  
2 0 0 0**

**PRE-REQUISITES: Nil**

**COURSE EDUCATIONAL OBJECTIVES:**

- 1:** To provide Knowledge in remembering Human Values.
- 2:** To understand about Human Esteem.
- 3:** To apply basic guidelines on Value Education.
- 4:** To analyze the concepts of Happiness and Prosperity.
- 5:** To evaluate the value of one's body as an instrument.

**UNIT 1: HUMAN VALUES**

**(9)**

Morals – Values – Ethics – Human Values – Integrity - Work Ethic – Service – Learning – Civic Virtue

**UNIT 2: HUMAN ESTEEM**

**(9)**

Respect for others – living peacefully – Caring – Sharing – Honesty – Courage – Valuing Time – Cooperation – Commitment – Empathy – Self Confidence – Character – Spirituality

**UNIT 3: VALUE EDUCATION.**

**(9)**

Understanding the need – Basic guidelines – content and process for value education – self exploration –its content and process – Natural acceptance and experiential validation as the mechanism for self exploration.

**UNIT 4: HAPPINESS AND PROSPERITY**

**(9)**

Continuous Happiness and Prosperity – Basic Human aspirations – right understanding – relationship and physical facilities – the basic requirements for fulfillment of aspirations.

**UNIT 5: UNDERSTANDING THE BODY**

**(9)**

Understanding the body as an instrument of 'I' ('I' being the doer, seer, and enjoyer) – understanding Harmony in the family – the basic unit of human interaction..

**TOTAL HOURS: 45**

**COURSE OUTCOMES:**

<b>On successful completion of the course the student will be</b>		<b>Pos</b>
<b>CO1</b>	Remember the concepts on developing Human Values and Ethics.	<b>PO1</b>
<b>CO2</b>	Understand and Develop Knowledge on Human Esteem.	<b>PO8</b>
<b>CO3</b>	Apply basic guidelines on Value Education	<b>PO3,PO6</b>
<b>CO4</b>	Analyze and follow How to maintain happiness and Prosperity.	<b>PO4</b>
<b>CO5</b>	Evaluate the Value of Oneself as an Instrument.	<b>PO4</b>



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**REFERENCES:**

- 1:** R.S. Naagarazan, "A Text Book on Professional Ethics and Human Values", New age International Publishers, New Delhi, 2014
- 2:** Jayshree Suresh & B.S.Raghavan, "Human Values and Professional Ethics", S. Chand & Company, New Delhi, 2010
- 3:** R.R Gaur, R Sangal, G P Bagaria, "The text book, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010.
- 4:** R.R Gaur, R Sangal, G P Bagaria, "The teacher's manual, A foundation course in Human Values and professional Ethics – Teachers Manual", Excel books, New Delhi, 2010.

**REFERENCE WEBSITE:**

1. <https://www.vlab.co.in/broad-area-electronics-and-communications>
2. <https://nptel.ac.in/courses/122/106/122106025>
3. <https://nptel.ac.in/courses/117/103/117103063>

**CO-PO MAPPING:**

<b>CO-PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	-	-	-	-	-	-	-	3	-	-	-	-
<b>CO3</b>	-	-	3	-	-	3	-	-	-	-	-	-
<b>CO4</b>	-	-	-	3	-	-	-	-	-	-	-	-
<b>CO5</b>	-	-	-	3	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>		<b>3</b>	<b>3</b>		<b>3</b>		<b>3</b>				



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech- III Semester**

<b>20BSC232</b>	<b>SPECIAL FUNCTIONS AND COMPLEX ANALYSIS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to EEE and ECE Branches)</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES:** A Course on Algebra & Calculus, Differential equations & Transform Technique

**COURSE EDUCATIONAL OBJECTIVES:**

1. To learn Gamma, Beta & Bessel functions, their properties and applications.
2. To analyze the functions of complex variable with a review of elementary complex Functions and to learn continuity, differentiability and analyticity of a complex function.
3. To learn conformal mapping & Bilinear Transformation of complex functions.
4. To understand the Taylor and Laurent expansion with their use in finding out the residue and improper integral.
5. To learn complex integration and applications to real integrals.

**UNIT - 1: SPECIAL FUNCTIONS (9)**

Beta and Gamma functions – Properties (without proof) - Evaluation of Integrals(Simple examples) Bessel Function - Generating function (without proof) - Recurrence Relations - Orthogonality.

**UNIT - 2: COMPLEX FUNCTIONS (9)**

Functions of a complex variable - Elementary functions: Exponential, Trigonometric, Hyperbolic and Logarithmic functions and their properties. Continuity - Differentiability - Analyticity – Properties - Cauchy-Riemann equations in Cartesian and polar coordinates - Harmonic and conjugate harmonic functions - Milne-Thompson method.

**UNIT - 3: CONFORMAL MAPPING AND BILINEAR TRANSFORMATION (9)**

Conformal Mapping: Definitions - Transformation by  $e^z$ ,  $\ln z$ ,  $z^2$ ,  $\sin z$ ,  $\cos z$  - Translation - Rotation - Inversion and Bilinear transformation - Fixed point - Cross ratio - Determination of bilinear transformation.

**UNIT - 4: COMPLEX INTEGRATION AND COMPLEX POWER SERIES (9)**

**Complex Integration:** Line integral - Evaluation along curves and closed contours - Cauchy's theorem, Cauchy's integral formula & Generalized Cauchy's integral formula (without proof).

**Complex Power Series:** Taylor's and Laurent series expansions of complex functions - Singular point - Isolated singular point - Pole of order m - Essential singularity.

**UNIT - 5: RESIDUE CALCULUS (9)**

Residue - Evaluation of residue by formula - Residue theorem (without proof) - Evaluation of integrals using residue theorem - Evaluation of improper and real integrals of the type

$$(a) \int_{-\infty}^{+\infty} f(x)dx \quad (b) \int_c^{c+2\pi} f(\cos \theta, \sin \theta)d\theta \quad (c) \int_{-\infty}^{\infty} e^{imx} f(x)dx$$

**Total Hours: 45**



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

<b>On successful completion of the course, students will be able to</b>		<b>POs</b>
<b>CO1</b>	Demonstrate knowledge in Gamma, Beta functions and Bessel functions and develop analytical skills in providing solutions for problems involving real integrals using Gamma and Beta functions	PO1,PO2,PO3
<b>CO2</b>	Demonstrate knowledge in the theory of functions of one complex variable develop in continuity and differentiability of a complex function and write Cauchy-Riemann equations to describe the analyticity of complex functions	PO1,PO2,PO3
<b>CO3</b>	Demonstrate knowledge in conformal mappings and bilinear transformations and develop skills in analyzing the properties exhibited by complex functions in Argand plane	PO1,PO2
<b>CO4</b>	Demonstrate knowledge in integration of complex functions and develop analytical skills in providing solutions for problems involving integration of complex functions and develop skills in analyzing the properties of complex functions by expressing them in power series	PO1,PO2
<b>CO5</b>	Develop analytical skills in providing solutions for problems involving improper real integrals and develop skills in analyzing properties of improper integrals through residue theory	PO1,PO2,PO3

**TEXT BOOKS:**

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. "Engineering Mathematics – III" Prasad Engineering Mathematics – III,, S. Chand and Company Publishers, Delhi,2013.
2. Higher Engineering Mathematics, 34/e, 1999, Dr. B. S. Grewal, Khanna Publishers, Delhi

**REFERENCE BOOKS:**

1. B.V. Ramana," Engineering Mathematics for JNTU" Tata McGraw Hill Publishers, New Delhi, 3/e, 2008.
2. Murray R. Spiegel, Theory and Applications of Complex Variables,Schaum's outline series, McGraw-Hill Book Company, Singapore,1981.
3. Dr. M. K. Venkata Ramana, "Higher Engineering Mathematics" National Pub, Madras.
4. N.P.Bali, "A Text Book of Engineering Mathematics" Laxmi publications (P)Ltd, New Delhi,201.
5. E. Rukmangadachari, E. Keshava Reddy, "Engineering Mathematics", Volume – III , 2013, Pearson Education, Chennai.

**REFERENCE WEBSITE:**

1. <https://youtu.be/JOfnCCNj4gQ>
2. <https://youtu.be/b5VUnapu-qs>
3. <https://youtu.be/ceYSD97IILk>
4. <https://youtu.be/snZ6mmJ-4Ew>
5. <https://youtu.be/Mpmlk1H1aQo>

**CO-PO MAPPING:**

<b>CO/PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO.1</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO.2</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO.3</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO.4</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO.5</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>2</b>									



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech- III Semester**

<b>20ESC231</b>	<b>FLUID MECHANICS AND MACHINERY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to MECH and EEE Branches)</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES:** Nil

**COURSE EDUCATIONAL OBJECTIVES:**

1. To understand the properties of fluids and concept of kinematic of flow.
2. To study the applications of the conservation laws to flow through pipes.
3. To understand the importance of dimensional analysis and basics of turbo machinery.
4. To understand the importance of various types of flow in turbines.
5. To understand the importance of various types of flow in pumps.

**UNIT –1: PROPERTIES OF FLUIDS, BUOYANCY AND KINEMATICS OF FLOW (9)**

**Properties of Fluids:** Fluid properties – Compressibility, surface tension and capillarity.  
**Pressure Measurements:** Variation of static pressure – Atmospheric, absolute, gauge and vacuum pressure – Pressure measurements – Piezometer, U-tube and differential manometers.  
**Buoyancy and Floatation:** Concepts of buoyancy, buoyancy force, center of buoyancy, meta center and meta centric height (theory only). **Kinematics of Flow:** Principles of fluid flow – Types of fluid flow – Rate of flow – Continuity equation.

