



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
(Accredited by NBA)**

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 become a centre of excellence in Electronics and Communication Engineering and provide necessary skills to the students to meet the challenges of industry and 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 spirit among students



PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

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

PEO1: Have Professional competency through the application of knowledge gained from subjects like Mathematics, Physics, Chemistry, Inter-Disciplinary and core subjects like Signal Processing, VLSI, Embedded Systems, Communication and Automation. **(Professional Competency)**

PEO2: Excel in one's career by critical thinking towards successful services and growth of the organization or as an entrepreneur or through higher studies. **(Successful Career Goals)**

PEO3: Enhance knowledge by updating advanced technological concepts for facing the rapidly changing world and contribute to society through innovation and creativity. **(Continuing Education and Contribution to Society)**

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.



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- 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.

PROGRAM SPECIFIC OUTCOMES (PSO's)

On Successful completion, the graduate will be able to,

- PSO1: Apply the knowledge obtained in core areas for the analysis and design of components in Signal Processing, VLSI, Embedded Systems, Communication and Automation.
- PSO2: Adapt Innovation, Creativity and design to develop products which meet industrial and societal needs.



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 subject 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 pursue 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 undergraduate 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 subjectwise 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.



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



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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 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.



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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, 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.



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- 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.
- 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.



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- 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.
- 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



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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.

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



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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 6th semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year 6th semester.

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



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- 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 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 upto 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



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program by the department. If minimum enrolments criteria are not met then the students shall be permitted to register for the equivalent 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



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tracks can be the fundamental courses in CSE, ECE, EEE, CE, ME etc 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) upto 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 upto 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 8/12 weeks 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 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



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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^{th} subject and G_i is the grade point scored by the student in the i^{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.



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

where ' S_j ' is the SGPA of the j^{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) x 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	≥ 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 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



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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
- ii. projects and gathering scientific as well as technological knowledge.
- iii. 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 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.



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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.

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
 - 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.



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- 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.

NATURE OF MALPRACTICES/ IMPROPER CONDUCT PUNISHMENT	PUNISHMENT
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.	Expulsion from the examination hall and cancellation of the performance in that subject Only.



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<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>
<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 candidates 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 SYLLABUS (2020 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 Structures	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 Structures 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			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 Equations and Transformation techniques	2	1	0	3	30	70	100
3	20EEE121	Electrical Circuit Analysis	2	1	0	3	30	70	100
4	20ECE111	Electronic Devices and Circuits	3	0	0	3	30	70	100
5	20ESC115	Programming with Python	2	1	0	3	30	70	100
6	20HSM112	Communicative English Language lab	0	0	3	1.5	30	70	100
7	20ECE121	Electronic Devices and Circuits 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	-	p
Contact hours per week			14	3	9	-	-	-	-
Total hours per week			26				-	-	-
Total credits			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 & Complex Analysis	2	1	0	3	30	70	100
2	20ESC233	Principles of Electrical Engineering	2	1	0	3	30	70	100
3	20ECE231	Digital Electronics	2	1	0	3	30	70	100
4	20ECE232	Electronic Circuit Analysis	2	1	0	3	30	70	100
5	20ECE233	Signals and Systems	2	1	0	3	30	70	100
6	20HSM231	Soft Skills (SOC/SAC Course)	0	1	2	2	30	70	100
7	20ESC234	Principles of Electrical Engineering Lab	0	0	3	1.5	30	70	100
8	20ECE234	Digital Electronics Lab	0	0	3	1.5	30	70	100
9	20ECE235	Electronic Circuit Analysis lab	0	0	3	1.5	30	70	100
10	20MAC231	Environmental Science	2	0	0	0	P	-	-
Contact Hours per week			12	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	20BSC231	Numerical Methods and Probability Theory	3	1	0	4	30	70	100			
2	20ECE241	Linear Control Systems	2	1	0	3	30	70	100			
3	20ECE242	Computer Architecture and Microprocessor	2	1	0	3	30	70	100			
4	20ECE243	Linear and Digital IC applications	2	1	0	3	30	70	100			
5	20ECE244	Pulse and Digital Circuits	2	1	0	3	30	70	100			
6	20ECE245	PCB Design (SOC/SAC Course)	0	1	2	2	30	70	100			
7	20ECE246	Linear IC applications Lab	0	0	3	1.5	30	70	100			
8	20ECE247	Microprocessor and Interfacing Lab	0	0	3	1.5	30	70	100			
9	20ECE248	Pulse and Digital circuits Lab	0	0	3	1.5	30	70	100			
		Internship during summer vacation	-	-	-	-	-	-	-			
Contact Hours per week			11	6	11	-	-	-	-			
Total Hours per week			28				-	-	-			
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

20BSC111

ALGEBRA AND CALCULUS
(Common to All Branches)

L	T	P	C
2	1	-	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To familiarize the students with the theory of matrices.
2. To explain the series expansion using mean 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 I: 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 – II: 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 III: 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 IV: 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 V: 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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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs related to COs
CO1	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.	PO1,PO2,PO3
CO2	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.	PO1,PO2,PO3
CO3	To evaluate double and triple integrals of functions of several variables	PO1,PO2,PO3
CO4	To illustrate the physical interpretation of gradient, divergence and curl and apply operator del to scalar and vector point functions.	PO1,PO2,PO3
CO5	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.	PO1,PO2,PO3

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=KgItZSst2sU>
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
CO1	3	3	2	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-
CO*	3	3	2	-	-	-	-	-	-	-	-	-



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
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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)	L	T	P	C
		3	-	-	3

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 I: 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 - II: 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 -III: 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 - IV: 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 - V: 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:

On successful completion of the course the will be able to,		POs related to Cos
CO1	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.	PO1, PO2,PO6
CO2	Acquire the knowledge in corrosion phenomenon and develop skills in the design of methods for control of corrosion	PO1, PO2
CO3	Acquire knowledge on polymeric materials and to prepare polymeric material for environmental safety and society need.	PO1, PO2,PO6
CO4	Understand and apply the concept of electrochemistry and analyse the standard Electrodes and different types of fuels cells	PO1, PO2
CO5	Demonstrate the basic knowledge of instrumental methods and their applications in the structural analysis of materials	PO1, PO2,PO3

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

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



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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)

L T P C
3 - - 3

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 Various atomic phenomena
5. To provide knowledge about semiconductors and Nanomaterials.

UNIT-I 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-II LASERS & FIBER OPTICS

(9)

Lasers-Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein’s coefficients – Population inversion – Conditions for 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-III 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 IV: 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 V: SEMICONDUCTOR PHYSICS & NANOMATERIALS

(10)

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



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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 related to COs
CO1	Identify the importance and applications Wave Optics in various Streams of Engineering	PO1, PO2
CO2	Understand the working principle and applications of Lasers and Optical fibers	PO1,PO2
CO3	To elucidate the importance, properties and applications of Magnetic materials and dielectrics	PO1, PO2
CO4	Use ideas with mathematical solutions to Quantum mechanics and its applications in various atomic phenomena	PO1,PO2,
CO5	Provide knowledge about semiconductors and Nanomaterials	PO1,PO2,PO12

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
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	2
CO*	3	2	-	-	-	-	-	-	-	-	-	2



20ESC111	ENGINEERING GRAPHICS	L	T	P	C
	(Common to all branches)	1	-	4	3

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 (12)

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:

On successful completion of the course, students will be able to		POS RELATED TO COS
CO1	Construct the Engineering curves and generate tangent and normal for those curves.	P01,P02,P03,P10
CO2	Draw the projection of points, lines and plane surfaces.	P01,P02,P03, P10
CO3	Draw the projection of solids, sections of solids like prisms, pyramids, cylinder and cone.	P01,P02,P03, P10
CO4	Draw the isometric projections and views and also develop the development of surfaces.	P01,P02,P03, P10
CO5	Draw the orthographic and perspective projections of solids.	P01,P02,P03, P10

TEXT BOOKS:

1. N.D. Bhatt and V. M. Panchal , "Engineering Drawing" , Charotar Publishing House, 50th edition, , 2010.
2. K.V.Natrajan , "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai. 2009.

REFERENCES BOOKS:

1. K.V.Natrajan , "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2009.
2. 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.
3. K.Venugopal and V.Prabhu Raja ,"Engineering Graphics", New Age International (P) Limited. 2008.
4. M.B.Shah and B.C.Rana , "Engineering Drawing", Pearson Education, 2/e, 2009.
5. 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

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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I B.TECH. – I SEMESTER

20CSE111	C & DATA STRUCTURES (Common to ECE, EEE, CSE, CSM)	L	T	P	C
		2	1	-	3

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 related to COs
CO1	Understand the problem solving basics.	PO1, PO2
CO2	Identify and develop programs using control structures like selection control and iterative control statements.	PO1, PO2, PO3
CO3	Apply and Demonstrate knowledge on pointers, structure and union.	PO1,PO2, PO3, PO4
CO4	Categorize the basic data Structures and its applications	PO1, PO2,PO5
CO5	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
2. 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
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	2	2	-	-	-	-	-	-	-	-
CO4	3	3	-	-	2	-	-	-	-	-	-	-
CO5	3	-	2	2	-	-	-	-	-	-	-	-
CO*	3	3	2	2	2	-	-	-	-	-	-	-



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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)	- - 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 $BaCl_2$ Vs Na_2SO_4 (Precipitation Titration).
10. Determination of viscosity of the given oils through Redwood viscometer

COURSE OUTCOMES:

On successful completion of the course the students will be able to		POs related to COs
CO1	Prepare standard solutions	PO1,PO3
CO2	Acquire knowledge about volumetric analysis of estimation copper by EDTA and by Iodometry	PO1,PO2,PO3
CO3	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	PO1,PO2,PO3,PO6,PO12
CO4	Acquire skills to use instrumental techniques for the determination of electrical conductance of electrolytes and viscosity of lubricants	PO1,PO2,PO3
CO5	Provide solutions for environmental issues through determination of quality of water	PO1,PO2,PO3,PO6,PO7



