



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(AUTONOMOUS)

**Dr. Visveswaraya Road, (Bangalore-Tirupathi Bye-pass Road), Murukambattu,
Chittoor – 517127, Andhra Pradesh, India**

B.Tech Course Structures and Syllabus Under R23 Regulations

(Applicable for 2023-2024 Regular Students & 2024-2025 Lateral Students)

Department of Civil Engineering

Institute Vision

To emerge as a Centre of Excellence for Learning and Research in the domains of engineering, computing and management.

Institute Mission

IM1: Provide congenial academic ambience with state -of -art of resources for learning and research.

IM2: Ignite the students to acquire self-reliance in the latest technologies.

IM3: Unleash and encourage the innate potential and creativity of students.

IM4: Inculcate confidence to face and experience new challenges.

IM5: Foster enterprising spirit among students.

IM6: Work collaboratively with technical Institutes / Universities / Industries of National and International repute

Department Vision

To become a Centre of excellence in Civil Engineering studies and research.

Department Mission

DM1: Provide congenial academic ambience with necessary infrastructure and learning resources

DM2: Inculcate confidence to face and experience new challenges from industry and society.

DM3: Ignite the students to acquire self-reliance in the latest Technologies

DM4: Foster Enterprising spirit among students

Program Educational Objectives (PEOs)

Graduates of civil Engineering shall

PEO1: Have Professional competency through the application of knowledge gained from subjects like Mathematics, Physics, Chemistry, Inter-Disciplinary and core subjects like Surveying, Building Planning, Construction materials, analysis and design of Civil structures, Environmental and Transportation Engineering). **(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).**

Program Specific Outcomes (PSO's)

After the completion of the Program, The student shall able to,

PSO1: Apply the knowledge obtained in core areas for the analysis and design civil Engineering structures using relevant codes of practice, materials, techniques and software.

PSO2: Adapt state-of-the-art practices and materials in civil Engineering projects with human values and ethics with team spirit

Program Outcomes

Engineering Graduates 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, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3-Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4-Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5-Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6-The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7-Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8-Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9-Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10-Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11-Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12-Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



Academic Regulations (R23) for B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year
2023-2024 onwards)

1. AWARD OF THE DEGREE

- (a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:
- (i) Pursues a course of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).
 - (ii) Registers for **160 credits and secures all 160 credits.**

(b) Award of B.Tech. degree with Honors

A student will be declared eligible for the award of the B.Tech. with Honors if he/she fulfils the following:

- (i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.
- (ii) Registering for Honors is optional.
- (iii) Honors is to be completed simultaneously with B.Tech. programmer.

2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled. This clause shall be read along with clause.

3. ADMISSIONS

Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/University from time to time. Admissions shall be made either based on the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/University or any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. PROGRAM RELATED TERMS

Credit: A unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

Credit definition:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hrs. Practical (Lab) per week	1 credit

- a) **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.

- b) Choice Based Credit System (CBCS):** The CBCS provides a choice for students to select from the prescribed courses.

5. SEMESTER/CREDITS:

- i) A semester comprises 90 working days and an academic year is divided into two semesters.
- ii) The summer term is for eight weeks during summer vacation. Internship/ apprenticeship / work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.
- iii) Regular courses may also be completed well in advance through MOOCs satisfying prerequisites.

6. STRUCTURE OF THE UNDERGRADUATE PROGRAMME

All courses offered for the undergraduate program (B. Tech.) are broadly classified as follows:

S.No.	Category	Breakup of Credits (Total 160)	Percentage of total credits	AICTE Recommendation (%)
1.	Humanities and Social Science including Management (HM)	13	8 %	8 – 9%
2.	Basic Sciences (BS)	20	13 %	12 – 16%
3.	Engineering Sciences (ES)	23.5	14%	10 – 18%
4.	Professional Core (PC)	54.5	34 %	30 – 36%
5.	Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC)	33	21 %	19 – 23%
6.	Internships & Project work (PR)	16	10 %	8 – 11%
7.	Mandatory Courses (MC)	Non-credit	Non-credit	-

7. COURSE CLASSIFICATION:

All subjects/ courses offered for the undergraduate programmer in Engineering & Technology (B.Tech. degree programmers) are broadly classified as follows:

S.No.	Broad Course Classification	Course Category	Description
1.	Foundation Core Courses	Foundation courses	Includes Mathematics, Physics and Chemistry. Fundamental engineering courses; humanities, social sciences, and management courses
2.	Core Courses	Professional Core Courses (PC)	Includes subjects related to the parent discipline / department / branch of Engineering.
3.	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline/department/ branch of Engineering
		Open Elective Courses (OE)	Elective subjects which include interdisciplinary Subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain Specific skill Enhancement Courses (SEC)	Interdisciplinary/Job-oriented/domain courses which are relevant to the industry
4.	Project & Internships	Project	B.Tech. Project or Major Project
		Internships	Summer Internships – Community based and Industry Internships; Industry oriented Full Semester Internship
5.	Audit Courses	Mandatory non-credit Courses	Covering subjects of developing desired attitude among the learners

8. PROGRAMME PATTERN

- Total duration of the of B. Tech (Regular) Programmed is four academic years.
- Each academic year of study is divided into two semesters.
- Minimum number of instruction days in each semester is 90 days.

- iv. There shall be mandatory student induction program for freshers, with a three- week duration before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations etc., are included as per the guidelines issued by AICTE.
- v. Health/wellness/yoga/sports and NSS /NSS /Scouts & Guides / Community service activities are made mandatory as credit courses for all the undergraduate students.
- vi. Courses like Environmental Sciences, Indian Constitution, Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.
- vii. Design Thinking for Innovation & Tinkering Labs are made mandatory as credit courses for all the undergraduate students.
- viii. Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.
- ix. Professional Elective Courses, include the elective courses relevant to the chosen specialization/branch. Proper choice of professional elective courses can lead to students specializing in emerging areas within the chosen field of study.
- x. A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for B.Tech. Degree with a Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.
- xi. While choosing the electives, students shall ensure that they do not opt for the courses with syllabus contents similar to courses already pursued.
- xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.
- xiii. Students shall undergo mandatory summer internships, for a minimum of eight weeks duration at the end of second and third year of the programme. The internship at the end of second year shall be community oriented and industry internship at the end of third year.
- xiv. There shall also be mandatory full internship in the final semester of the programmer along with the project work.
- xv. Undergraduate degree with Honors is introduced by the Institution for the students having good academic record.
- xvi. Departments shall take measures to implement Virtual Labs (<https://www.vlab.co.in>) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.
- xvii. Institution shall assign a faculty advisor/mentor after admission to a group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/other competitive exams etc.
- xviii. Preferably 25% of course work for the theory courses in every semester shall be conducted in the blended mode of learning.

9. EVALUATION PROCESS

The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. Summer Internships shall be evaluated for 50 marks, Full Internship & Project work in final semester shall be evaluated for 200 marks, mandatory courses with no credits shall be evaluated for 30 mid semester marks.

A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester and end examination marks taken together for the theory, practical, design, drawing subject or project etc. In case of a mandatory course, he/she should secure 40% of the total marks.

Theory Courses:

Assessment Method	Marks
Continuous Internal Assessment (CIA)	30
Semester End Examination (SEE)	70
Total	100

- For theory subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.
- For practical subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.
- If any course contains two different branch subjects, the syllabus shall be written in two parts with 3 units each (Part-A and Part-B) and external examination question paper shall be set with two parts each for 35 marks.
- If any subject is having both theory and practical components, they will be evaluated separately as theory subject and practical subject. However, they will be given same subject code with an extension of 'T' for theory subject and 'P' for practical subject.

a) Continuous Internal Evaluation

- For theory subjects, during the semester, there shall be two midterm examinations. Each midterm examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment.
- Objective paper shall contain for 05 short answer questions with 2 marks each or maximum of 20 bits for 10 marks. Subjective paper shall contain 3 either or type questions (totally six questions from 1 to 6) of which student has to answer one from each either-or type of questions. Each question carries 10 marks. The marks obtained in the subjective paper are condensed to 15 marks.

Note:

- The objective paper shall be prepared in line with the quality of competitive examinations questions.
- The subjective paper shall contain 3 either or type questions of equal weightage of 10 marks. Any fraction shall be rounded off to the next higher mark.
- The objective paper shall be conducted either online or offline by the respective institution on the day of subjective paper test.
- If conducted offline, the midterm examination shall be conducted first by distribution of the Objective paper, simultaneously marking the attendance, after 20 minutes the answered objective paper shall be collected back. The student is not allowed to leave the examination hall. Then the descriptive question paper and the answer booklet shall be distributed. After 90 minutes the answered booklets are collected back.
- Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.

- iii) If the student is absent for the mid semester examination, no re-exam shall be conducted and mid semester marks for that examination shall be considered as zero.
- iv) First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.
- v) Final mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weightage given to the better mid exam and 20% to the other.

For Example:

Marks obtained in first mid: 25 Marks obtained

in second mid: 20

Final mid semester Marks: $(25 \times 0.8) + (20 \times 0.2) = 24$

If the student is absent for any one midterm examination, the final mid semester 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: Absent Marks

obtained in second mid: 25

Final mid semester Marks: $(25 \times 0.8) + (0 \times 0.2) = 20$

b) End Examination Evaluation:

End examination of theory subjects shall have the following pattern:

- i) There shall be 6 questions and all questions are compulsory.
- ii) Question I shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.
- iii) There shall be 2 short answer questions from each unit.
- iv) In each of the questions from 2 to 6, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
- v) The questions from 2 to 6 shall be set by covering one unit of the syllabus for each question.

End examination of theory subjects consisting of two parts of different subjects, for Example: Basic Electrical & Electronics Engineering and Basic Civil & Mechanical Engineering shall have the following pattern:

- i) Question paper shall be in two parts viz., Part A and Part B with equal weightage of 35 marks each.
- ii) In each part, question 1 shall contain 5 compulsory short answer questions for a total of 5 marks such that each question carries 1mark.
- iii) In each part, questions from 2 to 4, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
- iv) The questions from 2 to 4 shall be set by covering one unit of the syllabus for each question.

Practical Courses:

Assessment Method	Marks
Continuous Internal Assessment (CIA)	30
Semester End Examination (SEE)	70
Total	100

- a) For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks.
- b) Day-to-day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the regularity/record/viva and 15 marks for the internal test.
- c) The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.
- Procedure: 20 marks
 - Experimental Work & Results: 30 marks
 - Viva voce: 20 marks.

In a practical subject consisting of two parts (Eg: Basic Electrical & Electronics Engineering Lab), the end examination shall be conducted for 70 marks as a single laboratory in 3 hours.

The end examination shall be evaluated 35 marks in each part. Mid semester examination shall be evaluated as above for 30 marks (day-to- day evaluation 15 marks and internal examination 15 marks) in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

- d) For the subject having design and/or drawing, such as Engineering Drawing, the distribution of marks shall be 30 for mid semester evaluation and 70 for end examination.

Assessment Method	Marks
Continuous Internal Assessment (CIA)	30
Semester End Examination (SEE)	70
Total	100

Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class.

And there shall be two midterm examinations in a semester for duration of 2 hours each for 15 marks with weightage of 80% to better mid marks and 20% for the other. The subjective paper shall contain 3 either or type questions of equal weightage of 5 marks. There shall be no objective paper in mid semester examination. The sum of day-to-day evaluation and the mid semester marks will be the final sessional marks for the subject.

The end examination pattern for Engineering Graphics, shall consists of 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other subjects related to design/drawing, multiple branches, etc is mentioned along with the syllabus.

- e) There shall be no external examination for mandatory courses with zero credits. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 40% or more in the internal examinations. In case, the student fails, a re-examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.
- f) The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.

10. SKILL ORIENTED COURSES

- i) There shall be five skill-oriented courses offered during III to VII semesters.
- ii) Out of the five skill courses two shall be skill-oriented courses from the same domain. Of the remaining three skill courses, one shall be a soft skill course and the remaining two shall be skill-advanced courses from the same domain/Interdisciplinary/Job oriented.
- iii) The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination similar to practical examination pattern shall be conducted by the concerned teacher and an expert in the subject nominated by the principal.
- iv) The Head of the Department shall identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, coordinator and a senior Faculty member nominated by the Head of the Department shall monitor the evaluation process. The marks/grades shall be assigned to the students by the above committee based on their performance.
- v) The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies or any other accredited bodies. If a student chooses to take a Certificate Course offered by external agencies, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency. A committee shall be formed at the level of the college to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades.
- vi) The recommended courses offered by external agencies, conversions and appropriate grades/marks are to be approved by the University at the beginning of the semester. The principal of the respective college shall forward such proposals to the University for approval.

- vii) If a student prefers to take a certificate course offered by external agency, the department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the University.

11.MASSIVE OPEN ONLINE COURSES (MOOCs):

A Student has to pursue and complete one course compulsorily through MOOCs approved by the Institution. A student can pursue courses other than core through MOOCs and it is mandatory to complete one course successfully through MOOCs for awarding the degree. A student is not permitted to register and pursue core courses through MOOCs.

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall appoint one mentor to monitor the student's progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the university.

Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

12.CREDIT TRANSFER POLICY

Adoption of MOOCs is mandatory, to enable Blended model of teaching- learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the University shall allow up to a maximum of 20% of the total courses being offered in a particular programme i.e., maximum of 32 credits through MOOCs platform.

- i) The Institution shall offer credit mobility for MOOCs and give the equivalent credit weightage to the students for the credits earned through online learning courses.
- ii) Student registration for the MOOCs shall be only through the respective department of the institution; it is mandatory for the student to share necessary information with the department.
- iii) Credit transfer policy will be applicable to the Professional & Open Elective courses only.
- iv) The concerned department shall identify the courses permitted for credit transfer.
- v) The University/institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.
- vi) The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
- vii) The university shall ensure no overlap of MOOC exams with that of the university examination schedule. In case of delay in results, the university will re-issue the marks sheet for such students.

- viii) Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.
- ix) The institution shall submit the following to the examination section of the university:
 - a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.
 - b) Undertaking form filled by the students for credit transfer.
- x) The institutions shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall be permitted to register for MOOCs offered through online platforms approved by the Institution from time to time.

13. ACADEMIC BANK OF CREDITS (ABC)

The Institution has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

- xi) Provide option of mobility for learners across the universities of their choice
- xii) Provide option to gain the credits through MOOCs from approved digital platforms.
- xiii) Facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC
- xiv) Execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

14. MANDATORY INTERNSHIPS SUMMER INTERNSHIPS

Summer Internships: Two summer internships either onsite or virtual each with a minimum of 08 weeks duration, done at the end of second and third years, respectively are mandatory. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program. One of the two summer internships at the end of second year (Community Service Project) shall be society oriented and shall be completed in collaboration with government organizations/NGOs & others. The other internship at the end of third year is Industry Internship and shall be completed in collaboration with Industries. The student shall register for the internship as per course structure after commencement of academic year. The guidelines issued by the APSCHE / University shall be followed for carrying out and evaluation of Community Service Project and Industry Internship.

Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department.

A certificate of successful completion from industry shall be included in the report. The report and the oral presentation shall carry 50% weight age each. It shall be evaluated for 50 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the Institutions.

Full Semester Internship and Project work:

In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.

The project report shall be evaluated with an external examiner. The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Presentation/Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the University and is evaluated for 140 marks.

The institution shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

15. GUIDELINES FOR OFFERING A MINOR

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

- a. The Minor program requires the completion of 12 credits in Minor stream chosen.
- b. Two courses for 06 credits related to a Minor are to be pursued compulsorily for the minor degree, but maybe waived for students who have done similar/equivalent courses. If waived for a student, then the student must take an extra elective course in its place. It is recommended that students should complete the compulsory courses (or equivalents) before registering for the electives.
- c. Electives (minimum of 2 courses) to complete a total of 12 credits.

Note: A total of 04 Open Electives is offered in the curriculum. A student can complete the requirement for Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.

16. GUIDELINES FOR OFFERING HONORS

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additionally the specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

- d. Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.
- e. A student shall earn additional 15 credits for award of B.Tech.(Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).

- f. A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.
- g. The concerned Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.
- h. Courses that are used to fulfil the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.
- i. Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of
12 weeks for a 3-credit course and 8 weeks duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.
- j. The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.
- k. A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.
- l. A student registered for Honors shall pass in all subjects that constitute the requirement for the Honors degree program. No class/division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors degree programmed.
- m. 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. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.
- n. The Honors will be mentioned in the degree certificate as Bachelor of Technology (Honors) in XYZ. For example, B.Tech. (Honors) in Mechanical Engineering.

Enrolment into Honors:

- i) Students of a Department/Discipline are eligible to opt for Honors program offered by the same Department/Discipline
- ii) The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7 CGPA without any backlog subjects will be permitted to register for Honors.
- iii) If a student is detained due to lack of attendance either in Major or in Honors, registration shall be cancelled.
- iv) Transfer of credits from Honors to regular B. Tech degree and vice- versa shall not be permitted.
- v) Honors is to be completed simultaneously with a Major degree program.

Registration for Honors:

- i) The eligible and interested students shall apply through the HOD of his/her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register the courses under Honors.
- ii) The selected students shall submit their willingness to the principal through his/her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.

- iii) The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.
- iv) There is no fee for registration of subjects for Honors program offered in offline at the respective institutions.

17. ATTENDANCE REQUIREMENTS:

- A student shall be eligible to appear for the University external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the subjects. b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee (CAC).
- Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.
- A stipulated fee shall be payable towards condonation of shortage of attendance to the Institution.
- Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
- A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester from the date of commencement of class work.
- If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
- If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.
- For induction programmed attendance shall be maintained as per AICTE norms.

18. PROMOTION RULES:

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in section 16.

- A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per university norms.
- A student will be promoted from II to III year if he/she fulfils the academic requirement of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) up to in the subjects that have been studied up to III semester.
- A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.
- And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.
- When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfilment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

19. GRADING:

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:

After each course 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.

(a) Structure of Grading of Academic Performance

Range in which the marks in the subject fall	Grade	Grade points Assigned
90 & above	Superior	10
80 - 89	A (Excellent)	9
70 - 79	B (Very Good)	8
60 - 69	C (Good)	7
50 - 59	D (Average)	6
40 - 49	E (Pass)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

- A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.
- For non-credit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.
- Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):
- 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.,

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

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.

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

$$\text{CGPA} = \sum (C_i \times S_i) / \sum C_i$$

where "S_i" is the SGPA of the ith semester and C_j is the total number of credits up to that semester.

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

While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.
Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by the letters S, A, B, C, D and F.

(b) Award of Class:

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

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5 (Without any Supplementary Appearance)
First Class	$\geq 6.5 < 7.5$
Second Class	$\geq 5.5 < 6.5$
Pass Class	$\geq 5.0 < 5.5$

Note: * Students who have written supplementary examinations to fulfil the credit requirement will not be awarded First Class with Distinction. For such students the highest degree that is awarded will be First Class Only.

CGPA to Percentage conversion Formula – (CGPA – 0.5) x 10

20. WITH-HOLDING OF RESULTS

If the candidate has any dues not paid to the institution or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld in such cases.

21. MULTIPLE ENTRY / EXIT OPTION

(a) Exit Policy:

The students can choose to exit the four-year programmed at the end of first/second/third year.

- UG Certificate in (Field of study/discipline)** - programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.
- UG Diploma (in Field of study/discipline)** - programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

- iii) **Bachelor of Science (in Field of study/discipline) i.e., B.Sc. Engineering in (Field of study/discipline)-** programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

(b) Entry Policy:

Modalities on multiple entry by the student into the B.Tech. programme will be provided in due course of time.

Note: The Universities / Institution shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

22.GAP YEAR CONCEPT:

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish startups. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The principal of the respective college shall forward such proposals submitted by the students to the University.

An evaluation committee constituted by the University shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not.

23.TRANSITORY REGULATIONS

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance 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, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

Candidates who are permitted to avail Gap Year shall be eligible for re-joining into the succeeding year of their B. Tech from the date of commencement of class work, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

24.MINIMUM INSTRUCTION DAYS FOR A SEMESTER:

The minimum instruction days including exams for each semester shall be 90 days.

25.MEDIUM OF INSTRUCTION

The medium of instruction of the entire B. Tech undergraduate programme in Engineering & Technology (including examinations and project reports) will be in English only.

26.STUDENT TRANSFERS:

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

27.GENERAL INSTRUCTIONS:

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

- d) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Head of the Institution is final.
- e) The Institution may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Universities.
- f) In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Head of the institution is final.

Academic Regulations (R23) for B.Tech (Lateral Entry Scheme)

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2024-2025 onwards)

1. AWARD OF THE DEGREE

(a) **Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:**

- (i) Pursues a course of study for not less than three academic years and not more than six academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Six years).
- (ii) Registers for 120 credits and secures all 120 credits.

(b) **Award of B.Tech. degree with Honors**

A student will be declared eligible for the award of the B.Tech. with Honors if he/she fulfils the following:

- (i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 120 credits.
- (ii) Registering for Honors is optional.
- (iii) Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. MINIMUM ACADEMIC REQUIREMENTS

The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.2

- (i) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester evaluation and end examination taken together.
- (ii) A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.
- (iii) And in case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

4. COURSE PATTERN

- (i) The entire course of study is three academic years on semester pattern.
- (ii) A student eligible to appear for the end examination in a subject but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
- (iii) When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfilment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

5. All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

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.
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.	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.
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.	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 reaming examinations of the subjects of that semester/Year. The Hall Ticket of the candidate will be cancelled and retained by the CE.

3. Impersonates any other candidate in connection with the examination.	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 candidates subject to the academic regulations in connection with forfeiture of seat.
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.	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.
5. Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.

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 damage to or destruction of property in the examination hall or any part of the college campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that 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.
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.	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.
8. Possesses any lethal weapon or firearm in the examination hall	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.

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.	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. Person(s) who do not belong to the college will be handed over to police and, a Police case will be registered against them.
10. Comes in a drunken state to the examination hall.	Expulsion from the examination hall and cancellation of the performance.
11. Copying is detected on the basis of internal evidence, such as, during valuation or during special scrutiny	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.
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.	

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

B.Tech R23 - COURSE STRUCTURE AND SYLLABI

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	23HSM111T	Communicative English	2	0	0	2	30	70	100
2	23BSC114T	Linear Algebra and Calculus	2	1	0	3	30	70	100
3	23ESC112T	Basic Electrical and Electronics Engineering	2	1	0	3	30	70	100
4	23ESC113T	Engineering Graphics	1	0	4	3	30	70	100
5	23ESC114T	Introduction to Programming	2	1	0	3	30	70	100
6	23HSM112L	Communicative English Lab	0	0	2	1	30	70	100
7	23ESC115L	Computer Programming Lab	0	0	3	1.5	30	70	100
8	23ESC116L	Electrical and Electronics Engineering Workshop	0	0	3	1.5	30	70	100
9	23ESC118L	IT Workshop	0	0	2	1	30	70	100
10	23HSM114L	NSS/NCC/Scouts & Guides/Community Service	0	0	1	0.5	-	-	100
Contact Hours per week			9	3	15	-	-	-	-
Total Hours per week			27				-	-	-
Total credits			19.5				-	-	-
Total Marks							270	630	1000

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	23BSC121T	Differential Equations and Vector Calculus	2	1	0	3	30	70	100
2	23BSC112T	Engineering Chemistry	3	0	0	3	30	70	100
3	23BSC113T	Engineering Physics	3	0	0	3	30	70	100
4	23ESC111T	Basic Civil and Mechanical Engineering	3	0	0	3	30	70	100
5	23MEC121T	Engineering Mechanics	2	1	0	3	30	70	100
6	23BSC116L	Engineering Chemistry Lab	0	0	2	1	30	70	100
7	23BSC117L	Engineering Physics Lab	0	0	2	1	30	70	100
8	23ESC117L	Engineering Workshop	0	0	3	1.5	30	70	100
9	23MEC122L	Engineering Mechanics Lab	0	0	3	1.5	30	70	100
10	23HSM113L	Health and wellness, Yoga and Sports	0	0	1	0.5	-	-	100
Contact Hours per week			13	2	11	-	-	-	-
Total Hours per week			26				-	-	-
Total credits			20.5				-	-	-
Total Marks							270	630	1000

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	23BSC233T	Numerical and Statistical Methods	2	1	-	3	30	70	100
2	23HSM234T	Universal Human Values– Understanding Harmony and Ethical Human Conduct	2	1	-	3	30	70	100
3	23CIV231T	Fluid Mechanics	2	1	-	3	30	70	100
4	23CIV232T	Strength of Materials	2	1	-	3	30	70	100
5	23CIV233T	Surveying	2	-	-	2	30	70	100
6	23CIV234L	Building Planning and Drawing (SOC)	-	1	2	2	30	70	100
7	23CIV235L	Strength of Materials Lab	-	-	3	1.5	30	70	100
8	23CIV236L	Surveying Lab	-	-	3	1.5	30	70	100
9	23MAC231U	Environmental Science	2	-	-	-	-	-	P
Contact Hours per week			12	05	10	-	-	-	-
Total Hours per week			26			-	-	-	-
Total credits						20	-	-	-
Total Marks							270	560	800

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	23HSM231/ 23HSM232/ 23HSM233	Business Environment/ Managerial Economics and Financial Analysis /Organizational Behavior	2	1	-	3	30	70	100
2	23ESC242T	Hydraulics and Hydraulic Machinery	2	-	-	2	30	70	100
3	23CIV241T	Concrete Technology	2	1	-	3	30	70	100
4	23CIV242T	Engineering Geology	2	1	-	3	30	70	100
5	23CIV243T	Structural Analysis	2	1	-	3	30	70	100
6	23CIV244T	Concrete Technology Lab	-	-	3	1.5	30	70	100
7	23CIV245T	Engineering Geology Lab	-	-	3	1.5	30	70	100
8	23HSM241L	Soft Skills (Skill Enhancement Course)	-	1	2	2	30	70	100
9	23ESC241I	Design Thinking and Innovation	1	-	2	2	30	70	100
Contact Hours per week			11	05	10	-	-	-	-
Total Hours per week			26			-	-	-	-
Total credits						21	-	-	-
Total Marks							270	630	900
Mandatory Community Service Project Internship of 06-08 weeks duration during summer Vacation									

Semester V (Third 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	23CIV351T	Design of Reinforced Concrete Structures	3	-	-	3	30	70	100
2	23CIV352T	Geotechnical Engineering	3	-	-	3	30	70	100
3	23CIV353T	Water Resources Engineering	3	-	-	3	30	70	100
4	PE-I	Professional Elective – I	3	-	-	3	30	70	100
5	OE-I	Open Elective – I	3	-	-	3	30	70	100
6	23ESC351T	Introduction to Quantum Technology and Applications	3	-	-	3	30	70	100
7	23CIV357L	Geotechnical Engineering Lab	-	-	3	1.5	30	70	100
8	23CIV356L	Fluid Mechanics Hydraulic Machines Lab	-	-	3	1.5	30	70	100
9	23CIV355L	Estimation, Specifications, Costing & Valuation (Skill Enhancement Course)	-	1	2	2	30	70	100
10	23ESC352L	Tinkering Lab	-	-	2	1	30	70	100
11	23CIV351P	Evaluation of Community Service Project	-	-	-	2	-	100	100
Contact Hours per week			15	04	10	-	-	-	-
Total Hours per week			29			-	-	-	-
Total credits						26	-	-	-
Total Marks							300	800	1100

Semester VI (Third 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	23CIV361T	Design of Steel Structures	3	-	-	3	30	70	100
2	23CIV362T	Environmental Engineering	3	-	-	3	30	70	100
3	23CIV363T	Highway Engineering	3	-	-	3	30	70	100
4	PE-II	Professional Elective – II	3	-	-	3	30	70	100
5	PE-III	Professional Elective – III	3	-	-	3	30	70	100
6	OE-II	Open Elective – I	3	-	-	3	30	70	100
7	23CIV368L	Highway Engineering Lab	-	-	3	1.5	30	70	100
8	23CIV367T	Environmental Engineering Lab	-	-	3	1.5	30	70	100
9	23CIV366L	Building Information Modelling (Skill Enhancement Course)	-	1	2	2	30	70	100
10	23MAC351U	Technical Paper Writing & IPR	2	-	-	-	30	-	P
11	23CIV361P	Domain Specific Workshop	-	-	-	-	50	-	-
Contact Hours per week			14	04	08	-	-	-	-
Total Hours per week			29			-	-	-	-
Total credits						23	-	-	-
Total Marks							350	630	900



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

B.Tech R23 - COURSE STRUCTURE AND SYLLABI

Semester VII (Fourth 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	23CIV471T	Finite Element Methods	3	-	-	3	30	70	100
2	23HSM471	Management Elective	2	-	-	2	30	70	100
3	PE-IV	Professional Elective – IV	3	-	-	3	30	70	100
4	PE-V	Professional Elective – V	3	-	-	3	30	70	100
5	OE-III	Open Elective – III	3	-	-	3	30	70	100
6	OE-IV	Open Elective – IV	3	-	-	3	30	70	100
7	23CIV474L	Skills in STAADPRO / CAD / TEKL (Skill Enhancement Course)	-	1	2	2	30	70	100
8	23MAC471U	Gender Sensitization	2	-	-	-	30	-	P
9	23CIV471P	Evaluation Industry Internship	-	-	-	2	-	100	100
Contact Hours per week			19	01	02	-	-	-	-
Total Hours per week			22			-	-	-	-
Total credits						21	-	-	-
Total Marks							240	590	800

Semester VIII (Fourth 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	23CIV481P	Internship	-	-	24	4	30	70	100
2	23CIV482P	Project Work	-	-	-	8	30	70	100
Contact Hours per week			-	-	24	12	-	-	-
Total Hours per week			24			-	-	-	-
Total credits						12	-	-	-
Total Marks							60	140	200

Note:

1. A student is permitted to register for Honours or a Minor in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to their Minor from V Semester onwards.
2. A student shall not be permitted to take courses as Open Electives / Minor / Honours with content substantially equivalent to the courses pursued in the student's primary major.
3. Minor & Honour tracks shall be offered for 18 credits over and above 163 Credits 05 theory courses of 3 credits each, practical courses of 1.5 credits each or project for 3 credits for Minors and Honours.
4. A student is permitted to select a Minor program only if the institution is already offering a Major degree program in that discipline.
5. **One Industry Visit** is Mandatory either in 3rd or 4th year
6. Student will undergo **ONE WEEK WORKSHOP** (domain specific) after the end of the FIFTH semester examination and it will be reflected in SIXTH semester for zero credits.
7. **One Expert Lecturer** in every semester (domain Specific) is mandatory.

Professional Elective – I - Semester V (Third 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	23CIV354A	Air Pollution and Control	3	-	-	3	30	70	100
2	23CIV354B	Environmental Impact Assessment	3	-	-	3	30	70	100
3	23CIV354C	Municipal Solid waste Management	3	-	-	3	30	70	100
4	23CIV354D	Pre-stressed Concrete	3	-	-	3	30	70	100

Professional Elective – II - Semester VI (Third 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	23CIV364A	Design of Earthquake Resistant Structures	3	-	-	3	30	70	100
2	23CIV364B	Foundation Engineering	3	-	-	3	30	70	100
3	23CIV364C	Open Channel Flow	3	-	-	3	30	70	100
4	23CIV364D	Repair and Rehabilitation of Structures	3	-	-	3	30	70	100

Professional Elective – III - Semester VI (Third 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	23CIV365A	Advanced Structural Analysis	3	-	-	3	30	70	100
2	23CIV365B	Cost Effective Housing Techniques	3	-	-	3	30	70	100
3	23CIV365C	Remote Sensing and GIS	3	-	-	3	30	70	100
4	23CIV365D	Watershed Management	3	-	-	3	30	70	100

Professional Elective – IV - Semester VII (Fourth 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	23CIV472A	Bridge Engineering	3	-	-	3	30	70	100
2	23CIV472B	Experimental Stress Analysis	3	-	-	3	30	70	100
3	23CIV472C	Geo-synthetics and Reinforced Earth Structures	3	-	-	3	30	70	100
4	23CIV472D	Railways, Airports, Docks and Harbour Engineering	3	-	-	3	30	70	100

Professional Elective – V - Semester VII (Fourth 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	23CIV473A	Ground Improvement Techniques	3	-	-	3	30	70	100
2	23CIV473B	Subsurface Investigation and Instrumentation	3	-	-	3	30	70	100
3	23CIV473C	Transportation Economics	3	-	-	3	30	70	100
4	23CIV473D	Traffic Engineering	3	-	-	3	30	70	100

Management Science Elective – Semester VII (Fourth 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	23HSM471A	Business Ethics and Corporate Governance	3	-	-	3	30	70	100
2	23HSM471B	E-Business	3	-	-	3	30	70	100
3	23HSM471C	Management Science	3	-	-	3	30	70	100

Open Elective – I - Semester V (Third Year)

S.No	Course Code	Offered Department	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OME351A	ME	Sustainable Energy Technologies	3	-	-	3	30	70	100
2	23OEE351A	EEE	Electrical Safety Practices and Standards	3	-	-	3	30	70	100
3	23OEC361A	ECE	Electronic Circuits	3	-	-	3	30	70	100
4	23OCS351A	CSE & Allied	Java Programming	3	-	-	3	30	70	100
5	23OAI351A		Fundamentals of Artificial Intelligence	3	-	-	3	30	70	100
6	23OSH351A	Mathematics	Mathematics for Machine Learning and AI	3	-	-	3	30	70	100
7	23OSH351B	Physics	Materials Characterization Techniques	3	-	-	3	30	70	100
8	23OSH351C	Chemistry	Chemistry of Energy Systems	3	-	-	3	30	70	100
9	23OSH351D	Humanities	English for Competitive Examinations	3	-	-	3	30	70	100
10	23OSH351E		Entrepreneurship and New Venture Creation	3	-	-	3	30	70	100

Open Elective – II - Semester VI (Third Year)

S.No	Course Code	Offered Department	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OME361A	ME	Automation and Robotics	3	-	-	3	30	70	100
2	23OEE361A	EEE	Renewable Energy Sources	3	-	-	3	30	70	100
3	23OEC361A	ECE	Digital Electronics	3	-	-	3	30	70	100
4	23OCS361A	CSE & Allied	Operating Systems	3	-	-	3	30	70	100
5	23OML361A		Introduction of Machine Learning	3	-	-	3	30	70	100
6	23OSH361A	Mathematics	Optimization Techniques for Engineers	3	-	-	3	30	70	100
7	23OSH361B		Mathematical Foundation Of Quantum Technologies	3	-	-	3	30	70	100
8	23OSH361C	Physics	Physics Of Electronic Materials And Devices	3	-	-	3	30	70	100
9	23OSH361D	Chemistry	Chemistry Of Polymers And Applications	3	-	-	3	30	70	100
10	23OSH361E	Humanities	Academic Writing and Public Speaking	3	-	-	3	30	70	100

Open Elective – III - Semester VII (Fourth Year)

S.No	Course Code	Offered Department	Course Title	Scheme of Instructios Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OME471A	ME	3D Printing Technologies	3	-	-	3	30	70	100
2	23OEE471A	EEE	Smart Grid Technologies	3	-	-	3	30	70	100
3	23OEC471A	ECE	Microprocessors and Microcontrollers	3	-	-	3	30	70	100
4	23OCS471A	CSE & Allied	Data Base Management Systems	3	-	-	3	30	70	100
5	23OCS471B		Cyber Security	3	-	-	3	30	70	100
6	23OSH471A	Mathematics	Wavelet transforms and its Applications	3	-	-	3	30	70	100
7	23OSH471B	Physics	Smart Materials And Devices	3	-	-	3	30	70	100
8	23OSH471C		Introduction to Quantum Mechanics	3	-	-	3	30	70	100
9	23OSH471D	Chemistry	Green Chemistry and Catalysis For Sustainable Environment	3	-	-	3	30	70	100
10	23OSH471E	Humanities	Employability Skills	3	-	-	3	30	70	100

Open Elective – IV - Semester VII (Fourth Year)

S.No	Course Code	Offered Department	Course Title	Scheme of Instructios Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OME472A	ME	Total Quality Management							
2	23OEE471A	EEE	Electric Vehicles	3	-	-	3	30	70	100
3	23OEC471A	ECE	Transducers and Sensors	3	-	-	3	30	70	100
4	23OCS471A	CSE & Allied	Computer Networks	3	-	-	3	30	70	100
5	23OCS471B		Internet of Things	3	-	-	3	30	70	100
7	23OSH472A	Mathematics	Financial Mathematics	3	-	-	3	30	70	100
8	23OSH472B	Physics	Sensors And Actuators For Engineering Applications	3	-	-	3	30	70	100
9	23OSH472C	Chemistry	Chemistry of Nanomaterial's and Applications	3	-	-	3	30	70	100
10	23OSH473D	Humanities	Literary Vibes	3	-	-	3	30	70	100

S.No	Subject Area	Credit Mapping								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	HSMC	3.5	0.5	3	-	-	-	2	-	09
2	BSC	3	11	3	3	-	-	-	-	20
3	ESC	13	4.5	1	4	4	-	-	-	26.5
4	PCC	-	4.5	11	12	12	12	3	-	54.5
5	SEC	-	-	2	2	2	2	2	-	10
6	PEC	-	-	-	-	3	6	6	-	15
7	OEC	-	-	-	-	3	3	6	-	12
8	PWC	-	-	-	-	2	-	2	12	16
9	AC	-	-	Y	-	-	Y	Y	-	--
TOTAL		19.5	20.5	20	21	26	23	21	12	163

NOTE: **HSMC** – Humanities, Social Science and Management Science Courses; **BSC** – Basic Science Courses; **ESC** – Engineering Science Courses; **PCC** – Professional Core Courses; **SEC** – Skill Enhancement Course; **PEC** – Professional Elective Courses; **OEC** – Open Elective Courses; **PWC** – Project Work Courses & **AC** – Audit Courses



I B.Tech I/II sem

23HSM111T	COMMUNICATIVE ENGLISH	L	T	P	C
	(Common to All Branches of Engineering)	2	0	0	2

PRE-REQUISITES: The objectives of the course are to

COURSE EDUCATIONAL OBJECTIVES

The main objective of introducing this course, communicative English, is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

UNIT-I: HUMAN VALUES-Gift of Magi (Short Story)

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Writing: Mechanics of Writing-Capitalization, Spelling Punctuation- Parts of Sentences.