**UNIT –2: DYNAMICS OF FLUID FLOW AND FLOW THROUGH PIPES (9)**

**Dynamics of Fluid Flow:** Equations of motion – Euler’s equation – Bernoulli’s equation for real fluid – Application of Bernoulli’s equation in venturimeter, orifice meter and pitot tube. **Boundary Layer Theory:** Boundary layer characteristics – Boundary layer, displacement, momentum and energy thickness (Basics only). **Forces on Submerged bodies:** Expression for Drag and Lift – Drag on a sphere. **Flow Through Pipes:** Reynold’s experiment – Loss of energy in pipes – Darcy’s Weisbach equation and Chezy’s formula – Minor energy losses – Pipes in series and parallel – Equivalent pipe.

**UNIT –3: DIMENSION ALANALYSIS AND TURBOMACHINERY (9)**

**Dimensional Analysis:** Dimensions – Dimensional homogeneity – Rayleigh method – Buckingham n-method – Selection of repeating variables – Model analysis – Similitude and similarities – Forces acting in moving fluid – Dimensionless numbers – Similarity laws – Model testing of partially submerged bodies – Distorted and undistorted models. **Basics of Turbo Machinery:** Force exerted by the jet on a stationary and moving of flat, inclined and curved – Jet on a hinged plate – Jet striking centrally and at tip of curved plate.

**UNIT –4: HYDRAULICTURBINES (9)**

**Hydraulic Turbines:** Classification of hydraulic turbines – Heads and efficiencies – Working principles of Pelton wheel, Francis turbine and Kaplan turbine – Velocity triangle diagrams, work done, heads and efficiencies – Draft tube - Unit quantities and specific speed –Characteristics curves –Governing of turbines –Water hammer –Surge tank.

**UNIT –5: HYDRAULIC PUMPS (9)**

**Centrifugal Pumps:** Principles of working – Work done – Heads and efficiencies – Minimum starting speed – Multi stage centrifugal pump – Specific speed – Model testing – Priming – Characteristics curves – Cavitations – Suction height – NPSH. **Reciprocating Pumps:** Principles of working – Slip – Work saved by fitting air vessels.

**Total Hours: 45**





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STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to		POs
<b>CO1</b>	Apply mathematical knowledge to predict the properties and characteristics of a fluid, analysis.	<b>PO1, PO2, PO12</b>
<b>CO2</b>	Demonstrate knowledge and understanding the basic equations of fluid flows, compute drag and lift coefficients and solve problems in flow of fluids	<b>PO1, PO2, PO3, PO4, PO12</b>
<b>CO3</b>	Analyze the model and the prototype using dimensional analysis and force exerted in turbo machinery.	<b>PO1, PO2, PO3, PO4, PO12</b>
<b>CO4</b>	Design the working proportions of hydraulic turbines and analysis to improve the performances.	<b>PO1, PO2, PO3, PO4, PO12</b>
<b>CO5</b>	Analyze to improve the performance of pumps and ability to engage in independent.	<b>PO1, PO2, PO3, PO4, PO12</b>

**TEXT BOOKS:**

1. Hydraulics and Fluid Mechanics, "P.N. Modi and S.M. Seth", Standard Book House, Delhi, 18/e, 2011.
2. Fluid Mechanics, "Yunus A. Cengel and John Cimbala", McGraw Hill Education Private Ltd., 2017.

**REFERENCE BOOKS:**

1. Bruce R. Munson, Donald F. Young, Theodore H. Okiishi, "Fundamentals of Fluid Mechanics", McGraw Hill, New York, 5/e, 2008.
2. S.K. Som and G. Biswas, "Introduction to Fluid Machines", Tata McGraw-Hill Education, Pvt. Ltd., Noida, 2/e, 2010.
3. R.K. Bansal, "Fluid Mechanics and Hydraulic Machines", Laxmi Publications (P) Ltd., 10/e, 2018.
4. A.K. Jain, "Fluid Mechanics", Khanna Publishers, New Delhi, 11/e, 2012.
5. R.K. Rajput, "Fluid Mechanics and Hydraulic Machinery", S. Chand & Company, Pvt. Ltd., New Delhi, 4/e, 2010.

**REFERENCE WEBSITE:**

1. <https://nptel.ac.in/courses/112/105/112105171/>
2. <https://nptel.ac.in/courses/112/105/112105287/>
3. <https://nptel.ac.in/courses/105/103/105103192/>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO.1</b>	3	2	-	-	-	-	-	-	-	-	-	1
<b>CO.2</b>	3	2	1	1	-	-	-	-	-	-	-	1
<b>CO.3</b>	3	2	1	1	-	-	-	-	-	-	-	1
<b>CO.4</b>	3	2	1	1	-	-	-	-	-	-	-	1
<b>CO.5</b>	3	2	1	1	-	-	-	-	-	-	-	1
<b>CO*</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	-	-	-	-	-	-	-	<b>1</b>





**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**TEXT BOOKS:**

1. J. Millman, C. Halkias, "Electronic Devices and Circuits"- Tata Mc-Graw Hill, Second Edition.
2. Jacob Millman, C. Halkies, C.D.Parikh, "Integrated Electronics"- Tata Mc-Graw Hill, 2009.

**REFERENCES:**

1. K. Satya Prasad "Electronic Devices and Circuits"-, VGS Book Links.
2. Salivahanan, Kumar, Vallavaraj "Electronic Devices and Circuits"-, Tata Mc-Graw Hill, Second Edition
3. David Bell, "Electronic Devices and Circuits", Oxford Press.

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	2	-	-	-	-	-	-	-	-	-
CO.3	3	3	2	2	-	-	-	-	-	-	-	-
CO.4	3	3	2	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	3	2.8	2	2	-	-	-	-	-	-	-	-



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech- III Semester**

<b>20ECE237</b>	<b>SWITCHING THEORY AND LOGIC DESIGN</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**COURSE EDUCATIONAL OBJECTIVES:**

**1:** To Provide Knowledge On

- Fundamentals of Digital logic design, Different Types Of Number Systems
- Conversions Of Number Systems, Arithmetic And Logical Operations, Weighted and Non Weighted Codes.
- Differences between Boolean And Ordinary Algebra and Minimization of Switching Functions Using Boolean Algebra.

**2:** To develop skill to minimize switching functions in effective way using K-MAP

**3:** To develop skill to design combinational logic circuits and realize the design using PLD's.

**4:** To provide knowledge on memory elements and develop skill to design sequential circuits.

**5:** To develop the skill to design and analyze finite state machines of different models.

**UNIT - 1: NUMBER SYSTEMS & CODES (9)**

Review of Number Systems- Binary Arithmetic-Subtraction with  $r$  and  $(r-1)$ 's Complements- Weighted & Non Weighted Codes- Error Detection and Error Correction Codes- Hamming Code.

**Boolean Algebra :** Boolean Theorems-Basic Logic Operations (NOT,OR,AND)-Complement and Dual of Logical Expressions- Universal Gates- EX-OR & EX-NOR Gates- Standard SOP and POS-Minimization of Logic Functions using Theorems.

**UNIT – 2: MINIMIZATION OF SWITCHING FUNCTIONS (9)**

Minimization of Switching Functions using K-Map upto 6 variables- Minimal SOP and POS Realization-Problem Solving using K-Map for Boolean Functions in SOP and POS Forms.

**UNIT – 3: COMBINATIONAL LOGIC CIRCUITS & PLD'S (9)**

Design of Half Adder - Full Adder - Half Subtractor- Full Subtractor- 4-Bit Binary Adder-4-Bit Adder Subtractor- BCD Adder-Carry Look Ahead Adder -Magnitude Comparator – Decoder- Encoder- Multiplexer – De Multiplexer.

**PLDS:**PROM – PLA – PAL ,Realization of Switching Functions using PROM - PLA and PAL - Comparison of PROM, PLA, and PAL.

**UNIT- 4: SEQUENTIAL CIRCUITS-I (9)**

Classification of Sequential Circuits (Synchronous And Asynchronous)-Basic Latches & Flip Flops-SR,D,JK,T –Conversion between Flip Flops- Design of Synchronous and Asynchronous Counters-Design of Shift Registers-Universal Shift Register. Design of Synchronous and Asynchronous Counters.

**UNIT – 5: SEQUENTIAL CIRCUITS –II (9)**

Finite State Machine - Capabilities and Limitations- Analysis of Clocked Sequential Circuits- Design Procedures- Reduction of State Tables and State Assignment-Realization of Circuits Using Various Flip flops - Mealy and Moore State Machines. Introduction to ASM Charts with Examples

**Total Hours: 45**



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

On successful completion of the course the student will be able to,		POs
<b>CO1</b>	Demonstrate knowledge on types and conversion of number systems, Error Detection and Error Correction arithmetic and logical operations of different radix and applying boolean algebra for switching functions reduction.	<b>PO1, PO2</b>
<b>CO2</b>	Identify the most efficient grouping to minimize the switching functions using k-map.	<b>PO1,PO2</b>
<b>CO3</b>	Design the combinational logic circuits and realize the PLD's for given specifications.	<b>PO1,PO2,PO3</b>
<b>CO4</b>	Understand the knowledge on latches and flip flops and design the sequential logic circuits.	<b>PO1,PO2,PO3</b>
<b>CO5</b>	Analyze and design finite state machines of different models by implementing state tables and state diagrams and Become familiarize with ASM.	<b>PO1,PO2,PO3,PO4</b>

**TEXT BOOKS:**

1. Morris Mano "Digital Design", 3/e, Prentice Hall of India, New Delhi, 2006.
2. Thomas L. Floyd "Digital Fundamentals", 10/e, Pearson/Prentice Hall, New Delhi, 2008.

**REFERENCE BOOKS:**

1. Charles H. Roth "Fundamentals of Logic Design", 5/e, Thomas Publications, New Delhi, 2004.
2. Zvi Kohavi, "Switching & Finite Automata Theory", 2/e, Tata McGraw Hill, New Delhi.
3. Ronald J. Tocci Neal S. Widmer, Digital Systems Principles and Applications, 8/e, Pearson Education, New Delhi, 2002.