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C06	Communicate verbally and in written form pertaining to results of the Experiments	PO1,PO2,PO8,PO9,
C07	Learns to perform experiments involving chemistry in future years.	PO1,PO2,PO8,PO9, PO10
C08	Communicate verbally and in written form, the understanding about the experiments.	PO1,PO2,PO8,PO9,PO10
C09	Continue updating their skill related to chemistry laboratory.	PO1,PO2,PO8, PO9,PO10

CO-PO MAPPING

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	2	-	2	-	-	-	-	-	-	-	-	-
C02	2	2	2	-	-	-	-	-	-	-	-	-
C03	2	2	2	-	-	2	-	-	-	-	-	2
C04	2	2	2	-	-	-	-	-	-	-	-	-
C05	2	2	2	-	-	2	2	-	-	-	-	-
C06	2	2	-	-	-	-	-	2	2	-	-	-
C07	2	2	-	-	-	-	-	2	2	2	-	-
C08	2	2	-	-	-	-	-	2	2	2	-	-
C09	2	2	-	-	-	-	-	2	2	2	-	-
CO*	3	2	2	-	-	2	2	-	-	-	-	2



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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
		-	-	2	1

PRE-REQUISITES: Nil

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

LIST OF EXPERIMENTS

- 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

TEXT BOOKS:

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



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Course Outcomes:

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

CO-PO MAPPING

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



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I B.TECH. – I SEMESTER

20CSE112

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

L T P C
- - 3 1.5

PRE-REQUISITES: Nil

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.

LIST OF 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: $9 > 1 + 3$).



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



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COURSE OUTCOMES:

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

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
2. 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
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9												3
CO*	3	3	3	3	-	-	-	3	3	3		3



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I B.TECH. – I SEMESTER

20ESC112	ENGINEERING WORKSHOP AND IT WORKSHOP	L T P/D C
	(Common to all branches)	- - 2 1

PRE-REQUISITES: Nil

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.

A. 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):

On successful completion of the course, students will be able to		POs related to COs
CO1	Demonstrate the knowledge on different tools used in carpentry, fitting, sheet metal, house wiring and plumbing sections and also basic machining process	PO1
CO2	Analyze the basic pipeline connection using different joints	PO2
CO3	Design and develop simple components by using different materials includes wood, GI sheet and MS plates	PO3
CO4	Apply basic electrical engineering tools on the house wiring practice	PO5
CO5	Follow the ethical principles in while doing the exercises.	PO8
CO6	Do the exercises effectively as an individual and as a team member in a Group	PO9



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CO7	Communicate verbally among team members and in written form, the understanding about the trade exercises.	PO10
CO8	Continue updating their skill related to trades.	PO12

TEXT BOOKS:

1. Lab manual provided by the department.

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



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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.

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.



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COURSE OUTCOMES (IT WORKSHOP):

On the successful completion of this course, the student should be able to,		POs related to COs
CO1	Acquire knowledge on computer system such as system unit, input devices, and output devices connected to the computer.	PO1
CO2	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.	PO2
CO3	Demonstrate the working of the internet that include the use of protocols, domains, IP addresses, URLs, web browsers, web servers, mail-servers, etc.	PO3
CO4	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.	PO5
CO5	Follow the ethical principles in implementing the programs	PO8
CO6	Do experiments effectively as an individual and as a team member in a group.	PO9
CO7	Communicate verbally and in written form, the understanding about the experiments and	PO10
CO8	Continue updating their skill related to MS Office, Internet and Computer in future.	PO12

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, IITL 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 MAPPING

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



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I B.TECH. – II SEMESTER

20HSM111	COMMUNICATIVE ENGLISH FOR ENGINEERS	L T P C
	(Common to All Branches)	3 - - 3

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-I: 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 oneself 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.

UNITII: 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;mecahanics of writings.

Grammar and Vocabulary: Word formation (Derivtion,Borrowing-coinage-compounding) Tenses.

UNITIII: 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 IV: 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 oneself 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.



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UNIT V: 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 oneself 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.

Total Hours :45

COURSE OUTCOMES:

On successful completion of the course, student will be able to		POs related to COs
CO1	Understand the concepts on developing vocabulary and communicating in a verbal manner.	P01
CO2	Understand and develop knowledge on the use of Technology for social aspects.	P05
CO3	Understand Acquiring skills to become an able Entrepreneur	P02
CO4	Understand contextual knowledge to recognize the need of ability to engage in independent and life-long learning in the broadest context of technological change.	P06
CO5	Understand the importance of Medical advancement and its uses on Human life in India..	P04

TEXT BOOKS:

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

REFERENCE BOOKS:

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

REFERENCE WEBSITE:

- www.english club.com
- www.easyworldofenglish.com
- www.languageguide.org/english/
- www.bbc.co.uk/learningenglish
- www.eslpod.com/index.html
- www.myenglishpages.com

CO-PO MAPPING

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



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I B.TECH. – II SEMESTER

20BSC121	DIFFERENTIAL EQUATIONS AND TRANSFORMATION TECHNIQUES (COMMON TO ALL BRANCHES)	L T P C 2 1 0 3
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PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1	To learn the methods of solving the ordinary differential equations of first & higher order and applications of first order ordinary differential equations.
2	To learn partial differential equations and how they can serve as models for physical processes and also master the technique of separation of variables to solve partial differential equation.
3	To learn the concepts of Laplace Transforms and inverse Laplace Transforms and to explore the solving initial value problems by using Laplace transform method.
4	To develop skill to design Sine and Cosine waves with the help of Fourier series
5	To learn the concepts of Fourier transform and inverse Fourier Transform.

UNIT I: ORDINARY DIFFERENTIAL EQUATIONS (9)

Differential Equations of First Order and First Degree: Formation – Linear and Bernoulli’s equations – Applications to L-R and C-R circuit’s problems.

Linear Differential Equations of Higher Order: Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} v(x)$ & $x^m v(x)$ - Method of variation of parameters.

UNIT II: PARTIAL DIFFERENTIAL EQUATIONS (9)

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions - Solution of first order linear (Lagrange’s) equation and Non-Linear (standard forms) equations - Solution of PDE by the Method of separation of variables.

UNIT III: LAPLACE TRANSFORMS (9)

Definition of Laplace transform, Laplace transform of standard functions - Laplace Transform of Unit step function, Dirac’s delta function and Periodic function – Properties of Laplace Transforms(without proof): Linear property, First shifting theorem, Change of Scale Property, Second shifting theorem, Multiplication & Division by t , Transform of Derivatives & Integrals - Inverse transform - Convolution theorem(without proof) – Application: Solution of ordinary differential equations of first and second order with constant coefficients.

UNIT IV: FOURIER SERIES (9)

Determination of Fourier coefficients, Euler’s formulae, Dirichlet’s conditions - Fourier series of periodic functions, even and odd functions - Fourier series in an arbitrary interval - Half-range Fourier sine and cosine expansions.

UNIT V: FOURIER TRANSFORM (9)

Fourier integral theorem (without proof) - Fourier sine and cosine integrals - Fourier transform – Fourier sine and cosine transforms - Properties - Inverse transforms - Finite Fourier transforms.

TOTAL HOURS: 45



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs related to Cos
CO1	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.	PO1,PO2,PO3
CO2	Apply a range of techniques to find solutions of standard PDE's and outline the basic properties of standard PDE's	PO1,PO2,PO3
CO3	To understand the concepts of Laplace transform and elementary functions, general functions using its properties and special functions.	PO1,PO2,PO3
CO4	To understand finding Fourier series expression of the given function.	PO1,PO2,PO3
CO5	Understand Fourier transforms and properties of Fourier transforms	PO1,PO2,PO3

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:

1. <https://nptel.ac.in/courses/111/106/111106100/>
2. <https://www.youtube.com/watch?v=OBhZvyhc8JQ&t=982s>
3. <https://nptel.ac.in/courses/111/106/111106100/>
4. <https://www.youtube.com/watch?v=3zCdNO2xp3s>
5. <https://www.youtube.com/watch?v=XU5hUrh6-18&t=948s>
6. <https://nptel.ac.in/courses/111/106/111106139/>
7. https://www.youtube.com/watch?v=LGxE_yZYigI
8. <https://www.youtube.com/watch?v=6spPyJH6dkQ>
9. <https://www.youtube.com/watch?v=GFKggEkKtLM>

CO-PO MAPPING

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

I B.Tech. – II Semester



20EEE121

ELECTRICAL CIRCUIT ANALYSIS

L T P C
2 1 - 3

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-I 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-II 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-III 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-IV 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-V 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:

On successful completion of the course the student will be able to,		POs related to COs
CO1	Analyse electrical circuits	PO1, PO2, PO3,PSO12
CO2	Investigate different various periodic waveforms	PO1, PO2, PO3,PSO12
CO3	Analyse the magnetically coupled circuits and evaluate the resonance condition for series and parallel RLC network.	PO1, PO2, PO3,PSO12
CO4	Apply circuit theorems for DC circuits	PO1, PO2, PO3,PO12
CO5	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*	3	2.6	2									2



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20ECE111	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
		3	-	-	3

PRE-REQUISITES: Nil

Course Educational Objectives:

1. To study the basic concepts and characteristics of the PN Junction diodes.
2. To understand and analyze the working principle of Rectifier & Filter circuits and their application
3. To study and analyze the working principle and characteristics of BJT
4. To study and analyze the working principle and characteristics of FET
5. To understand the working principle and characteristics of special devices.

UNIT-I: Junction Diode Characteristics (9)

Open circuited p-n junction, Biased p-n junction, p-n junction diode, current components in PN junction Diode, diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance and its application, Zener diode – V-I Characteristics.

UNIT-2: Rectifiers and Filters (9)

Basic Rectifier setup, half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, comparison of various filter circuits in terms of ripple factors, Zener diode regulator.