Grammar: Parts of Speech, Basic Sentence Structures - forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT-II: NATURE-The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audiotexts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)

Grammar: Cohesive devices-linkers, use of articles and zero article; prepositions.

Vocabulary: Homonyms, Homophones, Homographs.

UNIT-III: BIOGRAPHY-Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading: Reading at extendedly making basic inferences-recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing: Summarizing, Note-making, paraphrasing



Grammar: Verbs-tenses; subject-verb agreement; Compound words, Collocations

Vocabulary: Compound words, Collocations

UNIT-IV: INSPIRATION-The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) –asking for and giving information/directions.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters, Resumes

Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice

Vocabulary: Words often confused, Jargons

UNIT-V: MOTIVATION-The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts

Reading: Reading comprehension.

Writing: Writing structure essays on specific topics.

Grammar: Editing short texts–identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Vocabulary: Technical Jargons

COURSE OUTCOMES:

On successful completion of the course the student will enable to		PO
CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues.	PO1
CO2	Apply grammatical structures to formulate sentences and correct word forms.	PO5
CO3	Analyzed is course markers to speak clearly on a specific topic in informal discussions	PO2
CO4	Evaluate reading/listening texts and To write summaries based On global comprehension of these texts.	PO6
CO5	Create a coherent paragraph, essay, and resume.	PO4

TEXT BOOKS:

Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023
Empowering with Language by Cengage Publications, 2023

REFERENCE BOOKS:

Dubey, Sham Ji&Co. English for Engineers, Vikas Publishers, 2020

Bailey, Stephen. Academic writing: A Handbook for International Students. R outledge, 2014

Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.

Lewis, Norman. Word Power Made Easy the Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.



REFERENCE WEBSITES:

GRAMMAR:

www.bbc.co.uk/learningenglish

<https://dictionary.cambridge.org/grammar/british-grammar/>

www.eslpod.com/index.html

<https://www.learngrammar.net/>

<https://english4today.com/english-grammar-online-with-quizzes/>

<https://www.talkenglish.com/grammar/grammar.aspx>

VOCABULARY

<https://www.youtube.com/c/DailyVideoVocabulary/videos>

https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

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	-	-	-	-	-	-



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

I B.Tech I sem

23BSC114T	LINEAR ALGEBRA & CALCULUS	L	T	P	C
	(Common to All Branches of Engineering)	2	1	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To familiarize the concepts of matrices and mean value theorems and their applications in engineering.
2. To equip the students to solve various application problems in engineering through evaluation of multiple integrals etc.,
3. To equip the students with standard concepts and tools of mathematics to handle various real-world problems and their applications.

UNIT-I: MATRICES

(9)

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method. Iterative methods: Jacobi and Gauss Seidel Methods.

UNIT-II: EIGEN VALUES, EIGEN VECTORS AND ORTHOGONAL TRANSFORMATION

(9)

Eigen values, Eigenvectors and their properties, Diagonalization of a matrix, Cayley- Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley- Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: CALCULUS

(9)

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT-IV: PARTIAL DIFFERENTIATION AND APPLICATIONS (MULTI VARIABLE CALCULUS)

(9)

Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT-V: MULTIPLE INTEGRALS (MULTIPLE VARIABLE CALCULUS)

(9)

Double integrals, Triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).



On successful completion of the course, students will be able to		Pos
CO1	To solve a system of homogenous and non-homogeneous linear equations	PO1, PO2, PO3
CO2	Develop and use of matrix algebra techniques that are needed by engineers for practical applications	PO1, PO2, PO3
CO3	Learn important tools of calculus in higher dimensions. Utilize mean value theorems to real life problems.	PO1, PO2, PO3
CO4	Familiarize with functions of several variables which is useful in optimization	PO1, PO2, PO3
CO5	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.	PO1, PO2, PO3

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition(9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Michael Greenberg, Pearson publishers, 9th edition
5. Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. Chand Publications, 2014, Third Edition (Reprint 2021)

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>

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SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

I B.Tech- I Semester

23ESC112T	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	L	T	P	C
	(Common to All branches of Engineering)	2	1	0	3

PART A: BASIC ELECTRICAL ENGINEERING

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1.	Apply fundamental circuit theories to both DC and AC circuits, and analyze the complex circuit configurations.
2.	Gain proficiency in understanding, operating, and analyzing electrical machines and their applications in various industries and understanding the concept of measuring instruments
3.	Gain knowledge about various energy resources and understand the concept of electrical energy consumption, billing mechanism, and safety measures.

UNIT-1: DC & AC Circuits:

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase and phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT-2: Machines and Measuring Instruments:

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Moving Coil and Moving Iron Instruments, Dynamometer Wattmeter, Energy meter and Wheat Stone bridge.

UNIT-3: Energy Resources, Electricity Bill & Safety Measures:

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Thermal, Nuclear, Solar & Wind power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

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SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

PART B: BASIC ELECTRONICS ENGINEERING

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1.	Gain the knowledge on basic semiconductor devices
2.	Acquire the knowledge on electronic circuits and instrumentation.
3.	Understand the principles of digital electronics, combinational circuits and sequential circuits

UNIT-1: SEMICONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.

UNIT-2: BASIC ELECTRONIC CIRCUITS AND INSTRUMENTATION

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT-3: DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adder, Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Course Outcomes:

On successful completion of the course the student could be		POs
CO1	Understand the concept and working of diodes, transistors, and their applications.	PO1, PO2, PO3, PO12
CO2	Analyze the electronic circuits and instrumentation	PO1, PO2, PO3, PO12
CO3	Familiarize with the number systems, codes, Boolean algebra and logic gates and understand the working of different combinational & sequential circuits.	PO1, PO2, PO3, PO12

TEXTBOOKS:

1. R. L. Boylsted & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

REFERENCE BOOKS:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. S. Salivahanan, N. Suresh Kumar, Electronic Devices & Circuits, third edition.



<https://archive.nptel.ac.in/courses/108/101/108101091/>
<https://archive.nptel.ac.in/courses/117/103/117103063/>
<https://archive.nptel.ac.in/courses/117/107/117107095/>
<https://archive.nptel.ac.in/courses/122/106/122106025/>
<https://archive.nptel.ac.in/courses/122/106/122106026/>

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I B.Tech. – I / II Semester

23ESC113T	ENGINEERING GRAPHICS	L	T	P	C
	(Common to All Branches)	1	-	4	3

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To expose them to 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.
4. To develop drawing skills for communication of concepts, ideas and design the development of surfaces of section of solids.
5. To develop geometrical shapes and multiple views of orthographic projections of isometric views.

UNIT –1: ENGINEERING CURVES AND SCALES (9)

Introduction: Introduction about lines, lettering and dimensioning – Geometrical constructions and constructing regular polygons by general methods.

Engineering Curves: Construction of ellipse, parabola and hyperbola by general method – Construction of cycloids – Construction involutes – Drawing of tangents and normal to the above curves. **Scales:** Plain scales, and diagonal.

UNIT –2: PROJECTION OF POINTS, LINES AND PLANE SURFACES (12)

Projection of Points: Principles of orthographic projection – Reference lines and Plane – Projections of points. **Projection of Lines:** Projections of lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane – Determination of true lengths, true inclinations by rotating line and trapezoidal method. **Projection of Planes:** Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT –3: PROJECTION OF SOLIDS (12)

Projection of Solids: Types of solids – Projection of simple solids (prisms, pyramids, cylinder and cone) – Axis perpendicular to horizontal plane, axis perpendicular to vertical plane and axis parallel to both the reference planes, projection of solids with axis inclined to one reference plane and parallel to another plane.

UNIT –4: SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES (12)

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.

Development of Surfaces: Development of Surfaces: Development of lateral surfaces of simple and sectioned solids like prisms, pyramids, cylinder and cone.



UNIT –5: ISOMETRIC PROJECTIONS AND ORTHOGRAPHIC PROJECTIONS (9)

Isometric Projection: Principles of isometric projection – Isometric scale – Isometric views of simple solids and truncated solids like prisms, pyramids, cylinder, sphere, and cone.

Orthographic Projections: Visualization principles – Plane of projections – Representation of three-dimensional objects – Sketching of multiple views from pictorial views – Conversion of isometric views to orthographic views – Conversion of orthographic views to isometric views.

COMPUTER GRAPHICS (Not for Examination)

(3)

Practicing of simple 2D and 3D drawings of objects using Auto CAD

Total Hours: 60

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Construct the Engineering curves and generate tangent and normal for those curves.	PO1, PO2, P03, P10,
CO2	Draw the projection of points, lines and plane surfaces.	PO1, PO2, P03, P10,
CO3	Draw the projection of solids, like prisms, pyramids, cylinder, and cone.	PO1, PO2, P03, P10,
CO4	Draw the section of solids and development of surfaces.	PO1, PO2, P03, P10,
CO5	Draw the isometric projections and orthographic views.	PO1, PO2, P03, P10,

TEXT BOOKS:

1. N.D. Bhatt and V. M. Panchal, "Engineering Drawing", Charotar Publishing House, 50th edition, 2010.
2. M.B. Shah and B. C. Rana, "Engineering Drawing", Pearson Education, 2/e, 2009.

REFERENCE BOOKS:

1. K.L. Narayana and P.Kannaiah, "Engineering Drawing", 2/e, 2012, SciTech Publishers.
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. Venugopal and V. Prabhu Raja" Engineering Graphics", New Age International (P) Limited, 2008.
4. Basant Agarwal and C.M. Agarwal, "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, , 2008,
5. K.V. Natrajan, "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai. 2009.
6. Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD



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	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO.1	3	2	3	-	-	-	-	-	-	1	-	1
CO.2	3	2	3	-	-	-	-	-	-	1	-	1
CO.3	3	2	3	-	-	-	-	-	-	1	-	1
CO.4	3	2	3	-	-	-	-	-	-	1	-	1
CO.5	3	2	3	-	-	-	-	-	-	1	-	1
CO*	3	2	3	-	-	-	-	-	-	1	-	1



I B.Tech - I Semester

23ESC114T	INTRODUCTION TO PROGRAMMING	L	T	P	C
	(Common to All Branches)	2	1	0	3

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce students to the fundamentals of computer programming.
2. To provide logical thinking and problem-solving skills using control structures.
3. To familiarize students with programming concepts such as data types, arrays and strings.
4. To introduce the concepts of pointers and user-define data types.
5. To encourage the students with functions and file handling mechanisms.

UNIT- 1 Introduction to Programming and Problem Solving (10)

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program- Algorithms, flowcharts. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operators and Expressions, Type Conversion, and Casting. Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT- 2 Control Structures

(8)

Simple sequential programs, Conditional Statements (if, if-else, switch), Loops (for, while, do-while). Break and continue.

UNIT- 3 Arrays and Strings

(9)

Arrays indexing, memory model, programs with array of integers, two dimensional arrays. Strings-Declaring and Initializing String Variables, reading string from terminal, Writing string to the screen, String Handling Functions.

UNIT-4 Pointers & User Defined Data types

(9) Pointers, dereferencing and address operators, pointer and address

arithmetic, array manipulation using pointers. User-defined data types-Structures and Unions.

UNIT-5 Functions & File Handling

(9)

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables. File Handling- Basic Operations on Files – File Handling Function.

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course the student will be able to,		POs related to COs
CO1	Understand basics of computers, the concept of algorithm and algorithmic thinking.	PO1, PO2
CO2	Analyze a problem and develop an algorithm and program using control structures to solve it.	PO1, PO2, PO3
CO3	Implement various programming concepts using arrays and strings.	PO1, PO2, PO3, PO4
CO4	Understand and implement more advanced features of pointers and user-defined data types.	PO1, PO2, PO5
CO5	Develop problem-solving using functions and file handling concepts.	PO1, PO3, PO4, PO5



TEXT BOOKS:

1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

REFERENCE BOOKS:

1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

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
C01	3	3	-	-	-	-	-	-	-	-	-	-
C02	3	3	2	-	-	-	-	-	-	-	-	-
C03	3	3	2	3	-	-	-	-	-	-	-	-
C04	3	3	-	-	3	-	-	-	-	-	-	-
C05	3	-	3	3	3	-	-	-	-	-	-	-
CO*	3	3	2	3	3	-	-	-	-	-	-	-



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

I B.Tech I/II sem

23HSM112L	COMMUNICATIVE ENGLISH LAB	L	T	P	C
	(Common to all Branches of Engineering)	-	-	2	1

COURSE EDUCATIONAL OBJECTIVES:

The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning students will get trained in the basic communication skills and make them ready to face job interviews.

LIST OF TOPICS:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play, Conversational Practice and TED talks
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates-Methods & Practice
9. PPT Presentations/Poster Presentation
10. Interviews Skills

SUGGESTED SOFTWARES:

1. Walden Info tech
2. Young India Films

REFERENCE BOOKS:

1. Meenakshi Raman, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Grant Taylor: English Conversation Practice, TataMcGraw-HillEducationIndia,2016
3. Hewing's, Martin. Cambridge Academic English(B2). CUP,2012.
4. T. Balasubramanyam, A Textbook of English Phonetics for Indian Students, (3rd Ed) Trinity Press.

WEB RESOURCES:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. <https://www.britishcouncil.in/english/online>
5. <http://www.letstalkpodcast.com/>
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. <https://www.youtube.com/c/ArnelsEverydayEnglish/featured>
8. <https://www.youtube.com/c/engvidAdam/featured>
9. <https://www.youtube.com/c/EnglishClass101/featured>
10. <https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists>
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

**COURSE OUTCOMES:**

On successful completion of the course the student will be able to		PO
C01	Understand the different aspects of the English language proficiency with emphasis on LSR W skills.	PO1
C02	Apply communication skills through various language learning activities.	PO5
C03	Analyze the English speech sounds, stress, rhythm, into nation and syllable division for better listening and speaking comprehension.	PO6
C04	Evaluate and exhibit professionalism in participating in debates and group discussions.	PO2
C05	Create effective resonate and prepare themselves to face interviews in future.	PO10

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	-	-
CO	3	3	-	-	3	3	-	-	-	3	-	-



23ESC118L	IT WORKSHOP LAB	L	T	P	C
	(Common to All branches of Engineering)	0	0	2	1

PRE-REQUISITES: Nil

COURSE OBJECTIVES:

1. To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables.
2. To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
3. To teach basic command line interface commands on Linux.
4. To teach the usage of Internet for productivity and self-paced life-long learning
5. To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

List of Experiments:

PC Hardware & Software Installation

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 would 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 (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva
5. Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

6. 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.
7. Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
8. 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 to the instructors by the student.
9. Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.



LaTeX and WORD

10. Word Orientation: The mentor needs to give an overview of La Tex and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La Tex and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

11. Using La TeX and Word to create a 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 La TeXand Word.

12. Creating project abstract Features to be covered: -Formatting Styles, inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

13. Creating a Newsletter: Features to be covered: - Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or 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. 14.Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

15. Calculating GPA -. Features to be covered: - Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

16. Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

17. Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

18. Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

19. Master Layouts (slide, template, and notes), Types of views (basic, presentation, slides lotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

20. Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: what is the capital of France?"

21. Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."



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(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING
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22. Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

- Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Total Hours: 45

Course Outcomes:

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.	PO4
CO5	Prompt the different types of questions using CHATBOT	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 MS Office, Internet and Computer in future.	PO12

Text Books:

- Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
- The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition

Reference Books:

- Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
- PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
- LaTeX Companion, Leslie Lamport, PHI/Pearson.
- IT Essentials PC Hardware and Software Companion Guide, David Anfinson and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
- IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition



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(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

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



I B.Tech. – I Semester

23ESC115L	COMPUTER PROGRAMMING LAB	L	T	P	C
	(Common to All Branches)	0	0	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, Structures and union.
5. To familiarize with file handling techniques.

Week 1

Familiarization with programming environment

- i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
- ii) Exposure to Turbo C, gcc
- iii) Writing simple programs using printf (), scanf()

Week 2

Converting algorithms/flow charts into C Source code.

Developing the algorithms/flowcharts for the following sample programs

- i) Sum and average of 3 numbers
- ii) Conversion of Fahrenheit to Celsius and vice versa
- iii) Simple interest Calculation

Week 3

Simple computational problems using arithmetic expressions.

- i) Finding the square root of a given number
- ii) Finding compound interest
- iii) Area of a triangle using heron's formulae
- iv) Distance travelled by an object

Week 4

Simple computational problems using the operator's precedence and associativity

- i) Evaluate the following expressions.
 - a. $A+B*C+(D*E) + F*G$
 - b. $A/B*C-B+A*D/3$
 - c. $A++++B---A$
 - d. $J= (i++) + (++i)$
- ii) Find the maximum of three numbers using conditional operator
- iii) Take marks of 5 subjects in integers, and find the total, average in float

Week 5

Problems involving if-then-else structures.

- i) Write a C program to find the max and min of four numbers using if-else.
- ii) Write a C program to generate electricity bill.
- iii) Find the roots of the quadratic equation.
- iv) Write a C program to simulate a calculator using switch case.
- v) Write a C program to find the given year is a leap year or not.



Week 8

Iterative problems e.g., the sum of series

- i) Find the factorial of given number using any loop.
- ii) Find the given number is a prime or not.
- iii) Compute sine and cos series
- iv) Checking a number palindrome
- v) Construct a pyramid of numbers

Week 7

1D Array manipulation, linear search

- i) Find the min and max of a 1-D integer array.
- ii) Perform linear search on 1D array.
- iii) The reverse of a 1D integer array
- iv) Find 2's complement of the given binary number.
- v) Eliminate duplicate elements in an array.

Week 8

Matrix problems, String operations, Bubble sort

- i) Addition of two matrices
- ii) Multiplication two matrices
- iii) Sort array elements using bubble sort
- iv) Concatenate two strings without built-in functions
- v) Reverse a string using built-in and without built-in string functions

Week 9

Pointers

- i) Write a C program to find the sum of a 1D array using pointers
- ii) Enter n students data using Pointers and display failed students list
- iii) Demonstrate the arithmetic operations using pointers.
- iv) Write a C Program using Pointers to Read in an Array of Integers and Print its Elements in Reverse Order

Week 10

Structures and Unions

- i) Demonstrate the differences between structures and unions using a C program.
- ii) Write a C program to find the total, average of n students using structures
- iii) Write a C program to copy one structure variable to another structure of the same type.
- iv) Write a C program to shift/rotate using bit fields.

Week 11

Simple functions using call by value, solving differential equations using Euler theorem.

- i) Write a C function to calculate NCR value.
- ii) Write a C function to find the length of a string.
- iii) Write a C function to transpose of a matrix.
- iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

Week 12

Recursive functions

- i) Write a recursive function to generate Fibonacci series.
- ii) Write a recursive function to find the GCD of two numbers.
- iii) Write a recursive function to find the factorial of a number.
- iv) Write a recursive function to find the sum of series.



Week 13

Simple functions using Call by reference.

- i) Write a C program to swap two numbers using call by reference.
- ii) Write a C program to copy one string into another using pointer.
- iii) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

Week 14

File operations

- i) Write a C program to write and read text into a file.
- ii) Write a C program to write and read text into a binary file using fread () and fwrite ()
- iii) Copy the contents of one file to another file.
- iv) Write a C program to merge two files into the third
- v) Write a C program to print last n characters of a given file.

Total Hours: 45

COURSE OUTCOMES:

After the successful completion of this course, the students able to:		POs related to COs
CO1	Read and understand the execution of programs written in C language.	PO1
CO2	Analyze the programs on control statements and arrays.	PO2
CO3	Design C programs which utilize memory efficiently using programming constructs like pointers.	PO3
CO4	Develop the programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C	PO4
CO5	Analyze and implement the advanced concepts on functions and File handling techniques.	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 loops, pointers and files, implementing programs in future.	PO12

TEXT BOOKS:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw Hill

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice-Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

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	PO 1	PO 2	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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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DEPARTMENT OF CIVIL ENGINEERING

23ESC116L	ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP	L	T	P	C
	(Common to All branches of Engineering)	0	0	3	1.5

COURSE EDUCATIONAL OBJECTIVES:

1	Gain the knowledge on basic laws
2	Acquire the knowledge on theorems and Characteristics.
3	Analyze the Power and Power factor measurement
4	Analyze various characteristics of electrical circuits, electrical machines and measuring instruments
5	Measurement of various electrical parameters; Household and commercial wiring

Activities:

1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
- Provide some exercises so that hardware tools and instruments are learned to be used by the students.
2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
- Provide some exercises so that measuring instruments are learned to be used by the students.
3. Components: Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.
- Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc. with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments:

1. Verification of Ohms law, KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

[illegible]

[illegible]



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

I B.Tech I/II sem

23HSM114L	NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE	L	T	P	C
	(Common to All branches of Engineering)	0	0	1	0.5

COURSE EDUCATIONAL OBJECTIVES:

1. To impart discipline, character, and fraternity amongst young citizens
2. To train them to work in teams/groups to enhance their team spirit.
3. To enable the students to acquire leadership qualities.
4. To induce social consciousness among students through various activities.
5. To instill self-confidence and the ideals of selfless service
6. To engage students in responsible and challenging actions for the common good.

COURSE OUTCOMES:

After the completion of the course the student will be able to

1. Understand the importance of discipline, character and service motto.
2. Outline the needs and problems of the community
3. Solve some societal issues by applying acquired knowledge, facts, and techniques
4. Explore human relationships by analyzing social problems
5. Determine to extend their help for the fellow beings and downtrodden people
6. Develop leadership skills and civic responsibilities

UNIT-I: ORIENTATION

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:

1. Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
2. Conducting orientations programs for the students –future plans-activities-releasing road map etc.
3. Displaying success stories-motivational biopics- award winning movies on societal issues etc.
4. Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT-II: NATURE & CARE

Activities:

1. Best out of waste competition.
2. Poster and signs making competition to spread environmental awareness.
3. Recycling and environmental pollution article writing competition.
4. Organizing Zero-waste day.



5. Digital Environmental awareness activity via various social media platforms.
6. Virtual demonstration of different eco-friendly approaches for sustainable living.
7. Write a summary on any book related to environmental issues.

UNIT-III: COMMUNITY SERVICE

Activities:

1. Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities- experts-etc.
2. Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
3. Conducting consumer Awareness. Explaining various legal provisions etc.
4. Women Empowerment Programmer - Sexual Abuse, Adolescent Health and Population Education.
5. Any other programmer in collaboration with local charities, NGOs etc.

REFERENCE BOOKS:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

GENERAL GUIDELINES:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students

EVALUATION GUIDELINES:

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totaling to 90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

I B.Tech II sem

23BSC121T	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	L	T	P	C
	(Common to All Branches of Engineering)	2	1	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To enlighten the learners in the concept of differential equations and multivariable calculus.
2. To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications

UNIT-I: DIFFERENTIAL EQUATIONS OF FIRST ORDER AND FIRST DEGREE (9)

Linear differential equations – Bernoulli's equations - Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay, Electrical circuits.

UNIT-II: LINEAR DIFFERENTIAL EQUATIONS OF HIGHER ORDER (CONSTANT COEFFICIENTS) (9)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT-III: PARTIAL DIFFERENTIAL EQUATIONS (9)

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method and Non-Linear (Standard forms) equations. Homogeneous Linear Partial differential equations with constant coefficients (Method of Separation of variables).

UNIT-IV: VECTOR DIFFERENTIATION (9)

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT-V: VECTOR INTEGRATION (9)

Line Integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
C01	Solve the first order differential equations related to various engineering fields	PO1, PO2,PO3
C02	Solve the higher order differential equations related to various engineering fields.	PO1, PO2,PO3
C03	Identify solution methods for partial differential equations that model physical processes.	PO1, PO2,PO3
C04	Interpret the physical meaning of different operators such as gradient, curl and divergence.	PO1, PO2,PO3
C05	Estimate the work done against a field, circulation and flux using vector calculus	PO1, PO2,PO3

TEXT BOOKS:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

REFERENCE BOOKS:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. Ramana, , McGraw Hill Education, 2017

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/111/106/111106100/>
1. <https://www.youtube.com/watch?v=OBhZvyhc8JQ&t=982s>
2. <https://nptel.ac.in/courses/111/106/111106100/>
3. <https://www.youtube.com/watch?v=3zCdNO2xp3s>
4. <https://www.youtube.com/watch?v=GFKggEkKtLM>
5. <https://www.youtube.com/watch?v=SZCsFS9izfQ>
6. <https://www.youtube.com/watch?v=ma1QmE1SH3I>

CO-PO MAPPING

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23BSC112T	ENGINEERING CHEMISTRY	L	T	P	C
	(Common to Civil, Mechanical Engineering)	3	0	0	3

COURSE EDUCATIONAL OBJECTIVES:

1. To impart the concept of soft and hard waters, softening methods of hard water and purification of water in order to get portable water.
2. To understand the concept of electro chemistry with its applications such as battery fuel cells and in addition the basics on corrosion with its effects and control
3. To train the students about the concepts and applications of polymers and in addition to the knowledge of fuels
4. To familiarize the concept and applications of modern engineering materials
5. To develop knowledge on concept of surface chemistry and nanomaterial's with applications

UNIT-I: WATER TECHNOLOGY

(9)

Soft and hardwater, Estimation of hardness of water by EDTA Method, Estimation of dissolved Oxygen - Boiler troubles –Priming, foaming, scale and sludge, Caustic embrittlement, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization (WHO) standards, Ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

UNIT-II: ELECTROCHEMISTRY AND APPLICATIONS

(9)

Electrodes –electrochemical cell, Nernst equation, cell potential calculations.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad), and lithium-ion batteries- working principle of the batteries including cell reactions; Fuel cells-Basic Concepts, the principle and working of hydrogen-oxygen Fuel cell.

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bedworth ratios and uses, Factors affecting the corrosion, cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

UNIT-III: POLYMERS AND FUEL CHEMISTRY

(9)

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth polymerization.

Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of poly styrene. PVC Nylon 6,6 and Bakelite.

Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol rubbers.

Fuels – Types of fuels, calorific value of fuels, numerical problems based on calorific value; Analysis of coal (Proximate and Ultimate analysis), Liquid Fuels, refining of petroleum, Octane and Cetane number- alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.



UNIT-IV: MODERN ENGINEERING MATERIALS

(9)

Composites- Definition, Constituents, Classification- Particle, Fiber and Structural reinforced composites, properties and Engineering applications

Refractories- Classification, Properties, Factors affecting the refractory materials and Applications.

Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications.

Building materials- Portland Cement, constituents, Setting and Hardening of cement.

UNIT-V: SURFACE CHEMISTRY AND NANOMATERIALS

(9)

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method), chemical and biological methods of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Longmuir), BET equation (no derivation) applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

COURSE OUTCOMES:

On successful completion of the course the students will be able to		POs
CO1	Demonstrate knowledge and exhibit skills on analysis of water with industrial applications and sustainability	PO1, PO2, PO6, PO7
CO2	Demonstrate knowledge on electrochemistry with applications such as battery, and fuel cells, sensors, corrosion and sustainability	PO1, PO2, PO6, PO7
CO3	Demonstrate knowledge on basics on polymers with applications related to society and sustainability, basic concepts on fuel with use, analysis and sustainability	PO1, PO2, PO6, PO7
CO4	Demonstrate knowledge engineering materials for industrial applications and use	PO1, PO2, PO6
CO5	Demonstrate knowledge on surface chemistry and related nanomaterials for several applications	PO1, PO2, PO6

TEXT BOOKS:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

REFERENCE BOOKS:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heinemann, 1992.



CO-MAPPING

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



I B.Tech I/II sem

23BSC113T	ENGINEERING PHYSICS	L	T	P	C
	(Common to All Engineering Branches)	3	0	0	3

COURSE EDUCATIONAL OBJECTIVES:

1. To study the intensity variation of light due to interference, diffraction and polarization
2. To understand the fundamental of crystals and their structures.
3. To recognize various types of polarization of dielectrics and classification of the magnetic materials.
4. To study the principles of quantum mechanics and implementing it the one-dimensional motion of particles and the band theory of solids.
5. To provide an overview of semiconductor and identification of type of semiconductor using Hall effect.

UNIT-I : Wave Optics

Interference: Introduction - Principle of superposition -Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit- Diffraction Grating -Applications

Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates. -Applications

UNIT-II: Crystallography and X-ray diffraction

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters - Bravais Lattices - crystal systems (3D) - coordination number - packing fraction of SC, BCC & FCC - Miller indices - separation between successive (hkl) planes.

X- ray diffraction: Bragg's law - X-ray Diffractometer - crystal structure determination by Laue's and powder methods.

UNIT-III: Dielectric and Magnetic Materials

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector - Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation - complex dielectric constant - Frequency dependence of polarization - dielectric loss

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability - Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT-IV: Quantum Mechanics and Free electron theory

Quantum Mechanics: Dual nature of matter - Heisenberg's Uncertainty Principle - Significance and properties of wave function - Schrodinger's time independent and dependent wave equations- Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) - Quantum free electron theory - electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy.

UNIT-V: Semiconductors

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation - Hall effect and its applications.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
C01	Identify the importance and applications Wave Optics in various Streams of Engineering	PO1, PO2
C02	Explain the fundamental of crystals and their structures	PO1, PO2
C03	Elucidate the importance, properties and applications of Magnetic materials and dielectrics	PO1, PO2
C04	Use ideas with mathematical solutions to Quantum mechanics and its applications in various atomic phenomena	PO1, PO2
C05	Provide knowledge about semiconductor and different type of semiconductor using Hall effect.	PO1, PO2

TEXT BOOKS:

1. A Text book of Engineering Physics - M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy,
2. S. Chand Publications, 11th Edition 2019.
3. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).

REFERENCE BOOKS:

1. Solid State Physics, by Kittel, Wiley
2. Engineering Physics by Gaur and Gupta, Dhanpatrai Publications
3. Engineering Physics by K.Thyagarajan, McGraw Hill.

REFERENCE WEBSITE:

<https://archive.nptel.ac.in/courses/122/107/122107035/>

<https://archive.nptel.ac.in/courses/112/106/112106293/>

<https://www.youtube.com/watch?v=6OUFuZpCqGw>

<https://archive.nptel.ac.in/courses/122/106/122106034/>

<https://www.youtube.com/watch?v=k6ZxP9Yr02E>

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I B.Tech. – II Semester

23ESC111T	BASIC CIVIL AND MECHANICAL ENGINEERING (Part-B)	L	T	P	C
	(Common to All Branches)	3	-	-	3

**BASIC CIVIL ENGINEERING
(Part-A)**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To study the Overview of civil engineering and basic concepts on construction materials.
2. To study the basic concepts in the field of surveying & Foundation Engineering
3. To study the basic transportation, water resources and environmental engineering.

UNIT –1: INTRODUCTION TO CIVIL ENGINEERING (8)

BASICS OF CIVIL ENGINEERING: Overview of civil engineering – Civil engineering contributions to the welfare of society – Various disciplines of civil engineering – Basic concepts and scope of structural engineering, geo-technical engineering, transportation engineering, hydraulics, water resources engineering, and environmental engineering

CONSTRUCTION TECHNOLOGY: Fundamental concepts of building planning for residential buildings and Sequences of Work in Building Construction – Introduction to Prefabricated construction Techniques & Green buildings concept **Construction Materials:** Cement – Aggregate – Bricks – Cement – Concrete – Steel – Timber – Modern materials. (Brief discussion only)

UNIT –2: SURVEYING & FOUNDATION ENGINEERING (8)

SURVEYING: Objectives of surveying – Horizontal measurements – Angular measurements – Introduction to bearings levelling instruments used for levelling – Simple problems on levelling and bearings– Contour mapping. (Brief discussion only)

FOUNDATIONS ENGINEERING: Bearing capacity of soil, functions of foundations, types – shallow and deep- Load bearing and framed structures (Brief discussion only)

UNIT –3: TRANSPORTATION AND WATER RESOURCES AND ENVIRONMENTAL ENGINEERING (8)

TRANSPORTATION ENGINEERING: Importance of transportation in Nation's economic development – Types of highway pavements – Flexible pavements and rigid pavements – Simple differences– Basics concepts on harbor, tunnel, airport, and railway engineering. (Brief discussion only)

WATER RESOURCES AND ENVIRONMENTAL ENGINEERING: Introduction on water resources and environmental engineering – Sources of water – Quality of water and Specifications – Introduction to hydrology – Rainwater harvesting – Water storage and conveyance structures – Fundamental concepts on dams and reservoirs. (Brief discussion only)

Total Hours: 24

(Note: The subject covers only the basic principles of Civil Engineering. The evaluation shall be intended to test only the fundamentals of the subject)

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.	PO1, PO12
CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying and Basics concepts of foundations engineering	PO1, PO12
CO3	Realize the importance of Transportation Water Resources and Environmental Engineering.	PO1, PO12

TEXT BOOKS:

1. Indian Standard Specifications for Drinking Water is : 10500 – 1983
2. G.Shanmugam and M.S.Palanichamy, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi , 1996.
3. Venugopal K, Prahua Raja V, "Basic Mechanical Engineering", Anuradha Publishers, Chennai.