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/106/105/106105185/>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO.1</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO.2</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO.3</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO.4</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO.5</b>	3	3	2	2	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>								



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech- III Semester**

**20EEE231**

**NETWORK ANALYSIS**

**L T P C  
2 1 0 3**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To demonstrate knowledge on three phase balanced and unbalanced circuits
2. To analyze DC and AC transients
3. To impart knowledge on graph theory of networks
4. To design and analyze two port networks
5. To understand and design of filters and attenuators

**UNIT – 1: THREE PHASE CIRCUITS (9)**

Phase sequence – star and delta connection-relation between line and phase voltages and currents in balanced systems-analysis of balanced and unbalanced three phase circuits – measurement of active and reactive power- Two-wattmeter method of measurement of three phase power- Analysis of unbalanced three phase circuits loop method-applications of Millman's theorem-star delta transformation technique.

**UNIT-2: TRANSIENT ANALYSIS (9)**

Transient response of RL, RC, RLC Series circuits for DC excitation sinusoidal excitations –Initial conditions –solution method using differential equations and Laplace transforms response of RL and RC networks to pulse excitation.

**UNIT-3: NETWORK TOPOLOGY (9)**

Definitions- graph, tree, basic cut set, and basic tie set matrices for planar networks-loop and nodal methods of analysis of networks with dependent and independent voltage and current sources-duality and dual networks.

**UNIT-4: TWO PORT NETWORKS (9)**

Two port network parameters-Z, Y, ABCD and hybrid parameters and their relations. Concept of transformed network-two port network parameters using transformed variables-cascaded networks.

**UNIT-5: FILTERS&SYMMETRICAL ATTENUATORS (9)**

Filters-Constant-K Low pass filter, High pass filter- m –derived,T-section-band pass filter and band elimination filter. Symmetrical Attenuators-T-type Attenuators-Type Attenuators, Bridged T type attenuator-Lattice Attenuators.

**TOTAL HOURS 45**

**COURSE OUTCOMES:**

<b>On successful completion of the course the student will be able to</b>		<b>POs</b>
<b>CO1</b>	Demonstrate knowledge on three phase balanced and unbalanced circuits and Analyze unbalanced three phase circuits by different methods	<b>PO1, PO2</b>
<b>CO2</b>	To determine and analyze the transient response of RL,RC and RLC circuits and the solutions for different types of excitations	<b>PO1, PO2,</b>
<b>CO3</b>	Demonstrate knowledge on graph theory and Analyze the networks with different network reduction methods	<b>PO1, PO2</b>
<b>CO4</b>	To determine and analyze the different two port networks	<b>PO1, PO2</b>
<b>CO5</b>	Demonstrate knowledge on attenuator and filters and design different types of attenuator and filters	<b>PO1, PO2, PO3</b>



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STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**TEXT BOOKS:**

1. C. Alexander and M. Sadiku "Fundamentals of Electric Circuits", 5/e McGraw Hill company 2014.
2. Chakrabarthi , Circuit Theory 3/e DhanpatRai and co., 2003.
3. Electric Circuitsby Schaum series

**REFERENCE BOOKS:**

1. M.E.VanValkenberg," Network Analysis"prantice hall India,3<sup>rd</sup> edition
2. C.L.Wadhwa, "Electric Circuit Analysis"new age international
3. William Hayt and Jack E.Kemmerly "Engineering Circuit Analysis",McGraw Hill Company,6<sup>th</sup> edition.

**REFERENCE WEBSITE LINK:**

<https://nptel.ac.in/courses/108/105/108105159/>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	2	-	-	-	-	-	-	-	-	-	-
CO.5	3	2	3	-	-	-	-	-	-	-	-	-
CO*	3	2.4	3	-	-	-	-	-	-	-	-	-



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech- III Semester**

**20HSM231**

**SOFTSKILLS  
(Common to All Braches)**

**L T P C  
0 1 2 2**

**PRE-REQUISITE:** NIL

**COURSE OBJECTIVES:**

1. To encourage all round development of the students by focusing on soft skills
2. To make the students aware of critical thinking
3. To develop problem-solving skills and decision making
4. To develop Emotional Intelligence and Stress Management
5. To develop leadership skills and to function effectively with heterogeneous teams

**UNIT -1: Soft Skills & Communication Skills (9)**

Introduction, meaning, significance of soft skills – definition, significance, types of communication skills - Intrapersonal & Inter-personal skills - Verbal and Non-verbal Communication

**Activities:**

**Intrapersonal Skills-** Narration about self- strengths and weaknesses- clarity of thought – self-expression –articulating with felicity

(The facilitator can guide the participants before the activity citing examples from the lives of the great,anecdotes and literary sources)

**Interpersonal Skills-** Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Groupleader presenting views (non- controversial and secular) on contemporary issues or on a given topic.

**Verbal Communication-** Oral Presentations- Extempore- brief addresses and speeches-convincing-negotiating- agreeing and disagreeing with professional grace.

**Non-verbal communication** – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation

**UNIT -2: CRITICAL THINKING (9)**

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness –Creative Thinking

**Activities:**Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues –placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluatingthe views of others - Case Study, Story Analysis

**UNIT -3: PROBLEM SOLVING & DECISION MAKING (9)**

Meaning & features of Problem Solving – Managing Conflict – Conflict resolution Methods of decision making – Effective decision making in teams – Methods & Styles.

**Activities:** Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision.

Case Study & Group Discussion

**UNIT -4: EMOTIONAL INTELLIGENCE & STRESS MANAGEMENT (9)**

Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation –Stress factors – Controlling Stress – Tips.

**Activities:** Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, and sympathy, and confidence, compassion in the form of written or oral presentations.





**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
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Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates

**UNIT – 5: LEADERSHIP SKILLS**

**(9)**

Team-Building – Decision-Making – Accountability – Planning – Public Speaking – Motivation – Risk- Taking – Team Building – Time Management

**Activities:**

Forming group with a consensus among the participants- choosing a leader- encouraging the group membersto express views on leadership- democratic attitude- sense of sacrifice – sense of adjustment – vision – accommodating nature- eliciting views on successes and failures of leadership using the past knowledge and experience of the participants, Public Speaking, Activities on Time Management, Motivation, Decision Making, Group discussion etc.

**NOTE-:**

1. The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribedskill.

Case studies may be given wherever feasible for example for Decision Making- The decision of King Learor for good Leadership – Mahendar Singh Dhoni etc.

**TOTAL HOURS: 45**

**COURSE OUTCOMES:**

<b>On successful completion of the course, students will be able to</b>		<b>POs</b>
<b>CO1</b>	Demonstrate knowledge effectively on Soft Skill & Communication Skills	<b>PO1, PO6, PO7, PO8, PO9, PO10, PO12</b>
<b>CO2</b>	Demonstrate knowledge on Critical Thinking	<b>PO1, PO6, PO7, PO8, PO9, PO10, PO12</b>
<b>CO3</b>	Solve problems and take appropriate decisions	<b>PO1, PO2, PO6, PO7, PO8, PO9, PO10, PO12</b>
<b>CO4</b>	Effectively manage Emotional Intelligence and Stress Management	<b>PO1, PO6, PO7, PO8, PO9, PO10, PO12</b>
<b>CO5</b>	Function effectively as a leader and with heterogeneous team	<b>PO1, PO6, PO7, PO8, PO9, PO10, PO11, PO12</b>

**TEXTBOOKS:**

1. Personality Development and Soft Skills (English, Paperback, Mitra Barun K.)Publisher: OxfordUniversity Press; Pap/Cdr edition (July 22, 2012)
2. Personality Development and Soft Skills: Preparing for Tomorrow, Dr Shikha KapoorPublisher : IK International Publishing House; 0 edition (February 28, 2018)



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**REFERENCE BOOKS:**

1. Soft skills: personality development for life success by Prashant Sharma, BPB publications 2018.
2. Soft Skills By Alex K. Published by S.Chand
3. Soft Skills: An Integrated Approach to Maximise Personality Gajendra Singh Chauhan, Sangeetha Sharma Published by Wiley.
4. Communication Skills and Soft Skills (Hardcover, A. Sharma) Publisher: Yking books
5. SOFT SKILLS for a BIG IMPACT (English, Paperback, RenuShorey) Publisher: Notion Press
6. Life Skills Paperback English Dr. Rajiv Kumar Jain, Dr. Usha Jain Publisher: Vayu Education of India.

**REFERENCE WEBSITES:**

1. [https://youtu.be/DUlsNJtg2L8?list=PLLy\\_2iUCG87CQhELCytvXh0E\\_y-b001\\_q](https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-b001_q)
2. [https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel\\_j2PUy0pwjVUqj7KIJ](https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUqj7KIJ)
3. <https://youtu.be/-Y-R9hDI7IU>
4. <https://youtu.be/gkLsn4ddmTs>
5. <https://youtu.be/2bf9K2rRWwo>
6. <https://youtu.be/FchfE3c2jzc>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3					2	2	2	2	3		2
CO.2	3					2	2	2	2	2		2
CO.3	3	2				2	2	2	2	2		2
CO.4	3					2	2	2	2	2		2
CO.5	3					2	2	2	2	2	3	2
CO*	3	2				2	2	2	2	2.2	3	2



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STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech- III Semester**

**20ESC232**

**FLUID MECHANICS MACHINERY LAB  
(Common to MECH and EEE Branches)**

L	T	P	C
0	0	3	1.5

**COURSE EDUCATIONAL OBJECTIVES:**

- 1:** To understand the properties of fluid, types of fluid and types of flow.
- 2:** To understand about flow measuring devices based on Bernoulli's principle and notches.
- 3:** To help the students acquire knowledge about various loss in fluids flow through pipes.
- 4:** To acquire knowledge on basics of turbo machinery.
- 5:** To perform characteristic study of turbines and pumps.