UNIT-3: BJT Transistor Characteristics: (9)

Junction transistor, transistor current components, transistor configurations, Characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, punch through/ reach through.

UNIT-4: FET Transistor Characteristics: (9)

Construction and principle of operation and characteristics of JFET & MOSFET (Enhancement & Depletion mode). Biasing of FET, FET act as voltage variable resistor, comparison of BJT and FET

UNIT-5: Special Semiconductor Devices (9)

Principle of operation, characteristics and applications of - Varactor diode, Tunnel diode, Uni Junction Transistors, Silicon Controlled Rectifier, Scottky diode, LED, Photo transistor.

Total hours: 45



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Course Outcomes

On successful completion of the course, students will be able to		POs related to COs
CO1	Demonstrate concepts and Analyze the characteristics of the PN Junction diodes.	PO1, PO2
CO2	Design and Analyze of Rectifiers & Filters circuits and its application.	PO1,PO2, PO3
CO3	Design and investigate the working of BJT transistor and its configurations and characteristics	PO1,PO2, PO3,PO4
CO4	Design and analyze the working of FET, MOSFET and special diodes.	PO1, PO2, PO3, PO4
CO5	Demonstrate knowledge on special devices and analyze their VI characteristic.	PO1, PO2

TEXT BOOKS :

1. J. Millman, C. Halkias, Tata Mc-Graw Hill, "Electronic Devices and Circuits", 2e
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, 2e.
3. David Bell , "Electronic Devices and Circuits" ,Oxford Press.

REFERENCE WEBSITES:

1. <https://nptel.ac.in/courses/117/103/117103063>
2. <https://nptel.ac.in/courses/108/101/108101091>
3. <http://www.vidyarthiplus.in/2011/11/electronic-device-and-circuits-edc.html>
4. <https://www.allaboutcircuits.com/video-lectures>

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	2	2	-	-	-	-	-	-	-	-
CO4	3	3	2	2	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	3	2.8	2	2	-	-	-	-	-	-	-	-



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I B.TECH. – II SEMESTER

20ESC115

PROGRAMMING WITH PYTHON
(Common to All Branches)

L T P C
2 1 - 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 I: 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 II: 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 III: 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 IV: 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



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COURSE OUTCOMES:

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

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
2. 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
CO1	3	3	-	-	2	-	-	-	-	-	-	-
CO2	3	-	3	2	-	-	-	-	-	-	-	-
CO3	3	3	-	-	2	-	-	-	-	-	-	-
CO4	3	3	-	-	2	-	-	-	-	-	-	-
CO5	3	-	-	2	2	-	-	-	-	-	-	-
CO*	3	2	3	2	2							



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I B.TECH. – II SEMESTER

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

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:

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

SOFT WARE SUGGESTED: Walden –Hyderabad.

REFERENCE BOOKS:

1. Dr.K.Alex, "Soft Skills- Know yourself and know the world", S. Chand Publications, NewDelhi, 2010
2. T.Vijayakumar, K.Durga Bhavani, English in Action 1st 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
CO1	3	-		-	-	-	-	-	-	-	-	-
CO2	-	-		-	3	-	-	-	-	-	-	-
CO3	-	-	-	-	-	3	-	-	-	-	-	-
CO4	-	3	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-
CO*	3	3	-	-	3	3	-	-	-	3	-	-



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I B.TECH. – II SEMESTER

20ECE121	ELECTRONIC DEVICES AND CIRCUITS LAB	L	T	P	C
		-	-	3	1.5

PRE-REQUISITES: Nil

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.

LIST OF EXPERIMENTS

PART A: Electronic Workshop Practice

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, UJT.
3. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

PART B: (Minimum of 5 Experiments)

1. Verification of Ohm's law
2. Verification of KCL and KVL.
3. Mesh & Nodal Analysis
4. Verification of Thevenin's Theorem.
5. Verification of Superposition Theorem
6. Verification of Maximum Power Transfer Theorem.

PART C: (Minimum of 5 Experiments)

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

Equipment required for Laboratory

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators



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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

COURSE OUTCOMES:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on identification & testing of passive components along with active devices.	PO1
CO2	Analyze the practical characteristics of diodes and transistor with different configurations	PO2
CO3	Design Simple electronic circuits by soldering with specifications	PO3
CO4	Analyze the special purpose devices with their characteristics for future applications	PO4
CO5	Implement the devices like LED, LDR, Photo diode etc. for society applications	PO6
CO6	Follow ethical principles on analysis of different electronic circuits which is used for project works.	PO8
CO7	Do experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the experiments.	PO10
CO9	Continue updating their skill related to electronic devices and their applications during their life time	PO12

CO-PO Mapping

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	-	3	-	3	3	3	-	3



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I B.Tech. – II Semester

20ESC118	PROGRAMMING WITH PYTHON LAB (Common to All Branches)	L	T	P	C
		-	-	3	1.5

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.

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 xlswriter 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.



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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. (Area of the circle = πr^2)
- b) Write a python program to calculate Volume of a sphere. Use the pi constant in the math module in your calculations. (Volume 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.

COURSE OUTCOMES:

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

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 Publishes, 2020.

REFERENCE WEBSITES:

1. https://onlinecourses.swayam2.ac.in/aic20_sp33
2. https://onlinecourses.nptel.ac.in/noc22_cs32
3. <https://spoken-tutorial.org>
4. <https://www.w3schools.com/python.>
5. <https://www.geeksforgeeks.org.>



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CO-PO Mapping:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	3	-	2	-	-	-	-	-	-	-
C02	3	3	3	-	2	-	-	-	-	-	-	-
C03	3	3	3	-	2	-	-	-	-	-	-	-
C04	3	3	3	-	2	-	-	-	-	-	-	-
C05	3	3	3	3	2	-	-	-	-	-	-	-
C06	-	-	-	-	-	-	-	3	-	-	-	-
C07	-	-	-	-	-	-	-	-	3	-	-	-
C08	-	-	-	-	-	-	-	-	-	3	-	-
C09	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	2	-	-	3	3	3		3



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I B.Tech. – II Semester

20MAC121

HUMAN VALUES AND ETHICS
(Mandatory Audit Course)

L T P C
2 - - -

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 I: HUMAN VALUES

(9)

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

UNIT II: HUMAN ESTEEM

(9)

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

UNIT III: 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 IV 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 V UNDERSTANING 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:

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



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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

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



II B.TECH.- III SEMESTER

20BSC232	SPECIAL FUNCTIONS & COMPLEX ANALYSIS (Common to ECE,EEE)	L T P C
		2 1 - 3

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

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



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs related to COs
CO1	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
CO2	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
CO3	Demonstrate knowledge in conformal mappings and bilinear transformations and develop skills in analyzing the properties exhibited by complex functions in Argand plane	PO1,PO2
CO4	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
CO5	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. Prasad "Engineering Mathematics – III", 2013, S. Chand and Company Publishers, Delhi.
2. Dr. B. S. Grewal, Higher Engineering Mathematics, 34/e, 1999, Khanna Publishers, Delhi,

REFERENCE BOOKS:

1. B.V. Ramana,"Engineering Mathematics", 3/e, 2008, Tata McGraw Hill Publishers, New Delhi.
2. Murray R. Spiegel, Schaum's outline series, "Theory and Applications of Complex Variables", 1981, McGraw-Hill Book Company, Singapore
3. Dr. M. K. Venkata Ramana, "Higher Engineering Mathematics", National Pub , Madras.
4. N.P.Bali, "A Text Book of Engineering Mathematics", 2011, Laxmi publications(P)Ltd, New Delhi.
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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	2	-	-	-	-	-	-	-	-	-
CO.2	3	3	2	-	-	-	-	-	-	-	-	-
CO.3	3	3	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	3	2	-	-	-	-	-	-	-	-	-
CO*	3	3	2	-	-	-	-	-	-	-	-	-



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II B.TECH. - III SEMESTER

20ESC233

PRINCIPLES ELECTRICAL ENGINEERING

L T P C
2 1 - 3

PRE-REQUISITES: A Course on Electrical Circuits

COURSE EDUCATIONAL OBJECTIVES:

1. To impart the knowledge on two port networks.
2. To attain the knowledge on D.C. machines.
3. To acquire the knowledge on transformers and single phase ac machine.
4. Impart knowledge on basic of electrical measuring instruments and measurement of energy.
5. Impart knowledge on DC and AC Bridges.

UNIT –1: TWO PORT NETWORKS (9)

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

UNIT –2: DC MACHINES (9)

Principle of Operation of DC Generator, Types of DC Generator, EMF Equation in DC Generator - OCC of a DC Shunt Generator - Principle of Operation of DC Motor -Types of DC Motors - Torque Equation - Losses and Efficiency Calculation in DC Motors, Speed control of DC Shunt motor - Swinburne's Test and Brake Test

UNIT –3: TRANSFORMERS AND SINGLE PHASE AC MACHINE (9)

Principle of Operation - Constructional Details - Losses and Efficiency - Regulation of Transformer - Testing: O.C and S.C Tests. Working principle of single phase and three phase induction machine. Applications of AC machines.

UNIT –4: MEASURING INSTRUMENTS (9)

Introduction, Classification of Instruments, Operating Principles, Essential Features of Measuring Instruments, Moving Coil and Moving Iron Instruments, Dynamometer Wattmeter and Energy meter

UNIT –5: DC AND AC BRIDGES (9)

Introduction , 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.

Total Hours: 45



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Analyze various parameters of two-port networks.	PO1, PO2
CO2	Demonstrate knowledge and analyze various performance characteristics of DC machine.	PO1, PO2
CO3	Demonstrate knowledge on single phase transformer and Induction motors	PO1, PO2
CO4	Understand and evaluate the calibration of different electrical measuring instruments.	PO1, PO2, PO3, PO12
CO5	Demonstrate knowledge on DC and AC bridges	PO1, PO2

TEXT BOOKS:

1. A.Sudhakar, Shyammohan S.palli, "Principles of Electrical Engineering", TMH, 3rd edition, 2009
2. A.K.Sawhney, "Electrical Measurements", Dhanpat Rai & Co. Publications, 18/e -2010 New Delhi.