REFERENCE BOOKS:

1. Building Material by S K Duggal New Age International Publishers; Second Edition.
2. Text book of surveying, C.Venkataramaiah, Universities Press.
3. S.K.Khanna & C.E.G.Justo, Highway Engineering Nemchand & Bros., 7th edition (2000).
4. Garg, S.K., Environmental Engineering Vol. II, Khanna Publishers, New Delhi, 2015.
5. P.K.Nag, "Power Plant Engineering", McGraw-Hill Education Pvt. Ltd., New Delhi, 4/e, 2014.
6. P.N.Modi, Irrigation and Water Resources & Water Power Engineering, Standard Book House.
7. M. S. Shetty, Concrete Technology, S. Chand and Company Ltd., New Delhi, 2003
8. K.R.Arora, Soil Mechanics and Foundation Engineering, Standard Publishers and Distributors, Delhi.,

REFERENCE WEBSITE:

1. https://onlinecourses.nptel.ac.in/noc22_ce42/preview

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I B.Tech. – II Semester

23ESC111T	BASIC CIVIL AND MECHANICAL ENGINEERING (Part-B)	L	T	P	C
	(Common to All Branches)	3	-	-	3

BASIC MECHANICAL ENGINEERING
(Part-B)

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To study the basic concepts materials, machining, and scope of mechanical engineering.
2. To study the basic concepts in the field of thermal engineering.
3. To study the basic principles of power plants, mechanical transmission system and fundamentals of robotics.

UNIT –1: INTRODUCTION TO MATERIALS & MANUFACTURING ENGINEERING (8)

Introduction to Mechanical Engineering: Role of mechanical engineering in industries and society – Technologies and scope in different sectors such as energy, manufacturing, design, automotive, aerospace, and marine. **Engineering Materials:** Introduction on metals-ferrous and non-ferrous, ceramics, composites, smart materials. **Manufacturing Processes:** Basic principles and applications of casting, forming, joining processes, and machining – Introduction to CNC machines, 3D printing, and smart manufacturing.

UNIT –2: INTRODUCTION TO THERMAL ENGINEERING (8)

Thermal Engineering: Working principle of boilers. **Refrigeration:** Refrigeration and air-conditioning cycles – Units of refrigeration – Refrigerants – Vapour-compression and absorption system. **Air Conditioning:** Terminology in air conditioning – Working principle of window, split, and central air conditioning system. **IC Engines:** Basic concepts on Otto cycle and Diesel cycle – Components of IC engines – SI/CI Engines – Working principle of two/four stroke petrol and diesel engines – Differences between petrol and diesel engines – Basic concepts on electric and hybrid vehicles.

UNIT –3: POWER PLANTS, MECHANICAL TRANSMISSION AND ROBOTICS (8)

Power Plants: Working principle of steam, diesel, hydro, gas turbine, and nuclear power plants. **Mechanical Power Transmission:** Belt drives, chain, rope drives, gear drives and their applications. **Introduction to Robotics:** Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

Total Hours: 24

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to		Pos
CO1	Understand the concepts of engineering materials and basic manufacturing process.	PO1, PO2, PO3
CO2	Describe the basic concepts of thermal engineering, refrigeration, air conditioning and IC engines.	PO1, PO2, PO3
CO3	Describe the working of different mechanical power transmission systems, power plants, and fundamentals of robotics.	PO1, PO2, PO3

TEXT BOOKS:

1. G.Shanmugam and M.S.Palanichamy, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi , 1996.
2. Venugopal K,Prahu Raja V, "Basic Mechanical Engineering", Anuradha Publishers, Chennai, 2000.

REFERENCE BOOKS:

1. Materials Science and Engineering: An Introduction, William D. Callister, 9/e, 2014,Wiley India Pvt. Ltd.
2. Serope Kalpakjian and Steven R. Schmid, "Manufacturing Engineering and Technology (SI Edition)", Pearson Education, New Delhi, 7/e, 2018.
3. Ian Gibson, David W.Rosen and Brent Stucker, "Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping and Direct Digital Manufacturing", Springer, 2/e, 2015.
3. V. Ganesan, "Internal Combustion Engines", Tata McGraw-Hill Education Pvt. Ltd., 4/e, 2012.
4. C P Arora, "Refrigeration and Air Conditioning", Tata McGraw-Hill Education Pvt. Ltd., Noida, 3/e, 2008.
5. M.Ehsani, Y.Gao,S.Gayand AliEmadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles" Fundamentals, Theory and Design", CRC Press, 2005
6. P.K.Nag, "Power Plant Engineering", McGraw-Hill Education Pvt. Ltd., New Delhi,4/e, 2014.
7. S.S.Rattan, "Theory of Machines and Mechanisms", Tata McGraw-Hill Education Pvt.Ltd, Noida, 5/e, 2019.
8. Industrial Robotics: Technology, Programming and Applications, Mikell P Groover, Mitchell Weiss, Roger N. Nagel, Nicholas G Odrey and Ashish Dutta 2/e, 2012, Tata McGraw-Hill Education Pvt. Ltd.,

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/112103316>
2. <https://nptel.ac.in/courses/112106293>
3. <https://nptel.ac.in/courses/112104290>

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



I B.Tech. - II Semester

23MEC121T	ENGINEERING MECHANICS	L	T	P	C
	(Common to Civil and Mechanical Branches)	2	1	-	3

PRE-REQUISITES: Engineering Mathematics

COURSE EDUCATIONAL OBJECTIVES:

1. To apply the methods to determine the resultant forces and its equilibrium.
2. To analyze the bodies subjected to equilibrium of systems of forces, frames & virtual work.
3. To apply the concepts of centroids/center of gravity of various sections.
4. To analyze the kinematics of a body undergoing rectilinear, curvilinear motion.
5. To apply the dynamic equilibrium principles and work energy equations to solve appropriate problems.

UNIT –1: SYSTEMS OF FORCES AND FRICTION: (9)

Introduction to Engineering Mechanics: Basic concepts – Laws of mechanics – Scope and applications of engineering mechanics. **Systems of Forces:** Coplanar concurrent forces – Components in space – Resultant – Moment of force and its application – Couples and resultant of force systems. **Friction:** Laws of friction – Co-efficient of friction – Limiting friction and impending motion – Coulomb's laws of dry friction – Angles of friction – Angle repose – Friction on horizontal and inclined plane – Friction on ladder.

UNIT –2: EQUILIBRIUM, FRAMES & VIRTUAL WORK (9)

Equilibrium: Free body diagrams – Lami's theorem – Equations of equilibrium of coplanar systems – Parallelogram, triangular and polygon law of forces – Conditions of equilibrium – Equations of equilibrium for spatial system of forces – Numerical examples on spatial system. **Perfect Frames:** Simple trusses – Analysis of trusses by method of joints and sections (analytical method only). **Virtual Work:** Principle of virtual work – Applying the virtual work in mechanical efficiency of real machines.

UNIT –3: CENTRE OF GRAVITY AND MOMENT OF INERTIA (9)

Centroid: Centroid and center of gravity – First moments of areas and lines – Centroids of simple and composite sections by method of moments. **Centre of Gravity:** Centre of gravity of simple body (from basic principles) – Centre of gravity of composite bodies – Theorems of Pappus-Guldin us. **Moment of Inertia:** Second moment of inertia of an area – Parallel and perpendicular axis theorem – Radius of gyration – Moments of inertia of simple and composite areas – Polar moment of inertia – Product of inertia – Mass Moment of Inertia – Principal axes and principal moments.

UNIT –4: KINEMATICS (9)

Kinematics of Particles: Equations of motion – Position, velocity and acceleration – Constant and variable acceleration – Rectilinear and curvilinear motion – Motion under gravity – Projectile motion – Rectangular, tangential and normal components of velocity and acceleration – Radius of curvature. **Kinematics of Rigid Bodies:** Translation and rotation about a fixed axis – General plane motion in velocity and acceleration.



UNIT –5: KINETICS

(9)

Kinetics of Particles: Newton's laws of motion and gravitation – Dynamic equilibrium (D'Alembert's principle). – Motion on rough and inclined surfaces – Motion of two bodies connected by strings – Linear and angular momentum of a particle – Principle of work and energy – Power and efficiency – Principle of conservation of energy – Principle of impulse and momentum – Impacts.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrated and applied the knowledge of the various methods to determine the resultant forces.	PO1, PO2, PO3, PO4
CO2	Analyze the equilibrium acting on a particle, bodies subjected to friction, simple frames and apply principle of virtual work to find reactions.	PO1, PO2, PO3, PO4
CO3	Find the location of centroid, center of gravity and moment of inertia for the given appropriate sections.	PO1, PO2, PO3, PO4
CO4	Analyze the kinematics of a body undergoing rectilinear, curvilinear motion.	PO1, PO2, PO3, PO4
CO5	Apply the dynamic equilibrium principles and work energy equations to solve appropriate problems.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Ferdinand P. Beer, E. Russell Johnston, David Mazurek, Phillip J. Cornwell, Brian Self, Sanjeev Sanghi, "Vector Mechanics for Engineers", Tata McGraw-Hill Education Pvt., Ltd., 12/e, 2019.
2. J. L. Meriam, L. G. Kraige and J. N. Bolton, Engineering Mechanics: Statics, SI Version, & Engineering Mechanics: Dynamics, SI Version, John Wiley & Sons, Inc., 2017.

REFERENCE BOOKS:

1. S S Bhavikatti, Engineering Mechanics, New Age International Ltd, 2019.
2. R.C Hibbeler, Engineering Mechanics, Pearson Education Ltd, 2017.
3. A K Tayal, "Engineering Mechanics Statics and Dynamics", Umesh publications, New Delhi ,14/e, 2010.
4. N.H.Dubey, "Engineering Mechanics Statics and Dynamics", Tata McGraw-Hill Education Pvt. Ltd, Noida, 1/e, 2012.
5. Andrew Pytel, Jaan Kiusalaas and Ishan Sharma, "Engineering Mechanics – Dynamics, (SI Edition)", Cengage Learning, 3/e, 2010.

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/112/103/112103109/>
2. <https://nptel.ac.in/courses/122/104/122104015/>
3. <https://www.digimat.in/nptel/courses/video/112106180/L01.html>
4. <https://nptel.ac.in/courses/112/106/112106286/>
5. <https://nptel.ac.in/courses/112/105/112105164/>
6. <https://nptel.ac.in/courses/112/103/112103108/>
7. <https://nptel.ac.in/courses/122/104/122104014/>



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

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



I B.Tech II sem

23BSC116L	ENGINEERING CHEMISTRY LAB	L	T	P	C
	(Common to Civil, Mechanical Engineering)	-	-	2	1

COURSE EDUCATIONAL OBJECTIVES:

1. To Verify the fundamental concepts with experiments
2. To provide solid foundation in chemistry laboratory to solve engineering problems
3. To apply theoretical principles in preparing polymer and nanomaterial's
4. To apply theoretical principles in estimating hardness, dissolved oxygen, alkalinity and acidity in water, percentage of iron and calcium cement, adsorption of acetic acid and moisture content in coal
5. To experience the importance of theory by using analytical tools such as colorimeter, redwood viscometer, Junkers gas colorimeter, Ostwald viscometer and PH meter

LIST OF EXPERIMENTS

1. Determination of Hardness of a groundwater sample using EDTA.
2. Estimation of Dissolved Oxygen by Winkler's method
3. Determination of Strength of an acid in Pb-Acid battery
4. Preparation of a polymer (Bakelite)
5. Determination of percentage of Iron in Cement sample by colorimetry
6. Estimation of Calcium in port land Cement using EDTA
7. Preparation of ZnO nanomaterials by precipitation method.
8. Adsorption of acetic acid by charcoal
9. Determination of percentage Moisture content in a coal sample
10. Determination of Viscosity of lubricating oil by Redwood Viscometer 1
11. Determination of Viscosity of lubricating oil by Redwood Viscometer 2
12. Determination of Calorific value of gases by Junker's gas Calorimeter
13. Determination of alkalinity of water
14. Determination of acidity of water
15. Determination of molecular weight of polymer by Ostwald's viscometer
16. PH metric titration of strong acid(HCL) vs strong base (NaOH)

Note: Any **TEN** of the listed experiments are to be conducted, out of which any **TWO** experiments may be conducted in virtual mode.

REFERENCE BOOK

1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar

COURSE OUTCOMES:

On successful completion of the course the student will be able to		POs
CO1	Demonstrate knowledge on preparation of bakerite and nanomaterials	PO1
CO2	Analyse dissolved oxygen, acidity and alkalinity in water, calcium in Portland cement	PO2
CO3	Conduct investigations using lead acid battery, colorimeter	PO4
CO4	Analysis of acid in lead acid battery, calcium in cement by colorimetry	PO7
CO5	Follow the ethical principles in implementing the programmer	PO8
CO6	Conduct 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	PO10
CO8	Continue updating skills	PO12



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

CO/POs	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
CO	3	3	-	3	-	-	3	3	3	3	-	3



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

I B.Tech I/II sem

23BSC117L	ENGINEERING PHYSICS LAB	L	T	P	C
	(Common to All Engineering Branches)	-	-	2	1

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To Operate optical instruments like travelling microscope and spectrometer.
2. To Estimate the wavelengths of different colors using diffraction grating.
3. To Plot the intensity of the magnetic field of circular coil carrying current with distance.
4. To Calculate the band gap of a given semiconductor.
5. To verify the laws of stretched strings

LIST OF EXPERIMENTS

1. Determination of radius of curvature of a given Plano convex lens by Newton's rings.
2. Determination of thickness of a thin wire using wedge method
3. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
4. Determination of wavelength of Laser light using diffraction grating.
5. Determination of energy gap of a semiconductor using p-n junction diode.
6. Determination of particle size using laser source
7. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
8. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
9. Sonometer: Verification of laws of stretched string.
10. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration
11. Determination of temperature coefficients of a thermistor.
12. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any **TEN** of the listed experiments are to be conducted. Out of which any **TWO** experiments may be conducted in virtual mode.

REFERENCE BOOK:

1. A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. Chand Publishers, 2017.

WEB RESOURCE:

1. **URL:** www.vlab.co.in



COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
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-MAPPING

CO/POs	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
CO	3	3	-	3	-	-	-	3	3	3	-	3



I B.Tech. - II Semester

23ESC117L	ENGINEERING WORKSHOP	L	T	P	C
	(Common to All Branches)	-	-	3	1.5

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.

Trade for Exercises:

1. **Demonstration:** Safety practices and precautions to be observed in workshop.
2. **Carpentry:** Familiarity with different types of woods and tools used in wood working and make following joints.
 - a. Middle T lap joint or Half lap joint
 - b. Mortise and tenon joint
 - c. Dove tail joint or bridle joint
3. **Sheet Metal:** Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
 - a. Tapered tray
 - b. Conical funnel
 - c. Elbow pipe
 - d. Brazing
4. **Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises.
 - a. V fit
 - b. Dove tail joint
 - c. Semi-circular fit / Square fit
 - d. Bicycle tire puncture
5. **House Wiring:** Familiarity with different types of basic electrical circuits and make the following connections.
 - a. Parallel and series
 - b. Two-way switch
 - c. Godown lighting
 - d. Tube light
 - e. Three phase motor
 - f. Soldering of wires
6. **Basic Machining:** Familiarity with different types of tools used in metal parts and practicing basic machining operation.
 - a. Simple plain turning / simple step turning.
 - b. Drilling and tapping
7. **Plumbing:** Familiarity with plumbing tools, Preparation of pipe joints with coupling for same diameter and with reducer for different diameters and make the following tap connections
 - a. Single tap connections
 - b. Multi tap connections.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Trade for Demonstration:

- 1. Foundry Trade:** Demonstration and practice on moulding tools and processes, preparation of green sand moulds for single and split patterns.
- 2. Welding:** Demonstration and practice on Arc Welding and Gas welding
Preparation of Lap joint and Butt joint.

TEXT BOOKS:

1. Serape Kalpak Jain and Steven R. Schmid, "Manufacturing Processing for Engineering Materials (SI Edition)", Pearson Education, New Delhi, 6/e, 2018.
2. P.N. Rao, "Manufacturing Technology - Foundry, Farming and Welding, Volume- I", Tata McGraw-Hill Education Pvt. Ltd., Noida, 5/e, 2018.

REFERENCE BOOKS:

1. Hajra Choudhury S.K and Nirjhar Roy, "Elements of Workshop Technology, Volume- I", Media Promoters and Publishers Pvt.Ltd, 15/e, 2010.
2. Roy A Lindberg, "Process and Materials of Manufacturing", Pearson Education, New Delhi, 4/e, 2015.
3. R.K. Jain, "Production Technology", Khanna publishers, New Delhi, 17/e, 2011.
4. R.K. Rajput, "A Textbook of Manufacturing Technology: Manufacturing Processes", Laxmi Publications (P) Ltd., New Delhi, 2/e, 2017.
5. "A Text book of Manufacturing Technology-I", P.C.Sharma, S.Chand& Company Pvt. Ltd., New Delhi, 1/e, 2011.

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/112/104/112104301/>
2. <https://nptel.ac.in/courses/112/107/112107219/>

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
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
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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

CO-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
CO	3	3	3	-	3	-	-	3	3	3	-	3



I B.Tech. - II Semester

23MEC122L	ENGINEERING MECHANICS LAB	L	T	P	C
	(Mechanical Engineering)	-	-	3	1.5

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To provide exposure to the students with hands on experience on various basic engineering mechanics in the field of mechanical engineering.

List of Experiments:

1. Verification of Law of Triangle of Forces.
2. Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in Equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table.
3. Determination of coefficient of Static and Rolling Frictions
4. Determination of Centre of Gravity of different shaped Plane Lamina.
5. Verification of the conditions of equilibrium of a rigid body under the action of coplanar non-concurrent, parallel force system with the help of a simply supported beam.
6. Study of the systems of pulleys and draw the free body diagram of the system.
7. Determine the acceleration due to gravity using a compound pendulum.
8. Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to the plane of oscillation and passing through its centre of mass.
9. Determine the Moment of Inertia of a Flywheel.
10. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.	PO1
CO2	Verify Law of Polygon of forces and Law of Moment using force polygon and bell crank lever.	PO2
CO3	Determine the Centre of gravity and Moment of Inertia of different configurations.	PO3
CO4	Verify the equilibrium conditions of a rigid body under the action of different force systems	PO4
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
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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

CO-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
CO	3	3	3	-	3	-	-	3	3	3	-	3



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)

DEPARTMENT OF SCIENCE & HUMANITIES

I B.Tech I/II sem

23HSM113L	Health And Wellness, Yoga and Sports	L	T	P	C
	(Common to All branches of Engineering)	0	0	1	0.5

COURSE EDUCATIONAL OBJECTIVES:

1. To maintain their mental and physical wellness upright and develop ability in them to come up with the stress arising in the life.
2. To create space in the curriculum to nurture the potential of the students in sports/games/yoga etc.
3. To introduce a practice oriented introductory course on the subject.

COURSE OUTCOMES:

After completion of the course the student will be able to

1. Be Physical fit to perform daily routine without undue fatigue.
2. Be Mentally alert and Socially Cohesive
3. Consider success and failure equally.
4. Develop Positive Personality
5. Improve Leadership qualities

UNIT-I:

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

Activities:

1. Organizing health awareness programmed in community
2. Preparation of health profile
3. Preparation of chart for balance diet for all age groups

UNIT- II:

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)**

DEPARTMENT OF CIVIL ENGINEERING

UNIT-III:

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.

Activities:

1. Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc.

Practicing general and specific warm up, aerobics

2. Practicing cardio respiratory fitness, treadmill, run test, 9 min walk, skipping and running.

REFERENCE BOOKS:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022
2. T.K.V. Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J. Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc. 2014

GENERAL GUIDELINES:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

EVALUATION GUIDELINES:

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totaling to 90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)**

DEPARTMENT OF CIVIL ENGINEERING

23BSC233T	II B. Tech III Semester	L	T	P	C
	NUMERICAL & STATISTICAL METHODS	3	0	0	3

PRE-REQUISITES: Algebra, Calculus, Differential equations, Set theory, Series

COURSE EDUCATIONAL OBJECTIVES:

1. To develop skill to analyze appropriate method to find the root of the Algebraic and Transcendental Equations and apply the concept of interpolation and Curve fitting for the Prediction of required values
2. To learn the method of evaluation of numerical derivative, numerical integration
3. To learn the method of solve ordinary differential equation using numerical methods.
4. To learn the concept of Laplace, Transform and Inverse Laplace Transform
5. To develop skill to design sine and cosine waves with the help of Fourier Series and to learn the concept of Fourier Transform and Inverse Fourier Transform.

UNIT I: Solution of Algebraic & Transcendental Equations and Interpolation

09

Introduction-Bisection Method-Iterative method, Regula-falsi method and Newton Raphson method Finite differences-Newton's forward and backward interpolation formulae – Lagrange's formulae.

UNIT II: Numerical Differentiation, Numerical Integration and Curve Fitting

09

Numerical differentiation: Newton's forward and backward formulae, Numerical integration: Trapezoidal rule - Simpson's 1/3 Rule - Simpson's 3/8 Rule. Curve fitting: Fitting of straight line, second-degree and Exponential curve by method of least squares.

UNIT III: Solution of Initial value problems to Ordinary differential equations

09

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's and modified Euler's methods-Runge- Kutta methods (second and fourth order).

UNIT IV: Laplace Transforms

09

Definition-Laplace transform of standard functions-existence of Laplace Transform – Inverse transform – First shifting Theorem, transforms of derivatives and integrals - Convolution theorem –Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT V: Fourier series & Fourier transforms

09

Determination of Fourier coefficients (Euler's) – Dirichlet conditions for the existence of Fourier series - Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Half-range Fourier sin and cosine expansions Fourier integral theorem (without proof) – Fourier sine and cosine integrals-complex form of Fourier integral. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – convolution theorem.

Total Hours: 45

[illegible]



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)**

DEPARTMENT OF CIVIL ENGINEERING

23HSM234T	UNIVERSAL HUMAN VALUES –UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT	L	T	P	C
	(Common to All Branches)	2	1	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

UNIT-I:

(9)

Introduction to Value Education:

(6 lectures and 3 tutorials for practice session)

Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)

Lecture 2: Understanding Value Education

Tutorial 1: Practice Session PS1 Sharing about Oneself

Lecture 3: self-exploration as the Process for Value Education

Lecture 4: Continuous Happiness and Prosperity – the Basic Human Aspirations

Tutorial 2: Practice Session PS2 Exploring Human Consciousness

Lecture 5: Happiness and Prosperity – Current Scenario.

Lecture 6: Method to Fulfill the Basic Human Aspirations

Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

UNIT-II:

(9)

Harmony in the Human Being:

(6 lectures and 3 tutorials for practice session)

Lecture 7: Understanding Human being as the Co-existence of the self and the body.

Lecture 8: Distinguishing between the Needs of the self and the body

Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.

Lecture 9: The body as an Instrument of the self

Lecture 10: Understanding Harmony in the self

Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self

Lecture 11: Harmony of the self with the body

Lecture 12: Programme to ensure self-regulation and Health

Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT-III:

(9)

Harmony in the Family and Society:

(6 lectures and 3 tutorials for practice session)

Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction

Lecture 14: 'Trust' – the Foundational Value in Relationship

Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust

Lecture 15: 'Respect' – as the Right Evaluation

Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect

Lecture 16: Other Feelings, Justice in Human-to Human Relationship

Lecture 17: Understanding Harmony in the Society



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)**

DEPARTMENT OF CIVIL ENGINEERING

Lecture 18: Vision for the Universal Human Order

Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

UNIT IV:

(9)

Harmony in the Nature/Existence

(4 lectures and 2 tutorials for practice session)

Lecture 19: Understanding Harmony in the Nature

Lecture 20: Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature

Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature

Lecture 21: Realizing Existence as Co-existence at All Levels

Lecture 22: The Holistic Perception of Harmony in Existence

Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence.

UNIT V:

(9)

Implications of the Holistic Understanding – a Look at Professional Ethics:

(6lectures and 3 tutorials for practice session)

Lecture 23: Natural Acceptance of Human Values

Lecture 24: Definitiveness of (Ethical) Human Conduct

Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct

Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order

Lecture 26: Competence in Professional Ethics

Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education

Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies

Lecture 28: Strategies for Transition towards Value-based Life and Profession

Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human

Order

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define the terms like natural acceptance ,Happiness and Prosperity. (L1,L2)	PO8
CO2	Identify One's self and one's surroundings family society nature. (L1, L2)	PO8
CO3	Apply what they have learnt to their own self in different day to day settings in real life. (L3)	PO8
CO4	Relate human values with human relationship and human society. (L4)	PO8
CO5	Justify the need for universal human values and harmonious existence. (L5) Develop as socially and ecologically responsible engineers. (L3,L6)	PO8

READINGS: Textbook and Teachers Manual

(a). The Textbook R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics,2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

(b). The Teacher's Manual R R Gaur, R Asthana, G P Bagaria,Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)**

DEPARTMENT OF CIVIL ENGINEERING

4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

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*	-	-	-	-	-	-	3	3	-	-	-	-



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)**

**DEPARTMENT OF CIVIL ENGINEERING
II B. Tech - III Semester**

23CIV231T	FLUID MECHANICS	L	T	P	C
		3	0	0	3

**PRE-REQUISITES: A course on fluid
mechanics COURSE EDUCATIONAL**

OBJECTIVES:

1. To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects.
2. To impart ability to solve engineering problems in fluid mechanics
3. To enable the students measure quantities of fluid flowing in pipes, tanks and channels
4. To teach integral forms of fundamental laws of fluid mechanics to predict relevant pressures, velocities and forces.
5. To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses.

UNIT I: (9)

Basic concepts and definitions: Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; Variation of viscosity with temperature, Newton law of viscosity; Vapor pressure, Boiling point, Surface tension, Capillarity, Bulk modulus of elasticity, Compressibility

UNIT II: (9)

Fluid statics: Fluid Pressure: Pressure at a point, Pascal 's law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U Tube Differential Manometer. Pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies

UNIT III: (9)

Fluid Kinematics : Classification of fluid flow: steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one-, two- and three-dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three-Dimensional continuity equations in Cartesian coordinates.

UNIT IV: (9)

Fluid Dynamics: Surface and body forces; Equations of motion - Euler 's equation; Bernoulli 's equation – Derivation; Energy Principle; Practical applications of Bernoulli 's equation: Venturi meter, orifice meter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number;

UNIT V: (9)

Analysis Of Pipe Flow: Energy losses in pipelines; Darcy– Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length – Pipes in Parallel and Series.

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Understand the principles of fluid statics, kinematics and dynamics	PO1, PO2, PO3
CO2	Apply the laws of fluid statics and concepts of buoyancy	PO1, PO2, PO3
CO3	Understand the fundamentals of fluid kinematics and differentiate types of fluid flows	PO1, PO2, PO3, PO4
CO4	Apply the Principle of conservation of energy for flow measurement.	PO1, PO2
CO5	Analyse the losses in pipes and discharge through pipe network.	PO1, PO2, PO3, PO4

Textbooks:

1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House 22nd edition 2019
2. K.Subrahmanya Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2nd edition 2018

Reference Books:

1. R.K.Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi 11th edition, 2024.
2. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
3. Fluid Mechanics by Frank M. White, Henry Xue, Tata McGraw Hill, 9th edition, 2022.
4. C.S.P.Ojha, R.Berndtsson and P.N.Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
5. Introduction to Fluid Mechanics & Fluid Machines by S K Som, Gautam Biswas, S Chakraborty Tata McGraw Hill, 3rd edition 2011

Online Learning Resources:

<https://archive.nptel.ac.in/courses/112/105/112105269/h>
<https://nptel.ac.in/courses/112104118>
<https://nptel.ac.in/courses/105103192>

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	3	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-



II B.TECH - III SEMESTER

23CIV232T	STRENGTH OF MATERIALS	L	T	P	C
		3	0	0	3

Pre-requisites: A course on strength of materials

COURSE EDUCATIONAL OBJECTIVES:

1. To impart Fundamental concepts of Strength of Material and Principles of Elasticity and Plasticity Stress
2. To gain concepts of shear force and bending moment on various types of beams and loading conditions
3. To able know the concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections.
4. The concepts above will be utilized in measuring deflections in beams under various loading and support conditions.
5. To classify cylinders and columns based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure

UNIT-I:

(9)

Simple Stresses and Strains: Elasticity and plasticity - Types of stresses and strains - Hooke's law Factor of safety, Poisson's ratio - Relationship between Elastic constants - Temperature stress - stresses in composite bars.

UNIT-II:

(9)

Shear Force and Bending Moment: Definition of beam — Types of beams — Concept of shear force and bending moment — Point of contra flexure — Relation between S.F., B.M and rate of loading at a section of a beam; S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.

UNIT-III:

(9)

Flexural and Shear Stresses: Flexural Stresses: Theory of simple bending — Assumptions Derivation of bending Equation, Neutral axis — Determination of bending stresses — section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections — Design of simple beams
Shear Stresses: Derivation of formula — Shear stress distribution across various beam sections like rectangular, circular, I, T Angle sections. Torsion—circular shafts only.

UNIT-IV:

(9)

Deflection of Beams: Double integration and Macaulay's methods—Determination of slope and deflection for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads. Mohr's theorems — Moment area method — application to simple cases of cantilever.

UNITV: COLUMNS

(9)

Columns: Introduction — Classification of columns — Axially loaded compression members — Euler's crippling load Theory- Derivation of Euler's critical load formulae for various end conditions — Equivalent length — Slenderness ratio — Euler's critical stress — Limitations of Euler's theory — Rankine formulae — Eccentric loading



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Thin and Thick cylindrical shells — Derivation of formula for longitudinal and circumferential stresses — hoop, longitudinal and volumetric strains — changes in diameter, and volume of thin cylinders. Lames theory for thick cylinders, Derivation of Lames formulae, distribution of hoop and radial stresses across the thickness, compound cylinders- distribution of stresses

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to Cos
CO1	To understand the basic materials behavior under the influence of different External loading conditions and the support conditions.	PO1, PO2, PO5
CO2	To draw the diagrams indicating the variation of the key performance features Like axial forces, bending moment and shear forces in structural members.	PO1, PO4, PO5
CO3	To acquire knowledge of bending concepts and calculation of section modulus And for determination of stresses developed in the beams	PO1, PO3, PO4, PO5
CO4	To analyze the deflections due to various loading conditions.	PO1, PO4, PO5
CO5	To assess stresses across section of the thin, thick cylinders and columns to arrive At optimum sections to with stand the internal pressure using Lame's equation	PO1, PO2, PO4, PO5

Textbooks:

1. Strength of Materials by R.K.Bansal, Lakshmi Publications, 16th Edition, 2022.
2. Strength of Materials by B. S.Basavarajaiah and P. Mahadevappa, Universities Press 3rd Edition, 2010
3. Strength of Materials by J.K.Gupta and S.K.Gupta, Cengage publications 2nd edition 2024

References:

1. Advanced Mechanics of Solids, L.S.Srinath, Mc Graw Hill Education, 2017, 3rd Edition
2. Strength of Materials-Fundamentals and Applications, T.D.Gunneswara Rao and Mudim by Andal, Cambridge University Press, 2018, 1st Edition
3. Mechanics of Materials, Beer and Johnston, McGraw Hill India Pvt. Ltd., 2020, 8th Edition (SI Units).
4. Mechanics of Solids— E.P.Popov, Prentice Hall, 2nd Edition, 2015.
5. A Textbook of Strength of Materials, by R. K. Rajput (Mechanics of Solids) SI Units S. Chand & Co, New Delhi 7th edition 2022.
6. Strength of Materials by S.S.Ratan Tata Mc Grill Publications 3rd Edition, 2016.

CO-PO MAPPING:

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



II B. Tech III Semester

23CIV233T	SURVEYING	L	T	P	C
		0	0	0	3

PRE-REQUISITES: A course on surveying

COURSE EDUCATIONAL OBJECTIVES:

1. To ensure that the student develops knowledge of the basic and conventional surveying instruments
2. To acquire knowledge on leveling and levelling & contour surveying
3. To Know surveying principles to determine areas and volumes
4. The setting out curves and use modern surveying equipment's for accurate results
5. To Know the basics of Photogrammetry Surveying

Syllabus:

UNIT-I: (9)

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, surveying accessories. Introduction to Compass, leveling and Plane table surveying.

Linear distances- Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections. Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip –systems and W.C.B and Q.B systems of locating bearings.

UNIT-II: (9)

Leveling: Types of levels, methods of levelling, and Determination of levels, Effect of Curvature of Earth and Refraction.

Contouring: Characteristics and uses of Contours, methods of contour surveying.

Areas: Determination of areas consisting of irregular boundary and regular boundary.

Volumes: Determination of volume of earthwork in cutting and embankments for level section, capacity of reservoirs.

UNIT-III: (9)

Theodolite Surveying: Types of Theodolites, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical leveling when base is accessible and inaccessible.

Traversing: Methods of traversing, traverse computations and adjustments, Introduction to Omitted measurements.

UNIT VI: (9)

Curves: Types of curves and their necessity, elements of simple, compound, reverse curves. Introduction to Tacheometric Surveying.

Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station- advantages and Applications. Introduction to Global Positioning System. Introduction to Drone survey and Li DAR Survey (Light Detection and Ranging).

UNIT V: (9)

Photogrammetry Surveying: Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo-plotting instruments, mosaics, map substitutes.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Text Books:

1. Surveying Vol- 1 by Duggal SK, Tata Mc Graw Hill Publishing Co. Ltd. New Delhi, 5th edition, 2019.
2. Surveying Vol- 2 by Duggal SK, Tata Mc Graw Hill Publishing Co. Ltd. New Delhi, 5th edition, 2019.
3. Textbook of Surveying by C Venkatramaiah, Universities Press 1st Edition, 2011.

Reference Books:

1. Surveying Vol-1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain- Laxmi Publications (P) Ltd., New Delhi, 18th edition 2024.
2. Surveying Vol-2, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain- Laxmi Publications (P) Ltd., New Delhi 17th 2022.
3. Surveying Vol-3, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain- Laxmi Publications (P) Ltd., New Delhi 16th 2023.
4. Plane Surveying and Higher Surveying by Chandra AM, New age International Pvt. Ltd. Publishers, New Delhi, 3rd Edition, 2015.
5. Surveying and Levelling by N.Basak Tata Mc Graw Hill Publishing Co. Ltd. New Delhi, 4th edition, 2014.
6. Surveying Vol 1, by Arora K R, Standard Book House, Delhi. Edition: 12th, 2015.
7. Surveying Vol 2, by Arora K R, Standard Book House, Delhi. Edition: 12th, 2015.
8. Surveying Vol 3, by Arora K R, Standard Book House, Delhi. Edition: 12th, 2015.
9. Revised SOP (Standard Operating Procedure) under sub rule 34A of MCDR 2017.