**LIST OF EXPERIMENTS**

- 1.** Calibration of venturimeter and orifice meter.
- 2.** Determination of coefficient of discharge for small orifice by a constant head method.
- 3.** Determination of coefficient of discharge for an external mouth piece by variable head method.
- 4.** Calibration of contracted rectangular notch and triangular notch.
- 5.** Determination of coefficient of loss of head in a sudden contraction and friction factor.
- 6.** Verification of Bernoulli's theorem.
- 7.** Impact of jet on vanes.
- 8.** Turbine flow meter.
- 9.** Study of hydraulic jump.
- 10.** Performance test on hydraulic turbine.
  - a) Pelton wheel.
  - b) Francis turbine
  - c) Kaplan turbine
- 11.** Performance test on centrifugal pump.
  - a) Single stage centrifugal pump.
  - b) Multi stage centrifugal pump.
- 12.** Performance test on reciprocating pump.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to		POs
<b>CO1</b>	Demonstrate the knowledge on properties of fluids and fluid flow characteristics of various hydraulic machines.	PO1
<b>CO2</b>	Measure and analyze the flow parameters using orifice, mouth piece and notches also Analyze the performance of centrifugal, reciprocating pumps and also ability to engage in independent	PO2
<b>CO3</b>	Determine and design the pipe flow by considering various loss of energy	PO3
<b>CO4</b>	Understand working, performance of hydraulic turbine by conduct investigation.	PO4
<b>CO5</b>	Follow the ethical principles while doing the experiments	PO8
<b>CO6</b>	Do the experiments effectively as an individual and as a team member in a group.	PO9
<b>CO7</b>	Communicate verbally and in written form pertaining to results of the experiments	PO10
<b>CO8</b>	Continue updating their skills related to fluid mechanics and hydraulic machines in future.	PO12

**TEXT BOOKS:** Lab manual provided by the department.

**REFERENCE WEBSITE:**

1. <https://nptel.ac.in/courses/112/105/112105171/>
2. <https://nptel.ac.in/courses/112/105/112105287/>
3. <https://nptel.ac.in/courses/105/103/105103192/>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	-	3	-	-	-	-	-	-	-	-	-	-
<b>CO3</b>	-	-	3	-	-	-	-	-	-	-	-	-
<b>CO4</b>	-	-	-	3	-	-	-	-	-	-	-	-
<b>CO5</b>	-	-	-	-	-	-	-	3	-	-	-	-
<b>CO6</b>	-	-	-	-	-	-	-	-	3	-	-	-
<b>CO7</b>	-	-	-	-	-	-	-	-	-	3	-	-
<b>CO8</b>	-	-	-	-	-	-	-	-	-	-	-	3
<b>CO</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	-	-	-	<b>3</b>	<b>3</b>	<b>3</b>	-	<b>3</b>



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STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech- III Semester**

<b>20ECE238</b>	<b>SEMICONDUCTOR DEVICES AND CIRCUITS LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>

**COURSE EDUCATIONAL OBJECTIVES:**

1. To understand the functionality & specifications of basic electronic passive components.
2. To know the functionality & specifications of electronic active components and special Devices.
3. To study the operation of analog and digital meters which are used for practical Experiments.
4. To provides soldering practice of basic electronic circuits for projects
5. To know the practical knowledge of diodes and transistors with their input-output characteristics

**PART A:**

**Electronic Workshop Practice**

1. Identification, Specifications, Testing of RLC Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

**PART B:**

**List of Experiments**

1. P-N Junction Diode Characteristics (Silicon and Germanium).
2. Zener Diode Characteristics as a Voltage Regulator.
3. Rectifier (without and with filter).
4. BJT Characteristics (CE & CB Configuration).
5. FET Characteristics (Drain and Transfer).
6. SCR Characteristics.
7. UJT Characteristics.

**Equipment required for Laboratory**

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components
10. Bread Boards
11. Connecting Wires



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

successful completion of the course the student will be able to,		POs
<b>C01</b>	Demonstrate knowledge on identification and specification also testing of passive components.	<b>PO1</b>
<b>C02</b>	Demonstrate knowledge on identification and specification also testing of active components.	<b>PO1</b>
<b>C03</b>	Soldering practice on simple electronic circuits for future applications	<b>PO3</b>
<b>C04</b>	Demonstrate knowledge on operation of PN diode and Zener diode with practical characteristics	<b>PO1.</b>
<b>C05</b>	Analyze the practical characteristics of transistor in CB, CE, CC configurations	<b>PO2</b>
<b>C06</b>	Do experiments effectively as an individual and as a member in a group.	<b>PO9</b>
<b>C07</b>	Communicate verbally and in written form, the understandings about the experiments.	<b>PO10</b>
<b>C08</b>	Follow ethical principles on analysis of different electronic circuits which is used for project works.	<b>PO8</b>
<b>C09</b>	Continue updating their skill related to electronic devices and their applications during their life time	<b>PO12</b>

**TEXT BOOKS:**

1. J. Millman, C. Halkias, "Electronic Devices and Circuits"- Tata Mc-Graw Hill, Second Edition.
2. Jacob Millman, C. Halkies, C.D.Parikh, "Integrated Electronics"- Tata Mc-Graw Hill, 2009.

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>C01</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>C02</b>	-	3	-	-	-	-	-	-	-	-	-	-
<b>C03</b>	-	-	3	-	-	-	-	-	-	-	-	-
<b>C04</b>	-	-	-	3	-	-	-	-	-	-	-	-
<b>C05</b>	-	-	-	-	-	-	-	3	-	-	-	-
<b>C06</b>	-	-	-	-	-	-	-	-	3	-	-	-
<b>C07</b>	-	-	-	-	-	-	-	-	-	3	-	-
<b>C08</b>	-	-	-	-	-	-	-	-	-	-	-	3
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	-	-	-	<b>3</b>	<b>3</b>	<b>3</b>	-	<b>3</b>



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STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech- III Semester**

**20EEE232**

**NETWORK ANALYSIS LAB**

**L T P C  
0 0 3 1.5**

**COURSE EDUCATIONAL OBJECTIVES:**

- 1: To apply transient response of first order RL and RC circuits.
- 2: To provide practical experience for the determination of two port network Parameters.
- 3: To provide practical experience for measuring active and reactive power.
- 4: To provide practical experience with simulation of electrical circuits.
- 5: To verify Thevenin's, Norton's and superposition theorems using simulation.

**Any Ten of the following experiments are required to be conducted**

1. Time Response of First Order RL And RC Circuits
2. Z and Y Parameters.
3. Transmission and Hybrid Parameters.
4. Measurement of Active Power for Star And Delta Connected Balanced Loads
5. Measurement of Reactive Power by Single Watt Meter for Star and Delta Connected Balanced Loads
6. Measurement of Three Phase Power by Two wattmeter Method for Unbalanced Loads
7. Simulation of DC Transient Response.
8. Simulation of Thevenin's Theorem and Norton's Theorem.
9. Simulation of Maximum Power Transfer Theorem.
10. Simulation of Superposition Theorem and Reciprocity theorem.
11. Simulation of Symmetrical Attenuators: T-Type And  $\Pi$ -Type
12. Simulation of Symmetrical Attenuators: Bridged T Type and Lattice Attenuators.

**COURSE OUTCOMES:**

<b>On successful completion of the course, student will be able to</b>		<b>POs</b>
<b>CO1</b>	Understand transient response of first order system	<b>PO1</b>
<b>CO2</b>	Determine two port network parameters	<b>PO2</b>
<b>CO3</b>	Understand practical experience with simulation of electrical circuits	<b>PO1</b>
<b>CO4</b>	Understand and apply circuit theorems and concepts in engineering applications	<b>PO1</b>
<b>CO5</b>	Application of Thevenin's, Norton's and superposition theorems using simulation	<b>PO8</b>
<b>CO6</b>	Do experiments effectively as an individual and as a member in a group.	<b>PO9</b>
<b>CO7</b>	Communicate verbally and in written form, the understandings about the experiments.	<b>PO10</b>
<b>CO8</b>	Follow ethical principles on analysis of different electronic circuits which is used for project works.	<b>PO8</b>
<b>CO9</b>	Continue updating their skill related to electronic devices and their applications during their life time	<b>PO12</b>



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**TEXT BOOKS:**

1. C. Alexander and M. Sadiku "Fundamentals of Electric Circuits", ,5/e McGraw Hill company 2014.
2. Chakrabarthi, Circuit Theory 3/e DhanpatRai and co., 2003.
3. Electric Circuits by Schaum series

**REFERENCE WEBSITE LINK:**

<https://nptel.ac.in/courses/108/105/108105159/>

**CO-PO MAPPING:**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	-	-	-	-	-	-	-	-	-	-	-
CO.4	3	-	-	-	-	-	-	-	-	-	-	-
CO.5	3	-	-	-	-	-	-	-	-	-	-	-
CO.6	-	-	-	-	-	-	-	-	3	-	-	-
CO.7	-	-	-	-	-	-	-	-	-	3	-	-
CO.8	-	-	-	-	-	-	-	3	-	-	-	-
CO.9	-	-	-	-	-	-	-	-	-	-	-	3





**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech- III Semester**

**20MAC231**

**ENVIRONMENTAL SCIENCE**

**L T P C**

(Common To All Branches)

**2 0 0 0**

**PRE-REQUISITES:** NIL

**COURSE EDUCATIONAL OBJECTIVES:**

1. To recognize nature of environmental studies and various renewable and nonrenewable resources.
2. To understand flow and bio-geo- chemical cycles and ecological pyramids.
3. To identify various causes of pollution and solid waste management and related preventive measures.
4. To evaluate and interpret the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.
5. To understand the causes of population explosion, value education and welfare programmes.