REFERENCE BOOKS:

1. V.K Mehtha, "Principle of Electrical Engineering", S Chand Publications
2. E.W. Golding and F.C. Widdis, Electrical Measurements and measuring Instruments, Reem Publications, 5th Edition.
3. Reissland, "Electrical Measurements - Concepts - Applications", M.U New Age International (P) Limited - Publishers, 1/e 2006 New Delhi.
4. M.S Naidu and S Kamakshaiah, "Basic Electrical Engineering

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	3	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	3
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	3	3	-	-	-	-	-	-	-	-	-	3



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II B.TECH. - III SEMESTER

20ECE231

DIGITAL ELECTRONICS

L T P C

2 1 - 3

PRE-REQUISITES: NIL

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.
2. To develop skill to minimize switching functions in effective way by using Boolean laws and 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 AND 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, Basic Logic Operations of (NOT,OR,AND), Universal Gates and EX-OR & EX-NOR Gates, Pin diagram of 74xx and 54xx series IC's

UNIT- 2: MINIMIZATION OF SWITCHING FUNCTIONS

(9)

Boolean Algebra: Boolean Theorems- Complement and Dual of Logical Expressions- Minimization of Logic Functions using Demorgans Theorems .Standard SOP and POS, Minimal SOP and POS Realization, Minimization of Switching Functions using K-Map up to 5 variables- - Problem Solving using K-Map for Boolean Functions in SOP and POS Forms using gates.

UNIT -3: COMBINATIONAL LOGIC CIRCUITS& PLD

(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: Realization of Switching Functions using PROM - PLA and PAL - Comparison of PROM, PLA, and PAL.

UNIT-4: SEQUENTIAL CIRCUITS-I

(9)

Basic Latches & Flip Flops-SR, D, JK,T -Conversion between Flip Flops- -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



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COURSE OUTCOMES:

On successful completion of the course students will be able to		POs
CO1	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.	PO1, PO2
CO2	Identify the most efficient grouping to minimize the switching functions using k-map.	PO1, PO2
CO3	Design the combinational logic circuits and realize the PLD's for given specifications.	PO1, PO2, PO3
CO4	Understand the knowledge on latches and flip flops and design the sequential logic circuits.	PO1, PO2, PO3
CO5	Analyze and design finite state machines of different models by implementing state tables and state diagrams and Become familiarize with ASM.	PO1, PO2, PO3, PO4

TEXTBOOKS:

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

REFERENCE BOOKS:

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

REFERENCE WEBSITE:

1. <https://en.wikipedia.org/wiki/>

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	2	-	-	-	-	-	-	-	-	-
CO.4	3	3	2	-	-	-	-	-	-	-	-	-
CO.5	3	2	3	2	-	-	-	-	-	-	-	-
CO*	3	2.6	2.3	2	-	-	-	-	-	-	-	-



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II B.TECH. - III SEMESTER

20ECE232

ELECTRONIC CIRCUIT ANALYSIS

L T P C

2 1 - 3

PRE-REQUISITES: Electronic Devices and Circuits

COURSE EDUCATIONAL OBJECTIVES:

1. To develop the basic understanding of transistor biasing and its analysis using hybrid model
2. To make students aware of amplifier operation at low and high frequency and its frequency responses.
3. To make students learn about different types of feedback amplifiers and oscillators 4.To Analyze the power efficiency calculations of power amplifiers
4. To make students learn about different types of Tuned amplifiers

UNIT –1: BIASING OF BJT TRANSISTOR (9)

Need for biasing, bias point, load line, Methods of BJT biasing - fixed bias, collector to base bias, self - bias, Stabilization against variations in V_{BE} and β , Bias compensation techniques, thermal runaway, condition for thermal stability.

UNIT –2: SMALL SIGNAL LOW FREQUENCY BJT AMPLIFIER MODELS (9)

Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers.

UNIT –3: SMALL SIGNAL HIGH FREQUENCY TRANSISTOR AMPLIFIER MODELS (9)

Transistor at high frequencies, Hybrid- π common emitter transistor model, determination of high-frequency parameters in terms of low-frequency parameters, CE short circuit current gain, current gain with resistive load, cut-off frequencies, frequency response and gain bandwidth product.

UNIT –4: MULTISTAGE AMPLIFIERS AND FEEDBACK AMPLIFIERS (9)

Multistage Amplifier: Classification of amplifiers, methods of coupling, Cascaded transistor amplifier and its analysis, Darlington pair amplifier, Cascode amplifier.

Feedback Amplifiers: Feedback principle, types of feedback, feedback topologies, Characteristics of negative feedback amplifiers, generalized analysis of feedback amplifiers, Performance comparison of feedback amplifiers, Introduction to oscillator.

UNIT –5: POWER AMPLIFIERS AND TUNED AMPLIFIERS (9)

Power Amplifiers: Classification of amplifiers, Class A power Amplifiers and their analysis, Harmonic Distortions, Class B Push-pull amplifiers and their analysis, Complementary symmetry push pull amplifier, Class AB power amplifier, Class-C power amplifier, Thermal stability and Heat sinks, Distortion in amplifiers

Tuned Amplifiers : Introduction, Q-Factor, small signal tuned amplifier, single tuned amplifier, double tuned amplifiers, effect of cascading single tuned amplifiers on band width, effect of cascading double tuned amplifiers on band width, staggered tuned amplifiers, stability of tuned amplifiers.

Total Hours: 45



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AUTONOMOUS
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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate basic concepts of BJT transistor biasing.	PO1, PO2
CO2	Investigate the small signal low frequency BJT Transistor Amplifier using h- parameters	PO1, PO2, PO4
CO3	Investigate the response of BJT at high frequency using hybrid model	PO1, PO2, PO4
CO4	Analyze the multistage transistor and feedback amplifiers	PO1, PO2, PO4
CO5	Analyze power efficiency calculations of power amplifiers and understand the different types of tuned amplifiers	PO1, PO2

TEXT BOOKS:

1. J. Millman and C.C. Halkias, "Integrated Electronics", McGraw-Hill, 2017.
2. Salivahanan, N.Suresh Kumar, A. Vallavaraj, "Electronic Devices and Circuits"- TATA McGraw Hill, 4th Edition, 2017.

REFERENCE BOOKS:

1. Robert T. Paynter, "Introductory Electronic Devices and Circuits", Pearson Education, 7th Edition
2. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits Theory", Pearson/Prentice Hall, 9th Edition, 2006.
3. Sedra A.S. and K.C. Smith, "Micro Electronic Circuits", Oxford University Press, 5th Edition.
4. Donald A. Neaman, "Electronic Circuit Analysis and Design", McGraw Hill.

REFERENCE WEBSITE:

1. <https://www.electronics-tutorials.ws/amplifier/transistor-biasing.html>
2. <https://nptel.ac.in/courses/108/102/108102095/>
3. <https://nptel.ac.in/courses/117/101/117101106/>

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	-	3	-	-	-	-	-	-	-	-
CO.3	3	3	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	-	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	3	2.8	-	2.6	-	-	-	-	-	-	-	-



II B.Tech. - III Semester

20ECE233

SIGNALS AND SYSTEMS

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

PRE-REQUISITES: A Course on Engineering Mathematics I, Engineering Mathematics II

COURSE EDUCATIONAL OBJECTIVES:

1. To understand the knowledge on definitions and classifications of signals and systems.
2. To recall the concepts of Fourier series and Fourier transform and apply and analyze the same for different continuous time signals.
3. To interpret the practical relevance of sampling process and explain the effects of under sampling and to demonstrate knowledge on system parameters.
4. To apply and analyze the response of Laplace transform for solving CT systems.
5. To apply and analyze the response of Z - transform for solving DT systems.

UNIT-1:CONTINUOUS AND DISCRETE TIME SIGNALS AND SYSTEMS: (10)

Definition and classification of Signals and Systems (Continuous time and Discrete time) - Elementary signals Impulse, Step, Ramp, Sinusoidal and Exponential and operations on signals. Definition and Classification of Systems – Linear, Time In-variant & Causal. Concept of Convolution (CT & DT) & Correlation of signals.

UNIT-2:FOURIER SERIES & FOURIER TRANSFORM FOR CT SIGNALS: (9)

Fourier series: Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series with examples. Fourier Transforms: Deriving Fourier Transform from Fourier series, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform.

UNIT-3: SAMPLING AND FILTERS (8)

Representation of continuous time signals by its samples - Sampling theorem – classifications, Aliasing effect - problems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, Relationship between bandwidth and rise time.

UNIT-4:LAPLACE-TRANSFORM: (9)

Laplace transform, Concept of ROC & properties, Properties of Laplace Transform, Laplace transform of different signals and Inverse Laplace Transform, Solution of differential equation with initial conditions.

UNIT-5:Z-TRANSFORM: (9)

Z- Transform, Concept of ROC & properties, Properties of Z-Transform, Z- Transform for different signals, Inverse Z-Transform, Solution of difference equation with initial conditions.

Total Periods: 45



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COURSE OUTCOMES:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate the concepts of signals and systems, Analyze the signals and apply different operations on signals.	PO1,PO2, PO3,PO5
CO2	Determine Fourier series coefficient for different types of signals. Evaluate Fourier Transforms for different types of continuous time signals.	PO1,PO2, PO3,PO4,PO5
CO3	Analyze sampling process and sampling of discrete time signals, Analyze Signal Transmission Through Linear Systems and to describe the Ideal characteristics LPF, HPF and BPF	PO1,PO2, PO3, PO4,PO5
CO4	Evaluate Laplace transforms with their properties by using the concept of ROC.	PO1, PO2, PO3, PO5
CO5	Determine Z transforms with their properties by using the concept of ROC and Evaluate the inverse z- transform.	PO1, PO2,PO3, PO4, PO5

TEXT BOOKS:

1. B. P. Lathi "Linear Systems and Signals" , Second Edition, Oxford Univesity press.
2. A.V. Oppenheim "Signals and Systems", A.S.Willsky and S.H.Nawab, Pearson, 2ndEd.,.
3. Ramakrishna Rao "Signals and Systems",2008, TMH.