Web Resources: https://koha.srmamap.edu.in/cgi-bin/koha/opac-detail.pl?biblionumber=11522&shelfbrowse_itemnumber=23066

COURSE OUTCOMES:

On successful completion of the course, students will be able to			Pos
CO1	Apply the principle and methods of surveying and measuring of horizontal and vertical- distances and angles		PO1
CO2	To acquire knowledge on leveling and levelling & contour surveying		PO3
CO3	Apply surveying principles to determine areas and volumes		PO5
CO4	Setting out curves and using modern surveying equipment's		PO6
CO5	Apply the basics of Photogrammetry Surveying infield		PO12

CO-PO MAPPING:

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



II B.TECH - III SEMESTER

23CIV234L	BUILDING PLANNING AND DRAWING (SOC)	L	T	P	C
		0	1	0	2

PRE-REQUISITES: A course on building planning and drawing

COURSE EDUCATIONAL OBJECTIVES:

1. Initiating the student to different building bye-laws and regulations.
2. Imparting the planning aspects of residential buildings and public buildings.
3. Giving training exercises on various sign sand bonds.
4. Giving training exercises on different building units.
5. Imparting the skills and methods of planning of various buildings.

Syllabus (Only manual drawing in charts)

1. Detailing & Drawing of Sign Conventions.
2. Detailing & Drawing of English Bond.
3. Detailing & Drawing of Flemish Bond.
4. Detailing & Drawing of Doors.
5. Detailing & Drawing of Windows.
6. Detailing & Drawing of Ventilators & Roofs.
7. Drawing of Line Diagram of Residential Buildings by using Building Bye-Laws.
8. Drawing of Plan, Elevation & Section from line diagram for a single Storey Building.
9. Drawing of Plan, Elevation & Section for Hospital Building.
10. Drawing of Plan, Elevation & Section for Industrial Building.

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Plan various buildings as per the building by-laws.	PO1
CO2	Distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.	PO2
CO3	Draw signs and bonds	PO3
CO4	Draw different building units	PO4
CO5	Learn the Skills of drawing building elements and plan the buildings as per requirements.	PO5

Text Books:

1. Planning, designing and Scheduling, Gurcharan Singhand Jagdish Singh
2. Building Planning and drawing by M.Chakraborti.
3. Building drawing, M G Shah, C M Kale and S Y Patki, Tata McGraw Hill, New Delhi.

Reference Books:

1. National Building Code 2016(Volume-I&II).
2. Principles of Building Drawing, M G Shah and C M Kale, Trinity Publications, New Delhi.
3. Civil engineering drawing and House planning, B. P. Verma, Khanna publishers, New Delhi.
4. Civil Engineering Building practice, Suraj Singh: CBS Publications, New Delhi, and Chennai
5. Building Materials and Construction, G. C Saha and JoyGopalJana, McGraw-Hill Education (P) India Ltd. New Delhi.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

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	-	-	-	-	-	-	-



II B.TECH - III SEMESTER

23CIV235L	STRENGTH OF MATERIALS LAB	L	T	P	C
		0	0	3	1.5

PRE-REQUISITES: A course on STRENGTH OF MATERIALS LAB

COURSE EDUCATIONAL OBJECTIVES:

1. To determine the tensile strength and yield parameters of mild steel
2. To find out flexural strengths of Steel/Wood specimens and measure deflections
3. To determine the torsion parameters of mild steel bar
4. To determine the hardness numbers, impact and shear strengths of metals
5. To determine the load-deflection parameters for springs

LIST OF EXPERIMENTS:

1. Tension test.
2. Bending test on (Steel/Wood) Cantilever beam.
3. Bending test on simply supported beam.
4. Continuous beam-deflection test.
5. Torsion test.
6. Hardness test.
7. Compression test on Open coiled springs
8. Tension test on Closely coiled springs
9. Compression test on wood/concrete
10. Izod/Charpy Impact test on metals
11. Shear test on metals
12. Use of electrical resistance strain gauges.

COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Plan various buildings as per the building by-laws.	PO1,PO2,PO3, PO5
CO2	Distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.	PO1,PO2,PO3, PO5
CO3	Draw signs and bonds	PO1,PO2,PO3, PO5
CO4	Draw different building units	PO1,PO2,PO3,PO5
CO5	Learn the Skills of drawing building elements and plan the buildings as per requirements.	PO1, PO2, PO3,PO4,P5

Text Books:

4. Planning, designing and Scheduling, Gurcharan Singhand Jagdish Singh
5. Building Planning and drawing by M.Chakraborti.
6. Building drawing, M G Shah, C M Kale and S Y Patki, Tata McGraw Hill, New Delhi.

Reference Books:

6. National Building Code 2016(Volume-I&II).
7. Principles of Building Drawing, M G Shah and C M Kale, Trinity Publications, New Delhi.
8. Civil engineering drawing and House planning, B. P. Verma, Khanna publishers, New Delhi.



9. Civil Engineering Building practice, Suraj Singh: CBS Publications, New Delhi, and Chennai
10. Building Materials and Construction, G. C Saha and Joy Gopal Jana, McGraw-Hill Education (P) India Ltd. New Delhi.

REFERENCE WEBSITE:

<https://koha.srmap.edu.in/cgi-bin/koha/opac-detail.pl?biblionumber=11522&shelfbrowse>

CO-PO MAPPING:

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



II B. TECH - III SEMESTER

23CIV236L	SURVEYING LAB	L	T	P	C
		0	0	3	1.5

PRE-REQUISITES: A course on SURVEYING LAB

COURSE EDUCATIONAL OBJECTIVES:

1. To Know about various linear and angular measuring instruments
2. Take Measurements in the linear and angular view
3. Determine the area and volume by interpreting the data obtained from surveying activities
4. To Know modern equipment such as total station
5. Draft field notes from survey data

List of Field Works:

1. Chain survey of road profile with offsets in case of road widening.
2. Determination of distance between two inaccessible points by using compass.
3. Plane table survey; finding the area of a given boundary by the method of radiation
4. Fly levelling: Height of the instrument method (differential leveling)
5. Fly levelling: rise and fall method.
6. Theodolite survey: determining the horizontal and vertical angles by the method of repetition method
7. Theodolite survey: finding the distance between two in accessible points.
8. Theodolite survey: finding the height of far object.
9. Determination of area perimeter using total station.
10. Determination of distance between two inaccessible point by using total station.
11. Setting out a curve
12. Determining the levels of contours

COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Handle various linear and angular measuring instruments	PO1, PO5, PO2, PO3,
CO2	Measure the linear and angular measurements	PO1, PO5, PO2, PO3,
CO3	Calculate the area and volume by interpreting the data obtained from surveying activities	PO1, PO5, PO2, PO3,
CO4	Handle modern equipment such as total station	PO1, PO5, PO2, PO3,
CO5	Prepare field notes from survey data	PO1, PO2, PO3, PO4, PO5

Text Books:

1. Planning, designing and Scheduling, Gurcharan Singhand Jagdish Singh
2. Building Planning and drawing by M.Chakraborti.
3. Building drawing, M G Shah, C M Kale and S Y Patki, Tata McGraw Hill, New Delhi.



Reference Books:

11. National Building Code 2016(Volume-I&II).
12. Principles of Building Drawing, M G Shah and C M Kale, Trinity Publications, New Delhi.
13. Civil engineering drawing and House planning, B. P. Verma, Khanna publishers, New Delhi.
14. Civil Engineering Building practice, Suraj Singh: CBS Publications, New Delhi, and Chennai
15. Building Materials and Construction, G. C Saha and JoyGopalJana, McGraw-Hill Education (P) India Ltd. New Delhi.

REFERENCE WEBSITE:

https://koha.srmap.edu.in/cgi-bin/koha/opac =11522&shelfbrowse_itemnumber=23066

CO-PO MAPPING:

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

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II B.Tech. - III Semester

23MAC231U	Environmental Science	L	T	P	C
	(Common to All Branches)	2	1	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To recognize nature of environment, atmosphere and natural resources including renewable and nonrenewable resources.
2. To understand flow and bio-geo-chemical cycles, ecological pyramids and bio-diversity with its conservation.
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 and environmental issues such as ozone layer depletion, greenhouse effect etc.
5. To understand the causes of population explosion, value education and welfare programs.

UNIT I:

(6)

INTRO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES

Multidisciplinary Nature Of Environmental Studies:

- (a) Definition, scope and importance. Need for public awareness Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. and Forest resources: Use and over-exploitation, deforestation, case studies, 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:

(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-Bio geographical 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-Hotspots 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.



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(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

measures of urban and industrial wastes-Role of an individual in prevention of pollution. Pollution case studies-Disaster management: floods, earthquake, cyclone and landslides.

UNIT 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.

UNIT V: HUMAN POPULATION AND THE ENVIRONMENT

(6)

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

Total Hours: 30

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Grasp multidisciplinary nature of environmental studies, atmosphere and various renewable and nonrenewable resources.	PO1, PO7, PO8
CO2	Understand flow and bio-geo- chemical cycles, ecological pyramids and biodiversity and with its conservation.	PO1, PO7, PO8
CO3	Understand various causes of pollution and solid waste management and related preventive measures.	PO1, PO7, PO8
CO4	Gain knowledge on rainwater harvesting, watershed management, environmental issues and waste land reclamation.	PO1, PO7, PO8
CO5	Understand population explosion, value education and welfare programmes.	PO1, PO7, PO8

TEXT BOOKS:

1. Ferdinand P. Beer, E. Russell Johnston, "Vector Mechanics for Engineers", TataMcGraw-HillEducationPvt., Ltd, 12/e, 2019.
2. ErachBharucha, "Textbook of Environmental Studies for Undergraduate Courses",University Grants Commission, 2/e,2013, University Press.
3. Palaniswamy, "Environmental Studies", Pearson Educations.
4. S. AzeemUnisa, "Environmental Studies", Academic Publishing Company.
5. K. RaghavanNambiar, "Text book of Environmental Studies for UndergraduateCourses as per UGC model syllabus", SciTech Publications (India) Pvt. Ltd.

REFERENCE BOOKS:

1. DeekshaDave, and E. Sai Baba Reddy, "Textbook of Environmental Science" CengagePublications.
2. C.P.Kaushik and AnubhaKaushik "Text book of EnvironmentalStudies", New AgeInternational publishers, 4/e,2006.
3. M. Anji Reddy, "Text Book of Environmental Sciences and Technology", BSPublications.
4. J.P. Sharma, "Comprehensive Environmental Studies", Laxmi Publications.
5. J. Glynne Henry and Gary W. Heinke, "Environmental Sciences and Engineering",Printice Hall of India Pvt Ltd.
6. G.R. Chatwal, "A Text book of Environmental Studies", Himalaya Publishing House
7. Gilbert M. Masters, and Wendell P. Ela, "Introduction to EnvironmentalEngineeringand Science", Printice Hall of India Pvt Ltd.



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(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

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



II Year B.Tech. CE-IV Semester

23HSM231A	BUSINESS ENVIRONMENT	L	T	P	C
		2	0	0	2

Course Objectives:

- To make the student to understand about the business environment
- To enable them in knowing the importance of fiscal and monetary policy
- To facilitate them in understanding the export policy of the country
- To Impart knowledge about the functioning and role of WTO
- To Encourage the student in knowing the structure of stock markets

UNIT-I Overview of Business Environment

Introduction – meaning Nature, Scope, significance, functions and advantages. Types- Internal & External, Micro and Macro. Competitive structure of industries -Environmental analysis- advantages & limitations of environmental analysis.

UNIT-II Fiscal & Monetary Policy

Introduction – Nature, meaning, significance, functions and advantages. Public Revenues- Public Expenditure - Evaluation of recent fiscal policy of GOI. Highlights of Budget- Monetary Policy- Demand and Supply of Money – RBI -Objectives of monetary and credit policy - Recent trends- Role of Finance Commission.

UNIT-III India's Trade Policy

Introduction – Nature, meaning, significance, functions and advantages. Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank -Balance of Payments- Structure & Major components - Causes for Disequilibrium in Balance of Payments - Correction measures.

UNIT-IV World Trade Organization

Introduction- Nature, significance, functions and advantages. Organization and Structure- Role and functions of WTO in promoting world trade- GATT -Agreements in the Uruguay Round –TRIPS, TRIMS - Disputes Settlement Mechanism - Dumping and Anti-dumping Measures.

UNIT-V Money Markets and Capital Markets

Introduction – Nature, meaning, significance, functions and advantages. Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – SEBI – Stock Exchanges
-Investor protection and role of SEBI, Introduction to international finance.

COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Define Business Environment and its Importance.	PO1,PO2,PO3, PO5
CO2	Understand various types of business environment.	PO1,PO2,PO3, PO5
CO3	Apply the knowledge of Money markets in future investment	PO1,PO2,PO3, PO5
CO4	Analyze India's Trade Policy	PO1,PO2,PO3,PO5
CO5	Evaluate fiscal and monetary policy	PO1, PO2, PO3,PO4,PO5



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(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Textbooks:

1. Francis Cherunilam, International Business: Text and Cases, Prentice Hall of India.
2. K. Aswath Appa, Essentials of Business Environment: Texts and Cases & Exercises 13th Revised Edition. HPH

Reference Books:

1. K.V. Sivayya, V.B. M Das, Indian Industrial Economy, Sultan Chand Publishers, New Delhi, India.
2. Sundaram, Black, International Business Environment Text and Cases, Prentice Hall of India, New Delhi, India.
3. Chari. S. N, International Business, Wiley India.
4. E. Bhattacharya, International Business, Excel Publications, New Delhi.

Online Learning Resources:

<https://www.slideshare.net/ShompaDhali/business-environment-53111245>
<https://www.slideshare.net/rbalsells/fiscal-policy-ppt>
<https://www.slideshare.net/aguness/monetary-policy-presentationppt>
<https://www.slideshare.net/DaudRizwan/monetary-policy-of-india-69561982>
<https://www.slideshare.net/ShikhaGupta31/indias-trade-policyppt>
<https://www.slideshare.net/viking2690/wto-ppt-60260883>
<https://www.slideshare.net/prateeknepal3/ppt-mo>

CO-PO MAPPING:

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



23HSM232B	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	L	T	P	C
		2	0	0	2

Course Objectives:

- To inculcate the basic knowledge of micro economics and financial accounting
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- To know the various types of market structure and pricing methods and strategy
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

UNIT-I Managerial Economics

Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand- Demand Elasticity- Types– Measurement. Demand Forecasting- Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT-II Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquants and Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

UNIT-III Business Organizations and Markets

Introduction – Forms of Business Organizations- Sole Proprietary- Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT-IV Capital Budgeting

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects–Payback.

Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT- V Financial Accounting and Analysis

Introduction– Concept and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

**COURSE OUTCOMES:**

On successful completion of this course the students should be able to:		POs related to COs
CO1	Define the concepts related to Managerial Economics, financial accounting and management	PO1,PO2,PO3, PO5
CO2	Understand the fundamentals of Economics viz., demand, Production, cost, revenue and markets	PO1,PO2,PO3, PO5
CO3	Apply the Concept of Production cost and revenues for effective Business decision	PO1,PO2,PO3, PO5
CO4	Analyze how to invest their capital and maximize returns	PO1,PO2,PO3,PO5
CO5	Evaluate the capital budgeting techniques.	PO1, PO2, PO3,PO4,P5

Textbooks:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
2. Ayari: Business Economics and Financial Analysis, 4/e, MGH.

Reference Books:

1. Ahuja Hl Managerial economics Schad.
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph. Nell and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

Online Learning Resources:

<https://www.slideshare.net/123ps/managerial-economics-ppt>
<https://www.slideshare.net/rossanz/production-and-cost-45827016>
<https://www.slideshare.net/darkyla/business-organizations-19917607>
<https://www.slideshare.net/balarajbl/market-and-classification-of-market>
<https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396>
<https://www.slideshare.net/ashu1983/financial-accounting>

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	3	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-



23HSM233C	ORGANISATIONAL BEHAVIOUR	L	T	P	C
		2	0	0	2

Course Objectives:

- To enable student's comprehension of organizational behavior-
- To offer knowledge to students on self-motivation, leadership and management
- To facilitate them to become powerful leaders
- To Impart knowledge about group dynamics
- To make them understand the importance of change and development

UNIT- I Introduction to Organizational Behavior

Meaning, definition, nature, scope and functions - Organizing Process - Making organizing effective -Understanding Individual Behavior -Attitude -Perception - Learning -Personality.

UNIT- II Motivation and Leading

Theories of Motivation- Maslow's Hierarchy of Needs - Herzberg's Two Factor Theory - Vroom's theory of expectancy - Mc Clelland's theory of needs-Mc Gregor's theory X and theory Y- Adam's equity theory.

UNIT-III Organizational Culture

Introduction - Meaning, scope, definition, Nature - Organizational Climate - Leadership - Traits Theory-Managerial Grid - Transactional Vs Transformational Leadership - Qualities of good Leader - Conflict Management -Evaluating Leader.

UNIT-IV Group Dynamics

Introduction - Meaning, scope, definition, Nature- Types of groups - Determinants of group behavior - Group process - Group Development - Group norms - Group cohesiveness - Small Groups - Group decision making - Team building - Conflict in the organization- Conflict resolution

UNIT- V Organizational Change and Development

Introduction -Nature, Meaning, scope, definition and functions- Organizational Culture - Changing the Culture - Change Management - Work Stress Management - Organizational management - Managerial implications of organization's change and development

COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Define the Organizational Behavior, its nature and scope.	PO1,PO2,PO3, PO5
CO2	Understand the nature and concept of Organizational behavior	PO1,PO2,PO3, PO5
CO3	Apply theories of motivation to analyses the performance problems	PO1,PO2,PO3, PO5
CO4	Analyze the different theories of leadership	PO1,PO2,PO3,PO5
CO5	Evaluate group dynamics	PO1, PO2, PO3,PO4,P5



Textbooks:

2. Luthans, Fred, Organizational Behavior, McGraw-Hill, 12th edition.
3. P. Subbarao, Organizational Behavior, Himalya Publishing House.

Reference Books:

1. Mc Shane, Organizational Behavior, TMH
2. Nelson, Organizational Behavior, Thomson.
3. Robbins, P. Stephen, Timothy A. Judge, Organizational Behavior, Pearson.
4. Aswath Appa, Organizational Behavior, Himalaya.

Online Learning Resources:

<https://www.slideshare.net/Knight1040/organizational-culture>

<https://www.slideshare.net/AbhayRajpoot3/motivation-165556714>

<https://www.slideshare.net/harshrastogi1/group-dynamics-159412405>

<https://www.slideshare.net/vanyasingla1/organizational-change-development-26565951>

CO-PO MAPPING:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	3	--	-	-	-	-	-	-	-	-
C02	3	3	3	3	-	-	-	-	-	-	-	-
C03	3	3	3	3	-	-	-	-	-	-	-	-
C04	3	3	3	3	-	-	-	-	-	-	-	-
C05	3	3	3	3	-	-	-	-	-	-	-	-



23ESC242T	HYDRAULICS AND HYRAULIC MACHINERY	L	T	P	C
		3	0	0	3

Pre-requisite: Fluid Mechanics Course Objectives:

- To Introduce concepts of laminar and turbulent flows
- To teach principles of uniform flows through open channel.
- To teach principles of non-uniform flows through open channel.
- To impart knowledge on design of turbines.
- To impart knowledge on design of pumps

UNIT-I

Laminar & Turbulent flow in pipes: Laminar Flow- Laminar flow through: circular pipes, annulus and parallel plates. Stoke 's law, Measurement of viscosity. Reynolds experiment, Transition from laminar to turbulent flow. Resistance to flow of fluid in smooth and rough pipes-Moody's diagram – Introduction to boundary layer theory.

UNIT-II

Uniform flow in Open Channels: Open Channel Flow - Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. Hydraulically efficient channel sections: Rectangular, trapezoidal and triangular channels, Energy and Momentum correction factors

UNIT-III

Non-Uniform flow in Open Channels: Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth. Measurement of Discharge and Velocity – Gradually Varied Flow- Dynamic Equation of Gradually Varied Flow. Hydraulic Jump and classification - Elements and characteristics- Energy dissipation.

UNIT-IV

Impact of Jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - Velocity triangles at inlet and outlet - Work done and efficiency Hydraulic Turbines: Classification of turbines; Pelton wheel and its design. Francis's turbine and its Design - efficiency - Draft tube: theory - characteristic curves of hydraulic turbines. Cavitation: causes and effects.

UNIT-V

Pumps: Working principles of a centrifugal pump, work done by impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head (NPSH); Performance and characteristic curves; Cavitation effects; Multistage centrifugal pumps; troubles and remedies



COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Understand the characteristics of laminar and turbulent flows	PO1,PO2,PO3, PO5
CO2	Apply the knowledge of fluid mechanics to address the uniform flow Problems in Open channels	PO1,PO2,PO3, PO5
CO3	Solve non-uniform flow problems and hydraulic jump phenomenon in open channel flows.	PO1,PO2,PO3, PO5
CO4	Evaluate the performance of impact of jets on plates and design Pelton wheel, Francis and Kaplan turbine	PO1,PO2,PO3,PO5
CO5	CO5Underst and the principles, losses and its efficiencies of centrifugal pumps	PO1, PO2, PO3,PO4,P5

TEXTBOOKS:

1. P.M. Modi and S.M. Seth, Hydraulics and Fluid Mechanics, Standard Book House 22nd, 2019.
2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata Mc Graw Hill, 2nd edition 2018

Reference Books:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi 11th edition, 2024.
2. Fluid Mechanics by Frank M. White, Henry Xue, Tata Mc Graw Hill, 9th edition, 2022.
3. C.S.P. Ojha, R. Berndtsson and P.N. Chandarmouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
4. Introduction to Fluid Mechanics & Fluid Machines by SK Som, Gautam Biswas, S Chakrabarty 3rd edition 2011.

Online Learning Resources:

<https://nptel.ac.in/courses/105105203>

<https://archive.nptel.ac.in/courses/112/106/112106300/>

<https://archive.nptel.ac.in/courses/112/103/112103249/>

CO-PO MAPPING:

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



23CIV241T	CONCRETE TECHNOLOGY	L	T	P	C
		3	0	0	3

Course Objectives

- Learn material sand their properties used in the production of concrete
- Learn the behavior of concrete at fresh stage
- Learn the behavior of concrete at hardened stage
- Learn the in fluence of elasticity, creep and shrinkage on concrete
- Learn the mix design methodology and special concretes

UNIT- I

CEMENTS: Portland cement–Chemical composition–Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement– Test for physical properties – Different grades of cements– Admixtures–Mineral and chemical admixtures–accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates– Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate– Bulking of sand– Deleterious substances– Soundness–Alkali aggregate reaction– Thermal properties– Sieve analysis– Fineness modulus–Grading curves–Grading of fine & coarse aggregates–Maximum aggregate size– Quality of mixing water

UNIT-II

FRESH CONCRETE: Steps in Manufacture of Concrete–proportion, mixing, placing, compaction, finishing, curing – including various types in each stage . Properties of fresh concrete–Workability – Factors affecting workability – Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete, Ready mixed concrete, Shotcrete

UNIT-III

HARDENED CONCRETE: Water / Cement ratio – Abram’s Law – Gel/space ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression – Factors affecting strength–Relation between compression & tensile strength–Curing, Testing of Hardened Concrete: Compression test –Tension test –Factors affecting strength– Flexure test – Splitting test – Non-destructive testing methods – Codal provisions for NDT.

UNIT-IV

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Poisson’s ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage –types of shrinkage.

UNIT- V

MIX DESIGN AND SPECIAL CONCRETES: Ready mixed concrete, Fibre reinforced concrete– Different types of fibres–Factors affecting properties of FRC, High performance concrete – Self consolidating concrete, Self-healing concrete.

Factors in the choice of mix proportions –Quality control of concrete- Statistical methods– Acceptance Criteria–Concepts Proportioning of concrete mixes by ACI method and IS Code method.



COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Familiarize the basic in gradients of concrete and their role in the production of concrete and its behavior in the field.	PO1,PO2,PO3, PO5
CO2	Test the fresh concrete properties and the hardened concrete properties. Understand the basic concepts of concrete. Design the concrete mix by BIS method.	PO1,PO2,PO3, PO5
CO3	Evaluate the ingredients of concrete through lab test results. realize the importance of quality of concrete	PO1,PO2,PO3, PO5
CO4	Understand the behavior of concrete in various environments.	PO1,PO2,PO3,PO5
CO5	Familiarizethebasicconceptsofspecialconcreteandtheirproductionand applications.	PO1, PO2, PO3, PO4,P5

Textbooks:

1. Properties of Concrete by A.M. Neville–PEARSON–4thedition
2. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi 5th edition 2013.
3. Concrete Technology by Job Thomas, Cengagae Publications,1stedition,2015

References

1. Concrete Microstructure, Properties of Materials by P.K. Mehta and Monterio. McGraw Hill 4th edition 2014
2. Concrete Technology, J. J. Brooks and A.M. Neville, Pearson,2019,2ndEdition.
3. Concrete Technology by M.S.Shetty.–S.Chand&Co.;2004
4. Concrete Technology by A.R.Santha Kumar, Oxford University Press, New Delhi

CO-PO MAPPING:

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



23CIV242T	ENGINEERING GEOLOGY	L	T	P	C
		3	0	0	3

Course Objectives:

- To know the importance of Engineering Geology to the Civil Engineering.
- To enable the students, understand what minerals and rocks are and their formation and identification.
- To highlight significance/ importance/ role of Engineering Geology in construction of Civil Engineering structures.
- To enable the student, realize its importance and applications of Engineering Geology in Civil Engineering constructions.
- Concepts of Ground water and its geo physical methods

UNIT-I:

Introduction: Branches of Geology, Importance of Geology in Civil Engineering with case studies, weathering of rocks, Geological agents, weathering process of Rock, Rivers and geological work of rivers.

UNIT-II

Mineralogy And Petrology: Definitions of mineral and rock-Different methods of study of mineral and rock. Physical properties of minerals and rocks for megascopic study for the following minerals and rocks. Common rock forming minerals: Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite and Bauxite. Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, metamorphic rocks, and their megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sandstone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

UNIT-III

Structural Geology: Strike, Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

UNIT-IV

Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

Earth quakes and Landslide's: Terminology, Classification, causes and effects, Shield areas and Seismic belts, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides.

Geophysics: Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

UNIT-V

Geology of Dams, Reservoirs and Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Geology consideration for successful constructions of reservoirs, Life of Reservoirs. Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

**COURSE OUTCOMES:**

On successful completion of this course the students should be able to:		POs related to COs
CO1	Understand the significance of geological agents on Earth surface and its significance in Civil Engineering.	PO1,PO2,PO3, PO5
CO2	Identify and understand the properties of Minerals and Rocks.	PO1,PO2,PO3, PO5
CO3	Understand the concepts of Ground water and its geophysical methods.	PO1,PO2,PO3, PO5
CO4	Classify and measure the Earthquake prone areas, Landslides and sub side net practice the hazard zonation.	PO1,PO2,PO3,PO5
CO5	Investigate the project site for mega/mini civil engineering projects and site selection for mega engineering projects like Dams, Reservoirs and Tunnels.	PO1, PO2, PO3,PO4,P5

Textbooks:

1. Engineering Geology by N.Chenna Kesavulu, Laxmi Publications.2ndEdn2014.
2. Engineering & General Geology by Parbin Singh Katson educational series 8th2023

References:

1. Engineering Geology by Supino Gango pad hay Oxford University press1stedition, 2012.
2. Engineering Geology by D. Venkat Reddy, VikasPublishing,2ndEdn,2017,
3. Geology for Engineers and Environmental Society' Alan Ekehew, 3rd edn., 2013) Pearson publications.
4. 'Environmental Geology' (2013) K.S. Valdiya,2nded., Mc Graw Hill Publications.

Web Materials:

2. <http://nptel.iitm.ac.in/video.php?subjectId=105105106>
3. <http://nptel.iitm.ac.in/video.php?courseId=1055&p=1>
4. <http://nptel.iitm.ac.in/video.php?courseId=1055&p=3>
5. <http://nptel.iitm.ac.in/video.php?courseId=1055&p=4>

CO-PO MAPPING:

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



II Year B.Tech. CE-IV Semester

23CIV243T	STRUCTURAL ANALYSIS	L	T	P	C
		3	0	0	3

Course Objectives

Learn energy theorems

Learn the analysis of indeterminate structures Analysis of fixed and continuous beams Learn about slope-deflection method

Learn about Moment-distribution method

Course Outcomes:**UNIT-I**

ENERGY THEOREMS: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano 's first theorem Deflections of simple beams and pin jointed trusses.

UNIT-II

ANALYSIS OF INDETERMINATE STRUCTURES: Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies – Solution of trusses with upto two degrees of internal and external indeterminacies – Castigliano 's-II theorem.

UNIT-III

FIXED BEAMS & CONTINUOUS BEAMS: Introduction to statically indeterminate beams with uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams – Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT-IV

SLOPE-DEFLECTION METHOD: Introduction-derivation of slope deflection equations- application to continuous beams with and without settlement of supports - Analysis of single bay portal frames without sway.

UNIT-V

MOMENT DISTRIBUTION METHOD: Introduction to moment distribution method- Application to continuous beams with and without settlement of supports-Analysis of single bay storey portal frames without sway.

COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Apply energy theorems to analyze trusses	PO1,PO2,PO3, PO5
CO2	Analyze indeterminate structures by using Castigliano's-II theorem	PO1,PO2,PO3, PO5
CO3	Analysis of fixed and continuous beams	PO1,PO2,PO3, PO5
CO4	Analyze continuous beams and portal frames by using slope-deflection method	PO1,PO2,PO3,PO5
CO5	Analyze continuous beams and portal frames by using Moment-distribution method	PO1, PO2, PO3, PO4,PO5

Textbooks:

1. Analysis of Structures – Vol-I&II by V.N. Vazirani & M.M. Ratwani, Khanna Publications, New Delhi.



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(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

2. Basic Structural Analysis by C.S.Reddy, Tata McGraw-Hill Publishers. 3rd edition 2017.

Reference Books:

1. Structural analysis by Aslam Kassimali Cengage publications 6th edition 2020.
2. Structural analysis Vol.I and II by Dr.R. Vaidyanathan and Dr. Perumal-Laxmi publications. 3rd 2016
3. Introduction to structural analysis by B.D. Nautiyal, New Age international publishers, New Delhi.
4. Structural Analysis-D.S. Prakas Rao-University press.
5. Strength of Materials and Mechanics of Structures by B.C. Punmia, Khanna Publications, New Delhi.

CO-PO MAPPING:

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

II Year B.Tech. CE–IV Semester

23CIV244T	CONCRETE TECHNOLOGY LABORATORY	L	T	P	C
		0	0	3	1.5

Course Objectives: To test basic properties of ingredients of concrete fresh and hardened concrete properties

Detailed Syllabus:

1. Tests on Cement

- I. Normal Consistency and Fineness of cement.
- II. Initial setting time and Final setting time of cement.
- III. Specific gravity and soundness of cement.
- IV. Compressive strength of cement.

2. Tests on Fine Aggregates

- I. Grading and fineness modulus of Fine aggregate by sieve analysis.
- II. Specific gravity of fine aggregate
- III. Water absorption and Bulking of sand.

3. Tests on Coarse Aggregates

- I. Grading of Coarse aggregate by sieve analysis.
- II. Specific gravity of coarse aggregate
- III. Water absorption of Coarse aggregates

4. Test son fresh Concrete

- I. Workability of concrete by compaction factor method
- II. Workability of concrete by slump test
- III. Workability of concrete by Vee-bee test.

5. Tests on Hardened Concrete

- I. Compressive strength of cement concrete and Modulus of rupture Young's Modulus and Poisson's Ratio
- II. Split tensile strength of concrete.
- III. Non-Destructive testing on concrete (for demonstration)

COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Outline importance of testing cement and its properties	PO1,PO2,PO3
CO2	Assess different properties of Aggregates	PO1,PO2,PO3
CO3	Assess fresh concrete properties and the irrelevance to hardened concrete	PO1,PO2,PO3
CO4	Assess hardened concrete properties	PO1,PO2,PO4

Textbooks:

- 1. Properties of Concrete by A.M. Neville–PEARSON–4th edition
- 2. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi 5th edition 2013.
- 3. Concrete Technology by Job Thomas, Cengage Publications, 1st edition, 2015



References

5. Concrete Microstructure, Properties of Materials by P.K. Mehta and Monterio. McGraw Hill 4th edition 2014
6. Concrete Technology, J. J. Brooks and A.M. Neville, Pearson, 2019, 2nd Edition.
7. Concrete Technology by M.S. Shetty. - S. Chand & Co.; 2004
8. Concrete Technology by A.R. Santha Kumar, Oxford University Press, New Delhi

CO-PO MAPPING:

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



23CIV245T	ENGINEERING GEOLOGY LABORATORY	L	T	P	C
		0	0	3	1.5

Course Objectives:

- To identify the megascopic types of Ore minerals & Rock forming minerals.
- To identify the Mega society pes of Igneous, Sedimentary, Metamorphic rocks.
- To identify the topography of the site & material selection

Course Outcomes:

- Identify megascopic minerals their properties.
- Identify megascopic rocks & their properties.
- Identify the site parameters such as contour, slope aspect for topography.
- Know the occurrence of materials using the strike & dip problems.
-

LIST OF EXPERIMENTS

1. Physical properties of minerals: Mega-scope identification of
 - a) Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmaline, Calcite, Gypsum, etc...
 - b) Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc...
2. Megascopic description and identification of rocks.
 - a) Igneous rocks–Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Porphyry, Basalt, etc.
 - b) Sedimentary rocks–Sandstone, Ferruginous sandstone, Limestone, Shale, Laterite, Conglomerate, etc.
 - c) Metamorphic rocks–Biotite–Granite Gneiss, Slate, Muscovite & Biotite schist, Marble, Khondalite, etc.
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
4. Simple Structural Geology problems.
5. Borehole data.
6. Strength of the rock using laboratory tests.
7. Fieldwork–To identify Minerals, Rocks, Geomorphology & Structural Geology.

LAB EXAMINATION PATTERN:

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Borehole problems.
6. Project report on geology.

References:

1. 'Applied Engineering Geology Practical's by MT Mathusha Reddy, New Age International Publishers, 2nd Edition.
2. 'Foundations of Engineering Geology' by Tony Waltham, Spon Press, 3rd edition,



232HSM241L	SOFT SKILLS	L	T	P	C
		0	1	2	2

Course Objectives:

- To encourage all round development of the students by focusing on soft skills
- To make the students aware of critical thinking and problem-solving skills
- To enhance healthy relationship and understanding within and outside an organization
- To function effectively with heterogeneous teams

Course Outcomes

- List out various elements of soft skills (L1, L2)
- Describe methods for building professional image(L1,L2)
- Apply critical thinking skills in problem solving (L3)
- Analyses the need so an individual and team for well-being(L4)
- Assess the situation and take necessary decisions(L5)
- Create a productive workplace atmosphere using social and work-life skills ensuring personal and emotional well-being (L6)

UNIT-I Soft Skills & Communication Skills

Soft Skills - Introduction, Need - Mastering Techniques of Soft Skills – Communication Skills - Significance, process, types - Barriers of communication - Improving techniques.

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

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking - Positive thinking – Reflection.

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

Meaning&featuresofProblemSolving–ManagingConflict–Conflictresolution–Team-building-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 Management

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

Activities:

Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, 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 : Corporate Etiquette

Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Sensitivity - Etiquette in interaction- Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette- Corporate grooming tips -Overcoming challenges

Activities

Providing situations to take part in the Role Plays where the students will learn about bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study- Business Etiquette Games

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.
2. Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear.