**UNIT-1: INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES (6)**

**Multidisciplinary nature of environmental studies:** Definition, scope and importance. Need for public awareness.

**Natural Resources:** Renewable and non-renewable resources: Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and nonrenewable energy resources.

**UNIT -2: CONCEPT OF ECOSYSTEM AND BIODIVERSITY (6)**

**Structure and function of an ecosystem:** Producers, consumers and decomposers- Energy flow in the ecosystem- Ecological succession- Food chains, food webs and ecological pyramids- Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**Biodiversity and its conservation:** Introduction - Definition: genetic, species and ecosystem diversity-Biogeographical classification of India-Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels-India as a mega-diversity nation-Hot-spots of biodiversity-Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. -Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

**UNIT -3: ENVIRONMENTAL POLLUTION AND WASTE MANAGEMENT (6)**

**Environmental Pollution:** Definition - Cause, effects and control measures of: - a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. nuclear hazards

**Solid waste Management:** Causes, effects and control measures of urban and industrial wastes-Role of an individual in prevention of pollution. Pollution case studies-Disaster management: floods, earthquake, cyclone and landslides.

**UNIT -4: SOCIAL ISSUES AND THE ENVIRONMENT (6)**

**From Unsustainable to Sustainable development:** Urban problems related to energy Water conservation, rain water harvesting, watershed management-Resettlement and rehabilitation of people; its problems and concerns. -Environment Protection Act-Air (Prevention and Control of Pollution) Act-Water (Prevention and control of Pollution) Act-Wildlife Protection Act- Forest Conservation Act -Issues involved in enforcement of environmental legislation- Public awareness.



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**UNIT –5: HUMAN POPULATION AND THE ENVIRONMENT**

**(6)**

**Population growth:** variation among nations-Population explosion – Family Welfare Programme- Environment and human health-Human Rights-Value Education-HIV/AIDS. Women and Child Welfare-Role of Information Technology in Environment and human Case Studies.

**Total hours: 30**

**COURSE OUTCOMES:**

<b>On successful completion of the course, students will be able to</b>		<b>POs</b>
<b>CO1</b>	Grasp multidisciplinary nature of environmental studies and various renewable and nonrenewable resources.	<b>PO1, PO2, PO3 PO4, PO5, PO6,PO7</b>
<b>CO2</b>	Understand flow and bio-geo- chemical cycles and ecological pyramids.	<b>PO1, PO2, PO3 PO4, PO5, PO6,PO7</b>
<b>CO3</b>	Understand various causes of pollution and solid waste management and related preventive measures.	<b>PO1, PO2, PO3 PO4, PO5, PO6,PO7</b>
<b>CO4</b>	Understand concept of rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.	<b>PO1, PO2, PO3 PO4, PO5, PO6,PO7</b>
<b>CO5</b>	Causes of population explosion, value education and welfare programmes.	<b>PO1, PO2, PO3 PO4, PO5, PO6,PO7</b>

**TEXT BOOKS:**

1. R. Rajagopalan, " Environmental Studies", Oxford University Press.
2. Gilbert M. Masters and Wendell P. Ela. "Environmental Engineering and science" PHI Learning Pvt. Ltd, 2008

**REFERENCE BOOKS:**

1. ErachBharucha "Textbook of Environmental Studies for Undergraduate Courses", University grants commission, 2/e,2013.
2. C.P.Kaushik and Anubhakaushik "Text book of environmental studies", New age International publishers, 4/e,2006.

**REFERENCE WEBSITE:**

1. <https://nptel.ac.in/courses/127/105/127105018/>
2. <https://nptel.ac.in/courses/113/104/113104061/>
3. <https://nptel.ac.in/courses/120/108/120108005/>
4. <https://nptel.ac.in/courses/120/108/120108002/>

**CO-PO MAPPING:**

<b>CO-PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO.1</b>	3	2	1	2	2	2	3	-	-	-	-	-
<b>CO.2</b>	3	2	1	2	2	2	3	-	-	-	-	-
<b>CO.3</b>	3	2	1	2	2	2	3	-	-	-	-	-
<b>CO.4</b>	3	2	1	2	2	2	3	-	-	-	-	-
<b>CO.5</b>	3	2	1	2	2	2	3	-	-	-	-	-
<b>CO*</b>	<b>3</b>	2	1	2	2	2	<b>3</b>	-	-	-	-	-



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech-IV Semester**

<b>20BSC241</b>	<b>ELECTROMAGNETICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>2</b>	<b>0</b>	<b>4</b>

**PRE-REQUISITES: A Course on Network Analysis**

**COURSE EDUCATIONAL OBJECTIVES:**

- 1: To demonstrate knowledge on static electric field.
- 2: To impart knowledge on Laplace and Poissons equations, and capacitance.
- 3: To impart knowledge Magneto static field.
- 4: To create awareness on effect of magnetic field, inductance.
- 5: To impart knowledge on time varying electromagnetic field

**UNIT-1: ELECTROSTATIC FIELD (9)**  
Sources and effects of electromagnetic fields – Coordinate Systems – Vector fields –Gradient, Divergence, Curl – theorems and applications - Coulomb’s Law – Electric field intensity – Field due to discrete and continuous charges – Gauss’s law and applications.

**UNIT -2: ELECTROSTATIC APPLICATIONS (9)**  
Electric potential – Electric field and equipotential plots, Uniform and Non-Uniform field, Utilization factor – Electric field in free space, conductors, dielectrics - Dielectric polarization – Dielectric strength - Electric field in multiple dielectrics – Boundary conditions, Poisson’s and Laplace’s equations, Capacitance, Energy density, Applications.

**UNIT-3: STEADY ELECTRO-MAGENTIC FIELDS (9)**  
Lorentz force, magnetic field intensity (H) – Biot–Savart’s Law - Ampere’s Circuit Law – H due to straight conductors, circular loop, infinite sheet of current, Magnetic flux density (B) – B in free space, conductor, magnetic materials – Magnetization, Magnetic field in multiple media – Boundary conditions, scalar and vector potential, Poisson’s Equation, Magnetic force, Torque, Inductance, Energy density, Applications

**UNIT-4: MAGNETO STATICS AND APPLICATIONS (9)**  
Magnetic Circuits - Faraday’s law – Transformer and motional EMF – Displacement current - Maxwell’s equations (differential and integral form) – Relation between field theory and circuit theory – Applications.

**UNIT-5: CURRENT DENSITY AND WAVE PROPAGATION (9)**  
Electromagnetic wave generation and equations – Wave parameters; velocity, intrinsic impedance, propagation constant – Waves in free space, lossy and lossless dielectrics, conductors- skin depth - Poynting vector – Plane wave reflection and refraction.

**Total Hours 45**



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**COURSE OUTCOMES:**

On successful completion of the course, student will be able to		POs
<b>CO1</b>	Demonstrate knowledge on electrostatic field due to different types of electric charges.	<b>PO1, PO2, PO5.</b>
<b>CO2</b>	Develop knowledge on Laplace and Poissons equations, and capacitance	<b>PO1, PO2, PO5.</b>
<b>CO3</b>	Demonstrate knowledge on Magneto static field due to steady current.	<b>PO1, PO2, PO5.</b>
<b>CO4</b>	Analyze the effects of magnetic field.	<b>PO1, PO2</b>
<b>CO5</b>	Demonstrate knowledge on wave propagation.	<b>PO1, PO4, PO5</b>

**TEXT BOOKS**

1. Mathew N. O. Sadiku, 'Principles of Electromagnetics', 6th Edition, Oxford University Press Inc. Asian edition, 2015.
2. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', McGraw Hill Special Indian edition, 2014.

**REFERENCE BOOKS**

1. David K Cheng, "Field and Wave Electromagnetics", Pearson Education, 2<sup>nd</sup> edition, 2004.
2. John D. Kraus, "Electromagnetics" McGraw Hill, 5th Edition, 1999.
3. N. Narayana Rao, "Elements of Engg. Electro Magnetics", Prentice Hall of India, 6<sup>rd</sup> Edition, 2008.
4. T.V.S. Arun Murthy, "Electromagnetic Fields", S.Chand, 2008. 5. David J Griffiths, "Introduction to Electrodynamics, PHI, 3<sup>rd</sup> edition, 2008

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/117/103/117103065/>

**CO-PO MAPPING:**

PO-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	3	-	-	2	-	-	-	-	-	-	-
<b>CO2</b>	3	3	-	-	2	-	-	-	-	-	-	-
<b>CO3</b>	3	2	-	-	2	-	-	-	-	-	-	-
<b>CO4</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO5</b>	3	-	-	2	2	-	-	-	-	-	-	-
<b>CO*</b>	3	2.4		2	2							



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech-IV Semester**

**20EEE241**

**CONTROL SYSTEMS**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES: A Course on Network Analysis**

**COURSE EDUCATIONAL OBJECTIVES:**

1. The concepts of open and closed loop control systems.
2. Analyse the Time and frequency domain response of second order systems.
3. Design a compensator to meet the design specifications of control system.
4. Solve problems pertaining to control systems to provide feasible solutions in real time environment.  
Apply the conceptual knowledge of control systems in domestic and industrial
5. applications.

**UNIT-1: MATHEMATICAL MODELING OF SYSTEMS:**

**(9)**

Introduction to control systems. Basic elements of control system - open loop and closed loop systems. Effect of feedback. Modelling of physical systems-electrical systems, mechanical systems, analogous systems, armature control and field control of DC motor, DC servomotor. Transfer function - block diagram reduction techniques, signal flow graph.

**UNIT-2: TIME RESPONSE AND STABILITY ANALYSIS:**

**(9)**

Various test signals and its importance. Time response of first and second order systems, Time-domain specifications, steady state response, steady state error and error constants, static and generalized error coefficients. Routh-Hurwitz stability criterion, Root locus technique- root locus diagram, rules to construct root loci, effect of pole zero additions on the root loci.