REFERENCES BOOKS:

1. Simon Haykin and Van Veen, "Signals & Systems", Wiley, 2nd Edition.
2. B.P. Lathi, "Signals, Systems & Communications", 2009, BS Publications.
3. Michel J. Robert, "Fundamentals of Signals and Systems", MGH International Edition.
4. C. L. Philips, JNTU.M.Parrand Eve A.Riskin,"Signals, Systems and Transforms", Pearson education.3rd Edition.

REFERENCE WEBSITE:

1. http://www.tutorialspoint.com/signals_and_systems/
2. <https://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/lecturenotes/>
3. <http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?reload=true&punumber=78>
4. <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=8919>
5. <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=82>
6. <http://nptel.ac.in/courses/117104074> 7. <http://nptel.ac.in/courses/117101055>

CO-PO MAPPING

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



II B.TECH - III SEMESTER

20HSM231	Soft Skills(SOC/SAC Course) (Common to all branches)	L	T	P	C
		-	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 (10)

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 - Group leader 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 – II: CRITICAL THINKING (10)

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 – evaluating the views of others - Case Study, Story Analysis

UNIT – III: PROBLEM SOLVING & DECISION MAKING (10)

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 – IV: EMOTIONAL INTELLIGENCE & STRESS MANAGEMEN (10)

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



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Activities:

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

(10)

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 members to 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 prescribed skill.
Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear or for good Leadership – Mahendar Singh Dhoni etc.

COURSE OUTCOME:

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



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TEXTBOOKS:

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

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/DUIsNJtg2L8?list=PLLy_2iUCG87CQhELCyvXh0E_y-b001_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHIsQFwJZel_j2PUy0pwjVUgj7KIJ
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



II B.TECH. - III SEMESTER

20ESC234

PRINCIPLES OF ELECTRICAL ENGINEERING LAB

**L T P C
- - 3 1.5**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide practical experience for the determination of two port network Parameters.
2. To conduct and analyze the load test on DC shunt machines.
3. To conduct various test on Transformer.
4. To provide practical experience on measurement of energy
5. To determine the resistance, inductance and capacitance parameters using DC and AC bridges

LIST OF EXPERIMENTS

1. Determine Z (impedance) parameters of a given two-port network
2. Determine Y (admittance) parameters
3. Determine ABCD (transmission parameters) of a given two-port network
4. Determine the H (hybrid) parameters
5. Magnetization characteristics of D.C shunt generator determination of critical field resistance.
6. Swinburne's test of dc shunt machine.
7. Brake test on dc shunt motor. Determination of performance characteristics.
8. OC & SC tests on single- phase transformer to find the efficiency.
9. Regulation of single- phase transformer.
10. Calibration and testing of single phase energy meter
11. Measurement of unknown inductance using anderson's bridge
12. Wheatstone's bridge for measurement of medium resistance.
13. Measurement of unknown capacitance using schering bridge.



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COURSE OUTCOMES

At the end of the course, students will able to		POs related to COs
C01	Determine two port network parameters	PO1
C02	Evaluate the Characteristics of D.C Shunt Generator and DC Motor through experimentation.	PO2
C03	Investigate AC Machines like Induction Motor and Transformer for solving complex problems.	PO3
C04	To determine the energy calculation	PO4
C05	Determine the resistance, inductance and capacitance parameters using DC and AC bridges	PO4
C06	Follow the ethical principles in implementing the experiments.	PO8
C07	Do experiments effectively as an individual and as a team member in a group.	PO9
C08	Communicate verbally and in written form, the understanding about the experiments.	PO10
C09	Continue updating their skill related to electrical circuits	PO12

CO-PO Mapping

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



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II B.Tech. - III Semester

20ECE234

DIGITAL ELECTRONICS LAB

L	T	P	C
-	-	3	1.5

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge on different logic gates for different input signals
2. To develop a design skill of logic functions of combinational circuits
3. To develop skill on different logic gates with different combinational circuits
4. To provide a design knowledge of different sequential circuits
5. To inculcate design skill on different sequential circuits

LIST OF EXPERIMENTS:

1. Verify truth table of all gates using IC-74XX.
2. Verify the Boolean Function by using Logic Gates.
3. Verify the functions of the following circuits using logic gates (Digital ICs):
 - a. Half adder, Half Subtractor,
4. Verify the functions of the following circuits using Digital ICs.
 - a. Full adder, Full Subtractor.
5. Construct the following circuits; check the outputs using multiplexer IC-74X151 and Demultiplexer IC-74X155.
6. Construct the following circuits and check the logic output of 3-8 Decoder using IC-74138 and 8-3 Encoder using IC-74148.
7. Construct and verify logic output of the comparator using IC-74x85.
8. Construct and verify the functions of a D FLIP-FLOP.
9. Construct and verify functions of the shift register
10. Construct and verify functions of a counter using IC-74x90.

EQUIPMENTS REQUIRED FOR LABORATORY

1. Regulated Power Supply: 0-30V,
2. Fixed power supply 5V
3. Components and IC'S



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COURSEOUTCOMES:

On successful completion of the course the student will be able to,		POs related to COs
CO1	Demonstrate knowledge on using different circuits for different applications	PO1
CO2	Analyze the output waveforms for the designed circuits	PO2
CO3	Design and develop the different circuits based on the requirement in digital circuits	PO3
CO4	Investigate and test the circuits for produces required outputs	PO4
CO5	Select appropriate design tools to test the different circuits for different values	PO5
CO6	Follow the ethical values in designing the circuits.	PO8
CO7	Do experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the experiments.	PO10
CO9	Continue updating their design skill related to for various circuits based on application during their life time	PO12

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



II B.Tech. - III Semester

20ECE235

ELECTRONIC CIRCUIT ANALYSIS LAB

**L T P C
- - 3 1.5**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To understand the biasing of BJT transistor
2. To understand the design considerations and frequency response of amplifiers
3. To understand the design of oscillators namely, RC and LC oscillators for a given Frequency of oscillations
4. To analyze the conversion efficiency of large signal amplifiers.
5. To understand the design considerations of single tuned amplifiers.

List of Experiments: (Minimum of 7 Experiments has to be performed)

Part –A: Hardware

1. Fixed and Voltage divider bias BJT configuration
2. Two Stage RC Coupled Amplifier
3. Darlington Pair Amplifier
4. Bootstrapped Emitter Follower
5. Voltage-Series Feedback Amplifier
6. Current-Shunt Feedback Amplifier
7. Class A Series-fed Power Amplifier
8. Transformer-coupled Class A Power Amplifier
9. Class B Push-Pull Power Amplifier
10. Complementary Symmetry Class B Push-Pull Power Amplifier
11. Single Tuned Voltage Amplifier

Part –B: Using MULTISIM Software Tool

1. Fixed and Voltage divider bias BJT configuration
2. Two Stage RC Coupled Amplifier
3. Darlington Pair Amplifier
4. Bootstrapped Emitter Follower
5. Voltage-Series Feedback Amplifier
6. Current-Shunt Feedback Amplifier
7. Class A Series-fed Power Amplifier
8. Transformer-coupled Class A Power Amplifier
9. Class B Push-Pull Power Amplifier
10. Complementary Symmetry Class B Push-Pull Power Amplifier



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11. Single Tuned Voltage Amplifier

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate knowledge on biasing, small and large signal BJT amplifier	PO1
CO2	Analyze the simulated results of various small and large signal amplifiers	PO2
CO3	Design and testing the small and large signal amplifiers and in the hardware	PO3
CO4	Conduct investigation and test the functionality of amplifiers and oscillators	PO4
CO5	Select appropriate tools as Multisim PSPICE simulation package tool and procedure to simulate and implement amplifiers and oscillators	PO5
CO6	Follow ethical principles in designing, simulating and implementing circuits	PO8
CO7	Do experiments effectively as an individual and as a member in a group	PO9
CO8	Communicate verbally and in written form, the understandings about the experiments	PO10
CO9	Continue updating their skill related to implementation for various application during their life time	PO12

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



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II B.TECH. - III SEMESTER

20MAC231

**ENVIRONMENTAL SCIENCE
(COMMON TO ALL BRANCHES)**

L T P C

2 - - -

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To recognize nature of environmental studies and various renewable and non renewable 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 - I: 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 – II: 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 – III: 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.



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UNIT – IV: 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.

UNIT – V: 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:

On successful completion of the course, students will be able to		POs mapped with COs
CO1	Grasp multidisciplinary nature of environmental studies and various renewable and nonrenewable resources.	PO1, PO2, PO3 PO4, PO5, PO6,P07
CO2	Understand flow and bio-geo- chemical cycles and ecological pyramids.	PO1, PO2, PO3 PO4, PO5, PO6,P07
CO3	Understand various causes of pollution and solid waste management and related preventive measures.	PO1, PO2, PO3 PO4, PO5, PO6,P07
CO4	Understand concept of rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.	PO1, PO2, PO3 PO4, PO5, PO6,P07
CO5	Causes of population explosion, value education and welfare programmes.	PO1, PO2, PO3 PO4, PO5, PO6,P07

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



II B.TECH IV SEMESTER

20BSC231	NUMERICAL METHODS AND PROBABILITY THEORY (Common to ECE,CSE,CIV,MECH & AIML)	L	T	P	C
		3	1	-	4

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

COURSE EDUCATIONAL OBJECTIVES:

1. To develop skill to analyze appropriate method to find the root of the Algebraic and Transcendental Equations and to develop skill to apply the concept of interpolation for the Prediction of required values
2. To learn the method of evaluation of numerical integration and to solve ordinary differential equations numerically using numerical methods
3. To develop skill to analyze the discrete and continuous data
4. To develop skill to analyze the discrete and continuous data using appropriate Statistical Distributions like Binomial, Poisson, Normal etc., and To inculcate skill to investigate different applications of statistical distributions and the corresponding conclusions required for the analysis of sample data.
5. To develop skill in testing of hypotheses and Tests of significance for small and large samples

UNIT – 1: SOLUTION OF ALGEBRAIC, TRANSCENDENTAL EQUATIONS & INTERPOLATION (9)

Solution of Algebraic and Transcendental Equations: Introduction - The Bisection method - The method of False position - The Iteration method - Newton-Raphson method (Single Variable).
Interpolation: Introduction - Finite differences - Forward differences, Backward differences - Newton's forward, Newton's backward - Lagrange's method of interpolation.