Prescribed Books:

1. Mitra Barun K, Personality Development and Soft Skills, Oxford University Press, Pap/Cdr edition 2012
2. Dr. Shikharas poor, Personality Development and Soft Skills: Preparing for Tomorrow, I K International Publishing House, 2018

Reference Books

1. Sharma, Prashant, Soft Skills: Personality Development for Life Success, BPB Publications 2018.
2. AlexK, Soft Skills S.Chand & Co, 2012 (Revised edition)
3. Gajendra Singh Chauhan & Sangeetha Sharma, Soft Skills: An Integrated Approach to Maximize Personality Published by Wiley, 2013
4. Pillai, Sabina & Fernandez Agna, Soft Skills and Employability Skills, Cambridge University Press, 2018
5. Soft Skills for a Big Impact (English, Paper back, Renu Shorey) Publisher: Notion Press
6. Dr. Rajiv Kumar Jain, Dr. Usha Jain, Life Skills (Paperback English) Publisher: Vayu Education of India, 2014

Online Learning Resources:

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>
7. <https://www.businesstrainingworks.com/training-resource/five-free-business-etiquette-training-games/>
8. https://onlinecourses.nptel.ac.in/noc24_hs15/preview
9. https://onlinecourses.nptel.ac.in/noc21_hs76/preview



23ESC241I	DESIGN THINKING & INNOVATION	L	T	P	C
		1	0	2	2

Course Objectives:

The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcomes:

- Define the concepts related to design thinking. (L1, L2)
- Explain the fundamentals of Design Thinking and innovation (L1, L2)
- Apply the design thinking techniques for solving problems in various sectors. (L3)
- Analyses to work in a multidisciplinary environment (L4)
- Evaluatethevalueofcreativity(L5)
- Formulate specific problem statements of real time issues (L3, L6)
-

UNIT-I Introduction to Design Thinking

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT-II Design Thinking Process

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

Activity: Every student presents their idea in three minutes, every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT-III Innovation

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations- Creativity to Innovation- Teams for innovation- Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT-IV Product Design

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies

Activity: Importance of modelling, how to set specifications, Explaining their own product design.

UNIT-V Design Thinking in Business Processes

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs- Design thinking for Startups- Defining and testing Business Models and Business Cases- Developing & testing prototypes.

Activity: How to market our own product, About maintenance, Reliability and plan for startup.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Textbooks:

1. Tim Brown, Change by design, Harper Bollins (2009)
2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.

Reference Books:

1. DavidLee, Design Thinking in the Classroom, Ulysses press
2. Shrut in N Shetty, Design the Future, Nort on Press
3. William idwell, Universal Principles of Design-Kritina holden, Jill Butter.
4. Chesbrough, The Era of Open Innovation– 2013

Online Learning Resources:

<https://nptel.ac.in/courses/110/106/110106124/>
<https://nptel.ac.in/courses/109/104/109104109/>
https://swayam.gov.in/nd1_noc19_mq60/preview



23ESC241	COMMUNITY SERVICE PROJECT	L	T	P	C
		0	0	0	2

Experiential learning through community engagement

Introduction

- Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development.
- Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.
- Community Service Project is meant to link the community with the college for mutual benefit. The community will benefit with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and emerge as a socially responsible institution.

Objective

Community Service Project should be an integral part of the curriculum, as an alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer

internships. The specific objectives are;

- To sensitize the students to the living conditions of the people who are around them,
- To help students to realize the stark realities of society.
- To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
- To make students aware of their inner strength and help them to find new /out of box solutions to social problems.
- To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
- To help students to initiate developmental activities in the community in coordination with public and government authorities.
- To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project

- Every student should put in 6 weeks for the Community Service Project during the summer vacation.
- Each class/section should be assigned with a mentor.
- 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, housewives, etc.
- A logbook must be maintained by each of the students, where the activities undertaken/involved to be recorded.
- The logbook has to be countersigned by the concerned mentor/faculty in charge.
- An evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
- The final evaluation to be reflected in the grade memo of the student.
- The Community Service Project should be different from the regular programs of NSS/NCC/Green Corps/Red Ribbon Club, etc.



- Minor project reports 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/apprentice/ on the job training.

Procedure

- 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, to enable them to commute from their residence and return back by evening or so.

The Community Service Project is at woof done–

- 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.
- 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

EXPECTED OUTCOMES

BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS

Learning Outcomes

- Positive impact on students' academic learning
- Improves students' ability to apply what they have learned in "the real world"
- Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development.
- Improved ability to understand complexity and ambiguity

Personal Outcomes

- Greater sense of personal efficacy, personal identity, spiritual growth, and moral development
- Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills.

Social Outcomes

- Reduced stereo types and greater inter-cultural understanding
- Improved social responsibility and citizenship skills
- Greater involvement in community service after graduation



Career Development

- Connections with professional and community members for learning and career opportunities
- Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity.

Relationship with the Institution

- Stronger relationships with faculty
- Greater satisfaction with college
- Improved graduation rates

BENEFITS OF COMMUNITY SERVICE PROJECT OF FACULTY MEMBERS

- Satisfaction with the quality of student learning
- New avenues for research and publication via new relationships between faculty and community
- Providing networking opportunities with engaged faculty in other disciplines or institutions
- A stronger commitment to one's research.

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

- Improved in situational commitment.
- Improved student retention
- Enhanced community relations

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY

- Satisfaction with student participation
- Valuable human resources needed to achieve community goals.
- New energy, enthusiasm and perspectives applied to community work.
- Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following is the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions, and modifications. Colleges are expected to focus on specific local issues for this kind of project. The students are expected to carry out these projects with involvement, commitment, responsibility, and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of project. The project reports shall be placed in the college website for reference.

Systematic, Factual, methodical and honest reporting should be ensured.

For Engineering Students

1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programmes
5. Horticulture
6. Herbal plants
7. Botanical survey
8. Zoological survey
9. Marine products
10. Aquaculture
11. In land fisheries
12. Animals and species
13. Nutrition
14. Traditional health care methods
15. Food habits
16. Air pollution
17. Water pollution



18. Plantation
19. Soil protection
20. Renewable energy
21. Plant diseases
22. Yoga awareness and practice
23. Health care awareness programmed and their impact
24. Use of chemicals on fruits and vegetables
25. Organicfarming
26. Crop rotation
27. Floury culture
28. Access to safe drinking water
29. Geographical survey
30. Geological survey
31. Sericulture
32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilization off reel electricity to farmers and relate disuses
40. Gender ration in schooling level-observation.

Complimenting the community service project the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programs

Programs for School Children

1. Reading Skill Program (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality/Leadership Development
4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Program on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Program on Socially relevant themes.

Programs for Women Empowerment

1. Government Guidelines and Policy Guidelines
2. Women's Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship General Camps
1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp
6. Swatch Bharath
7. AIDS awareness camp
8. Anti Plastic Awareness
9. Programs on Environment
10. Health and Hygiene
11. Hand wash programmed
12. Commemoration and Celebration of important days



Programs for Youth Empowerment

1. Leadership
2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Development Common Programs
 1. Awareness on RTI
 2. Health intervention programmers
 3. Yoga
 4. Tree plantation
 5. Programs in consonance with the Govt. Departments like–
 - i. Agriculture
 - ii. Health
 - iii. Marketing and Cooperation
 - iv. Animal Husbandry
 - v. Horticulture
 - vi. Fisheries
 - vii. Sericulture
 - viii. Revenue and Survey
 - ix. Natural Disaster Management
 - x. Irrigation
 - xi. Law & Order
 - xii. Excise and Prohibition
 - xiii. Mines and Geology
 - xiv. Energy

Role of Students:

- Students may not have the expertise to conduct all the programmers on their own. The students then can play a facilitator role.
- For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
- As and when required the College faculty themselves act as Resource Persons.
- Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
- And also, with the Governmental Departments. If the program is rolled out, the District Administration could be roped in for the successful deployment of the program.
- An in-house training and induction program could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Time line for the Community Service Project Activity Duration: 8 weeks

1. Preliminary Survey (One Week)

- A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.
- A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.
- The Governmental agencies, like revenue administration, corporation and municipal authorities and village secretariats could be aligned for the survey.

2. Community Awareness Campaigns (One Week)

- Based on the survey and the specific requirements of the habitation, different awareness campaigns and programmers to be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.



3. Community Immersion Programme (Three Weeks)

Along with the Community Awareness Programmer, the student batch can also work with any one of the below-listed governmental agencies and work in tandem with them. This community involvement programmed will involve the students in exposing themselves to experiential learning about the community and its dynamics. Programs could be in consonance with the Govt. Departments.

4. Community Exit Report (One Week)

- During the last week of the Community Service Project, a detailed report of the outcome of the 8weeks' works to be drafted and a copy shall be submitted to the local administration.
- This report will be a basis for the next batch of students visiting that habitation.
- The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the University.
- Throughout the Community Service Project, a daily log book needs to be maintained by the student's batch, which should be counter signed by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B.Tech– V Semester					
Course Code	DESIGN OF REINFORCED CONCRETE STRUCTURES	L	T	P	C
23CIV351T		3	0	0	3

Course Objectives: The objectives of this course are to make the student to:

1. **Understand** the fundamental methods of concrete structure design, including elastic, ultimate load, and limit state methods.
2. **Analyze** and design reinforced concrete beams, slabs, staircases, columns, and footings using the Limit State Method as per IS codes.
3. **Evaluate** the behavior of reinforced concrete members in terms of flexure, shear, torsion, bond, and anchorage.
4. **Apply** design principles to ensure serviceability and safety of concrete structures under various loading conditions.
5. **Develop** skills to use design aids and professional software for the analysis and design of RC structures.

UNIT– I

METHODS OF DESIGN OF CONCRETE STRUCTURES:

Concept of Elastic Method, Ultimate Load Method and Limit State Method – Working Stress Method As Detailed in IS Code - Design of Singly Reinforced Beam By Working Stress Method - Limit State Philosophy As Detailed in IS Code - Advantages of Limit State Method Over Other Methods - Analysis and Design of Singly and Doubly Reinforced Rectangular Beams By Limit State Method.

UNIT– II

LIMIT STATE METHOD – FLANGED BEAM, SHEAR & TORSION

Analysis and Design of Flanged Beams – Use of Design Aids for Flexure - Behavior of RC Members in Bond and Anchorage-Design Requirements As Per Current Code-Behavior Of RC Beams in Shear and torsion - Design of RC Members for Combined Bending, Shear and torsion - Serviceability.

UNIT– III

LIMIT STATE DESIGN OF SLABS

Analysis and Design of Cantilever, One Way, Two Way and Continuous Slabs Subjected to Uniformly Distributed Load for Various Boundary Conditions- –Introduction to Flat Slab.

UNIT– IV

LIMIT STATE DESIGN of COLUMNS Types of Columns – Design of Short Rectangular and Circular Columns for Axial, Uniaxial and Biaxial Bending.

LIMIT STATE DESIGN of FOOTING Design of Wall Footing – Design of Axially and Eccentrically Loaded Rectangular Pad and Sloped Footings – Design of Combined Rectangular Footing for Two Columns Only.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

UNIT- V

LIMIT STATE DESIGN OF STAIR CASE, SERVICEABILITY AND MISCELLANEOUS

(Aspects of Deflection, Cracking aspects) Types of Staircases – components of stair case -Design of Dog-Legged Staircase.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the different methods of concrete structure design and their advantages.	PO1, PO2, PO3
CO2	Analyze and design singly and doubly reinforced beams, flanged beams, slabs, and staircases using the Limit State Method.	PO1, PO2, PO3
CO3	Evaluate the behavior of RC members under shear, torsion, and combined loading conditions.	PO1, PO2, PO3, PO4
CO4	Design short columns and footings considering axial and eccentric loading conditions.	PO1, PO2
CO5	Utilize IS code provisions and design aids for efficient structural design.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Limit State Design, Laxmi Publications Pvt. Ltd., New Delhi
2. P. C. Varghese, Limit State—Designed of Reinforced Concrete, Prentice Hall of India, New Delhi.

REFERENCEBOOKS:

1. N. Krishnaraju, —Structural Design and Drawing, Universities Press Pvt Ltd, Hyderabad. 4rd edition 2020.
2. N.C. Sinha and S.K. Roy,—Fundamentals of Reinforced Concrete, S. Chand Publishers
3. N. Subramanian, —Design of Reinforced Concrete Structures, Oxford University Press

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/105/105105105/>

Codes/Tables: IS 456-2000 and relevant sheets (Pertaining to columns) of SP 16 Code books to be permitted into the examinations Hall.

NOTE: Assignment on preparation of drawing sheets detailing various RC Elements

All the designs to be taught in Limit State

Method Following plates should be prepared by the students.

1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One-way, Two way and continuous slabs



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Exam Pattern:

1. The end examination paper should consist of Part A and Part B. Part A consists of two questions in Design and Drawing out of which one question is to be answered.
2. Part-B should consist of five questions on design out of which three are to be answered. Weightage for Part -A is 40% and Part-B is 60%.

CO-MAPPING:

CO/P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	PO 8	P O 9	P O 10	P O 11	P O 12	PS O1	PS O2
CO-1	3	2	2	1	-	-	-	-	-	2	-	2	3	2
CO-2	3	3	3	2	2	-	-	-	-	-	-	1	3	2
CO-3	3	2	2	2	2	-	-	-	-	-	-	1	2	2
CO-4	3	3	3	2	2	-	-	-	-	-	-	1	3	3
CO-5	2	2	2	1	3	-	-	-	-	2	1	2	2	2



III B. Tech– V Semester					
Course Code	GEOTECHNICAL ENGINEERING	L	T	P	C
23CIV352T		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the classification and compaction characteristics of different soil types and their engineering significance.
2. **Analyze** the concepts of effective stress, permeability, and seepage in soils and their impact on soil behavior.
3. **Apply** stress distribution theories and settlement computations to evaluate soil response under loads.
4. **Evaluate** shear strength properties of soil using various testing methods and their applications in geotechnical engineering.
5. **Assess** the stability of slopes using different analytical methods and suggest suitable slope protection measures.

UNIT– I

SOIL CLASSIFICATION AND COMPACTION

Formation of Soil - Soil Description – Particle – Size Shape and Colour – Composition of Gravel, Sand, Silt, Clay Particles – Particle Behavior – Soil Structure – Phase Relationship – Index Properties – Significance – BIS Classification System – Unified Classification System – Compaction of Soils – Theory, Laboratory and Field Tests – Field Compaction Methods – Factors Influencing Compaction of Soils.

UNIT– II

EFFECTIVE STRESS AND PERMEABILITY

Soil - Water – Static Pressure in Water - Effective Stress Concepts in Soils – Capillary Phenomena– Permeability Interaction – Hydraulic Conductivity – Darcy 's Law – Determination of Hydraulic Conductivity – Laboratory Determination (Constant Head and Falling Head Methods) and Field Measurement Pumping Out in Unconfined and Confined Aquifer – Factors Influencing Permeability of Soils – Seepage - Two-Dimensional Flow – Laplace 's Equation – Introduction to Flow Nets – Simple Problems. (Sheet Pile and Weir).

UNIT– III

STRESS DISTRIBUTION AND SETTLEMENT

Stress Distribution in Homogeneous and Isotropic Medium – Boussinesq Theory – (Point Load, Line Load and UDL) Use of New Marks Influence Chart –Components of Settlement – Immediate and Consolidation Settlement – Terzaghi's One-Dimensional Consolidation Theory – Computation of Rate of Settlement. - $\sqrt{T}$ and Log T Methods– E-Log P Relationship.

UNIT– IV

SHEAR STRENGTH

Shear Strength of Cohesive and Cohesion Less Soils – Mohr-Coulomb Failure Theory – Measurement of Shear Strength - Direct Shear, Tri-axial Compression, UCC and Vane Shear Tests – Pore Pressure



Parameters –Shear strength characteristics of clays and soils- Bearing capacity theories and Earth pressure theories.

UNIT- V

SLOPE STABILITY

Stability Analysis - Infinite Slopes and Finite Slopes – total Stress Analysis for Saturated Clay – Friction Circle Method – Use of Stability Number – Method of Slices – Felonious and Bishop's Method - Slope Protection Measures.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the different methods of concrete structure design and their advantages.	PO1, PO2, PO3
CO2	Analyze and design singly and doubly reinforced beams, flanged beams, slabs, and staircases using the Limit State Method.	PO1, PO2, PO3
CO3	Evaluate the behavior of RC members under shear, torsion, and combined loading conditions.	PO1, PO2,PO3,PO4
CO4	Design short columns and footings considering axial and eccentric loading conditions.	PO1,PO2
CO5	Utilize IS code provisions and design aids for efficient structural design.	PO1, PO2,PO3,PO4

TEXT BOOKS:

1. K.R.Arora, Soil Mechanics and Foundation Engineering, Standard Publishers and Distributors, Delhi, 7th edition, 2019
2. C.Venkataramaiah, Geotechnical Engineering, New Age Publications, 6th edition, 2018

REFERENCEBOOKS:

1. V.N.S. Murthy, Soil Mechanics and Foundation Engineering, CBS Publishers and Distributor's, 2016
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Soil Mechanics and Foundation, Laxmi publications Pvt. Ltd., New Delhi, 2017
3. Manoj Dutta & Gulati S.K, Geotechnical Engineering, McGraw-Hill Publishers, NewDelhi,2010
4. Gopal Rajan and A.S.R. Rao, Basic and Applied Soil Mechanics, New Age Publications,2nd revised edition, 2014

Online Learning Resources:

<https://nptel.ac.in/courses/105101201><https://nptel.ac.in/courses/10510515>

CO-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	PS O1	PS O2
CO-1	3	2	2	1	-	-	-	-	-	2	-	2	3	2
CO-2	3	3	3	2	2	-	-	-	-	-	-	1	3	2
CO-3	3	2	2	2	2	-	-	-	-	-	-	1	2	2
CO-4	3	3	3	2	2	-	-	-	-	-	-	1	3	3
CO-5	2	2	2	1	3	-	-	-	-	2	1	2	2	2



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B. Tech– V Semester					
Course Code	WATER RESOURCES ENGINEERING	L	T	P	C
23CIV353T		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the fundamental concepts of hydrology, including precipitation, evaporation, infiltration, and runoff, and their significance in water resource management.
2. **Analyze** hydrographs, unit hydrographs, and groundwater characteristics for estimating water availability and flood management.
3. **Evaluate** the necessity, importance, and methods of irrigation, along with soil-water plant relationships and irrigation efficiencies.
4. **Apply** silt theories and principles of canal design to ensure efficient water conveyance and management in irrigation systems.
5. **Assess** the principles of diversion head works, water logging, canal lining, and the stability of hydraulic structures on permeable foundations.

UNIT-I INTRODUCTION to HYDROLOGY:

Engineering Hydrology and Its Applications; Hydrologic Cycle; Precipitation- Types and forms, Rainfall Measurement, Types of Rain Gauges, Computation of Average Rainfall Over A Basin, Presentation and Interpretation of Rainfall Data. Evaporation- Factors Affecting Evaporation, Measurement of Evaporation; Infiltration- Factors Affecting Infiltration, Measurement of Infiltration, Infiltration Indices; Run off- Factors Affecting Run- off, Computation of Run-Off; Design Flood; Estimation of Maximum Rate of Run-Off; Separation of Base Flow.

UNIT-II HYDROGRAPH ANALYSIS:

Hydrograph; Unit Hydrograph- Construction and Limitations of Unit Hydrograph, Application of The Unit Hydrograph to The Construction of A Flood Hydrograph Resulting from Rainfall of Unit Duration; S-Hydrograph.

GROUND WATER:

Introduction; Aquifer; Aquiclude; Aquifuge; Aquifer Parameters Porosity, Specific Yield, Specific Retention; Divisions of Sub-Surface Water; Water Table; Types of Aquifers; Storage Coefficient of Permeability and Transmissibility.

UNIT- III IRRIGATION:

Introduction; Necessity and Importance of Irrigation; Advantages and Ill Effects of Irrigation; Types of Irrigation; Methods of Application of Irrigation Water; Quality for Irrigation Water. Duty and Delta; Duty at Various Places; Relation Between Duty and Delta; Factors Affecting Duty; Methods of Improving Duty.

WATER REQUIREMENT of CROPS: Types of Soils, Indian Agricultural Soils, Preparation of Land for Irrigation; Soil Fertility; Soil-Water-Plant Relationship; Vertical Distribution of Soil Moisture; Soil Moisture Tension; Soil Moisture Stress; Various Soil Moisture Constants; Limiting Soil Moisture Conditions; Depth and



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Frequency of Irrigation; Gross Command Area; Culturable Command Area; Culturable Cultivated and Uncultivated Area; Kor Depth and Kor Period; Crop Seasons and Crop Rotation; Irrigation Efficiencies; Determination of Irrigation Requirements of Crops; Assessment of Irrigation Water. Consumptive Use of Water-Factors Affecting Consumptive Use, Direct Measurement and Determination By Use of Equations (Theory Only)

UNIT- IV CHANNELS- SILT THEORIES:

Classification; Canal Alignment; Inundation Canals; Cross-Section of An Irrigation Channel; Balancing Depth; Borrow Pit; Spoil Bank; Land Width; Silt Theories-Kennedy's Theory, Kennedy 's Method of Channel Design; Drawbacks in Kennedy's Theory; Lacey's Regime Theory- Lacey 's Theory Applied to Channel Design; Defects in Lacey's Theory; Comparison of Kennedy 's and Lacey's Theory.

WATER LOGGING and CANAL LINING: Water Logging; Effects of Water Logging; Causes of Water Logging; Remedial Measures; Saline and Alkaline Soils and their Reclamation; Losses in Canal; Lining of Irrigation Channels – Necessity, Advantages and Disadvantages; Types of Lining; Design of Lined Canal.

UNIT- V

DIVERSION HEADWORKS:

Types of Diversion Head Works; Diversion and Storage Head Works; Weirs and Barrages; Layouts of Diversion Head Works; Components; Causes and Failure of Hydraulic Structures

On Permeable Foundations; Bligh's Creep Theory; Khosla's Theory; Determination of Uplift Pressure, Impervious Floors Using Bligh's and Khosla's Theory; Exit Gradient.

COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the hydrologic cycle, precipitation types, and measurement techniques for rainfall, evaporation, infiltration, and runoff computation.	PO1, PO2, PO3
CO2	Analyze hydrographs, unit hydrographs, and groundwater flow parameters for flood estimation and water resource planning.	PO1, PO2, PO3
CO3	Evaluate irrigation requirements, soil-water-plant relationships, duty, delta, and irrigation efficiencies for sustainable agricultural productivity.	PO1, PO2, PO3, PO4
CO4	Apply silt theories and design principles of irrigation canals to ensure effective water conveyance and prevent water logging.	PO1, PO2
CO5	Assess the stability of diversion head works, including weirs and barrages, using Bligh's and Khosla's theories for hydraulic structure design.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Irrigation and Water Power Engineering By Punmia&Lal, Laxmi Publications Pvt. Ltd., New Delhi 17th Edition 2021
2. Engineering Hydrology By K. Subramanya, The Tata McGraw Hill Company, Delhi 5th Edition 2020



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

REFERENCEBOOKS:

1. Irrigation Engineering and Hydraulic Structures By S. K. Garg; Khanna Publishers, Delhi 36th Edition
2. Engineering Hydrology By Jayarami Reddy, Laxmi Publications Pvt. Ltd., New Delhi 3rd Edition 2016
3. Irrigation and Water Resources & Water Power By P.N.Modi, Standard Book House 6th Edition 2020

Online Learning Resources:

<https://nptel.ac.in/courses/105101214>

CO-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	PS 01	PS 02
CO-1	3	2	2	1	2	-	-	-	-	2	-	2	2	2
CO-2	3	3	3	3	3	-	-	-	-	2	-	2	3	2
CO-3	3	3	3	3	2	-	-	-	-	2	-	2	3	3
CO-4	3	3	3	3	3	3	3	3	-	2	-	2	3	3
CO-5	3	3	3	3	3	2	2	2	-	2	-	2	3	3



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B. Tech– V Semester					
Course Code	PRESTRESSED CONCRETE(PE-I)	L	T	P	C
23CIV354D		3	0	0	3

Course Objectives: -

The objectives of this course are to make the student to:

1. **Understand** the principles, methods, and materials used in prestressed concrete.
2. **Analyze** various losses of prestress in both pre-tensioned and post-tensioned members.
3. **Design** prestressed concrete beams considering flexure and shear forces.
4. **Evaluated** elections in prestressed concrete structures and their controlling factors.
5. **Analyze** the behavior of composite beams under different loading conditions.

UNIT- I

Introduction

Principles of Pre-Stressing – Prestressing Systems - Pre-Tensioning and Post Tensioning- Advantages and Limitations of Pre-Stressed Concrete- Need for High Strength Materials. Methods of Pre-Stressing: Pre-Tensioning (Hoyer System) and Post-Tensioning Methods (Freyssinet System and Gifford- Udall System)

UNIT- II

Losses of pre-stress

Loss of Pre-Stress in Pre-Tensioned and Post-Tensioned Members Due to Elastic Shortening, Shrinkage and Creep of Concrete, Relaxation of Stress in Steel, Anchorage Slip and Frictional Losses.

UNIT- III

Flexural and Shear

Analysis of Beams for Flexure and Shear-Beams Pre-Stressed with Straight, Concentric, Eccentric, Bent and Parabolic Tendons- Kern Line - Cable Profile - Design of PSC Beams (Rectangular and I Sections) Using IS 1343. Analysis and Design of Rectangular and I Beams for Shear. Introduction to Transmission Length and End Block (No Design and Analytical Problems).

UNIT- IV

DEFLECTIONS

Control of Deflections- Factors Influencing Deflections - Short Term Deflections of Uncracked Beams- Prediction of Long Time Deflections

UNIT- V

Composite beams

Different Types-Propped and Un-Propped-Stress Distribution-Differential Shrinkage- Analysis of Composite Beams.



COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the principles and methods of prestressing and the need for high-strength materials.	PO1, PO2, PO3
CO2	Analyze the different types of prestress losses and their impact on structural performance.	PO1, PO2, PO3
CO3	Design prestressed concrete beams considering flexural and shear stresses.	PO1, PO2, PO3, PO4
CO4	Evaluated deflections in prestressed beams and suggest control measures.	PO1, PO2
CO5	Analyze the stress distribution and differential shrinkage in composite beams.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Prestressed Concrete by N. Krishna Raju, Tata McGraw Hill Publications 6th edition 2018
2. Prestressed concrete by N. Rajagopalan, Narosa Publishing House 2nd edition 2017

REFERENCE BOOKS:

1. Design of Prestressed Concrete Structures by T.Y. Lin & Ned H. Burns, John Wiley & Sons 3rd edition 2010
2. Prestressed Concrete Design by Praveen Nagrajan, Pearson publications, 2013.
3. Prestressed Concrete by Ramamuratham, Dhanpatrai Publications 2020 edition
4. BIS code on—prestressed concrete, IS:1343 to be permitted in to the examination Hall

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/106/105106118/>

<https://nptel.ac.in/courses/105106117>

CO-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	PS O 1	PS O 2
CO-1	2	1	1	-	-	1	-	-	-	1	-	1	1	1
CO-2	2	2	1	1	2	-	-	-	-	-	-	1	1	1
CO-3	2	2	3	2	2	-	1	-	-	-	-	1	2	2
CO-4	2	1	2	2	3	1	-	-	-	-	-	1	2	1
CO-5	2	2	2	1	2	1	-	-	-	-	-	1	2	1



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B.Tech– V Semester					
Course Code	AIR POLLUTION AND CONTROL (PE – I)	L	T	P	C
23CIV354A		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the sources, classification, and effects of air pollution on humans and the environment.
2. **Analyze** meteorological factors influencing air pollution and dispersion modeling.
3. **Design** and evaluate control measures for particulate pollutants.
4. **Apply** techniques for controlling gaseous pollutants through chemical and physical processes.
5. **Assess** vehicular and indoor air pollution and propose control strategies.

UNIT– I

Air Pollution:

Definition - Sources & Classification of Air Pollutants - Effects of Air Pollution On Humans, Plants and Materials- Global Effects - Air Quality and NAAQS - National Clean Air Programmed- Sampling of Pollutants in Ambient Air - Stack Sampling.

UNIT– II

Meteorology and Air Pollution:

Factors Influencing Air Pollution, Wind Rose, Mixing Depths, Lapse Rates and Dispersion - Atmospheric Stability, Plume Rise and Dispersion, Prediction of Air Quality, Box Model - Gaussian Model - Dispersion Coefficient - Application of Tall Chimney for Pollutant Dispersion.

UNIT– III

Control of Particulate Pollutants:

Properties of Particulate Pollution - Particle Size Distribution - Control Mechanism - Dust Removal Equipment - Design and Operation of Settling Chambers, Cyclones, Wet Dust Scrubbers, Fabric Filters & ESP.

UNIT– IV

Control of Gaseous Pollutants:

Process and Equipment for The Removal By Chemical Methods - Design and Operation of Absorption and Adsorption Equipment - Combustion and Condensation Equipment.

UNIT– V

Automobile and Indoor Pollution:

Vehicular Pollution – Sources and Types of Emission – Effect of Operating Conditions- Alternate Fuels and Emissions-Emission Controls and Standards, Strategies to Control Automobile Pollution– Causes of Indoor Air Pollution-Changes in Indoor Air Quality- Control and Air Cleaning Systems-Indoor Air Quality



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the sources, classification, and global effects of air pollution.	PO1, PO2, PO3
CO2	Analyze meteorological parameters affecting air pollution dispersion.	PO1, PO2, PO3
CO3	Design control systems for particulate matter using appropriate removal techniques.	PO1, PO2, PO3, PO4
CO4	Apply suitable technologies for gaseous pollutant removal through adsorption, absorption, and combustion.	PO1, PO2
CO5	Evaluate vehicular and indoor air pollution sources and suggest mitigation strategies.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Rao, M. N. and Rao H. V. N., Air Pollution, Tata McGraw-Hill, New Delhi, 2007
2. Khare M, Sharma P, Kota, S.H, Sumanth C, Air Pollution Science Engineering and Management Fundamentals, CRC Press, 2024.
3. Noel, D. N., Air Pollution Control Engineering, Tata McGraw Hill Publishers, 1999.

REFERENCEBOOKS:

1. Fundamentals of Air Pollution by Dr.B.S.N. Raju, Oxford&I.B.H
2. Air Pollution Control Engineering by Nevers,, Mc Graw- Hill, Inc., 2000.
3. Rao, C.S., Environmental Pollution Control Engineering, New Age International, New Delhi, 2006.
4. Mahajan S. P., Pollution Control in Process Industries, Tata Mc Graw-Hill Publishing Company, New Delhi, 1991.
5. Peavy H.S., Rowe D.R. and Tchobanoglous G., Environmental Engineering, Mc Graw Hill, New York, 1985.

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/107/105107213/>

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO-1	2	1	-	-	-	2	3	-	-	1	-	1	1	1
CO-2	2	2	-	2	2	3	3	-	-	-	-	1	2	2
CO-3	2	2	3	2	2	3	3	-	-	-	-	1	2	2
CO-4	2	1	2	2	3	3	3	-	-	-	-	1	2	2
CO-5	2	2	2	2	2	3	3	2	-	-	-	1	2	2



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B.Tech- V Semester					
Course Code	ENVIRONMENTAL IMPACT ASSESSMENT (PE – I)	L	T	P	C
23CIV354B		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. Understand the principles, methodologies, and significance of Environmental Impact Assessment (EIA).
2. Analyze the impact of developmental activities on land use, soil, and water resources.
3. Evaluate the impact of development on vegetation, wild life, and assess environmental risks.
4. Develop environmental audit procedures and assess compliance with environmental regulations.
5. Understand and apply environmental acts, notifications, and legal frameworks in EIA studies.

UNIT- I

Concepts and methodologies of EIA

Initial Environmental Examination, Elements of EIA, - Factors Affecting E-I-A Impact Evaluation and Analysis, Preparation of Environmental Base Map, Classification of Environmental Parameters- Criteria for The Selection of EIA Methodology, E I A Methods, Ad-Hoc Methods, Matrix Methods, Network Method Environmental Media Quality Index Method, Overlay Methods and Cost/Benefit Analysis. Need and purposes of Environmental impact assessment

UNIT- II

Impact of Developmental Activities and Land Use

Introduction and Methodology for The Assessment of Soil and Ground Water, Delineation of Study Area, Identification of Actives. Procurement of Relevant Soil Quality, Impact Prediction, Assessment of Impact Significance, Identification and Incorporation of Mitigation Measures. E I A in Surface Water, Air and Biological Environment: Methodology for The Assessment of Impacts On Surface Water Environment, Air Pollution Sources, Generalized Approach for Assessment of Air Pollution Impact.

UNIT- III

Assessment of Impact on Vegetation, Wildlife and Risk Assessment

Introduction - Assessment of Impact of Development Activities On Vegetation and Wildlife, Environmental Impact of Deforestation - Causes and Effects of Deforestation - Risk Assessment and Treatment of Uncertainty-Key Stages in Performing Environmental Risk Assessment-Advantages of Environmental Risk Assessment.

UNIT- IV

Environmental audit

Introduction - Environmental Audit & Environmental Legislation Objectives of Environmental Audit, Types of Environmental Audit, Audit Protocol, Stages of Environmental Audit, Onsite Activities, Evaluation of Audit Data and Preparation of Audit Report.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

UNIT- V

Environmental Acts and Notifications

The Environmental Protection Act, The Water Preservation Act, The Air (Prevention & Control of Pollution Act), Wild Life Act - Provisions in The EIA Notification, Procedure for Environmental Clearance, Procedure for Conducting Environmental Impact Assessment Report-Evaluation of EIA Report. Environmental Legislation Objectives, Evaluation of Audit Data and Preparation of Audit Report. Post Audit Activities, Concept of ISO and ISO 14000.

COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Apply various methodologies for conducting Environmental Impact Assessments.	PO1, PO2, PO3
CO2	Analyze the impact of land-use changes on soil, water, and air quality.	PO1, PO2, PO3
CO3	Evaluate the environmental impact on vegetation, wildlife, and conduct risk assessments.	PO1, PO2, PO3, PO4
CO4	Develop environmental audit reports and assess compliance with environmental policies.	PO1, PO2
CO5	Interpret and apply environmental acts and regulations related to EIA.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B. S. Publication, Hyderabad 2nd edition 2011
2. Environmental Impact Assessment, by Canter Larry W., McGraw-Hill Education Edition (1996)

REFERENCE BOOKS:

1. Environmental Engineering, by Peavy, H.S, Rowe, D.R, Tchobanoglous, G. McGraw Hill International Editions, New York 1985.
2. Environmental Science and Engineering, by Suresh K. Dhaneja, S.K., Katania & Sons Publication, New Delhi
3. Environmental Science and Engineering, by J. Glynn and Gary W. Heinke, Prentice Hall Publishers.
4. Environmental Pollution and Control, by H.S. Bhatia, Galgotia Publication (P) Ltd, Delhi

Online Learning Resources:

<https://archive.nptel.ac.in/courses/124/107/124107160/>

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO-1	3	2	2	2	2	3	-	-	-	-	-	1	2	2
CO-2	3	3	3	2	2	3	-	-	-	-	-	1	3	2
CO-3	3	3	3	2	2	3	3	-	-	-	-	1	3	3
CO-4	3	3	3	3	2	3	3	-	-	-	-	1	3	3
CO-5	2	2	2	2	2	3	3	3	-	-	-	1	2	2

**III B.Tech. – V Semester**

23CIV354C	MUNICIPAL SOLID WASTE MANAGEMENT AND DISPOSAL	L	T	P	C
		3	-	-	3

PRE-REQUISITES: A Course on Environmental engineering.