**UNIT-3: FREQUENCY DOMAIN ANALYSIS:**

**(9)**

Performance specifications in the frequency domain. Stability analysis - Bode plot, Polar plot and Nyquist plot.

**UNIT-4: CONTROLLERS AND COMPENSATORS:**

**(9)**

Introduction to controllers, effect of P, PI and PID controllers. Compensators - lag, lead, lead-lag compensator design using Bode plot.

**UNIT-5: STATE SPACE ANALYSIS:**

**(9)**

Transfer function vs state space representation. Concepts of state, state variables and state model. Modeling of physical system in state space. Transfer function to state model and vice versa. State transition matrix and its properties. Controllability and observability using Kalman's test.

**Total Hours: 45**



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

<b>On successful completion of the course, students will be able to</b>		<b>POs</b>
<b>CO1</b>	Demonstrate knowledge onThe concepts of open and closed loop control systems.	<b>PO1,PO2,PO3,PO4</b>
<b>CO2</b>	Analyse Time and frequency domain response of second order systems.	<b>PO1,PO2,PO3,PO4</b>
<b>CO3</b>	Design a compensator to meet the design specifications of control system.	<b>PO1,PO2, PO3</b>
<b>CO4</b>	Solve problems pertaining to control systems to provide feasible solutions in real time environment.	<b>PO1,PO2,PO4</b>
<b>CO5</b>	Apply the conceptual knowledge of control systems in domestic and industrial applications.	<b>PO1,PO2,PO12</b>

**TEXT BOOKS:**

1. Nagrath I.J. and Gopal M, "Control Systems Engineering" New Age International Publications, 5th edition, 2010.
2. Katsuhiko Ogata," Modern Control Engineering", Pearson Education Publishers, 5th edition, 2010.

**REFERENCE BOOKS:**

1. Richard C. Dorf and Robert H. Bishop, "Modern Control Systems", Prentice Hall, 12th edition,2010.
2. Benjamin C.Kuo and Farid Golnaraghi, "Automatic Control Systems", John Wiley & Sons Publications, 8th edition, 2002.
3. A.Nagoorkani, "Control Systems", RBA Publications, 2nd edition,2006.
4. Anandkumar, "Control Systems" PHI learning Pvt Ltd., 2ndedition, 2014.

**REFERENCE WEBSITE:**

- NPTEL Video Lecture Notes on "Control Engineering "by Prof. S. D. Agashe, IIT Bombay.

**CO-PO MAPPING:**

<b>CO/PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO.1</b>	3	2	2	1	-	-	-	-	-	-	-	-
<b>CO.2</b>	3	3	2	2	-	-	-	-	-	-	-	-
<b>CO.3</b>	3	3	<b>2</b>	-	-	-	-	-	-	-	-	-
<b>CO.4</b>	3	3	-	<b>2</b>	-	-	-	-	-	-	-	-
<b>CO.5</b>	3	3	-	-	-	-	-	-	-	-	-	2
<b>CO*</b>	<b>3</b>	<b>2.8</b>	<b>2</b>	<b>1.6</b>								<b>2</b>



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech-IV Semester**

**20EEE242**

**ELECTRICAL MACHINES-I**

**L T P C  
2 1 0 3**

**PRE-REQUISITES: A Course on Basic Electrical Engineering**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To demonstrate knowledge on construction, operation and design of armature windings Of DC generator.
2. To demonstrate knowledge on construction, operation and characteristics of D C motor.
3. To analyze the operation of DC motor for various speed conditions
4. Demonstrate knowledge on construction and working of transformers.
5. Demonstrate knowledge on testing of poly phase transformers

**UNIT-1: D.C. GENERATORS**

**(9)**

Principle of Operation, Constructional Features, EMF Equation of a D.C. Generator, Collection and Flow of Current from Armature, Armature Reaction, Methods to Reduce Effects of Armature Reaction and Commutation Process, Armature Winding Diagram (Lap and Wave), Methods of Excitation, Generator Characteristics, Parallel Operation, Losses occur in DC Generator, Power Stages in D.C. Generator, Efficiency, Condition for Maximum Efficiency of a dc generator and Applications.

**UNIT-2: D.C. MOTORS**

**(9)**

Principle of operation, Types of DC Motors, Significance of Back Emf, condition for maximum power, Torque and Speed Equations, Starting and necessity of Starters, Types of Starters, DC Motor characteristics, Speed Control Methods of a D.C. Motors, Losses occur in DC Motors, Power Stages in D.C. Motor, Condition for Maximum Efficiency and Applications.

**UNIT-3: TESTING OF D.C. MOTORS**

**(9)**

Testing of D.C machines- losses – constants & variable losses – calculation of efficiency –condition for maximum efficiency .Methods of testing-direct, indirect & regenerative testing –brake test – Swinburne’s test – Hopkinson’s test – field’s test – retardation test – separation of stray losses in a D.C Motors test.

**UNIT-4: TRANSFORMERS**

**(9)**

Principle of operation, Constructional features, Types of Transformers, emf equation of a Transformer, Idea Transformer, Practical Transformer on No-Load and Load and its vector diagrams, Equivalent Circuit of a Transformers, Losses in a Transformer, Voltage Regulation and Efficiency, Testing of a Transformers, All Day Efficiency, Condition for Maximum Efficiency of a Transformer, auto transformers, tap changers on transformers, Parallel Operation of single phase transformers.

**UNIT -5: THREE PHASE TRANSFORMERS**

**(9)**

Three-phase Transformers, Three-phase Transformer Connections, Star/Star or Y/Y Connection, Delta-Delta or Connection, Wye/Delta or Y/Connection, Delta/Wye or /Y Connection, Open-Delta or Y-Y Connection, Power supplied by Y-Y Bank, Three-phase to Two-Phase conversion and vice-versa, Parallel operation of 3- phase Transformers.

**Total Hours: 45**



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

On successful completion of course, student will be able to		POs
<b>CO1</b>	Acquire knowledge on the construction, operation ,safety and design of DC generator.	<b>PO1,PO2,PO3,PO4</b>
<b>CO2</b>	Acquire knowledge on construction, operation, design, safety and characteristics of various types DC motors.	<b>PO1,PO2,PO4</b>
<b>CO3</b>	Acquire knowledge on the operation, analysis and safety of DC motors for various speed conditions.	<b>PO1,PO2,PO3,PO4</b>
<b>CO4</b>	Demonstrate knowledge on construction and working of transformers.	<b>PO1, PO2</b>
<b>CO5</b>	Demonstrate knowledge on testing of poly phase transformers	<b>PO1,PO2,PO3</b>

**TEXT BOOKS:**

1. P.S. Bimbhra, 'Electrical Machinery', Khanna Publishers, 2003.
2. B.L.Theraja & A.K.Theraja," A Text Book of Electrical Technology" S.Chand, New Delhi, 2012.

**REFERENCE BOOKS:**

1. A.E. Fitzgerald, Charles Kingsley, Stephen.D.Umans, "Electric Machinery", Tata McGraw Hill publishing Company Ltd, 2003.
2. J.B. Gupta, "Theory and Performance of Electrical Machine", S.K.Kataria and Sons, 2002.
3. D.P. Kothari and I.J. Nagrath, "Electric Machines", Tata McGraw Hill Publishing Company Ltd, 2002.

**REFERENCE WEBSITE LINK:**

<https://nptel.ac.in/courses/108/105/108105131/>

**CO-PO MAPPING:**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO.1</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO.2</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO.3</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO.4</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO.5</b>	3	2	3	-	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>	<b>2</b>	<b>3</b>									





**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech-IV Semester**

<b>20EEE243</b>	<b>ELECTRICAL POWER TRANSMISSION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES:** A Course on Generation of Electrical Power

**Course Educational Objectives:**

- 1: To make students capable to understand the electrical line parameters.
- 2: To impart knowledge on short, medium and long transmission lines.
- 3: To provide the knowledge about the system transients and transmission line parameters.
- 4: To acquire knowledge on the concepts of corona, sag and tension calculations.
- 5: To provide knowledge on the issues related to overhead line insulators and underground cables.

**UNIT-1: TRANSMISSION LINE PARAMETERS (9)**

Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems- Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Problems.

**UNIT-2: PERFORMANCE OF SHORT, MEDIUM AND LONG TRANSMISSION LINES (9)**

Classification of Transmission Lines - Short, medium and long line and their model - representations - Nominal-T, Nominal-Pie and A, B, C, D Constants. Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems. Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations - Representation of Long lines - Equivalent T and Equivalent - n - surge Impedance and surge Impedance loading - Ferranti effect , Charging current.

**UNIT-3: POWER SYSTEM TRANSIENTS (9)**

Types of system transients-Travelling or propagation of surges- attenuation, distortion , reflection and refraction coefficients- termination of lines with different types of conditions - open circuited line , short circuited line, T-junction (numerical problems)-Bewleys Lattice diagrams(for all cases mentioned with numerical examples).

**UNIT-4: CORONA, SAG AND TENSION CALCULATIONS (9)**

Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference. Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart and sag template and its applications.

**UNIT-5: OVERHEAD LINE INSULATORS AND UNDERGROUND CABLES (9)**

Types of Insulators, String efficiency and Methods for improvement, Numerical Problems - voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding. Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading, Numerical Problems, Description of Inter-sheath grading.

**TOTAL HOURS: 45**



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

<b>On successful completion of course, student will be able to</b>		<b>POs</b>
<b>CO1</b>	Ability to do calculation of resistance, Inductance and Capacitance of Transmission Lines.	<b>PO1, PO2</b>
<b>CO2</b>	Ability to apply the knowledge on short, medium and long transmission lines.	<b>PO1, PO2</b>
<b>CO3</b>	Demonstrate knowledge on power system transients.	<b>PO1, PO2</b>
<b>CO4</b>	Understand the concepts of corona, sag and tension calculations.	<b>PO1, PO2, PO3</b>
<b>CO5</b>	Able to analyze the overhead line insulators and underground cables.	<b>PO1, PO2, PO3</b>

**TEXT BOOKS:**

1. C.L.Wadwa "Electrical Power Systems", New Age International Publishers–New Delhi. 6/e 2012.
2. D.P.Kothari, I.J. Nagarath, 'Power System Engineering', Mc Graw-Hill Publishing Company limited, New Delhi, Second Edition, 2008.