UNIT-2: NUMERICAL INTEGRATION AND NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS (9)

Numerical integration: Trapezoidal rule - Simpson's 1/3 Rule - Simpson's 3/8 Rule.
Numerical solution of Ordinary Differential equations: Solution by Taylor's series - Picard's method of successive approximations - Euler's method - Runge-Kutta methods.

UNIT - 3: PROBABILITY, RANDOM VARIABLES (9)

Probability: Sample space and events - Probability - The axioms of probability - Some elementary theorems - Conditional probability - Baye's theorem.

Random variables: Discrete and continuous distributions - Statistical Parameters (Mean, Variance and Standard Deviation) of distribution functions.

UNIT -4: PROBABILITY DISTRIBUTIONS & SAMPLING THEORY (9)

Binomial - Poisson and Normal distributions - Related properties.

Sampling distribution: Populations and samples - Sampling distributions of mean (σ : known and unknown) - Proportions - Sums and differences.

UNIT - 5:TEST OF HYPOTHESIS AND TEST OF SIGNIFICANCE (9)

Test of Hypothesis: Means - Hypothesis concerning one and two means - Type I and Type II errors - One tail, two-tail tests.

Test of Significance: Student's t-test - F-test - Chi-square test of goodness of fit.

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
AUTONOMOUS
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs related to COs
CO1	Demonstrate knowledge in solving algebraic and transcendental equations by various mathematical methods and Design novel mathematical methods for constructing the interpolating polynomials to the given data	PO1,PO2
CO2	Demonstrate knowledge in finding the numerical values to integrals through different mathematical methods and solving ordinary differential equations numerically through various methods and Design novel mathematical methods for solving the ordinary differential equations.	PO1,PO2
CO3	Demonstrate knowledge on use the probability and Random Variables in the field of engineering	PO1,PO2, PO3
CO4	Demonstrate knowledge in probability distributions and develop analytical skills for the problems involving means, probability distributions and standard deviations sampling techniques for decision making in uncertain environments	PO1,PO2, PO3
CO5	Demonstrate knowledge in testing of hypotheses and Tests of significance for small and large samples and Develop skills for analyzing the data with suitable tests of significance for practical situations through probability distributions	PO1,PO2, PO3,PO4

TEXT BOOKS:

1. S.C. Gupta, V.K. Kapoor, "Fundamentals of Mathematical Statistics", 10/e, 2001, S. Chand and Company Publishers, New Delhi.
2. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad , "Probability and Statistics", 2012, S. Chand and Company Publishers, New Delhi.

REFERENCE BOOKS:

1. V. Ravindranath, T.S.R. Murthy, "Probability and Statistics, 2011, I.K. International Pvt. Ltd, New Delhi.
2. Johnson A. Richard, Miler & Fruends, "Probability and Statistics for Engineers", 6/e, 2006, Pearson Education, New Delhi.
3. Dr. B. S. Grewal, "Higher Engineering Mathematics", 34/e, 1999, Khanna Publishers, Delhi
4. Dr. J. Ravichandran, "Probability and Statistics for Engineers", 2011, Wiley-India Publishers, New Delhi.
5. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, "Probability and Statistics for Engineers and Scientists", 7/e, 2002, Pearson Education Asia, New Delhi.

REFERENCE WEBSITE:

1. <https://www.youtube.com/watch?v=hizXlwJO1Ck>
2. <https://www.youtube.com/watch?v=5817fLmsTGE>
3. <https://www.youtube.com/watch?v=yv6i9plC9nk>
4. <https://www.youtube.com/watch?v=r1sLCDA-kNY&list=PL46B9EA2CFEB51241>
5. <https://www.youtube.com/watch?v=r1sLCDAkNY&list=PL46B9EA2CFEB51241&index=1>
6. <https://www.youtube.com/watch?v=HnvB8BCDQm0&list=PL46B9EA2CFEB51241&index=2>



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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	3	2	-	-	-	-	-	-	-	-	-
CO.4	3	3	2	-	-	-	-	-	-	-	-	-
CO.5	3	3	2	2	-	-	-	-	-	-	-	-
CO*	3	3	2	2	-	-	-	-	-	-	-	-



II B.TECH. - IV SEMESTER

20ECE241

LINEAR CONTROL SYSTEMS

L T P C

2 1 - 3

PRE-REQUISITES: A Course on Engineering Mathematics I, Engineering Mathematics II

COURSE EDUCATIONAL OBJECTIVES:

1. To demonstrate knowledge on physical systems and modelling of Electrical and Mechanical systems
2. To educate problem solving skills in block diagram reduction technique, signal flow graph Techniques and the state equations of a system
3. To analyze the stability of the system in Time and Frequency domains.
4. To introduce state variable representation of physical systems
5. To impart knowledge on compensators and evaluating controllability and observability of a system

UNIT –1: MODELING OF CONTROL SYSTEMS

(9)

Control system and types - Effects of feedback - Differential equation model - Transfer Function model -Mathematical modelling of Electrical and Mechanical systems- Analogy between electrical and mechanical systems - Block diagram reduction technique – Signal flow graph.

UNIT –2: TIME DOMAIN ANALYSIS

(9)

Standard test signals - Time domain specifications - Unit step response of First and second order systems - Time response specifications of second order systems - Steady state response - Steady state errors and error constants. Effects of proportional, integral, derivative Controllers, Design of P, PD, PI PID Controllers.

UNIT –3: FREQUENCY DOMAIN ANALYSIS

(9)

Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Stability Analysis from Bode Plots - Polar Plots-Nyquist Plots- Phase margin and Gain margin- Design of compensation Lag, Lead, Lead-Lag Compensators.

UNIT –4: STABILITY ANALYSIS IN FREQUENCY DOMAIN

(9)

Concepts of stability - Necessary conditions for Stability - Routh- stability criterion - Stability and conditional stability More on the Routh stability criterion - root locus concept - construction of root loci-effects of adding poles and zeros to $G(s)H(s)$ on the root loci.

UNIT –5: STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

(9)

Concepts of state, state variables and state model, derivation of state models from Schematic models, differential equations, Transfer function, block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties. Concepts of controllability and observability.

Total Hours: 45



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COURSE OUTCOMES:

On successful completion of this course, the students will be able to		POs related to COs
CO1	Understand control system concepts, the use of differential equation and transfer function models for analyze physical systems.	PO1,PO2, PO3, PO4, PO5
CO2	Analyze the time response of systems and estimate the steady state errors.	PO1,PO2,PO3, PO4, PO5
CO3	Examine the open loop and closed-loop frequency responses of systems.	PO1,PO2,PO3, PO4, PO5
CO4	Design the compensators and analyze the stability of the system in time and frequency domains.	PO1,PO2,PO3, PO4, PO5
CO5	Explore the state variable representation of physical systems and controllability and observability.	PO1,PO2,PO3, PO4, PO5

TEXT BOOKS:

1. J Nagrath and M. Gopal "Control Systems Engineering" –New Age International (P) Limited - Publishers5/e- I .
2. Katsuhiko Ogata "Modern Control Engineering" - Prentice Hall of India Pvt. Ltd, New Delhi-5 /e - 2010 .
3. Stephen J. Chapman "MATLAB programming for engineers",6E -2019 .

REFERENCE BOOKS:

1. C. Kuo and Farid Golnaraghi – "Automatic Control Systems" -John wiley and son's ,New Delhi -8 /e- 2003 reprint 2009.
2. Anand Kumar "Control Systems", Prentice Hall of India Pvt. Ltd, New Delhi–1 /e- 2007.
3. Norman S ,"Control Systems Engineering" NISE John wiley - 6 /e - 2010 .
4. Yaduvir Singh and S. Janardhan, Cengage learning"Modern Control Engineering" - 1 /e, 2011
5. Stormy Attaway "MATLAB: A Practical Introduction to Programming and Problem Solving".

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/108/106/108106098/>

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	2	2	3	-	-	-	-	-	-	-
CO.2	3	3	3	3	3	-	-	-	-	-	-	-
CO.3	3	3	3	3	3	-	-	-	-	-	-	-
CO.4	3	3	3	3	3	-	-	-	-	-	-	-
CO.5	3	3	2	2	3	-	-	-	-	-	-	-
CO*	3	3	2.6	2.6	3	-	-	-	-	-	-	-



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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II B.TECH. - IV SEMESTER

20ECE242	COMPUTER ARCHITECTURE AND MICROPROCESSOR	L T P C
		2 1 - 3

PRE-REQUISITES: Digital Electronics

COURSE EDUCATIONAL OBJECTIVES:

1. To Acquire Knowledge on the basic structure and operation of a digital computer.
2. To discuss in detail the operation of the arithmetic unit including the algorithms of addition, subtraction, multiplication & division.
3. To analyze and understand the architecture of 8086 Microprocessor and its pin configuration.
4. To analyze and understand the concept of Timing diagrams and Different instructions of 8086.
5. To develop assembly language programming skills on 8086 processor using different instruction sets.