COURSE EDUCATIONAL OBJECTIVES:

1. To make the students conversant with the types, sources, generation, storage, collection, transport, processing of solid waste.
2. To provide knowledge about source reduction, waste storage of municipal solid waste
3. To make the students conversant with the collection, transport, of solid waste.
4. To make the students conversant with the processing and disposal of solid waste.
5. To provide knowledge about Bio medical waste management and disposal

UNIT I: SOURCES AND CHARACTERISTICS**(9)**

Sources and types of municipal solid wastes- Public health and environmental impacts of improper disposal of solid wastes- sampling and characterization of wastes - factors affecting waste generation rate and characteristics - Elements of integrated solid waste management – Requirements and salient features of Solid waste management rules (2016) -- Role of public and NGO's- Public Private participation – Elements of Municipal Solid Waste Management Plan.

UNIT II: SOURCE REDUCTION, WASTE STORAGE & RECYCLING**(9)**

Waste Management Hierarchy - Reduction, Reuse and Recycling - source reduction of waste – On-site storage methods – Effect of storage, materials used for containers – segregation of solid wastes – Public health and economic aspects of open storage – case studies under Indian conditions – Recycling of Plastics and Construction/Demolition wastes.

UNIT III: COLLECTION AND TRANSFER OF WASTES**(9)**

Methods of Residential and commercial waste collection – Collection vehicles –Manpower – Collection routes – Analysis of waste collection systems; Transfer stations –location, operation and maintenance; options under Indian conditions – Field problems solving.

UNIT IV: PROCESSING OF WASTES**(9)**

Objectives of waste processing – Physical Processing techniques and Equipment; Resource recovery from solid waste composting and bio methanation; Thermal processing options – case studies under Indian conditions. Land disposal of solid waste; Sanitary landfills – site selection, design and operation of sanitary landfills – Landfill liners – Management of leachate and landfill gas- Landfill bioreactor – Dumpsite Rehabilitation



UNIT V: WASTE DISPOSAL

(9)

Land disposal of solid waste; Sanitary landfills – site selection, design and operation of sanitary landfills – Landfill liners – Management of leachate and landfill gas- Landfill bioreactor – Dumpsite Rehabilitation

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management	PO1, PO2
CO2	Analyze MSW and apply techniques reduce, reuse and recycling of solid waste.	PO1, PO2
CO3	Analyze and design systems for storage, collection, transport, processing and disposal of municipal solid waste	PO1, PO2, PO3
CO4	Understand the processing of solid waste and energy recovery	PO3, PO6
CO5	Understand the bio medical waste management	PO1, PO2, PO3

TEXTBOOKS:

1. William A. Worrell, P. Aarne Vesilind (2012)" Solid Waste Engineering", Cengage Learning, 2012.
2. John Pitchel (2014)," Waste Management Practices-Municipal, Hazardous and industrial", CRC Press, Taylor and Francis, New York.
3. Manser A.G.R. and Keeling A," Practical Handbook of Processing and Recycling of Municipal solid Wastes", A, Lewis Publishers, CRC Press, 1996

REFERENCE BOOKS:

1. CPHEEO -Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization, 2014, Government of India, New Delhi.
2. George Tchobanoglous and Frank Kreith, Handbook of Solid waste management, 2002, McGraw Hill, New York.

CO-MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	2	3	-	-	-	-	-	-	-	-	-	-
CO.3	1	2	3	-	-	-	-	-	-	-	-	-
CO.4	-	-	2	-	-	2	-	-	-	-	-	-
CO.5	1	2	3	-	-	-	-	-	-	-	-	-
CO*	1.6	2.2	2.6		-	2	-	-	-	-	-	-

**III B.Tech. - V Semester**

230MEC351A	SUSTAINBLE ENERGY TECHNOLOGIES	L	T	P	C
	(Mechanical Branch)	3	-	-	3

PRE-REQUISITES: The objectives of the course are to

COURSE EDUCATIONAL OBJECTIVES:

1. To demonstrate the importance the impact of solar radiation, solar PVmodules
2. To understand the principles of storage in PV systems
3. To discuss solar energy storage systems and their applications.
4. To get knowledge in wind energy and bio-mass
5. To gain insights in geothermal energy, ocean energy and fuel cells.

UNIT –1: SOLAR RADIATION:

(9)

Roles and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems.

SOLAR PV MODULES AND PV SYSTEMS: PV Module Circuit Design, Module Structure, Packing Density, Interconnections, Mismatch and Temperature Effects, Electrical and Mechanical Insulation, Lifetime of PV Modules, Degradation and Failure, PV Module Parameters, Efficiency of PV Module, Solar PV Systems-Design of Off Grid Solar Power Plant. Installation and Maintenance

UNIT –2: STORAGE IN PV SYSTEMS:

(9)

Battery Operation, Types of Batteries, Battery Parameters, Application and Selection of Batteries for Solar PV System, Battery Maintenance and Measurements, Battery Installation for PV System.

UNIT –3:

(9)

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation.

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

UNIT –4:

(9)

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement. **BIO-MASS:** Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

UNIT –5:

(9)

GEOTHERMAL ENERGY: Origin, Applications, Types of Geothermal Resources, Relative Merits. **OCEAN ENERGY:** Ocean Thermal Energy; Open Cycle & Closed Cycle OTEC Plants, Environmental Impacts, Challenges.

FUEL CELLS: Introduction, Applications, Classification, Different Types of Fuel Cells Such as Phosphoric Acid Fuel Cell, Alkaline Fuel Cell, PEM Fuel Cell, MC Fuel Cell.

Total Hours: 45



On successful completion of the course, students will be able to		POs
C01	Define and explain the evolution and need for rapid prototyping in modern product development.	L1,L2,L6
C02	Compare and contrast various 3D printing technologies based on working principles, materials, and limitations.	L2,L4
C03	Apply knowledge of rapid tooling and reverse engineering techniques for industrial and design applications.	L3,L5,L6
C04	Diagnose and interpret different types of errors encountered in 3D printing processes and recommend solutions.	L2,L3,L5,
C05	Use RP-specific software tools to manipulate STL files and prepare models for printing in real-world scenarios.	L1,L3,L6

TEXT BOOKS:

1. Solar Energy – Principles of Thermal Collection and Storage/Sukhatme S.P. and J.K.Nayak/TMH
2. Non-Conventional Energy Resources- Khan B.H/ Tata McGraw Hill, New Delhi, 2006

REFERENCE BOOKS:

1. Frank W.Liou, –Rapid Prototyping & Engineering ApplicationsII, CRC Press, Taylor & Francis Group, 2011.
2. Rafiq Noorani, –Rapid Prototyping: Principles and Applications in Manufacturing, John Wiley Sons, 2006.

REFERENCE WEBSITE:

1. Principles of Solar Engineering - D.Yogi Goswami, Frank Kreith& John F Kreider / Taylor & Francis
2. Non-Conventional Energy - Ashok V Desai /New Age International (P) Ltd
3. Renewable Energy Technologies -Ramesh & Kumar /Narosa
4. Non-conventional Energy Source- G.D Roy/Standard Publishers

Online Learning Resources:

<https://nptel.ac.in/courses/112106318>

<https://youtube.com/playlist?list=PLyqSpQzTE6M-ZgdjYukayF6QevPv7WE-r&si=-mwIa2X-SuSiNy13>

https://youtube.com/playlist?list=PLyqSpQzTE6M-ZgdjYukayF6QevPv7WE-r&si=Apfix6oDfz1Rb_N3

https://youtu.be/zx04Kl8y4dE?si=VmOvp_OqqisILTAF

CO-MAPPING:-

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



III B. Tech – V Semester

230EE351A	ELECTRICAL SAFETY PRACTICES AND STANDARDS	L	T	P	C
	(OPENELECTIVE– I)	3	0	0	3

PRE-REQUISITES: NIL**COURSE EDUCATIONAL OBJECTIVES:**

1. To introduce the fundamentals of electrical safety, electric shock, and physiological effects of current on the human body.
2. To familiarize students with electrical safety components, protective equipment, and methods of protection against over-voltages and static electricity.
3. To explain the principles and practices of system grounding, equipment grounding, and safe earthing methods.
4. To develop awareness of safe operating procedures, first aid measures, and safety practices in various electrical installations and special locations.
5. To provide knowledge of national and international acts, rules, regulations, and standards related to electrical safety and statutory compliance.

UNIT –1: Introduction to Electrical Safety:**(9)**

Fundamentals of Electrical Safety-Electric Shock- physiological effects of electric current - Safety requirements –Hazards of electricity- Arc - Blast- Causes for electrical failure.

UNIT –2: Safety Components:**(9)**

Introduction to conductors and insulators- voltage classification -safety against over voltages- safety against static electricity-Electrical safety equipment's - Fire extinguishers for electrical safety.

UNIT –3: Grounding:**(9)**

General requirements for grounding and bonding- Definitions- System grounding- Equipment grounding -The Earth - Earthing practices- Determining safe approach distance-Determining arc hazard category.

UNIT –4: Safety Practices:**(9)**

General first aid-Safety in handling handheld electrical appliances tools- Electrical safety in train stations-swimming pools, external lighting installations, medical locations-Case studies.

UNIT –5: Standards For Electrical Safety:**(9)**

Electricity Acts- Rules & regulations- Electrical standards-NFPA 70 E-OSHA standards-IEEE standards-National Electrical Code 2005 – National Electric Safety code NESC-Statutory requirements from electrical inspectorate

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
C01	Understanding the Fundamentals of Electrical Safety	PO1, PO2
C02	Identifying and Applying Safety Components	PO1, PO2, PO3
C03	Analyzing Grounding Practices and Electrical Bonding	PO1, PO2, PO3, PO4
C04	Applying Safety Practices in Electrical Installations and Environments	PO1, PO2, PO3, PO4
C05	Evaluating Electrical Safety Standards and Regulatory Compliance	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Massimo A.G. Mitolo, "Electrical Safety of Low-Voltage Systems", McGraw Hill, USA, 2009.
2. Mohamed El-Sharkawi, "Electric Safety-Practice and Standards", CRC Press, USA, 2014

REFERENCES:

REFERENCE BOOKS:

1. Kenneth G. Mastrullo, Ray A. Jones, "The Electrical Safety Program Book", Jones and Bartlett Publishers, London, 2nd Edition, 2011.
2. Palmer Hickman, "Electrical Safety-Related Work Practices", Jones & Bartlett Publishers, London, 2009.
3. Fordham Cooper, W., "Electrical Safety Engineering", Butterworth and Company, London, 1986.
1. John Cadick, Mary Capelli-Schellpfeffer, Dennis K. Neitzel, "Electrical Safety Handbook", McGraw-Hill, New York, USA, 4th edition, 2012.

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B. Tech – V Semester

230CS351A

JAVA PROGRAMMING

(Common to CSE, CSM, CAI, CSD)

L T P C
3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Identify Java language components and how they work together in applications
2. Learn the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
3. learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications
4. understand how to design applications with threads in Java
5. understand how to use Java APIs for program development

UNIT 1:

(9)

Object Oriented Programming: Basic concepts, Principles,

Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style.

Data Types, Variables, and Operators : Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with printf() Method, Static Variables and Methods, Attribute Final,

Introduction to Operators, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (- -) Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, Bitwise Logical Operators.

Control Statements: Introduction, if Expression, Nested if Expressions, if-else Expressions, Ternary Operator (?:), Switch Statement, Iteration Statements, while Expression, do-while Loop, for Loop, Nested for Loop, For-Each for Loop, Break Statement, Continue Statement.

UNIT 2:

(9)

Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this.

Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods, Nesting of Methods, Overriding Methods, Attributes Final and Static.

UNIT 3:

(9)

Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two-dimensional Arrays, Arrays of Varying Lengths, Three-dimensional Arrays, Arrays as Vectors.



Inheritance: Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class-Object Class, Inhibiting Inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Interfaces and Inheritance.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, Functional Interfaces, Annotations.

UNIT 4:

(9)

Packages and Java Library: Introduction, Defining Package, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE, java.lang Package and its Classes, Class Object, Enumeration, class Math, Wrapper Classes, Auto-boxing and Auto-unboxing, Java util Classes and Interfaces, Formatter Class, Random Class, Time Package, Class Instant (java.time.Instant), Formatting for Date/Time in Java, Temporal Adjusters Class, Temporal Adjusters Class.

Exception Handling: Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Class Throwable, Unchecked Exceptions, Checked Exceptions.

Java I/O and File: Java I/O API, standard I/O streams, types, Byte streams, Character streams, Scanner class, Files in Java (Text Book 2)

UNIT 5:

(9)

String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Comparison, Modifying, Searching; Class String Buffer.

Multithreaded Programming: Introduction, Need for Multiple Threads Multithreaded Programming for Multi-core Processor, Thread Class, Main Thread-Creation of New Threads, Thread States, Thread Priority-Synchronization, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads.

Java Database Connectivity: Introduction, JDBC Architecture, Installing MySQL and MySQL Connector/J, JDBC Environment Setup, Establishing JDBC Database Connections, ResultSet Interface

Java FX GUI: Java FX Scene Builder, Java FX App Window Structure, displaying text and image, event handling, laying out nodes in scene graph, mouse events (Text Book 3)

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to Cos
C01	Analyse problems, design solutions using OOP principles, and implement them efficiently in Java. (L4)	PO1, PO2, PO5
C02	Design and implement classes to model real-world entities, with a focus on attributes, behaviours, and relationships between objects (L4)	PO1, PO4, PO5
C03	Demonstrate an understanding of inheritance hierarchies and polymorphic behaviour, including method overriding and dynamic method dispatch. (L3)	PO1, PO3, PO4, PO5



C04	Apply Competence in handling exceptions and errors to write robust and fault-tolerant code. (L3)	PO1,PO4, PO5
C05	Perform file input/output operations, including reading from and writing to files using Java I/O classes, graphical user interface (GUI) programming using JavaFX.(L3)	PO1, PO2, PO4, PO5

TEXT BOOKS:

- 1) JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
- 2) Joy with JAVA, Fundamentals of Object Oriented Programming, DebasisSamanta, MonalisaSarma, Cambridge, 2023.
- 3) JAVA for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

REFERENCES:

- 1) The complete Reference Java, 11th edition, Herbert Schildt, TMH
- 2) Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson

REFERENCE WEBSITE:

- 1) <https://nptel.ac.in/courses/106/105/106105191/>
- 2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012880464547618816347_shared/overview

CO-PO MAPPING:

C0-P0	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
C01	3	-	-	-	2	-	-	-	-	-	-	-
C02	2	-	-	3	3	-	-	-	-	-	-	-
C03	3	-	3	3	3	-	-	-	-	-	-	-
C04	3	-	-	3	3	-	-	-	-	-	-	-
C05	2	3	-	3	3	-	-	-	-	-	-	-
C0	2.6	3	3	3	2.8	-	-	-	-	-	-	-



III B.Tech - V Semester

230AI351A	FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE	L	T	P	C
		0	0	3	3

COURSE EDUCATIONAL OBJECTIVES:

1. To learn the distinction between optimal reasoning Vs. human like reasoning.
2. To understand the concepts of state space representation, exhaustive search, heuristic
3. Search together with the time and space complexities.
4. To learn different knowledge representation techniques.
5. To understand the applications of AI, namely game playing, theorem proving, and machine learning.

UNIT-I : Introduction to AI Searching for Solutions (9)

Introduction to AI-Intelligent Agents, Problem-Solving Agents,

Searching for Solutions-Breadth-first search, Depth- first search, Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces.

UNIT-II: Games & Logic (9)

Games - Optimal Decisions in Games, Alpha-Beta Pruning, Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Knowledge-Based Agents, **Logic**- Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses.

UNIT-III: First-Order Logic & Knowledge Representation (9)

First-Order Logic -Syntax and Semantics of First-Order Logic, Using First Order Logic, Knowledge Engineering in First-Order Logic. Inference in First-Order Logic: Propositional vs. First- Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution. **Knowledge Representation:** Onto logical Engineering, Categories and Objects, Events.

UNIT-IV: Planning (9)

Planning - Definition of Classical Planning, Algorithms for Planning with State Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches. Hierarchical Planning.



UNIT-V: Probabilistic Reasoning

(9)

Probabilistic Reasoning: Acting under Uncertainty, Basic Probability Notation Bayes' Rule and Its Use, Probabilistic Reasoning, Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability.

TOTAL HOURS:45

COURSE OUTCOMES:

On successful completion of the course the student will be		Pos related to COs
CO1	Learn the distinction between optimal reasoning Vs human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time And space complexities.	PO1,PO2
CO2	Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.	PO1,PO3
CO3	Learn different knowledge representation techniques.	PO1,PO2,PO4
CO4	Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities	PO1,PO2,PO3, PO4
CO5	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks.	PO1,PO2,PO4, PO5
CO6	Analyze Supervised Learning Vs. Learning Decision Tree	PO1,PO2

TEXTBOOK:

Artificial Intelligence: A Modern Approach, Third Edition Stuart Russe and Peter Norvig, Pearson Education.

REFERENCE BOOKS:

1. ArtificialIntelligence,3rdEdn.,E.RichandK.Knight(TMH)
2. ArtificialIntelligence,3rdEdn.,PatrickHennyWinston,PearsonEducation.
3. ArtificialIntelligence,ShivaniGoel,PearsonEducation.
4. ArtificialIntelligenceandExpertsystems–Patterson,PearsonEducation.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	-	-	-	-	-	-	-	-	-	-
C02	3	-	3	-	-	-	-	-	-	-	-	-
C03	3	2	-	2	-	-	-	-	-	-	-	-
C04	3	3	3	2	-	-	-	-	-	-	-	-
C05	3	3	-	3	2	-	-	-	-	-	-	-
CO*	3	2.8	1.2	1.4	2	-	-	-	-	-	-	-



	III B. Tech – V Semester				
23OECE361A	ELECTRONIC CIRCUITS (OPENELECTIVE– I)	L	T	P	C
		3	0	0	3

PRE-REQUISITES: Basic Mathematics

COURSE EDUCATIONAL OBJECTIVES:

1. To Learn Boolean algebra, logic simplification techniques, and combinational circuit design.
2. To analyze combinational circuits like adders, subtractors, and code converters.
3. To explore combinational logic circuits and their applications in digital design.
4. To understand sequential logic circuits, including latches, flip-flops, counters, and shift registers.
5. To gain knowledge about programmable logic devices and digital IC's.

UNIT –1 INTRODUCTION

(9)

Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms, Introduction to Logic Gates, Ex-OR, Ex-NOR operations, Minimization of Switching Functions: Karnaugh map method, Logic function realization: AND-OR, OR-AND and NAND/NOR realizations.

UNIT-II INTRODUCTION TO COMBINATIONAL DESIGN 1

(9)

Introduction to Combinational Design 1: Binary Adders, Subtractors and BCD adder, Code converters - Binary to Gray, Gray to Binary, BCD to excess3, BCD to Seven Segment display.

UNIT-III COMBINATIONAL LOGIC DESIGN 2

(9)

Combinational Logic Design 2: Decoders, Encoders, Priority Encoder, Multiplexers, Demultiplexers, Comparators, Implementations of Logic Functions using Decoders and Multiplexers.

UNIT-IV SEQUENTIAL LOGIC DESIGN

(9)

Sequential Logic Design: Latches, Flip-flops, S-R, D, T, JK and Master-Slave JK FF, Edge triggered FF, set up and hold times, Ripple counters, Shift registers.

UNIT-V PROGRAMMABLE LOGIC DEVICES AND DIGITAL ICs

(9)

Programmable Logic Devices: ROM, Programmable Logic Devices (PLA and PAL).

Digital IC's: Decoder (74x138), Priority Encoder (74x148), multiplexer (74x151) and demultiplexer (74x155), comparator (74x85).

TOTAL HOURS: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understanding the Fundamentals of Electrical Safety	PO1, PO2
CO2	Identifying and Applying Safety Components	PO1, PO2, PO3
CO3	Analyzing Grounding Practices and Electrical Bonding	PO1, PO2, PO3, PO4
CO4	Applying Safety Practices in Electrical Installations and Environments	PO1, PO2, PO3, PO4
CO5	Evaluating Electrical Safety Standards and Regulatory Compliance	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Massimo A.G. Mitolo, "Electrical Safety of Low-Voltage Systems", Mc Graw Hill, USA, 2009.
2. Mohamed El-Sharkawi, "Electric Safety-Practice and Standards", CRC Press, USA, 2014

REFERENCE BOOKS:

1. Kenneth G. Mastrullo, Raya. Jones, "The Electrical Safety Program Book", Jones and Bartlett Publishers, London, 2nd Edition, 2011.
2. Palmer Hickman, "Electrical Safety-Related Work Practices", Jones & Bartlett Publishers, London, 2009.
3. Fordham Cooper, W., "Electrical Safety Engineering", Butterworth and Company, London, 1986.
4. Johncock, Mary Capelli-Schellpfeffer, Dennis K. Neitzel, "Electrical Safety Handbook", McGraw-Hill, New York, USA, 4th edition, 2012.

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



230CS351A

JAVA PROGRAMMING
(Common to CSE, CSM, CAI, CSD)

L	T	P	C
3	0	0	3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Identify Java language components and how they work together in applications
2. Learn the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
3. Learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications
4. Understand how to design applications with threads in Java
5. Understand how to use Java APIs for program development

UNIT 1:

(9)

Object Oriented Programming: Basic concepts, Principles,

Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style.

Data Types, Variables, and Operators : Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with printf() Method, Static Variables and Methods, Attribute Final,

Introduction to Operators, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (--) Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, Bitwise Logical Operators.

Control Statements: Introduction, if Expression, Nested if Expressions, if-else Expressions, Ternary Operator (?:), Switch Statement, Iteration Statements, while Expression, do-while Loop, for Loop, Nested for Loop, For-Each for Loop, Break Statement, Continue Statement.

UNIT 2:

(9)

Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this.

Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods, Nesting of Methods, Overriding Methods, Attributes Final and Static.

UNIT 3:

(9)

Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two-dimensional Arrays, Arrays of Varying Lengths, Three-dimensional Arrays, Arrays as Vectors.



230AI351A	FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE	L	T	P	C
		0	0	3	3

COURSE EDUCATIONAL OBJECTIVES:

- 1) To learn the distinction between optimal reasoning Vs. human like reasoning.
- 2) To understand the concepts of state space representation, exhaustive search, heuristic
- 3) Search together with the time and space complexities.
- 4) To learn different knowledge representation techniques.
- 5) To understand the applications of AI, namely game playing, theorem proving, and machine learning.

UNIT-I : Introduction to AI Searching for Solutions

(9)

Introduction to AI-Intelligent Agents, Problem-Solving Agents, Searching for Solutions-Breadth-first search, Depth- first search, Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces.

UNIT-II: Games & Logic

(9)

Games - Optimal Decisions in Games, Alpha-Beta Pruning, Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Knowledge-Based Agents, Logic- Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses.

UNIT-III: First-Order Logic & Knowledge Representation

(9)

First-Order Logic -Syntax and Semantics of First-Order Logic, Using First Order Logic, Knowledge Engineering in First-Order Logic. Inference in First-Order Logic: Propositional vs. First- Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution. Knowledge Representation: Onto logical Engineering, Categories and Objects, Events.

UNIT-IV: Planning

(9)

Planning - Definition of Classical Planning, Algorithms for Planning with State Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches. Hierarchical Planning.

UNIT-V: Probabilistic Reasoning

(9)

Probabilistic Reasoning: Acting under Uncertainty, Basic Probability Notation Bayes' Probabilistic Reasoning, Representing Knowledge in an Uncertain Domain, Rule and Its Use, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability.

TOTAL HOURS:45



COURSE OUTCOMES:

On successful completion of the course the student will be		Pos related to COs
CO1	Learn the distinction between optimal reasoning Vs human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time And space complexities.	PO1,PO2
CO2	Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.	PO1,PO3
CO3	Learn different knowledge representation techniques.	PO1,PO2,PO4
CO4	Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities	PO1,PO2,PO3, PO4
CO5	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks.	PO1,PO2,PO4, PO5
CO6	Analyze Supervised Learning Vs. Learning Decision Tree	PO1,PO2

TEXTBOOK:

Artificial Intelligence: A Modern Approach, Third Edition Stuart Russe and Peter Norvig, Pearson Education.

REFERENCE BOOKS:

5. ArtificialIntelligence,3rdEdn.,E.RichandK.Knight(TMH)
6. ArtificialIntelligence,3rdEdn.,PatrickHennyWinston,PearsonEducation.
7. ArtificialIntelligence,ShivaniGoel,PearsonEducation.
8. ArtificialIntelligenceandExpertsystems–Patterson,PearsonEducation.

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO1 0	PO1 1	PO1 2
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-
CO3	3	2	-	2	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-
CO5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	3	2.8	1.2	1.4	2	-	-	-	-	-	-	-



III B Tech- V Semester

23OSH351A	MATHEMATICS FOR MACHINE LEARNING AND AI	L	T	P	C
	OPEN ELECTIVE-I (COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To provide a strong mathematical foundation for understanding and developing AI/Algorithms.
2. To enhance the ability to apply linear algebra, probability, and calculus in AI/ML models.
3. To equip students with optimization techniques and graph-based method subsiding AI applications.
4. To develop critical problem-solving skills for analyzing mathematical formulations in AI/ML.

UNIT I: Linear Algebra for Machine Learning (09)

Review of Vector spaces, basis, linear independence, Vector and matrix norms, Matrix factorization techniques, Eigen values, eigen vectors, diagonalization, Singular Value Decomposition (SVD) and Principal Component Analysis (PCA).

UNIT II: Probability and Statistics for AI (09)

Probability distributions: Gaussian, Binomial, Poisson. Bayes 'Theorem, Maximum Likelihood Estimation (MLE), and Maximum a Posteriori (MAP). Entropy and Kulbacki - Leibler (KL) Divergence in AI, Cross entropy loss, Markov chains.

UNIT III: Optimization Techniques for ML (09)

Multivariable calculus: Gradients, Hessians, Jacobians. Constrained optimization: Lagrange multipliers and KKT conditions. Gradient Descent and its variants (Momentum, Adam) Newton 's method, BFGS method.

UNIT IV: Vector Calculus & Transformations (09)

Vector calculus: Gradient, divergence, curl. Fourier Transform & Laplace Transform in ML applications.

UNIT V: Graph Theory for AI (09)

Graph representations: Adjacency matrices, Laplacian matrices. Bayesian Networks & Probabilistic Graphical Models. Introduction to Graph Neural Networks (GNNs).

Total Hours: 45

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to		POs
CO1	Apply linear algebra concepts to ML techniques like PCA and regression.	PO1,PO2,PO3,PO4,PO5,PO12
CO2	Analyze probabilistic models and statistical methods for AI applications.	PO1,PO2,PO3,PO4,PO5,PO12
CO3	Implement optimization techniques for machine learning algorithms.	PO1,PO2,PO3,PO4,PO5,PO6,PO12
CO4	Utilize vector calculus and transformations in AI-based models.	PO1,PO2,PO3,PO4,PO5,PO12
CO5	Develop graph-based AI models using mathematical representations.	PO1,PO2,PO3,PO4,PO5,PO12

TEXT BOOKS:

1. Mathematics for Machine Learning by Marc Peter Deisenroth, A.Aldo Faisal, Cheng Soon Ong, Cambridge University Press, 2020.
2. Pattern Recognition and Machine Learning by Christopher Bishop, Springer.

REFERENCE BOOKS:

1. Gilbert Strang, Linear Algebra and Its Applications, Cengage Learning, 2016.
2. Jonathan Gross, Jay Yellen, Graph Theory and Its Applications, CRC Press, 2018.

REFERENCE WEBSITE:

- MIT-MathematicsforMachineLearning<https://ocw.mit.edu>
- StanfordCS229-MachineLearningCourse <https://cs229.stanford.edu/>
- Deep AI-MathematicalFoundationsforAI<https://deepai.org>

CO-PO MAPPING:

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

• **3**=StrongMapping, **2**=ModerateMapping, **1**=SlightMapping, **-**=NoMapping



III B Tech- V Semester

23OSH351B	MATERIALS CHARACTERIZATION TECHNIQUES (OPEN ELECTIVE-I)	L	T	P	C
		3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To provide exposure to various characterization techniques.
2. To explain the fundamental principles and analytical methods of different spectroscopic techniques.
3. To describe the working principle, limitations, and applications of the Scanning Electron Microscope (SEM).
4. To illustrate the operation of the Transmission Electron Microscope (TEM), including Selected Area Electron Diffraction (SAED) patterns and its applications.
5. To educate on the use of advanced electrical and magnetic instruments in material characterization.

UNIT-I: STRUCTURE ANALYSIS BY POWDER X-RAY DIFFRACTION (9)

Introduction, Bragg's law of diffraction, Intensity of Diffracted beams, Factors affecting Diffraction, Intensities, Structure of polycrystalline Aggregates, Determination of crystal structure, Crystallite size by Scherer and Williamson-Hall (W-H) Methods, Small angle X-ray scattering (SAXS) (in brief).

UNIT-II: MICROSCOPY TECHNIQUE -1- SCANNING ELECTRON MICROSCOPY (SEM) (9)

Introduction, Principle, Construction and working principle of Scanning Electron Microscopy, Specimen preparation, Different types of modes used (Secondary Electron and Backscatter Electron), Advantages, limitations and applications of SEM.

UNIT-III: MICROSCOPY TECHNIQUE -2 - TRANSMISSION ELECTRON MICROSCOPY (TEM) (9)

Construction and Working principle, Resolving power and Magnification, Bright and dark fields, Diffraction and image formation, Specimen preparation, Selected Area Diffraction, Applications of Transmission Electron Microscopy, Difference between SEM and TEM, Advantage and Limitations of Transmission Electron Microscopy

UNIT-IV: SPECTROSCOPY TECHNIQUES (9)

Principle, Experimental arrangement, Analysis and advantages of the spectroscopic techniques –

(i) UV-Visible spectroscopy (ii) Raman Spectroscopy, (iii) Fourier Transform infrared (FTIR) spectroscopy, (iv) X-ray photoelectron spectroscopy (XPS).

UNIT V ELECTRICAL & MAGNETIC CHARACTERIZATION TECHNIQUES (9)

Electrical Properties analysis techniques (DC conductivity, AC conductivity) Activation Energy, Effect of Magnetic field on the electrical properties (Hall Effect). Magnetization measurement by induction method, Vibrating sample Magnetometer (VSM) and SQUID.

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

On successful completion of the course, students will be able to		POs
CO1	Employ different analytical methods to analyze the crystal structure and crystallite sizes	PO1, PO2, PO3, PO4, PO5
CO2	Investigate the morphology of the sample by using a Scanning Electron Microscope	PO1, PO2, PO3, PO4, PO5
CO3	Analyze the morphology and crystal structure of the sample by using Transmission Electron Microscope	PO1, PO2, PO3, PO4, PO5
CO4	Describe the principle and experimental arrangement of various spectroscopic techniques	PO1, PO2, PO3, PO4
CO5	Understand the construction and working principle of various Electrical & Magnetic Characterization technique	PO1, PO2, PO3, PO4

TEXTBOOKS:

1. Material Characterization: Introduction to Microscopic and Spectroscopic Methods – Yang Leng – John Wiley & Sons (Asia) Pvt. Ltd. 2013.
2. Microstructural Characterization of Materials - David Brandon, Wayne D Kalpan, John Wiley & Sons Ltd., 2008

REFERENCE BOOKS:

1. Fundamentals of Molecular Spectroscopy – IV Ed. – Colin Neville Banwell and Elaine M. McCash, Tata McGraw-Hill, 2008.
2. Elements of X-ray diffraction – Bernard Dennis Cullity & Stuart R Stocks, Prentice Hall, 2001 – Science.
3. Practical Guide to Materials Characterization: Techniques and Applications - Khalid Sultan – Wiley – 2021.
4. Materials Characterization Techniques -Sam Zhang, Lin Li, Ashok Kumar -CRC Press - 2008

REFERENCE LINK :

1. <https://nptel.ac.in/courses/115/103/115103030/>
2. https://nptel.ac.in/content/syllabus_pdf/113106034.pdf
3. <https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-mm0S8/>

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



23OSH351C	CHEMISTRY OF ENERGY SYSTEMS	L	T	P	C
	OPEN ELECTIVE-I(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To make the student understand basic electrochemical principles such as standard electrode potentials, emf and applications of electrochemical principles in the design of batteries.
2. To understand the basic concepts of processing and limitations of Fuel cells & their applications.
3. To impart knowledge to the students about fundamental concepts of photo chemical cells, reactions and applications.
4. Necessarily of harnessing alternate energy resources such as solar energy and its basic concepts.
5. To impart knowledge to the students about fundamental concepts of hydrogen storage in different materials and liquification method.

UNIT-1: Electrochemical Systems:

(09)

Galvanic cell, Nernst equation, standard electrode potential, application of EMF, electrical double layer, polarization, Batteries- Introduction, Lead-acid, Nickel- cadmium, Lithium-ion batteries and their applications.

UNIT-2: Fuel Cells:

(09)

Fuel cell- Introduction, Basic design of fuel cell, working principle, Classification of fuel cells, Polymer electrolyte membrane (PEM) fuel cells, Solid-oxide fuel cells (SOFC), Fuel cell efficiency and applications.

UNIT-3: Photo and Photo electrochemical Conversions:

Photochemical cells Introduction and applications of photochemical reactions, specificity of photo electrochemical cell, advantage of photoelectron catalytic conversions and their applications.

UNIT-4: Solar Energy:

(09)

Introduction and prospects, photovoltaic (PV) technology, concentrated solar power (CSP), Solar cells and applications. .

UNIT-5: Hydrogen Storage:

(09)

Hydrogen storage and delivery: State-of-the art, Established technologies, Chemical and Physical methods of hydrogen storage, Compressed gas storage, Liquid hydrogen storage, other storage methods, Hydrogen storage in metal hydrides, metal organic frameworks (MOF), Metal oxide porous structures, hydrogel, and Organic hydrogen carriers.