**REFERENCE BOOKS:**

1. V.K.Mehta, S.Chand "Principles of Power systems ", S.Chand Publications – New Delhi 4/e 2005
2. William D Stevenson "Elements of Power systems"–4/e 1982 - Tata McGraw – Hill Education Pvt. Ltd.. Noida
3. B.R.Gupta "Power system analysis and design ", S.chand&co, 6<sup>th</sup> revised edition
4. John J Grainger, William D Stevenson "Power system analysis", TMC Companies, 4<sup>th</sup> edition.

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/108/106/108106160/>

**CO-PO MAPPING:**

<b>CO/PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO.1</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO.2</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO.3</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO.4</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO.5</b>	3	3	2	-	-	-	-	-	-	-	-	-
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>2</b>	-	-							



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech-IV Semester**

<b>20EEE244</b>	<b>MEASUREMENTS AND INSTRUMENTATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**PRE-REQUISITES: A Course on Basic Electrical Circuits**

**COURSE EDUCATIONAL OBJECTIVES:**

- 1 Demonstrate knowledge on measuring instruments; analyze errors and its compensation.
- 2 Demonstrate knowledge on power and energy measuring instruments; analyze errors and its compensation.
- 3 Impart knowledge on instrument transformers, PF meters and analyze errors and its compensation.
- 4 Impart knowledge on potentiometers, DC and AC bridges
- 5 Demonstrate knowledge on CRO and transducers.

**UNIT -1: INTRODUCTION**

**(9)**

Classification- Deflecting - Control and damping torques-Ammeters and voltmeters-PMMC - Dynamometer - Moving Iron type instruments- Expression for deflecting and controlling torques-Errors and compensations -Extension of range using shunt and series resistances.

**UNIT -2: MEASUREMENT OF POWER AND ENERGY**

**(9)**

Principle of Operation of EDM type Wattmeters - Errors and compensations - LPF and UPF types - Measurement of Three phase power by two and three wattmeters - Single phase induction type Energy meter-Principle of operation - Errors and compensations in energy meters - Three phase Energy meter.

**UNIT -3: INSTRUMENT TRANSFORMERS AND PF METERS**

**(9)**

CT & PT-Phasor diagrams - Errors occurring in instrument transformers and compensations - Different types of PF meters-MI and Electro Dynamometer types - 1-phase and 3-phase meters - Frequency meters.

**UNIT -4: POTENTIOMETERS –DC AND AC BRIDGES**

**(9)**

D.C potentiometers –Principle and operation - Standardization- DC Crompton's Potentiometers-Applications. A.C potentiometers- Polar and coordinate type - Standardization.- Method of measuring low - Medium and high resistance- Sensitivity of Whetstone's bridge – Kelvin's double bridge for measuring low resistance - Measurement of high resistance - Loss of charge method - Measurement of inductance - Maxwell's bridge - Anderson's bridge - Measurement of capacitance and loss angle - Desauty bridge - Wien's bridge - Schering Bridge.

**UNIT-5: CRO- DIGITAL METERS - TRANSDUCERS**

**(9)**

Cathode Ray Oscilloscope- Cathode Ray tube-Time base generator –Deflection system -Horizontal and Vertical amplifiers - Application of CRO – Lissajous Patterns - Classification of transducers-Measurement of pressure using electrical transducers-Measurement of torque using transducers-Piezoelectric - Optical and digital transducers.

**TOTAL HOURS: 45**



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to		Pos
<b>CO1</b>	Demonstrate knowledge on measuring instruments; analyze errors and its compensation.	<b>PO1,PO2</b>
<b>CO2</b>	Demonstrate knowledge on power and energy measuring instruments; analyze errors and its compensation.	<b>PO1,PO2</b>
<b>CO3</b>	Demonstrate knowledge on instrument transformers and PF meters and analyze errors and its compensation.	<b>PO1,PO2</b>
<b>CO4</b>	Demonstrate knowledge on potentiometers, DC and AC bridges	<b>PO1</b>
<b>CO5</b>	Demonstrate knowledge on CRO and transducers	<b>PO1</b>

**TEXT BOOKS:**

1. A.K. Sawhney, 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2010.
2. J. B. Gupta, 'A Course in Electronic and Electrical Measurements', S. K. Kataria & Sons, Delhi, 2013.

**REFERENCE BOOKS:**

1. H.S. Kalsi, 'Electronic Instrumentation', McGraw Hill, III Edition 2010.
2. D.V.S. Murthy, 'Transducers and Instrumentation', Prentice Hall of India Pvt Ltd, 2015.
3. David Bell, ' Electronic Instrumentation & Measurements', Oxford University Press,2013.
4. Martin Reissland, 'Electrical Measurements', New Age International (P) Ltd., Delhi, 2001.

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/108/105/108105153/>

**CO-PO MAPPING:**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO.1</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO.2</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO.3</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO.4</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>CO.5</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>CO*</b>	3	2										



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech-IV Semester**

<b>20ECE249</b>	<b>ELECTRONIC CIRCUITS AND IC APPLICATIONS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Skill oriented Course)</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>2</b>

**COURSE EDUCATIONAL OBJECTIVES:**

1. To develop the basic understanding of small signal and large signal amplifiers
2. To provide knowledge on different types of feedback amplifiers and oscillators.
3. To provide knowledge on characteristics of operational amplifier.
4. To apply the ideas of op-amp on various applications and data converters
5. To introduce the concepts of 555 timer and special function ICs

**UNIT-1: SMALL SIGNAL and LARGE SIGNAL AMPLIFIERS (9)**

**SMALL SIGNAL AMPLIFIERS**

Review of CB, CE & CC amplifiers-Classification of amplifiers, approximate analysis, CE, CB, CC amplifiers comparison.

**LARGE SIGNAL AMPLIFIERS**

Class-A, Class-B power amplifiers and its Efficiency, transformer coupled, push-pull, complementary symmetry circuits, transistor power dissipation, Thermal runaway, Heat sinks.

**UNIT-2: FEEDBACK AMPLIFIERS and OSCILLATORS (9)**

**FEEDBACK AMPLIFIERS:** Classification of Feedback amplifiers, general characteristics negative feedback amplifiers, Voltage series, Voltage shunt, Current series, Current shunt configurations.

**OSCILLATORS:** Conditions & Frequency of oscillations for RC- RC phase shift & Wien bridge Oscillators, LC type- Hartley & Colpitts oscillators.

**UNIT 3: CHARACTERISTICS OF OP-AMP (9)**

IC Classification, chip size and circuit complexity, Ideal & practical Op-amp Characteristics, inverting and Non inverting amplifier, differential amplifier, frequency response of op -amp - Application of op-amp – adder, subtractor, comparator, differentiator, integrator.

**UNIT 4: APPLICATIONS OF OP-AMP (9)**

Instrumentation amplifier, comparators-Multivibrators, Wave generators-Clippers, Clampers, D/A converter- R-2R ladder & weighted resistor types, A/D converter- dual slope, successive approximation.

**UNIT 5: 555 TIMER & IC APPLICATIONS (9)**

Introduction to 555 timer- functional diagram, monostable and astable multivibrator, 566 voltage control oscillator circuit, 565 PLL, LM 317, LM 723 regulator, three terminal voltage regulators: 78xx, 79xx, LM 380 power amplifier, ICL 8038 function generator IC.

**Total Hours: 45**



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOMES:**

On successful completion of the course the student will be able to		POs
<b>CO1</b>	Gain the knowledge on various parameters of small signal and large signal amplifiers	<b>PO1, PO2</b>
<b>CO2</b>	Analyze various parameters of Feedback amplifiers and oscillators	<b>PO1, PO2</b>
<b>CO3</b>	Understand the basics of operational amplifiers with linear integrated circuits along with its characteristics	<b>PO1, PO2</b>
<b>CO4</b>	Analyze the applications of op-amp and data converters	<b>PO1, PO2</b>
<b>CO5</b>	Investigate the working principles of 555 timer and special ICs	<b>PO1,PO2</b>

**TEXT BOOKS:**

1. S.Salivahanan, N.Suresh Kumar "Electronic Devices and Circuits" 2nd Edition 2008.
2. Op-Amps & Linear ICs, 4th Edition, 1987,Ramakanth A. Gayakwad, PHI, New Delhi.
3. Linear Integrated Circuits, 2<sup>nd</sup> Edition, 2003, D. Roy Chowdhury, New Age International (P) Ltd, Mumbai.

**REFERENCE BOOKS:**

1. Solid State Pulse Circuits by David A. Bell 4th Edition.
2. Design with Operational Amplifiers & Analog Integrated Circuits, 3rd Edition.- 2002,Sergio Franco, McGraw Hill, New Delhi.
3. Linear IC and Applications, 1st Edition, 2005,U.A.Bakshi and A.P.Godse,Technical Publications, Pune.

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/108/102/1081021>  
<https://nptel.ac.in/courses/108/108/108108111/>

**CO-PO MAPPING:**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO.1</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO.2</b>	3	3	-	-	-	-	-	-	-	-	-	-
<b>CO.3</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO.4</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO.5</b>	3	2	-	-	-	-	-	-	-	-	-	-
<b>CO*</b>	3	2.4										



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech-IV Semester**

**20EEE245**

**CONTROL SYSTEM LAB**

**L T P C  
0 0 3 1.5**

**COURSE EDUCATIONAL OBJECTIVES:**

- 1 To demonstrate knowledge on different types of controllers.
- 2 To determine the characteristics of DC and AC servomotors.
- 3 To apply skills in DC position control and temperature control systems.
- 4 To obtain the transfer function of DC motors by conducting suitable tests.
- 5 To evaluate stability of Control system by different methods using MATLAB.