UNIT –1: BASIC STRUCTURE OF COMPUTERS (9)

Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Performance, Register Transfer language, Register Transfer, Bus and memory transfer, Arithmetic Micro operations, logic micro operations, shift micro operations.

UNIT –2: COMPUTER ARITHMETIC (9)

Computer Registers, Computer instructions–Instruction cycle, Addition and subtraction, multiplication Algorithms, Division Algorithms, Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT-3: INTRODUCTION TO 8086 MICROPROCESSOR (9)

8085 Overview, 8086 Internal Architecture- Register Organization, Memory Segmentation, Flag Register, Pin Configuration, Minimum and Maximum Mode Signals, Physical Memory Organization, General Bus Operation-, Timing Diagrams - Interrupts Of 8086

UNIT-4: INSTRUCTION SET AND PROGRAMMING WITH 8086 (9)

Instruction Formats -Addressing Modes-Instruction Set, Assembler Directives-Macros, Programs Involving Logical, Branch Instructions – Sorting and Evaluating Arithmetic Expressions – String Manipulations-Simple ALPs.

UNIT –5: INTERFACING DEVICES (9)

8255 PPI- Block Diagram, Various Modes of Operation, Interface D/A and A/D interfacing, Keyboard Interfacing, 8259 Interrupt controller,8279 Keyboard and display controller, seven segment display,8251 serial communication protocol.

Total Hours: 45



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate knowledge on fundamentals of Computer functional units and types of computers, Analyze the importance of register transfer, arithmetic, logical and shift operations.	PO1, PO2
CO2	Be familiar with the basic registers, instruction set and Algorithm Design for arithmetic bit level operations.	PO1, PO2,PO3
CO3	Understand the basic organization of 8086 Microprocessor with the knowledge of Pin Diagram, registers.	PO1, PO2
CO4	Analyze the timing diagrams for minimum and maximum mode and addressing modes, instructions of 8086 processor.	PO1,PO2
CO5	Be familiar with instruction set and assembly language programming using 8086 processor.	PO1,PO2, PO3, PO4

TEXT BOOKS:

1. M.Moris Mano, "computer system architecture"PHI/Pearson, IIIrd Edition.
2. A.K.Ray and K.M.Burcahndi, "Advanced microprocessor and peripheral, TMH,2nd edition, 2000.
3. Carl hamacher" Computer organization, Mc Graw hill, V edition.

REFERENCE BOOKS:

1. Doughlas U Hall, "Micro Processors &Interfacing",revised 2nd edition,TMH,New Delhi,2007.
2. Walter A,Triebel, Avtar Singh "The 8088 and 8086 microprocessors" 1st edition, PHI, New Delhi,2003.
3. William Stallings "Computer Organization and Architecture " VII edition-, PHI/Pearson.
4. John P.Hayes, "Computer architecture and organization" McGraw Hill International.

REFERENCE WEBSITE:

1. <https://www.tutorialspoint.com> > Microprocessor > Microprocessor - 8085 Architecture
2. <http://www.cpu-world.com/CPU/8086/>
3. <https://www.journals.elsevier.com/microprocessors-and-microsystems/>

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	2	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	2	-	-	-	-	-	-	-	-	-	-
CO.5	3	3	2	2	-	-	-	-	-	-	-	-
CO*	3	2.6	2	2	-	-	-	-	-	-	-	-



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II B.TECH. - IV SEMESTER

20ECE243

LINEAR & DIGITAL IC APPLICATIONS

L T P C

2 1 - 3

PRE-REQUISITES: Pulse and Digital Circuits

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the basic building blocks of linear integrated circuits and linear and non-linear applications of operational amplifiers.
2. To gain knowledge on the applications of operational amplifiers.
3. To gain knowledge of filters and oscillator circuits using integrated circuits.
4. To comprehend the working principles of data converters
5. To understand the concepts of CPLDs and FPGAs

UNIT –1: BASICS OF OPERATIONAL AMPLIFIER

(9)

IC Classification, chip size and circuit complexity, Op-amp Block Diagram, ideal and practical Op-amp specifications- DC and AC characteristics- 741 op-amp & its features - Frequency Compensation technique.

Inverting, Non-inverting amplifier, Differential amplifier, Integrator and differentiator, Instrumentation amplifier, AC amplifier, V-I & I-V converters.

UNIT –2: APPLICATIONS OF OP- AMPS

(9)

Non- Linear function generation- Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers-Half wave and full wave rectifiers, Voltage Regulators-723 voltage regulator.

Introduction to 555 timer- functional diagram- Monostable and Astable operations and Schmitt Trigger, VCO and PLL (IC565).

UNIT –3: FILTERS AND OSCILLATORS

(9)

Filters: Introduction to active filters- Butter worth filters – 1st order- LPF- HPF filters, Band pass- Band reject and all pass filters.

Oscillators: Conditions for Oscillation- Types of oscillator, RC Oscillator-RC Phase shift oscillator, Wien bridge oscillator, LC Oscillator– Colpitt’s and Hartley oscillator

UNIT –4: DATA CONVERTERS & CMOS LOGIC

(9)

Data Converters: Introduction- basic DAC techniques- weighted resistor DAC- R-2R ladder DAC- Different types of ADCs - Flash type ADC- successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

CMOS Logic: Introduction to logic families- CMOS logic- CMOS steady state electrical behavior- CMOS dynamic electrical behavior- CMOS logic families.

UNIT –5: CPLD AND FPGA

(9)

CPLD:Complex Programmable Logic Devices - Xilinx XC9500 CPLD Architecture Block, I/O and Switch matrix

FPGA: Field-Programmable Gate Arrays - Xilinx XC4000 FPGA Family – CLB, I/O Block and Programmable Interconnect, Applications of FPGAs.

Total Hours: 45



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Understand the basics of operational amplifiers with linear integrated circuits along with its characteristics	PO1, PO2
CO2	Comprehend and analyze the applications of operational amplifiers	PO1, PO2
CO3	Design and analyze various active filters and oscillator circuits using Integrated circuits	PO1, PO2, PO3
CO4	Demonstrate the working principles of data converters and understand the steady state and electrical behavior of CMOS logic	PO1, PO2
CO5	Understand the architecture of CPLDs and FPGAs	PO1, PO2

TEXT BOOKS:

1. Ramakanth A. Gayakwad, "Op-Amps & Linear ICs", PHI, New Delhi, 4th Edition, 2009.
2. John F. Wakerly, "Digital Design Principles & Practices", PHI/ Pearson Education Asia, New Delhi, 3rd Edition, 2005.

REFERENCE BOOKS:

1. D. Roy Chowdhury & ShailBala Jain, "Linear Integrated Circuits", New Age International (p) Ltd, Mumbai, 5th Edition, 2018.
2. U.A. Bakshi and A.P. Godse, "Linear IC and Applications", Technical Publications, Pune 1st Edition, 2005.
3. Charles H. Roth Jr, "Digital System Design Using VHDL", PWS Publications, New Delhi, 2nd edition, 2008.
4. Stephen Brown and Zvonko Vranesic, "Fundamentals of Digital Logic with VHDL Design", McGraw Hill, New Delhi, 2nd Edition. 2005.

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/108/108/108108111/>
2. <https://nptel.ac.in/courses/117/108/117108040/>
3. <https://nptel.ac.in/courses/117/106/117106088/>

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	3	2	-	-	-	-	-	-	-	-	-
CO.4	3	2	-	-	-	-	-	-	-	-	-	-
CO.5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	3	2.6	2	-	-	-	-	-	-	-	-	-



II B.TECH. - IV SEMESTER

20ECE244

PULSE AND DIGITAL CIRCUITS

L T P C

2 1 - 3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge on linear network responses for different signals
2. To develop knowledge on non-linear networks for different applications (operations)
3. To develop a skill on analysis and design of different switching devices and different logic families and their characteristics
4. To develop different circuits that produce non-sinusoidal waveforms (Multivibrator) and their applications
5. To provide knowledge on different time base generators and its applications

UNIT - 1: LINEAR WAVE SHAPING

(9)

High pass and Low pass RC circuits- their response for sinusoidal, step, pulse, and square inputs, RC network as differentiator and integrator, Attenuators and its applications in CRO probe, RL and Ringing Circuit,. Illustrative problems

UNIT - 2: NON LINEAR WAVE SHAPING

(9)

Diodeclippers- clipping at one & two independent voltage levels with Transfer characteristics, Zener diode clippers, Comparators and applications of voltage comparators, clamping operation, classification of clamping circuits, Clamping circuit theorem. illustrative problems

UNIT - 3: SWITCHING DEVICES AND DIGITAL LOGIC CIRCUITS

(9)

Diode as a switch, Transistor as a switch, transistor switching times, Design of transistor Switch, Realization of Logic gates (basic gates and universal gates) using DTL, RTL and TTL, ECL, CMOS logic Circuits, Comparison of logic families, Basic operation of Sampling gates and its Applications.

UNIT - 4: MULTIVIBRATORS

(9)

Astable Multivibrator: Analysis and Design of collector coupled AstableMultivibrators, Application of Astable Multivibrator as Voltage to Frequency converter.

Monostable Multivibrator: Analysis and Design of collector coupled MonostableMultivibrators, Application of monostable Multivibrator as Voltage to time converter.

Bistable Multivibrator: Analysis and Design of collector coupled BistableMultivibrators, Commutating capacitors, triggering Methods, Emitter coupled Bistable Multivibrator (**Schmitt Trigger**).illustrative problems.

UNIT - 5:TIME BASE GENERATORS

(9)

General Features of a Time Base Signal, Methods of Generating Time Base Waveform, UJT relaxation oscillator, Miller And Bootstrap Time Base Generators: Basic Principles, Transistorized Miller and Bootstrap Time Base Generators, Current Time Base Generator.