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Solve the problems based on electrode potential, Describe the Galvanic Cell Differentiate between Lead acid and Lithium-ion batteries, Illustrate the electrical double layer	PO1, PO2, PO2, PO4, PO5
CO2	Describe the working Principle of Fuel cell, Explain the efficiency of the fuel cell Discuss about the Basic design of fuel cells, Classify the fuel cell	PO1, PO2, PO2, PO4, PO6
CO3	Differentiate between Photo and Photo electrochemical Conversions, Illustrate the photochemical cells, Identify the applications of photochemical reactions, Interpret advantages of photoelectron catalytic conversion.	PO1, PO2, PO2, PO4, PO5
CO4	Apply the photo voltaic technology, demonstrate about solar energy and prospects Illustrate the Solar cells, discuss about concentrated solar power	PO1, PO2, PO2, PO4, PO5
CO5	Differentiate Chemical and Physical methods of hydrogen storage, Discuss the metal organic frame work, Illustrate the carbon and metal oxide porous structures Describe the liquification methods.	PO1, PO2, PO2, PO4, PO5

Text books

1. Physical chemistry by Ira N. Levine
2. Essentials of Physical Chemistry, Bahl and Bahl and Tuli.
3. Inorganic Chemistry, Silver and Atkins

Reference Books:

1. Fuel Cell Hand Book 7th Edition, by US Department of Energy (EG&G technical services And corporation)
2. Hand book of solar energy and applications by Arvind Tiwari and Shyam.
3. Solar energy fundamental, technology and systems by Klaus Jagar et.al.
4. Hydrogen storage by Levine Klebonoff

Mapping between Course Outcomes and Programme Outcomes

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

3=StrongMapping,2=ModerateMapping,1=Slight Mapping, -=No Mapping III B



Tech- V Semester

23OSH351D	ENGLISH FOR COMPETITIVE EXAMINATIONS	L	T	P	C
	(Open Elective-I)	3	0	0	3

Course Objectives:

1. To enable the students to learn about the structure of competitive English
2. To understand the grammatical aspects and identify the errors
3. To enhance verbal ability and identify the errors
4. To improve word power to answer competitive challenges
5. To make the ready to crack competitive exams

UNIT-I GRAMMAR-1

Lecture Hrs-9

Nouns-classification-errors-Pronouns-types-errors-Adjectives-types-errors-Articles-definite-indefinite- Degrees of Comparison-Adverbs-types- errors-Conjunctions-usage-repositions-usage-Tag Questions, types-identifying errors-Practice

UNIT-II GRAMMAR-2

Lecture Hrs-9

Verbs-tenses-structure-usages-negatives-positives-time adverbs-Sequence of tenses-If Clause-Voice-active voice and passive voice-reportedSpeech-Agreement-subjectandverb-Modals-SpottingErrors- Practices

UNIT-III VERBALABILITY

Lecture Hrs-9

Sentence completion-Verbal analogies-Word Groups-Instructions-Critical reasoning-Verbal Deduction-Select appropriate pair - Reading Comprehension - Paragraph - Jumbles - Selecting the proper statement by reading a given paragraph.

UNIT-IV READING COMPREHENSION AND VOCUBULARY

Lecture Hrs-9

Competitive Vocabulary – Word building – Memory Techniques – Synonyms, Antonyms, Affixes – Prefixes & suffix-One Word Substitutes-Compound words-Phrasal Verbs –Idioms and phrases-Homophones – Linking words – Modifiers – Intensifiers – Mastering Competitive Vocabulary – Cracking the unknowing passage –Speed Read info Techniques-Skimming and Scanning-Types of answering – Elimination methods.

UNIT-V WRITING FOR COMPETITIVE EXAMINATIONS

Lecture Hrs-9

Punctuations and Spelling rules –Word order-Sub skills of Writing –paragraph meaning – Salient features – types – Note making – Note taking- Summarizing – precise writing – Expansion of proverbs – Essay Writing – types.

TOTAL HOURS: 45

COURSE OUTCOMES (CO):

On successful completion of the course, students will be able to		POs
C01	Identify the basics of English grammar and its importance	PO2
C02	Explain the use of grammatical structures in sentences	PO5
C03	Demonstrate the ability to use various concepts in grammar and vocabulary and the applications in every day use and in competitive exams	PO6,PO10
C04	Analyze an unknown passage and reach conclusions about it.	PO10



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

CO5	Choose the appropriate form of verbs in framing sentences	PO4
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Text Books:

1. Wren Martin, English for competitive examinations, S. chand &Co,2021.
2. Objective English for competitive examinations, Tata Mc Graw Hill, NewDelhi,2014.

Reference Books:

1. Hari Mohan Prasad objective English for competitive examination Tata Mc-Graw hill, New Delhi,2014.
2. Philip Sunil Solomon English for Success in competitive exams, Oxford 2016.
3. Shalini Verma, Word power made Handy S. Chand Publications.
4. Neira Anjanna Dev&Co, Creative Writing: A Beginner's Manual Pearson Education India, 2008.
5. Abhishek Jain, Vocabulary learning Techniques VolI &IIRRGlobalPublishers2013.
6. MichaelS wan, Practical English Usage, Oxford,2006.

Online Services:

1. <https://www.grammar.cl/English/partsofspeech.htm>
2. <https://academicguides.waldenu.edu/writingcenter/grammar/PartsofSpeech>
3. <https://learnEnglish.britishcouncil.org/grammar/enlqish-grammar—reference/active-passive-voice>.
4. <https://www.languagetool.org/Insights/post/verb/tenses/>
5. <https://www.britishcouncil.in/blog/best/freeEnglish-learningresources-Britishcouncil>
6. <https://www.careerride.com/post/social-essays-for-competitive-exams-586.aspx>

CO-MAPPING OUTCOMES

CO\ P O	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	-	-	-	-	-	1
CO2	3	3	2	3	2	-	-	-	-	-	-	2
CO3	3	3	3	3	2	1	-	-	-	-	-	2
CO4	3	3	2	2	1	-	-	-	-	-	-	1
CO5	3	3	3	3	2	-	-	-	-	-	-	2



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

III B.Tech - V Semester

COURSE CODE	ENTREPRENEURSHIP AND NEW VENTURE CREATION	L	T	P	C
23OSH351E	(Open Elective-I)	4	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

- 1.To foster an entrepreneurial mind-set for venture creation and intrapreneurial leadership.
- 2.To encourage creativity and innovation and also validating customer personas.
- 3.To enable the students about understand MVP development and validation techniques to determine product-market fit and initiate solution design, prototype for proof of concept.
- 4.To make the students to create a business plan, financial planning and feasibility analysis to assess the financial viability of a venture.
- 5.To enable the students to identify potential and aspiration for scale vis-à-vis your venture idea.

UNIT –1: ENTREPRENEURSHIP FUNDAMENTALS AND CONTEXT (9)

Meaning and concept, attributes and mindset of entrepreneurial and intrapreneurial leadership, role models and their role in economic development, an understanding of how to build an entrepreneurial mindset, skill sets, attributes, and networks while on campus.

Core Teaching Tool: Simulation, Game, Industry Case Studies (Personalized for students – 16 industries to choose from), Venture Activity

UNIT –2: PROBLEM & CUSTOMER IDENTIFICATION (9)

Understanding and analyzing the macro problem and industry perspective – technological, socioeconomic, and urbanization trends and their implications on new opportunities, identifying passion, identifying and defining the problem using design thinking principles, analyzing the problem and validating with the potential customer, understanding customer segmentation, creating and validating customer personas.

Core Teaching Tool: Several types of activities including Class, game, Gen AI, Get out of the Building and Venture Activity.

UNIT –3: SOLUTION DESIGN, PROTOTYPING & OPPORTUNITY ASSESSMENT AND SIZING (9)

Understanding customer jobs-to-be-done and crafting innovative solution design to map to customer's needs and create a strong value proposition, understanding prototyping and Minimum Viable Product (MVP), developing a feasibility prototype with differentiating value, features, and benefits, assessing relative market position via competition analysis, sizing



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

the market and assessing the scope and potential scale of the opportunity.

Core Teaching Tool: Venture Activity, no-code Innovation tools, Class activity

UNIT –4: BUSINESS & FINANCIAL MODEL, GO-TO-MARKET PLAN(9)

Introduction to business model and types, lean approach, 9-block canvas model, riskiest assumptions to business models, importance of Build-Measure-Learn approach. **Business Planning:** components of business plan – sales plan, people plan, and financial plan. **Financial planning:** types of cost, preparing a financial plan for profitability using a financial template, understanding basics of unit economics, and analysing financial performance. Introduction to marketing and sales, selecting the right channel, creating digital presence, building customer acquisition strategy. Choosing a form of business organization specific to your venture, identifying sources of funds – debt and equity, mapping the start-up life cycle to funding options.

Core Teaching Tool: Founder Case Studies –Samaand Securely Share; Class activity and discussions; Venture Activities.

UNIT –5: SCALE OUTLOOK AND VENTURE PITCH READINESS (9)

Understand and identify potential and aspiration for scale vis-à-vis your venture idea. Persuasive storytelling and its key components. Build an investor-ready pitch deck.

Core Teaching Tool: Expert talks; Cases; Class activity and discussions; Venture Activities.

Total Hours: 45

COURSE OUTCOMES:

COs	On successful completion of the course, students will be able to	POs
CO1	Develop an entrepreneurial mindset and appreciate the concept of entrepreneurship	PO9, PO12
CO2	Comprehend the process of problem-opportunity identification through design thinking, identify market potential and customers while developing a compelling value proposition solution	PO2, PO4, PO5, PO9, PO11, PO12
CO3	Build a prototype for proof of concept and validate the MVP of their practice venture idea	PO3, PO4, PO5, PO6, PO9, PO11, PO12
CO4	Analyze and refine business models to ensure sustainability and profitability of a venture	PO7, PO9, PO10, PO11, PO12
CO5	Prepare and deliver an investible pitch deck of their practice venture to attract stakeholders	PO9, PO11, PO12



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

TEXT BOOKS:

1. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Sabyasachi Sinha. *Entrepreneurship*, McGraw Hill, 11th Edition (2020).
2. Ries, E. *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. Crown Business (2011).
3. Osterwalder, A., & Pigneur, Y. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. John Wiley & Sons (2010).

REFERENCE BOOKS:

1. Simon Sinek. *Start with Why*. Penguin Books Limited (2011).
2. Brown, Tim. *Change by Design Revised & Updated: How Design Thinking Transforms Organizations and Inspires Innovation*. Harper Business (2019).
3. Namita Thapar. *The Dolphin and the Shark: Stories on Entrepreneurship*. Penguin Books Limited (2022).
4. Saras D. Sarasvathy. *Effectuation: Elements of Entrepreneurial Expertise*. Elgar Publishing Ltd. (2008).

REFERENCE WEBSITE:

Ignite 5.0 Course – Wadhwani Platform (Includes 200+ components of custom-created modular content and 500+ components of the most relevant curated content).

CO-MAPPING OUTCOMES

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	-	-	-	2	-	-	3
CO.2	-	3	-	3	2	-	-	-	3	-	2	3
CO.3	-	-	3	2	3	2	-	-	3	-	2	3
CO.4	-	-	-	-	-	-	2	-	3	3	2	3
CO.5	-	-	-	-	-	-	-	-	3	-	2	3
CO*	-	3	3	2.5	2.5	2	2	-	2.8	3	2	3



23ESC351T	III B. Tech – V SEMESTER INTRODUCTION TO QUANTUM TECHNOLOGIES AND APPLICATIONS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES (COBJ):

- Introduce fundamental quantum concepts like superposition and entanglement.
- Understand theoretical structure of qubits and quantum information.
- Explore conceptual challenges in building quantum computers.
- Explain principles of quantum communication and computing.
- Examine real-world applications and the future of quantum technologies.

COURSE OUTCOMES (CO):

- Explain core quantum principles in a non-mathematical manner.
- Compare classical and quantum information systems.
- Identify theoretical issues in building quantum computers.
- Discuss quantum communication and computing concepts.
- Recognize applications, industry trends, and career paths in quantum technology.

Unit 1:

Introduction to Quantum Theory and Technologies The transition from classical to quantum physics, Fundamental principles explained conceptually: Superposition, Entanglement, Uncertainty Principle, Wave-particle duality, Classical vs Quantum mechanics – theoretical comparison, Quantum states and measurement: nature of observation, Overview of quantum systems: electrons, photons, atoms, The concept of quantization: discrete energy levels, Why quantum? Strategic, scientific, and technological significance, A snapshot of quantum technologies: Computing, Communication, and Sensing, National and global quantum missions: India's Quantum Mission, EU, USA, China

UNIT 2:

Theoretical Structure of Quantum Information Systems What is a qubit? Conceptual understanding using spin and polarization, Comparison: classical bits vs quantum bits, Quantum systems: trapped ions, superconducting circuits, photons (non-engineering view), Quantum coherence and decoherence – intuitive explanation, Theoretical concepts: Hilbert spaces, quantum states, operators – only interpreted in abstract, The role of entanglement and non-locality in systems, Quantum information vs classical information: principles and differences, Philosophical implications: randomness, determinism, and observer role

UNIT 3:

Building a Quantum Computer – Theoretical Challenges and Requirements What is required to build a quantum computer (conceptual overview)?, Fragility of quantum systems: decoherence, noise, and control, Conditions for a functional quantum system: Isolation, Error management, Scalability, Stability, Theoretical barriers: Why maintaining entanglement is difficult, Error correction as a theoretical necessity, Quantum hardware platforms (brief conceptual comparison), Superconducting circuits, Trapped ions, Photonics, Visions reality: what's working and what remains elusive, The role of quantum software in managing theoretical complexities



UNIT 4:

Quantum Communication and Computing - **Theoretical** Perspective Quantum vs Classical Information, Basics of Quantum Communication, Quantum Key Distribution (QKD), Role of Entanglement in Communication, The Idea of the Quantum Internet – Secure Global Networking, Introduction to Quantum Computing, Quantum Parallelism (Many States at Once), Classical vs Quantum Gates, Challenges: Decoherence and Error Correction, Real-World Importance and Future Potential

UNIT 5:

Applications, Use Cases, and the Quantum Future Real-world application domains: Healthcare (drug discovery), Material science, Logistics and optimization, Quantum sensing and precision timing, Industrial case studies: IBM, Google, Microsoft, PsiQuantum, Ethical, societal, and policy considerations, Challenges to adoption: cost, skills, standardization, Emerging careers in quantum: roles, skillsets, and preparation pathways, Educational and research landscape – India's opportunity in the global quantum race

TEXTBOOKS:

1. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 10th Anniversary Edition, 2010.
2. Eleanor Rieffel and Wolfgang Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
3. Chris Bernhardt, Quantum Computing for Everyone, MIT Press, 2019.

REFERENCE BOOKS:

1. David McMahon, Quantum Computing Explained, Wiley, 2008.
2. Phillip Kaye, Raymond Laflamme, Michele Mosca, An Introduction to Quantum Computing, Oxford University Press, 2007.
3. Scott Aaronson, Quantum Computing Since Democritus, Cambridge University Press, 2013.
4. Alastair I.M. Rae, Quantum Physics: A Beginner's Guide, Oneworld Publications, Revised Edition, 2005.
5. Eleanor G. Rieffel, Wolfgang H. Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
6. Leonard Susskind, Art Friedman, Quantum Mechanics: The Theoretical Minimum, Basic Books, 2014.
7. Bruce Rosenblum, Fred Kuttner, Quantum Enigma: Physics Encounters Consciousness, Oxford University Press, 2nd Edition, 2011.
8. Giuliano Benenti, Giulio Casati, Giuliano Strini, Principles of Quantum Computation and Information, Volume I: Basic Concepts, World Scientific Publishing, 2004.



ONLINE LEARNING RESOURCES:

IBM Quantum Experience and Qiskit Tutorials

Coursera Quantum Mechanics and Quantum Computation by UC Berkeley

- edX – The Quantum Internet and Quantum Computers
- YouTube – Quantum Computing for the Determined by Michael Nielsen
- Qiskit Textbook IBM Quantum
-

CO PO MAPPING:

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



III B.Tech– V Semester					
Course Code	GEOTECHNICAL ENGINEERING LAB	L	T	P	C
23CIV357L		0	0	0	1.5

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the fundamental index properties of soils and their significance in geotechnical engineering.
2. **Perform** field and laboratory tests to determine in-situ density and compaction characteristics of soils.
3. **Evaluate** the engineering properties of soil, including permeability, shear strength, and consolidation.
4. **Analyze** the strength and deformation characteristics of soils through shear and compression tests.
5. **Interpret** test results and relate engineering properties of soils to real-world geotechnical problems and design considerations.

LIST OF EXPERIMENTS: -

1. Atterberg's Limits.
2. Field density-core cutter and sand replacement method
3. Grain size analysis
4. Specific gravity of soils
5. Permeability of soil, constant and variable head test
6. Compaction test
7. CBR Test
8. Consolidation test
9. Unconfined compression test
10. Direct shear test.
11. Vane shear test.
12. Tri-axial Compression test

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO 1	Determine index properties of soil, including specific gravity, grain size distribution, and consistency limits.	PO1, PO2, PO3
CO 2	Conduct field and laboratory compaction tests to evaluate the moisture-density relationship of soil.	PO1, PO2, PO3
CO 3	Evaluate permeability and consolidation characteristics of soil using appropriate laboratory techniques.	PO1, PO2, PO3, PO4
CO 4	Analyze the shear strength and compressibility of soil through direct shear, unconfined compression, and tri-axial tests.	PO1, PO2
CO 5	Integrate test results and engineering judgment to interpret soil behavior and make informed decisions in geotechnical engineering applications.	PO1, PO2, PO3, PO4



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Note: Any 10 of the above Experiments.

TEXT BOOKS:

1. Lambe T.W., —Soil Testing for Engineers, John Wiley and Sons, New York, 1951. Digitized 2008.
2. IS Code of Practice (2720) Relevant Parts, as amended from time to time, Bureau of Indian Standards, New Delhi.

REFERENCEBOOKS:

1. Saibaba Reddy, E. Ramas Astri, K.—Measurement of Engineering Properties of Soils, New age International (P) limited publishers, New Delhi, 2008.
2. G. Venkat Appa Rao and Goutham. Potable, —Geosynthetics Testing—A laboratory Manual, Sai Master Geoenvironmental Services Pvt. Ltd., 1st Edition 2008.
3. Bajadas., —Soil Mechanics: Laboratory Manual, Oxford University Press, eighth edition, 2012

Online Learning Resources:

<https://nptel.ac.in/courses/105101160>

CO-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	PS 01	PS 02
CO-1	3	2	2	2	-	-	-	-	-	2	-	2	3	2
CO-2	3	3	3	2	2	-	-	-	-	-	-	1	3	2
CO-3	3	3	2	2	2	-	-	-	-	-	-	1	3	3
CO-4	3	3	3	2	2	-	-	-	-	-	-	1	3	3
CO-5	2	2	2	1	3	-	-	-	-	2	1	2	2	2



III B. Tech– V Semester					
Course Code	FLUID MECHANICS HYDRAULIC MACHINES LAB	L	T	P	C
23CIV356L		0	0	0	1.5

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the principles of fluid mechanics and validate fundamental concepts through experiments.
2. **Determine** discharge coefficients for various flow measurement devices and analyze flow behavior.
3. **Evaluate** energy losses in pipes, open channels, and hydraulic jumps to improve flow efficiency.
4. **Analyze** the impact of jet forces on vanes and their applications in hydraulic machinery.
5. **Assess** the performance characteristics of hydraulic turbines and pumps under different operating conditions.

List of Experiments

1. Verification of Bernoulli 's Equation
2. Determination of Coefficient of Discharge for A Small Orifice by a Constant Head Method
3. Calibration of Venturi meter/ Orifice Meter
4. Calibration of Triangular / Rectangular/Trapezoidal Notch
5. Determination of Minor Losses in Pipe Flow
6. Determination of Friction Factor of a Pipeline
7. Determination of Energy Loss in Hydraulic Jump
8. Determination of Manning 's and Chezy 's Constants for Open Channel Flow.
9. Impact of Jet On Vanes
10. Performance Characteristics of Pelton Wheel Turbine
11. Performance Characteristics of Francis Turbine
12. Performance Characteristics of Kaplan Turbine
13. Performance Characteristics of A Single Stage / Multistage Centrifugal Pump

Note: Minimum 10 out of the above are to be conducted.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO 1	Determine index properties of soil, including specific gravity, grain size distribution, and consistency limits.	PO1, PO2, PO3
CO 2	Conduct field and laboratory compaction tests to evaluate the moisture-density relationship of soil.	PO1, PO2, PO3
CO 3	Evaluate permeability and consolidation characteristics of soil using appropriate laboratory techniques.	PO1, PO2, PO3, PO4
CO 4	Analyze the shear strength and compressibility of soil through direct shear, unconfined compression, and tri-axial tests.	PO1, PO2
CO 5	Integrate test results and engineering judgment to interpret soil behavior and make informed decisions in geotechnical engineering applications.	PO1, PO2, PO3, PO4



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

TEXT BOOKS:

1. Desmukh T. S., A lab manual on Fluid Mechanics and Hydraulic Machines, Laxmi Publications
2. Dr. S.K. Panigrahi, Ms. L. Mohanty, Fluid Mechanics and Hydraulic Machines Laboratory Manual, S.K. KATARIA&SONS, Educational Publisher.

REFERENCEBOOKS:

1. Dr. N. Kumara Swamy, Fluid Mechanics and Machinery Laboratory Manual, Chartor Publications
2. D. Sathish, Fluid Mechanics and Machinery Lab Manual, BP International Publications

Online Learning Resources:

<https://archive.nptel.ac.in/courses/112/106/112106311/>

CO-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	PS O1	PS O2
CO-1	3	2	2	2	-	-	-	-	-	2	-	2	3	2
CO-2	3	3	3	2	2	-	-	-	-	-	-	1	3	2
CO-3	3	3	2	2	2	-	-	-	-	-	-	1	3	3
CO-4	3	3	3	2	2	-	-	-	-	-	-	1	3	3
CO-5	2	2	2	1	3	-	-	-	-	2	1	2	2	2



III B.Tech– V Semester					
Course Code	ESTIMATION, SPECIFICATIONS, COSTING AND VALUATION	L	T	P	C
23CIV355L		0	1	2	2

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the various methods and types of estimates used in civil engineering projects.
2. **Develop** detailed estimates for single and multi-story buildings using standard estimation methods.
3. **Analyze** rate analysis, abstract estimation, and bill preparation as per standard procedures.
4. **Prepare** detailed specifications and tender documents for construction works.
5. **Evaluate** the valuation, cost escalation, and value analysis of buildings.

List of Experiments

1. Activity Based on Learning Methods and Types of Estimates
2. Preparation of Detailed Estimate for A Single-Storied Residential Building Using Wall to Wall Method
3. Preparation of Detailed Estimate for A Single Storied Residential Building Using Centre Line Method for Earthwork, Foundations, Super Structure, Fittings Including Sanitary and Electrical Fittings &Paintings.
4. Preparation of Detailed Estimate for A Two Storied Residential Building Using Centre Line Method for Earthwork, Foundations, Super Structure, Fittings Including Sanitary and Electrical Fittings &Paintings.
5. Activity Based Learning of Estimate Data and Rate Analysis
6. Preparation of Abstract Estimate for The Detailed Estimate in Exercise No.3
7. Preparation of Abstract Estimate for The Detailed Estimate in Exercise No.4
8. Writing of Measurement Book and Bill Preparation as Per AP State Govt Procedure for Detailed Estimate in No. 3 and Abstract Estimate of No. 6
9. Writing of Detailed Specifications for Various Items of Estimate and Preparing A Model Tender Document for The Work Listed in No. 3 and 6
10. Activity Based Learning for Valuation of Buildings, Cost Escalation Procedures and Value Analysis for Any One Work



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO 1	Apply estimation techniques to prepare detailed estimates for various construction projects.	PO1, PO2, PO3
CO 2	Develop abstract estimates and rate analysis for different civil engineering works.	PO1, PO2, PO3
CO 3	Analyze the preparation of measurement books and bill preparation as per AP State Government procedures.	PO1, PO2, PO3, PO4
CO 4	Create detailed specifications and tender documents for construction projects.	PO1, PO2
CO 5	Assess building valuation, cost escalation, and value analysis techniques.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. B.N. Dutta - Estimating and Costing in Civil Engineering, CBS Publishers & Distributors, 28th Revised Edition (2020).
2. Rangwala - Estimating, Costing and Valuation, Charotar Publishing House, 2023.
3. D.D. Kohli & R.C. Kohli - A Textbook of Estimating and Costing (Civil), S. Chand Publishing, 2011.

REFERENCEBOOKS:

1. M. Chakraborti - Estimating, Costing, Specification & Valuation in Civil Engineering, 29th Edition (2021).
2. Gurcharan Singh - Estimating, Costing and Valuation, Standard Publishers, 2018.
3. V.N. Vazirani & S.P. Chandola - Civil Engineering Estimating & Costing, Khanna Publishers, 4th Edition (2001).

Online Learning Resources:

https://onlinecourses.swayam2.ac.in/nou20_cs11/preview
<http://www.coursera.org/learn/construction-cost-estimating>

CO-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	PS O1	PS O2
CO-1	3	3	2	1	-	-	-	-	-	1	-	2	3	2
CO-2	3	3	3	2	2	-	-	-	-	-	-	1	3	3
CO-3	3	3	3	2	2	-	2	1	-	-	-	1	3	3
CO-4	3	3	3	2	2	-	2	1	-	-	-	1	3	3
CO-5	2	2	2	1	3	-	3	1	-	1	1	2	2	2



III B.TECH.-V SEMESTER

23ESC52L

TINKERING LAB

L T P C
0 0 2 1

COURSE OBJECTIVES:

1. Encourage Innovation and Creativity
2. Provide Hands-on Learning and Impart Skill Development
3. Foster Collaboration and Teamwork
4. Enable Interdisciplinary Learning, Prepare for Industry and Entrepreneurship
5. Import Problem-Solving mind-set

LIST OF EXPERIMENTS: (Any nine experiments shall be done)

1. Make your own parallel and series circuits using breadboard for any application of your choice.
2. Design and 3D print a Walking Robot
3. Design and 3D Print a Rocket.
4. Temperature & Humidity Monitoring System (DHT11 + LCD)
5. Water Level Detection and Alert System
6. Automatic Plant Watering System
7. Bluetooth-Based Door Lock System
8. Smart Dustbin Using Ultrasonic Sensor
9. Fire Detection and Alarm System
10. RFID-Based Attendance System
11. Voice-Controlled Devices via Google Assistant
12. Heart Rate Monitoring Using Pulse Sensor
13. Soil Moisture-Based Irrigation
14. Smart Helmet for Accident Detection
15. Milk Adulteration Detection System
16. Water Purification via Activated Carbon
17. Solar Dehydrator for Food Drying
18. Temperature-Controlled Chemical Reactor
19. Ethanol Mini-Plant Using Biomass
20. Smart Fluid Flow Control (Solenoid + pH Sensor)
21. Portable Water Quality Tester
22. AI Crop Disease Detection
23. AI-based Smart Irrigation
24. ECG Signal Acquisition and Plotting
25. AI-Powered Traffic Flow Prediction
26. Smart Grid Simulation with Load Monitoring
27. Smart Campus Indoor Navigator
28. Weather Station Prototype
29. Firefighting Robot with Sensor Guidance
30. Facial Recognition Dustbin
31. Barcode-Based Lab Inventory System
32. Growth Chamber for Plants



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

- 33. Biomedical Waste Alert System
- 34. Soil Classification with AI
- 35. Smart Railway Gate
- 36. Smart Bin Locator via GPS and Load Sensors
- 37. Algae-Based Water Purifier
- 38. Contactless Attendance via Face Recognition

Note: The students can also design and implement their own ideas, apart from the list of experiments mentioned above.

Note: A minimum of 8 to 10 experiments must be completed by the students.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
C01	Design electronic circuits for variety of applications using series and parallel connections	PO1
C02	Analyze and solve real time problems using Arduino boards	PO2
C03	Design and analyze a real time circuit using Tinkercad	PO3
C04	Simulate and interface actuators using Arduino boards	PO4
C05	Able to use modern simulation tools for interfacing the hardware components.	PO5
C06	Follow ethical principles in designing, simulating and implementing various circuits.	PO8
C07	Do experiments effectively as an individual and as a member in a group.	PO9
C08	Communicate verbally and in written form, the understandings about the experiments.	PO10
C09	Continue updating their skill related to semiconductors implementation for various application during their life time	PO12



CO-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



III B.Tech. - V Semester

23CIV351P	EVALUATION OF COMMUNITY SERVICE PROJECT	L	T	P	C
	(Common to All Branches)	-	-	-	2

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development
2. Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.
3. Community Service Project is meant to link the community with the college for mutual benefit. The community will be benefited with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and also emerge as a socially responsible institution.
4. To sensitize the students to the living conditions of the people who are around them,
5. To help students to realize the stark realities of the society.
6. To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
7. To make students aware of their inner strength and help them to find new /out of box solutions to the social problems.
8. To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
9. To help students to initiate developmental activities in the community in coordination with public and government authorities.
10. To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

IMPLEMENTATION OF COMMUNITY SERVICE PROJECT

1. Every student should put in a minimum of 180 hours for the Community Service Project during the summer vacation.
2. Each class/section should be assigned with a mentor.
3. 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
4. A log book has to be maintained by each of the student, where the activities undertaken/involved to be recorded.
5. The logbook has to be countersigned by the concerned mentor/faculty in-charge.
6. Evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
7. The final evaluation to be reflected in the grade memo of the student.
8. The Community Service Project should be different from the regular programmes of NSS/NCC/Green Corps/Red Ribbon Club, etc.
9. 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.
10. Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training



PROCEDURE

1. 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.
2. 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.
3. 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 and Drinking Water.

EXPECTED OUTCOMES

- 1) **Learning Outcomes:** Positive impact on students' academic learning, Improves students' ability to apply what they have learned in –the real world, Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development and Improved ability to understand complexity and ambiguity.
- 2) **Personal Outcomes:** Greater sense of personal efficacy, personal identity, spiritual growth, and moral development, Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills
- 3) **Social Outcomes:** Reduced stereotypes and greater inter-cultural understanding, improved social responsibility and citizenship skills, Greater involvement in community service after graduation.
- 4) **Career Development:** Connections with professionals and community members for learning and career opportunities, Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity.
- 5) **Relationship with the Institution:** Stronger relationships with faculty, Greater satisfaction with college and Improved graduation rates.
- 6) **Benefits of Community Service Project to Faculty Members:** Satisfaction with the quality of student learning, New avenues for research and publication via new relationships between faculty and community, Providing networking opportunities with engaged faculty in other disciplines or institutions and A stronger commitment to one's research.
- 7) **Benefits of Community Service Project to Colleges:** Improved institutional commitment, Improved student retention and Enhanced community relations
- 8) **Benefits of Community Service Project to Community:** Satisfaction with student participation, Valuable human resources needed to achieve community goals, New energy, enthusiasm and perspectives applied to community work and Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions and modifications. Colleges are expected to focus on specific local issues for this kind of projects. The students are expected to carry out these projects with involvement, commitment, responsibility and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of projects. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting shall be ensured.



- 1. Water facilities and drinking water availability
- 2. Health and hygiene
- 3. Stress levels and coping mechanisms
- 4. Health intervention programmes
- 5. Horticulture
- 6. Herbal plants
- 7. Botanical survey
- 8. Zoological survey
- 9. Marine products
- 10. Aqua culture
- 11. Inland fisheries
- 12. Animals and species
- 13. Nutrition
- 14. Traditional health care methods
- 15. Food habits
- 16. Air pollution
- 17. Water pollution
- 18. Plantation
- 19. Soil protection
- 20. Renewable energy
- 21. Plant diseases
- 22. Yoga awareness and practice
- 23. Health care awareness programmes and their impact
- 24. Use of chemicals on fruits and vegetables
- 25. Organic farming
- 26. Crop rotation
- 27. Flourey culture
- 28. Access to safe drinking water
- 29. Geographical survey
- 30. Geological survey
- 31. Sericulture
- 32. Study of species
- 33. Food adulteration
- 34. Incidence of Diabetes and other chronic diseases
- 35. Human genetics
- 36. Blood groups and blood levels
- 37. Internet Usage in Villages
- 38. Android Phone usage by different people
- 39. Utilisation of free electricity to farmers and related issues
- 40. Gender ration in schooling level-observation.

TIMELINE FOR THE COMMUNITY SERVICE PROJECT ACTIVITY

1. **Socio-Economic Survey of the Village/Habitation (Two weeks):** A group of students under the guidance of faculty mentors conduct a Socioeconomic Survey of the Village/habitation. They will interact with people to acquire basic knowledge on the project chosen for study and conduct the survey using a structured questionnaire.
2. **Community awareness campaign (one week):** The students group takes up community awareness campaigns based on the above survey conducted by identifying the problems or



3. vulnerable issues. They may also conduct house to house campaign on socially relevant theme. Ex: Government welfare programs, health care, consumer protection, food adulteration, digital transactions, information sources, etc.
4. **Main Project (4 weeks):** A group of students choose a topic related to their subject area and conduct a Project which includes, Data collection, interviews, internship in any select unit or department. **Report preparation (one week):** The student should submit a project report duly signed by the mentor.

ASSESSMENT METHODOLOGY FOR COMMUNITY SERVICE PROJECT

Learning outcomes: To facilitate an understanding of the issues that confronts the vulnerable / marginalized sections of the society. To initiate team processes with the student groups for societal change. To provide students an opportunity to familiarize themselves with urban / rural community they live in. To enable students to engage in the development of the community. To plan activities based on the focused groups. To know the ways of transforming the society through systematic programme implementation. The following is the evaluation methodology for awarding marks/grades.

The following is the evaluation methodology for awarding marks/grades.

There will be only internal evaluation for this internship. Each faculty member is to be assigned with 10 to 15 students depending upon availability of the faculty members. The faculty member will act as a faculty-mentor for the group and is in-charge for the learning activities of the students and also for the comprehensive and continuous assessment of the students.

The assessment is to be conducted for 100 marks. The number of credits assigned is 4. Later as per the present practice the marks are converted into grades and grade points to include finally in the SGPA and CGPA.

The weightings shall be:

- Project Log - 20%
- Project Implementation - 30%
- Project report - 25%
- Presentation - 25%

Each student is required to maintain an individual logbook, where he/she is supposed to record day to day activities. The project log is assessed on an individual basis, thus allowing for individual members within groups to be assessed this way. The assessment will take into consideration the individual student's involvement in the assigned work.

While grading the student's performance, using the student's project log, the following should be taken into account –

- a. The individual student's effort and commitment.
- b. The originality and quality of the work produced by the individual student.
- c. The student's integration and co-operation with the work assigned.
- d. The completeness of the logbook

The assessment for the CSP implementation shall include the following components and based on the entries of Project Log and Project Report:

- a. Orientation to the community development
- b. Conducting a baseline assessment of development needs
- c. Number and Quality of Awareness Programmes organised on beneficiary programmes and improvement in quality of life, environment and social consciousness, motivation and leadership, personality development, etc.
- d. Number and Quality of Intervention Programmes (Prevention or promotion programs that aim to promote behavioral change in defined community contexts to address social problems) organized.



- e. Follow-up Programmes suggested (Referral Services, Bringing Community Participation)
- f. Developing short and mid-term action plans in consultation with local leadership and local government officers.

The Project Report shall be prepared as per the guidelines given in the Model Project Report. The Project Presentation is to be made by the student after he/she reports back to the College. The components for assessment are –

- a. assessing the involvement in the project
- b. presentation skills
- c. final outcome of the project as evinced by the student.

Name of the Student:	X. YY ZZZ	
Class & Year of Study	II B.A. 2021 - 2022	
Registered Number	000000	
Assessment Component	Max Marks	Marks Secured
1. Project Log	20	15
2. Project Implementation	30	20
3. Project Report	25	20
4. Presentation	25	20
TOTAL OUT OF 100	100	75

MODEL OF THE PROJECT REPORT

PART – A

1. Introduction: A about the Village / Habitation.
2. Socio-Economic Survey of the Village/Habitation. A. Data collection using prescribed formats.
3. Problems identified and Analyses of the problems.
4. Short-term and long term action plan for possible solutions for the problems identified and that could be recommended to the concerned authorities for implementation.
5. Community awareness programmes conducted w.r.t the problems and their outcomes.

PART - B

A mini-project work in the related subject w.r.t the habitation/village. (For ex., a student of Botany may do a project on Organic Farming or Horticulture or usage of biofertilisers or bio-pesticides or effect of the inorganic pesticides, etc. A student of Zoology may do a project on Aquaculture practices or animal husbandry or poultry or health and hygiene or Blood group analysis or survey on the Hypertension or survey on the prevalence of diabetes, etc.