**Any Ten of the following experiments are required to be conducted**

1. Time Response of Second Order System.
2. Characteristics of Synchros.
3. Transfer Function of Armature Controlled DC Machine.
4. Transfer Function of Separately Excited DC Generator.
5. Effect of P - PD - PI - PID Controller on A Second Order Systems
6. Lag and Lead Compensation – Magnitude and Phase Plot
7. Characteristics of Magnetic Amplifiers
8. Effect of feedback on DC Servo Motor
9. Characteristics of AC Servo Motor
10. Temperature control using PID controller
11. Linear System Analysis (Time Domain Analysis - Error Analysis) Using MATLAB
12. Stability Analysis of Control System - Bode Plot, Root Locus and Nyquist Plot Using MATLAB.

**COURSE OUTCOMES:**

<b>On successful completion of course, student will be able to</b>		<b>POs</b>
<b>CO1</b>	Demonstrate knowledge on different types of controllers.	<b>PO1</b>
<b>CO2</b>	Analyze the characteristics of DC and AC servomotors	<b>PO2</b>
<b>CO3</b>	Determine the transfer function of DC motors by conducting suitable tests.	<b>PO4</b>
<b>CO4</b>	Select appropriate design tools and procedure to evaluate stability of Control system	<b>PO5</b>
<b>CO5</b>	Follow ethical principles to evaluate performance of AC machines.	<b>PO8</b>
<b>CO6</b>	Do experiments effectively as an individual and as a member in a group.	<b>PO9</b>
<b>CO7</b>	Communicate verbally and in written form, the understandings about the experiments.	<b>PO10</b>
<b>CO8</b>	Continue updating their skill related to electronic devices and their applications during their life time	<b>PO12</b>
<b>CO9</b>	Analyze rotary inverter pendulum using LABVIEW.	<b>PO3</b>



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**TEXT BOOKS:**

1. Anandkumar, Control Systems, PHI learning Pvt Ltd., 2nd edition, 2014.
2. Katsuhiko Ogata, Modern Control Engineering, Pearson Education Publishers, 5th edition, 2010.

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/107/106/107106081/>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	-	3	-	-	-	-	-	-	-	-
CO.4	-	-	-	-	3	-	-	-	-	-	-	-
CO.5	-	-	-	-	-	-	-	3	-	-	-	-
CO.6	-	-	-	-	-	-	-	-	3	-	-	-
CO.7	-	-	-	-	-	-	-	-	-	3	-	-
CO.8	-	-	-	-	-	-	-	-	-	-	-	3
CO.9	-	-	3	-	-	-	-	-	-	-	-	-
CO*	3	3	3	3	3			3	3	3		3





**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech-IV Semester**

**20EEE246**

**ELECTRICAL MACHINES-1 LAB**

**L T P C  
0 0 3 1.5**

**COURSE EDUCATIONAL OBJECTIVES:**

1. To demonstrate knowledge on various parts of DC machine
2. To analyze the performance of various DC machines.
3. To obtain the performance characteristics of DC machines.
4. To obtain the transfer function of DC motors by conducting suitable tests.
5. To evaluate efficiency of DC machines by conducting suitable test

**Any Ten of the following experiments are required to be conducted**

1. Magnetization Characteristics of DC Shunt Generator. Determination of Critical Field Resistance And Critical Speed
2. Swinburne's Test and Speed Control of Dc Shunt Motor. Predetermination of Efficiencies
3. Brake Test on DC Shunt Motor. Determination of Performance Curves
4. Brake Test on DC Compound Motor. Determination of Performance Curves
5. Separation of Losses In Dc Shunt Motor
6. Retardation Test on Dc Shunt Motor. Determination of Losses At Rated Speed
7. Load Test on DC Separately Excited Generator To Determine Its Characteristics.
8. Load Test on DC Shunt Generator. Determination of Characteristics
9. Load Test on a DC Compound Generator. Determination of Characteristics
10. Load Test on DC Series Generator. Determination of Characteristics
11. Hopkinson's Test on Dc Shunt Machine. Predetermination Of Efficiency.
12. Field's Test on DC Series Machines. Determination of Efficiency

**COURSE OUTCOMES:**

<b>On successful completion of course, student will be able to</b>		<b>POs</b>
<b>CO1</b>	Demonstrate knowledge on various parts of DC machine.	<b>PO1</b>
<b>CO2</b>	Analyze the performance of various DC machines.	<b>PO2</b>
<b>CO3</b>	Determine various losses of DC machines by conducting suitable test	<b>PO4</b>
<b>CO4</b>	Analyze Field's Test on DC Series Motor.	<b>PO5</b>
<b>CO5</b>	Select appropriate design tools and procedure to evaluate performance of DC machines	<b>PO8</b>
<b>CO6</b>	Follow ethical principles to evaluate performance of DC machines.	<b>PO9</b>
<b>CO7</b>	Do experiments effectively as an individual and as a member in a group.	<b>PO10</b>
<b>CO8</b>	Communicate verbally and in written form, the understandings about the experiments.	<b>PO12</b>
<b>CO9</b>	Continue updating their skill related to various testing of DC machines during their life time	<b>PO12</b>



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**TEXT BOOKS:**

1. P.S. Bimbhra, 'Electrical Machinery', Khanna Publishers, 2003.
2. B.L.Theraja&A.K.Theraja," A Text Book of Electrical Technology" S.Chand, New Delhi, 2012.

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/108/105/108105131/>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-	-	-
<b>CO2</b>	-	3	-	-	-	-	-	-	-	-	-	-
<b>CO3</b>	-	-	-	3	-	-	-	-	-	-	-	-
<b>CO4</b>	-	-	-	-	3	-	-	-	-	-	-	-
<b>CO5</b>	-	-	-	-	-	-	-	3	-	-	-	-
<b>CO6</b>	-	-	-	-	-	-	-	-	3	-	-	-
<b>CO7</b>	-	-	-	-	-	-	-	-	-	3	-	-
<b>CO8</b>	-	-	-	-	-	-	-	-	-	-	-	<b>3</b>
<b>CO9</b>	-	-	<b>3</b>	-	-	-	-	-	-	-	-	3
<b>CO*</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>			<b>3</b>	<b>3</b>	<b>3</b>		<b>3</b>



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
STUDIES. (AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**II B.Tech-IV Semester**

**20EEE247                      MEASUREMENTS AND INSTRUMENTATION LAB                      L   T   P   C**  
**0   0   3   1.5**

**COURSE EDUCATIONAL OBJECTIVES:**

- 1** To provide practical experience on procedures for measuring Resistance, Inductance and Capacitance of different ranges
- 2** To evaluate the three phase power, frequency, core losses.
- 3** To design experiments for calibration of measuring instruments, LVDT and resistance strain gauge.
- 4** To determine the resistance, inductance and capacitance parameters using DC and AC bridges
- 5** To know the industrial practices of Measuring earth resistance, dielectric strength of transformer oil & Testing of underground cables

**Any Ten of the following experiments are required to be conducted**

1. Calibration And Testing of Single Phase Energy Meter
2. Crompton D.C. Potentiometer – Calibration of PMMC Ammeter And PMMC Voltmeter
3. Kelvin’s Double Bridge – Measurement of Resistance – Determination of Tolerance.
4. Measurement of Unknown Inductance Using Anderson’s Bridge
5. Measurement of 3 Phases Reactive Power with Single-Phase Wattmeter.
6. Measurement of Parameters of A Choke Coil Using 3 Voltmeter And 3 Ammeter Methods.
7. Calibration LPF Wattmeter – By Phantom Testing
8. Measurement of 3 Phase Power with Two Watt Meter Method (Balanced & Un Balanced).
9. Whetstone’s Bridge For Measurement Of Medium Resistance
10. Measurement of Unknown Capacitance Using Schering Bridge
11. Resistance Strain Gauge – Strain Measurements and Calibration.
12. LVDT and Capacitance Pickup – Characteristics and Calibration.

**COURSE OUTCOMES:**

<b>On successful completion of the course, student will be able to</b>		<b>POs</b>
<b>CO1</b>	Demonstrate knowledge on procedures for measuring Resistance, Inductance and Capacitance of different ranges.	<b>PO1</b>
<b>CO2</b>	Analyze and evaluate the three phase power, frequency, core losses	<b>PO2</b>
<b>CO3</b>	Design and calibrate of various measuring instruments	<b>PO3</b>
<b>CO4</b>	Determine the resistance, inductance and capacitance parameters using DC and AC bridges	<b>PO4</b>
<b>CO5</b>	Follow ethical principles to evaluate performance of AC machines.	<b>PO8</b>
<b>CO6</b>	Do experiments effectively as an individual and as a member in a group.	<b>PO9</b>
<b>CO7</b>	Communicate verbally and in written form, the understandings about the experiments.	<b>PO10</b>
<b>CO8</b>	Continue updating their skill related to electronic devices and their applications during their life time	<b>PO12</b>



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**TEXT BOOKS:**

1. A.K. Sawhney, 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2010.
2. J. B. Gupta, 'A Course in Electronic and Electrical Measurements', S. K. Kataria & Sons, Delhi, 2013.

**REFERENCE WEBSITE:**

<https://nptel.ac.in/courses/108/105/108105153/>

**CO-PO MAPPING:**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	-	3	-	-	-	-	-	-	-	-
CO.4	-	-	-	-	3	-	-	-	-	-	-	-
CO.5	-	-	-	-	-	-	-	3	-	-	-	-
CO.6	-	-	-	-	-	-	-	-	3	-	-	-
CO.7	-	-	-	-	-	-	-	-	-	3	-	-
CO.8	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3		3	3			3	3	3		3