Total hours: 45



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Analyse the different linear networks for different input signals	PO1, PO2, PO3
CO2	Analyse the different nonlinear networks for different applications	PO1, PO2, PO3,
CO3	Demonstrate design knowledge on diode, transistor switching and design concept of different digital logic families	PO1, PO2, PO3,
CO4	Able to Identify appropriate Multivibrator circuit based on application	PO1, PO2, PO3,
CO5	Capable to Identify appropriate time base circuit based on the application in display devices	PO1, PO2, PO3

TEXTBOOKS:

1. J. Millman and H. Taub, "Pulse, Digital and Switching Waveforms", 3/e, 1991, McGraw-Hill, New Delhi.
2. David A. Bell, "Solid State Pulse Circuits", 4/e., 2002, PHI, New Delhi.

REFERENCEBOOKS:

1. A. Anand Kumar, "Pulse and Digital Circuits", 2/e, 2009, PHI, New Delhi.
2. R. Venkataraman, "Pulse, Digital Circuits and Computer Fundamentals", 3/e, 1997, Dhanpat Rai Publications, New Delhi
3. Prof B.N. Yoga Narasimhan, "Pulse and Digital Circuits", 3/e, 2006, Shiva Book Publishers, Bangalore.
4. Syed Amjad Ali, "Pulse and Digital Circuits", 3/e, 2006, Hi-Tech Publishers, Hyderabad.
5. U.A. Bakshi, A.P. Godse, "Pulse and Digital Circuits", 1/e, 2011, Technical Publications, Pune

REFERENCE WEBSITE:

1. <https://en.wikipedia.org>

CO-PO MAPPING

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



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II B.Tech. - IV Semester

20ECE245

PCB Design(SOC/SAC COURSE)

L	T	P	C
0	1	2	2

PRE-REQUISITES: NIL

COURSE OUTCOMES:

1. Understand the basic concepts of electronic components and PCB Design.
2. Apply tools and techniques for design PCBs

UNIT I: Introduction to Electronic Components and Instruments: (3)

Study of electronic components- active & passive, Electronic Instruments: CRO, Function generator, Power Supply, Multi-meter, IC tester.

UNIT II : PCB Fundamentals: (3)

PCB Advantages, components of PCB, Classification of PCB - single, double, multilayer boards, Manufacturing of PCB, challenges in modern PCB design and manufacture, PCB standards, Terminologies in PCB Designs.

UNIT III: Layout Planning and Design: (3)

Layout Planning: General rules of Layout, Supply and Ground Conductors, general PCB design consideration – mechanical design consideration – electrical design consideration – component placement rules – fabrication and assembly consideration – environmental factors – layout design.

UNIT IV: PCB Design software's: (3)

Introduction, Types-features-specifications: EAGLE(Easily Applicable Graphical Layout Editor), Altium, Proteus, KiCAD, OrCAD, Design Spark, Protel Cadstar, Sprint-Layout, PADS PCB, Easy EDA.

UNIT V: PCB Design and Fabrication: (3)

Steps Involved in Design and Fabrication-Schematic and Simulation Procedure, PCB Layout design procedure, PCB Fabrication process steps.

Total hours: 15

TEXT BOOKS:

1. R S Khandpur - Printed Circuit Boards: Design, Fabrication, Assembly and Testing – McGraw Hill, India – 2006
2. Christopher T. Robertson - Printed Circuit Board Designer's Reference: Basics – Prentice International, U.S. – 2004



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REFERENCE BOOKS:

1. Printed circuit Board – Design & Technology by Walter C. Bosshart, Tata McGraw Hill.
2. Clyde F. Coombs "Printed circuits Handbook" III Edition, McGrawHill.

LIST OF EXPERIMENTS

Design PCB (schematic and Layout) for the following

- 1: PCB Design – Half- wave Rectifier
- 2: PCB Design – Full wave Rectifier
- 3: PCB Design – Full wave Bridge Rectifier
- 4: PCB Design – Voltage Regulator circuit
- 5: PCB Design – CE Amplifier
- 6: PCB Design –Half Adder
- 7: PCB Design –Full Adder
- 8: PCB Design –Half Subtractor
- 9: PCB Design –Full Subtractor
- 10: Develop and implement a new circuit as per the student choice

Total hours:30

Tools and materials required for PCB Design:

Open source EDA Tool.

Single/Double-sided PCB



II B.Tech. - IV Semester

20ECE246

LINEAR IC APPLICATIONS LAB

L T P C
- - 3 1.5

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To gain practical knowledge on linear and non-linear circuits using operational amplifiers
2. Gain practical hands-on experience on 555 timer applications
3. Gain practical knowledge on positive and negative Voltage Regulator
4. To construct the data converters using Integrated Circuits
5. Gain practical knowledge on phase locked loop.

LIST OF EXPERIMENTS

Minimum 10 experiments to be conducted:

1. OP AMP Applications - Adder, Subtractor, Comparator Circuits.
2. Design of Inverting and Non Inverting amplifiers
3. Integrator and Differentiator Circuits using IC 741
4. Function Generator using OP AMPs
5. IC 555 Timer - Monostable Operation Circuit
6. IC 555 Timer - Astable Operation Circuit
7. Three Terminal Voltage Regulators - 7805, 7809, 7912
8. Active Filter Applications - LPF, HPF (first order)
9. RC Phase shift oscillator/Wien bridge oscillator
10. Hartley oscillator/ Colpitt's oscillator
11. 4 bit DAC using OP AMP
12. Dual Slope ADC
13. Instrumentation amplifier
14. IC 565 - PLL Applications



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Understand the basic principles of Integrated circuits	PO1
CO2	Analyze the functioning performance of linear ICs	PO2
CO3	Gain practical knowledge to design an electronic circuit using integrated chips	PO3
CO4	Conduct investigation for analyzing the integrated circuits performance in various applications	PO4
CO5	Follow ethical principles in analyzing and designing the circuits	PO8
CO6	Do experiments effectively as an individual and as a member in a group	PO9
CO7	Communicate verbally and in written form, the understandings about the circuits	PO10
CO8	Continue updating their skill and apply during their life time	PO12

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



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II B.TECH. - IV SEMESTER

20ECE247

MICROPROCESSOR AND INTERFACING LAB

L T P C

- - 3 1.5

PRE-REQUISITES: Digital Electronics

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge on
 - Fundamentals of 8086 processor
 - Basic Arithmetic, logical operations.
 - Fundamentals of Cross Assembler
2. To become skilled in 8086 Assembly language programming
3. To develop skill to understand string based operations
4. To Understand DOS/BIOS programming
5. To develop skill to understand programmable peripheral devices and their interfacing with Processor.

LIST OF EXPERIMENTS

I. MICROPROCESSOR 8086:

1. Introduction to Cross Assembler /TASM
2. Arithmetic Operation(16 bit Addition, Subtraction, Multiplication and Division)-Multibyte Addition and Subtraction, Multiplication and Division, Signed and Unsigned Arithmetic Operation, ASCII-Arithmetic Operations.
3. Logic Operations-Shift Rotate-Converting Packed BCD to Unpacked BCD, BCD to ASCII Conversion.
4. By using string operation and instruction prefix: move block, reverse string, Sorting, string comparison.
5. DOS/BIOS programming: Display Characters, Strings

II.INTERFACING

1. 8279-Keybaord display: write a small program to display a string of characters.
2. Interfacing with stepper motor.
3. 8255-Interfacing with DAC to generate Triangular waveform
4. 8255-Interfacing with DAC to generate Square waveform.



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COURSE OUTCOMES:

On successful completion of the course the student will be able to		POs related to COs
CO1	Develop testing and experimental procedures on 8086 microprocessor and analyse the operation under different cases.	PO1
CO2	Setup programming strategies and select proper mnemonics and run the program on the training boards.	PO2
CO3	Able to understand and work with microprocessor real time interfaces including digital to analog converters, stepper motors, analog to digital converters	PO3
CO4	Design and implement programs on Sorting, moving block of memory	PO4
CO5	Design interfacing circuits with development boards and understand the concept related to I/O devices.	PO5
CO6	Follow ethical principles in analyzing and design the circuits	PO8
CO7	Do experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the circuits.	PO10
CO9	Continue updating their skill and apply during their life time.	PO12

CO-PO Mapping

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



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II B.TECH. - IV SEMESTER

20ECE248

PULSE AND DIGITAL CIRCUITS LAB

L	T	P	C
-	-	3	1.5

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge on responses of different linear and non linear circuits for various input signals
2. To develop a design skill on transistor switch
3. To develop skill on different logic gates with different logics.
4. To provide a design knowledge and analysis of different multi-vibrators and Schmitt trigger
5. To inculcate design skill on different sweep circuits

MINIMUM TEN(10) EXPERIMENTS TO BE CONDUCT.

1. Linear wave shaping (RC Differentiator and RC Integrator)
2. Non Linear Wave Shaping – Clippers
3. Non Linear Wave Shaping – Clampers
4. Transistor as a switch
5. Verify the truth tables of basic gates and universal gates using DTL.
6. Astable Multivibrator,
7. Monostable Multivibrator
8. Bistable multivibrator
9. Schmitt Trigger
10. UJT relaxation oscillator
11. Bootstrap Sweep Circuit
12. Miller Sweep Circuit

EQUIPMENTS REQUIRED FOR LABORATORY

1. Regulated Power Supply : 0-30V
2. Cathode Ray Oscilloscope: 0-20MHz
3. Function Generator: 0-1MHz
4. Multimeters.
5. Components.



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COURSE OUTCOMES:

On successful completion of the course the student will be able to,		POs related to COs
CO1	Demonstrate knowledge on using different circuits for different applications	PO1
CO2	Analyze the output waveforms for the designed circuits	PO2
CO3	Design and develop the different circuits based on the requirement in digital circuits	PO3
CO4	Investigate and test the circuits for produces required outputs	PO4
CO5	Select appropriate design tools to test the different circuits for different values	PO5
CO6	Follow the ethical values in designing the circuits.	PO8
CO7	Do experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the experiments.	PO10
CO9	Continue updating their design skill related to for various circuits based on application during their life time	PO12

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