PART - C

1. Recommendations and conclusions.
2. References



III B. Tech– VI Semester					
Course Code	DESIGN OF STEEL STRUCTURES	L	T	P	C
23CIV361T		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the properties, types, and applications of structural steel in construction.
2. **Analyze** the behavior and design of bolted and welded connections for steel structures.
3. **Design** tension and compression members, including built-up members and column bases.
4. **Develop** steel structural elements such as beams, plate girders, roof trusses, and gantry girders.
5. **Apply** plastic analysis concepts to the design of continuous beams and portal frames.

UNIT– I INTRODUCTION TO STRUCTURAL STEEL and DESIGN OF CONNECTIONS

General -Types of Steel -Properties of Structural Steel - I.S. Rolled Sections - Concept of Limit State Design - Design of Simple and Eccentric Bolted and Welded Connections - Types of Failure and Efficiency of Joint -- Introduction to HSFG bolts-Prying Action.

UNIT– II DESIGN OF TENSION AND COMPRESSION MEMBERS

Behavior and Design of Simple and Built-Up Members Subjected to Tension - Shear Lag Effect Design of Lug Angles - Tension Splice - Behavior of Short and Long Columns - Euler's Column Theory Design of Simple and Built-Up Compression Members with Lacing and Battens - Design of Column Bases - Slab Base and Gusseted Base.

UNIT– III DESIGN OF BEAMS

Design of Laterally Supported and Unsupported Beams - Design of Built-Up Beams - Design of Girders.

UNIT– IV INDUSTRIAL STRUCTURES

Design of Roof Trusses – Loads On Trusses – Purlin Design Using Angle and Channel Sections – Truss Design, Design of Joints and End Bearings–Design of Gantry Girder - Introduction to Pre-Engineered Buildings.

UNIT– V**PLASTIC ANALYSIS AND DESIGN**

Introduction to Plastic Analysis - Theory of Plastic Analysis - Design of Continuous Beams and Portal Frames Using Plastic Design Approach.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO1	Apply estimation techniques to prepare detailed estimates for various construction projects.	PO1, PO2, PO3
CO2	Develop abstract estimates and rate analysis for different civil engineering works.	PO1, PO2, PO3
CO3	Analyze the preparation of measurement books and bill preparation as per AP State Government procedures.	PO1, PO2, PO3, PO4
CO4	Create detailed specifications and tender documents for construction projects.	PO1, PO2
CO5	Assess building valuation, cost escalation, and value analysis techniques.	PO1, PO2, PO3, PO4



TEXT BOOKS:

1. Duggal S.K., Design of Steel Structures, Tata McGraw Hill, Publishing Co. Ltd., New Delhi, 2010
2. Bhavikatti S.S, Design of Steel Structures, Ik International Publishing House, New Delhi, 2017.

REFERENCE BOOKS:

1. Gambhir M L, Fundamentals of Structural Steel Design, McGraw Hill Education India Pvt Limited, 2013
2. Jack C. McCormac & Stephen F. Cernak - Structural Steel Design, Pearson, 7th Edition, 2023.
3. William T. Segui & Farid Soleimani - Steel Design, Cengage, 7th Edition, 2023.
4. Sarwar Alam Raz, Structural Design in Steel, New Age International Publishers, 2014
5. Subramanian N, Design of Steel Structures, Oxford University Press, New Delhi, 2016

ONLINE LEARNING RESOURCES

<https://nptel.ac.in/courses/105105162>

CO-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	PS O1	PS O2
CO-1	3	2	2	2	1	1	1	-	1	-	2	2	2	2
CO-2	3	2	2	2	1	1	1	-	1	-	2	2	1	1
CO-3	3	2	2	2	1	-	-	-	1	-	2	2	2	1
CO-4	3	2	2	2	1	-	-	-	1	-	2	2	1	1
CO-5	3	2	2	2	1	-	-	-	1	-	2	2	2	2



III B. Tech– VI Semester					
Course Code	ENVIRONMENTAL ENGINEERING	L	T	P	C
23CIV362T		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. Understand the sources, demand estimation, and quality parameters of water.
2. Apply water treatment processes for purification and supply.
3. Analyze storage, distribution, and operation of water supply systems.
4. Design sewerage systems, stormwater drainage, and plumbing networks.
5. Evaluate sewage treatment, sludge management, and water reuse methods.

UNIT– I WATER SUPPLY

Estimation of Surface and Subsurface Water Resources - Predicting Demand for Water- Impurities of Water and Their Significance - Physical, Chemical and Bacteriological Analysis

- Waterborne Diseases - Standards for Potable Water. Intake of Water: Pumping and Gravity Schemes- Water Safety Plans (WHO recommended) – important in smart water management.

UNIT– II WATER TREATMENT

Objectives - Unit Operations and Processes - Principles, Functions, and Design of Water Treatment Plant Units, Aerators of Flash Mixers, Coagulation and Flocculation – Clariflocculator- Plate and Tube Settlers - Pulsator Clarifier - Sand Filters - Disinfection - Softening, Removal of Iron and Manganese - Defluorination- Softening - Desalination Process - Residue Management - Construction, Operation and Maintenance Aspects.

UNIT– III WATER STORAGE AND DISTRIBUTION

Storage and Balancing Reservoirs - Types, Location and Capacity. Distribution System: Layout, Hydraulics of Pipe Lines, Pipe Fittings, Valves Including Check and Pressure Reducing Valves, Meters, Analysis of Distribution Systems, Leak Detection, Maintenance of Distribution Systems, Pumping Stations and Their Operations - House Service Connections.

UNIT– IV PLANNING AND DESIGN OF THE SEWERAGE SYSTEM

Characteristics and Composition of Sewage - Population Equivalent - Sanitary Sewage Flow Estimation - Sewer Materials - Hydraulics of Flow in Sanitary Sewers - Sewer Design - Storm Drainage-Storm Runoff Estimation - Sewer Appurtenances - Corrosion in Sewers - Prevention and Control – Sewage Pumping-Drainage in Buildings - Plumbing Systems for Drainage- Stormwater Harvesting & Urban Flood Mitigation principles.

UNIT– V SEWAGE TREATMENT AND DISPOSAL

Objectives - Selection of Treatment Methods - Principles, Functions, - Activated Sludge Process and Extended Aeration Systems - Trickling Filters - Sequencing Batch Reactor (SBR)

- UASB - Waste Stabilization Ponds - Other Treatment Methods - Reclamation and Reuse of Sewage - Recent Advances in Sewage Treatment - Construction, Operation and Maintenance Aspects. - Discharge Standards-Sludge Treatment -Disposal of Sludge.

**COURSE OUTCOMES:**

Upon successful completion of this course, students will be able to:		POs related to COs
CO1	Explain water sources, quality standards, and waterborne diseases.	PO1, PO2, PO3
CO2	Design unit processes of water treatment plants.	PO1, PO2, PO3
CO3	Analyze water distribution networks and pumping stations.	PO1, PO2, PO3, PO4
CO4	Design sewerage systems, including stormwater and sanitary sewers.	PO1, PO2
CO5	Assess sewage treatment methods and advanced wastewater management techniques	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Environmental Engineering by H. S Peavy, D. R. Rowe, G. Tchobanoglous, McGraw Hill Education (India) Pvt Ltd, 2014
2. Environmental Engineering, I and II by BC Punmia, Std. Publications.

REFERENCE BOOKS:

1. Environmental Engineering, I and II by SK Garg, Khanna Publications.
2. Environmental Pollution and Control Engineering CS Rao, Wiley Publications
3. Waste water engineering by Metcalf and Eddy, McGraw Hill, 2015.
4. Environmental Engineering by D. P. Sincero and G.A Sincero, Pearson 2015.
5. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr. Wiley, 2007.

ONLINE LEARNING RESOURCES

<https://nptel.ac.in/courses/103107084>

CO-MAPPING

Cours e Outco mes	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	PO 7	P O 8	P O 9	P O 10	P O 11	P O 12	PS O1	PS O2
CO-1	3	2	2	1	-	3	3	1	-	1	-	2	3	3
CO-2	3	3	3	2	2	2	2	1	-	-	-	1	3	3
CO-3	3	3	3	2	2	2	3	1	-	-	-	1	3	3
CO-4	3	3	3	2	2	2	3	1	-	-	-	1	3	3
CO-5	2	2	2	1	3	3	3	1	-	1	1	2	2	2



III B. Tech– VI Semester					
Course Code	HIGHWAY ENGINEERING	L	T	P	C
23CIV363T		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the history, importance, and planning aspects of highway development in India.
2. **Apply** geometric design principles for highway alignment, sight distance, and curves.
3. **Analyze** traffic characteristics, capacity, level of service, and road safety measures.
4. **Design** flexible and rigid pavements using IRC guidelines.
5. **Evaluate** highway construction materials, testing methods, and maintenance techniques.

UNIT– I PLANNED HIGHWAY DEVELOPMENT IN INDIA

Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment Factors affecting Alignment- Engineering Surveys – PM Gati Shakti, NHDP (National Highways Development Project)– under current highway development initiatives- Drawings and Reports

UNIT– II GEOMETRIC DESIGN of HIGHWAYS

Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves- Design of Vertical Alignment- Gradients Vertical curves.

UNIT– III TRAFFIC ENGINEERING STUDIES

Basic Parameters of Traffic- Volume, Speed and Density – Definitions and their inter relation – Highway capacity and level of service concept – factors affecting capacity and level of service - Traffic Volume Studies- Data Collection and Presentation- Speed studies- Data Collection and Presentation- - Road Accidents- Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams.

UNIT– IV INTERSECTION DESIGN

Conflicts at Intersections- Channelization: Objectives – Traffic Islands and Design criteria Types of At-Grade Intersections – Types of Grade-Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersections- Intelligent Transportation Systems (ITS) – Pedestrian and cyclist safety at intersections.

UNIT– V PAVEMENT DESIGN

Types of Pavements – Difference Between Flexible and Rigid Pavements – Pavement Components – Sub Grade, Sub Base, Base and Wearing Course – Functions of Pavement Components – Design Factors – Flexible Pavement Design Methods – G.I Method, CBR Method, (As Per IRC 37-2018) – Design of Rigid Pavements – Critical Load Positions - Westergard's Stress Equations – Computing Radius of Relative Stiffness and Equivalent Radius of Resisting Section – Stresses in Rigid Pavements – Design of Expansion and Contraction Joints in CC Pavements. Design of Dowel Bars and Tie Bars.

**COURSE OUTCOMES:**

Upon successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the significance, planning, and alignment of highways.	PO1, PO2, PO3
CO2	Design geometric elements of highways, including curves, gradients, and sight distances.	PO1, PO2, PO3
CO3	Analyze traffic flow, capacity, level of service, and implement road safety measures.	PO1, PO2, PO3, PO4
CO4	Design flexible and rigid pavements as per IRC guidelines.	PO1, PO2
CO5	Assess construction practices, highway materials, and pavement maintenance techniques.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Highway Engineering – S.K. Khanna & C.E.G. Justo, Nemchand & Bros., 9th edition (2011).
2. Transportation Engineering, Volume I, C Venkat Ramaiah, Universities Press, 2015

REFERENCE BOOKS:

1. Principles of Highway Engineering by L.R. Kadiyali, Khanna Publishers
2. Traffic Engineering and Transportation Planning by L.R. Kadiyali and Lal- Khanna Publications 9th edition
3. Highway Engineering – Dr. S.K. Sharma, S. Chand Publishers 2014 edition Code books:
4. -IRC codes IRC:37-2018 used for classification and planning (IRC SP: 30, IRC: 73).
5. IRC:37-2002 with IRC:37-2018 used for the latest flexible pavement design guideline (IRC SP: 30, IRC: 73)

ONLINE LEARNING RESOURCES

<https://nptel.ac.in/courses/105101087>

CO-MAPPING

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO-1	3	2	2	1	-	-	-	-	-	1	-	2	3	2
CO-2	3	3	3	2	2	-	-	-	-	-	-	1	3	3
CO-3	3	3	3	2	2	-	2	1	-	-	-	1	3	3
CO-4	3	3	3	2	2	-	2	1	-	-	-	1	3	3
CO-5	2	2	2	1	3	-	3	1	-	1	1	2	2	2



III B. Tech- VI Semester					
Course Code	DESIGN OF EARTHQUAKE RESISTANT STRUCTURES (PE- II)			L	T
23CIV364A				3	0

Course Objectives:

The objectives of this course are to make the student to:

1. Understand the fundamental concepts of engineering seismology, including earthquake phenomena, seismic waves, and measuring instruments.
2. Analyze the principles of structural vibrations, degrees of freedom, and dynamic response of structures to earthquake ground motions.
3. Evaluate conceptual design strategies, seismic design principles, and methods for improving earthquake resistance in structures.
4. Apply earthquake-resistant design principles to reinforced concrete and masonry buildings using IS codes and lateral force methods.
5. Assess the role of structural walls, non-structural elements, and ductility considerations in enhancing earthquake resistance.

UNIT- I Engineering Seismology: Earthquake Phenomenon - Cause of Earthquakes-Faults- Plate Tectonics- Seismic Waves- Terms Associated with Earthquakes-Magnitude/Intensity of An Earthquake-Scales- Energy Released-Earthquake Measuring Instruments Seismogram - Seismoscope, Seismograph, - Strong Ground Motions- Seismic Zones of India.

Theory of Vibrations: Elements of A Vibratory System- Degrees of Freedom-Continuous System- Lumped Mass Idealization-Equation of motion Oscillatory Motion-Simple Harmonic Motion-Free Vibration of Single Degree of Freedom (SDOF) System- Undamped and Damped-Critical Damping- Logarithmic Decrement-Forced Vibrations-Harmonic Excitation- Dynamic Magnification Factor- Excitation by Rigid Based Translation for SDOF System- Earthquake Ground Motion.

UNIT- II Conceptual Design: Introduction-Functional Planning-Continuous Load Path-Overall form- Simplicity and Symmetry-Elongated Shapes-Stiffness and Strength-Horizontal and Vertical Members-Twisting of Buildings-Ductility-Ductility Relationships-Flexible Buildings- Framing Systems- Choice of Construction Materials-Unconfined Concrete-Confined Concrete-Masonry-Reinforcing Steel.

Introduction to Earthquake Resistant Design: Seismic Design Requirements-Regular and Irregular Configurations-Basic Assumptions-Design Earthquake Loads-Basic Load Combinations- Permissible Stresses-Seismic Methods of Analysis-Factors in Seismic Analysis- Equivalent Lateral force Method.

UNIT- III Reinforced Concrete Buildings: Principles of Earthquake Resistant Design of RC Members- Structural Models for Frame Buildings - Seismic Methods of Analysis- Is Code Based Methods for Seismic Design - Vertical Irregularities - Plan Configuration Problems- Lateral Load Resisting Systems-Determination of Design Lateral forces as Per Is 1893 (Part- 1):2016-Equivalent Lateral force Procedure- Lateral Distribution of Base Shear



UNIT- IV Masonry Buildings: Introduction- Elastic Properties of Masonry Assemblage- Categories of Masonry Buildings- Behavior of Unreinforced and Reinforced Masonry Walls- Behavior of Walls-Box Action and Bands- Behavior of Infill Walls- Improving Seismic Behavior of Masonry Buildings-Load Combinations and Permissible Stresses- Seismic Design Requirements- Lateral Load Analysis of Masonry Buildings.

UNIT- V Structural Walls and Non-Structural Elements: Strategies in The Location of Structural Walls- Sectional Shapes- Variations in Elevation- Cantilever Walls Without Openings – Failure Mechanism of Non-Structures- Effects of Non-Structural Elements On Structural System- Analysis of Non-Structural Elements- Prevention of Non-Structural Damage Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction- Impact of Ductility- Requirements for Ductility- Assessment of Ductility- Factors Affecting Ductility- Ductile Detailing Considerations as Per IS 13920-2016- Behaviour of Beams, Columns and Joints in RC Buildings During Earthquakes

COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Explain earthquake mechanisms, seismic waves, and seismic zones, including measuring techniques and instruments.	PO1, PO2, PO3
CO2	Analyze vibratory systems, single-degree-of-freedom (SDOF) models, damping effects, and earthquake-induced dynamic forces.	PO1, PO2, PO3
CO3	Evaluate conceptual design strategies, ductility factors, and seismic design methods for ensuring structural resilience.	PO1, PO2, PO3, PO4
CO4	Apply IS code provisions and lateral force methods for seismic design of reinforced concrete and masonry buildings.	PO1, PO2
CO5	Assess the significance of structural walls, non-structural elements, and ductile detailing in enhancing earthquake resistance.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS:

- 1 Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons.
2. Earthquake Resistant Design of building structures by Vinod Hosur, Wiley India Pvt. Ltd.
3. Elements of Mechanical Vibration by R.N. Iyengar, I.K. International Publishing House Pvt. Ltd.
4. Masonry and Timber structures including earthquake Resistant Design – Anand S. Arya, Nemchand & Bros
5. Earthquake Tips – Learning Earthquake Design and Construction, C.V.R. Murthy
6. BIS Codes: 1. IS 1893(Part-1):2016 or Latest codes; 2. IS 13920:2016. 3. IS 4326. 4. IS 456:2000 or latest.



ONLINE LEARNING RESOURCES

<https://nptel.ac.in/courses/105107204>

CO-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	PS O1	PS O2
CO-1	3	2	-	-	1	-	3	1	-	2	-	2	2	2
CO-2	3	-	-	-	2	-	3	1	-	2	-	-	-	2
CO-3	3	-	-	3	-	-	3	2	-	2	-	-	-	3
CO-4	3	2	-	3	-	-	3	2	-	2	2	2	3	3
CO-5	3	3	-	3	-	-	3	2	-	2	2	2	3	3



III B. Tech– VI Semester					
Course Code	OPEN CHANNEL FLOW (PE-II)	L	T	P	C
23CIV364C		0	0	0	3

Course Objectives (COs):

The objectives of this course are to make the student to:

1. Explain the principles governing fluid flow in pipelines and networks, including steady and unsteady flow conditions.
2. Apply fundamental concepts of uniform and varied flow in open channels for analyzing hydraulic structures and networks.
3. Analyze the behavior of unsteady flows in open channels, including wave motion and dam break scenarios.
4. Evaluate sediment transport mechanisms and their impact on hydraulic structures, reservoirs, and river morphology.
5. Design and assess hydraulic models, flow measurement devices, and physical models for hydraulic applications

UNIT– I HYDRAULICS OF PIPELINES AND PIPE NETWORKS

Review of Fluid Mechanics. Reynolds Transport Theorem and Applications. Steady Flow Analysis of Pipe Network Systems. Unsteady Flows - Basic Equations of Water Hammer, Solution By Method of Characteristics. Network Analysis

UNIT– II STEADY VARIED FLOWS IN OPEN CHANNELS

Basic Concepts of Uniform Flow. Specific Energy and Specific force Concepts. Dynamic Equation for Spatially Varied Flows. Flow Profile Computations. Introduction to Hec-Ras. Spatially Varied Flows and Rapidly Varied Flows – Applications.

UNIT– III UNSTEADY FLOWS IN OPEN CHANNELS

Equations of Motion. Uniformly Progressive Wave. Rapidly Varied Unsteady Flow – Positive and Negative Surges. Dam Break Problem

UNIT– IV SEDIMENT TRANSPORT

Sediment Properties – Inception of Sediment Motion – Bed forms. Bed Load Suspended Load – total Sediment Transport. Design of Stable Channels and Regime Channels. Reservoir Sedimentation and Trap Efficiency

UNIT– V FLOW MEASUREMENTS and HYDRAULIC MODELING

Sharp-Crested Weirs, Broad-Crested Weirs, Critical Depth Flumes. Recent Advancement in Open Channel Flow Measurements. Physical Modeling in Hydraulics. Dimensional Analysis. Modeling Closed Flows and Free Surface Flows. Distorted Models. Design of Physical Models.

**COURSE OUTCOMES:**

After successful completion of this course, students will be able to:		POs related to COs
CO1	Describe the fundamental principles of fluid flow in pipelines and networks under steady and unsteady conditions.	PO1, PO2, PO3
CO2	Solve problems related to uniform and varied flow in open channels using theoretical and computational approaches.	PO1, PO2, PO3
CO3	Analyze the impact of unsteady flow phenomena such as surges and dam breaks in open channels.	PO1, PO2, PO3, PO4
CO4	Evaluate sediment transport processes and their influence on river morphology and hydraulic structures.	PO1, PO2
CO5	Develop and validate hydraulic models for flow measurement and physical modeling applications in fluid mechanics.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Flow in Open Channels, Subramanya K., Tata McGraw Hill Pub., N Delhi 2015
2. Flow through Open Channels, Rajesh Srivastava, Oxford Univ. Press. N Delhi, 2011
3. Open Channel Hydraulics, Chow, V.T., Mc Graw Hill Inc. NY, 1979.

REFERENCE BOOKS:

1. Open Channel Hydraulics, French, R.H., McGraw Hill Pub Co., NY, 1986
2. Open Channel Hydraulics, Terry Sturm, Tata McGraw Hill Pub. N Delhi, 2011

ONLINE LEARNING RESOURCES

<https://nptel.ac.in/courses/105/106/105106114/>

CO-MAPPING

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO-1	3	2	-	-	-	-	-	-	-	-	-	-	2	-
CO-2	3	2	2	1	2	-	-	-	-	-	-	-	2	1
CO-3	2	3	2	2	2	-	-	-	-	-	-	-	3	2
CO-4	2	3	3	3	2	-	-	-	-	-	-	-	3	3
CO-5	2	2	3	3	3	2	-	-	-	-	-	-	3	3



III B. Tech– VI Semester					
Course Code	FOUNDATION ENGINEERING (PE – II)	L	T	P	C
23CIV364B		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the need for soil exploration and various methods used in site investigations.
2. **Analyze** the stability of slopes under different conditions using various stability methods.
3. **Apply** earth pressure theories to analyze retaining walls and soil pressures.
4. **Evaluate** the bearing capacity and settlement characteristics of shallow foundations.
5. **Assess** the load-carrying capacity and settlement of deep foundations, including pile and well foundations.

UNIT– I SOIL EXPLORATION: Need – Methods of Soil Exploration – Boring and Sampling Methods – Field Tests – Penetration Tests – Plate Load Test – Pressure Meter – Planning of Programme and Preparation of Soil Investigation Report.

UNIT– II SHALLOW FOUNDATIONS: Types – Choice of Foundation – Location of Depth – Safe Bearing Capacity – Terzaghi's, Meyerhoff's and Skempton Methods

ALLOWABLE BEARING PRESSURE: Safe Bearing Pressure Based On N- Value – Allowable Bearing Pressure; Safe Bearing Capacity and Settlement from Plate Load Test – Allowable Settlements of Structures – Settlement Analysis.

UNIT– III PILE FOUNDATION: Types of Piles – Load Carrying Capacity of Piles Based on Static Pile formulae – Dynamic Pile formulae – Pile Load Tests – Load Carrying Capacity of Pile Groups in Sands and Clays – Settlement of Pile Groups

WELL FOUNDATIONS: Types – Different Shapes of Wells – Components of Wells – Functions and Design Criteria – Sinking of Wells – Tilts and Shifts

UNIT– IV EARTH SLOPE STABILITY: Infinite and Finite Earth Slopes – Types of Failures – Factor of Safety of Infinite Slopes – Stability Analysis by Swedish Arc Method, Standard Method of Slices, Bishop's Simplified Method – Taylor's Stability Number- Stability of Slopes of Earth Dams Under Different Conditions.

UNIT– V EARTH PRESSURE THEORIES: Rankine's Theory of Earth Pressure – Earth Pressures in Layered Soils – Coulomb's Earth Pressure Theory – Rebhann's and Cullman's Graphical Method
RETAINING WALLS: Types of Retaining Walls – Stability of Retaining Walls

COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the principles of soil exploration, field testing, and soil investigation reporting.	PO1, PO2, PO3
CO2	Analyze slope stability using different failure theories and numerical methods.	PO1, PO2, PO3
CO3	Apply earth pressure theories to determine the stability of retaining walls.	PO1, PO2, PO3, PO4
CO4	Evaluate the bearing capacity and settlement of shallow foundations using theoretical and field methods.	PO1, PO2
CO5	Analyze deep foundations, including pile and well foundations, for their load-carrying capacity and settlement.	PO1, PO2, PO3, PO4

**TEXT BOOKS:**

1. Geotechnical Engineering by C. Venkata Ramaiah, New Age Publications (2002).
2. Soil Mechanics and Foundation Engineering by Arora, Standard Publishers and Distributors, Delhi 7th edition 2009
3. Soil Mechanics and Foundations by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi publications Pvt. Ltd., New Delhi 17th edition 2017.

REFERENCE BOOKS:

1. Soil Mechanics and Foundation Engineering by Purushottam Raj, Pearson Publications 2nd edition 2013
2. Principles of Foundation Engineering by Das, B.M., - (1999)-6th edition (Indian edition) Thomson Engineering
3. Foundation Engineering by Varghese, P.C., Prentice Hall of India., New Delhi.
4. Foundation Engineering by V.N.S. Murthy, CRC Press, New Delhi.
5. Foundations of Engineering Geology by Tony Waltham, Spon press 3rd edition

ONLINE LEARNING RESOURCES

<https://nptel.ac.in/courses/105105176>

CO-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	PS O1	PS O2
CO-1	2	1	1	-	-	1	-	-	-	1	-	1	1	1
CO-2	2	2	1	1	2	-	-	-	-	-	-	1	1	1
CO-3	2	2	3	2	2	-	1	-	-	-	-	1	2	2
CO-4	2	1	2	2	3	1	-	-	-	-	-	1	2	1
CO-5	2	2	2	1	2	1	-	-	-	-	-	1	2	1



23CIV364D	REPAIR AND REHABILITATION OF STRUCTURES	L	T	P	C
		3	-	-	3

PRE-REQUISITES: A Course on Concrete Technology.

COURSE EDUCATIONAL OBJECTIVES:

1. To discuss quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures,
2. To explain the aspects of quality of concrete
3. To know the special concreting methods in repairing works
4. To study the techniques for repairing of structures.
5. To study the demolition techniques and procedures.

UNIT I: MAINTENANCE AND REPAIR STRATEGIES (9)

Maintenance-Repair and Rehabilitation-Facets of Maintenance-importance of Maintenance-Various aspects of Inspection-Assessment procedure for evaluating damaged structure-causes of deterioration.

UNIT II: STRENGTH AND DURABILITY OF CONCRETE (9)

Quality assurance for concrete – Strength-Durability and Thermal properties of concrete - Cracks, different types, causes – Effects due to climate, temperature, Sustained elevated temperature, Corrosion -Effects of cover thickness.

UNIT III: ADVANCED SPECIAL CONCRETES (9)

Polymer concrete-Sulphur infiltrated concrete-Fiber reinforced concrete-High strength concrete- High performance concrete-Vacuum Concrete-Self compacting concrete-Geopolymer concrete- Reactive powder concrete-Concrete made with industrial wastes.

UNIT IV: TECHNIQUES FOR REPAIR, REHABILITATION AND RETROFITTING OF STRUCTURES (12)

Non-destructive Testing Techniques-Epoxy Injection-Shoring-Underpinning-Corrosion protection techniques-Corrosion Inhibitors-Corrosion resistant steels-Coatings to reinforcement cathodic protection. Strengthening of Structural elements, Repair of structures distressed due to corrosion, fire, leakage, and earthquake.

UNIT V: DEMOLITION TECHNIQUE (6)

Demolition techniques - Engineered demolition methods - Case studies.

Total Hours: 45

[illegible]



III B. Tech– VI Semester					
Course Code	COST EFFECTIVE	L	T	P	C
23CIV365B	HOUSINGTECHNIQUES (PE – III)	3	0	0	3

Course Objectives (COs):

The objectives of this course are to make the student to:

1. Analyze the housing scenario in urban and rural areas, including challenges in housing finance and urban planning.
2. Explore and evaluate innovative low-cost housing technologies for sustainable construction.
3. Investigate alternative building materials and infrastructure services for cost-effective housing solutions.
4. Assess rural housing techniques, including traditional mud housing, soil stabilization, and fire treatment for roofing.
5. Develop strategies for housing in disaster-prone areas, with a focus on earthquake, cyclone, and flood-resistant construction.

UNIT– I a) Housing Scenario: Introducing - Status of Urban Housing - Status of Rural Housing **b)**

Housing Finance: Introducing - Existing Finance System in India - Government Role as Facilitator - Status at Rural Housing Finance – Impediment In Housing Finance and Related Issues

c) Land Use and Physical Planning for Housing: Introduction - Planning of Urban Land - Urban Land Ceiling and Regulation Act - Efficiency of Building Bye Law - Residential Densities

d) Housing the Urban Poor: Introduction - Living Conditions in Slums - Approaches and Strategies for Housing Urban Poor.

UNIT– II Development and adoption of low-cost Resilient housing technology

Introduction - Adoption of Innovative Cost-Effective Construction Techniques - Adoption of Precast Elements in Partial Prefabrication- Adopting of total Prefabrication of Mass Housing in India- General Remarks On Pre Cast Roofing/Flooring Systems -Economical Wall System

- Single Brick Thick Load Bearing Wall - 19cm Thick Load Bearing Masonry Walls - Half Brick Thick Load Bearing Wall – Fly-Ash Gypsum Thick for Masonry - Stone Block Masonry - Adoption of Precast R.C. Plank and Join System for Roof/Floor in The Building

UNIT– III Alternative Building Materials for Low-Cost Housing

Introduction - Substitute for Scarce Materials – Ferro-Cement - Gypsum Boards - Timber Substitutions - Industrial Wastes - Agricultural Wastes - Alternative Building Maintenance **Low-Cost**

Infrastructure Services: Introduction - Present Status - Technological Options - Low-Cost Sanitation - Domestic Water - Water Supply, Energy

UNIT– IV Rural Housing: Introduction Traditional Practice of Rural Housing Continuous - Mud Housing Technology Mud Roofs - Characteristics of Mud - Fire Treatment for Thatch Roof - Soil Stabilization - Rural Housing Program



UNIT- V Housing in Disaster prone areas: Introduction – Earthquake - Damages to Houses - Traditional Prone Areas - Type of Damages and Repairs of Non-Engineered Buildings - Repair and Restore Action of Earthquake Damaged Non-Engineered Buildings Recommendations for Future Constructions. Requirement 'sOf Structural Safety of Thin Precast Roofing Units Against Earthquake Forces Status of R&D in Earthquake Strengthening Measures - Floods, Cyclone, Future Safety.

COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Examine the current status of urban and rural housing and analyze the role of finance and planning in housing development.	PO1, PO2, PO3
CO2	Evaluate and recommend cost-effective construction techniques, including prefabrication and innovative roofing/flooring systems.	PO1, PO2, PO3
CO3	Assess the feasibility of alternative building materials and infrastructure solutions for low-cost housing.	PO1, PO2, PO3, PO4
CO4	Analyze traditional rural housing methods and propose modern techniques for improving rural housing quality.	PO1, PO2
CO5	Design housing solutions for disaster-prone areas by incorporating earthquake, cyclone, and flood-resistant strategies.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Building materials for low – income houses – International council for building research studies and documentation.
2. Hand book of low-cost housing by A.K. Lal – Newage international publishers.
3. Low-cost Housing – G.C. Mathur by South Asia Books

REFERENCE BOOKS:

1. Properties of concrete – Neville A.m. Pitman Publishing Limited, London.
2. Light weight concrete, Academic Kiado, Rudhai.G – Publishing home of Hungarian Academy of Sciences 1963.
3. Modern trends in housing in developing countries – A.G. Madhava Rao, D.S. Rama chandra Murthy & G. Annamalai. E. & F. N. Spon Publishers

ONLINE LEARNING RESOURCES

<https://nptel.ac.in/courses/124107001>

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO-1	3	2	1	2	-	2	2	-	-	1	-	1	2	2
CO-2	3	3	2	3	2	-	3	-	-	-	-	2	3	2
CO-3	3	2	3	3	2	-	3	-	-	-	-	2	3	3
CO-4	2	3	3	3	2	2	2	-	-	-	-	2	3	3
CO-5	2	3	3	3	3	3	3	-	-	-	-	2	3	3



III B. Tech– VI Semester					
Course Code	WATERSHED MANAGEMENT (PE – III)	L	T	P	C
23CIV365D		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the concept of watershed management, stakeholder roles, pollution sources, and environmental guidelines for water quality.
2. **Analyze** soil erosion processes, sediment yield, and wetland hydrology, including the role of water in wetland ecosystems.
3. **Evaluate** surface water and groundwater interactions, wetland water quality, and hydrological models for effective watershed planning.
4. **Apply** principles of wetland hydrologic assessment, water harvesting, and watershed treatment system design to real-world scenarios.
5. **Assess** irrigation planning, participatory water management, and water footprint concepts to ensure sustainable water resource utilization.

UNIT– I

Concept of Watershed, Introduction to Watershed Management, Different Stakeholders and Their Relative Importance, Watershed Management Policies and Decision Making, Watershed Management Practices in Arid and Semiarid Regions, Short Term and Long Term Strategic Planning, Types and Sources of Pollution, Environmental Guidelines for Water Quality, Perspective On Recycle and Reuse

UNIT– II

Morphometry, Soil Erosion - Erosion - Factors Affecting Erosion, Effects of Erosion On Land Fertility and Land Capability, Soil Erosion Modelling, Erosivity and Erodibility - Sediment Yield and Sedimentation- Wetland Definitions and The Role of Water in Wetland Structure and Function, Introduction to Wetland Water Budgets and Hydro-Period Components of The Water Budget: Inflows, Outflows, and Storage, Precipitation and Runoff, Evapotranspiration;

UNIT– III

Surface Water Flows: Structures and Channels, Groundwater-Surface Water Exchange in Wetlands, Surface Water Flows II and Wetland Hydrology Case Studies, Flow and Mixing in Wetlands Wetland Water Quality Information: Nutrients, Organic/Inorganic Contaminants, Sediments and Colloids, Wetland Transport Models I: Plug Flow, Cstrs and Cstrs in Series; Intro to Method of Moments.

UNIT– IV

Wetland Hydrologic Assessment: Physical and Biological Processes, Anthropogenic and Climate Change Impacts On Wetland Hydrology, Modeling Wetland Hydrology, Hydraulics, and Hydrodynamics, Introduction to Wetland Treatment Systems Design - Water Harvesting: Rainwater Harvesting, Catchment Harvesting, Harvesting Structures - Model Watershed – Government and Ngo Projects.

**UNIT- V**

Rain Water Management. Planning and Operation of Irrigation Systems. Conjunctive Use of Water. Participatory Irrigation Management and Integrated Water Resources Management (IWRM), Water Management Policy During Droughts. Predicting Effect of Water Shortage on Crops. Introduction to Water Footprint of Crops and Its Applications. Blue, Green and Grey Water Foot Print.

COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Explain watershed management concepts, pollution control strategies, and environmental policies related to water quality.	PO1, PO2, PO3
CO2	Analyze erosion processes, wetland water budgets, and sediment transport models to assess land degradation and conservation needs.	PO1, PO2, PO3
CO3	Evaluate surface and groundwater interactions, wetland treatment efficiency, and hydrological models for integrated water resource management.	PO1, PO2, PO3, PO4
CO4	Apply water harvesting techniques, hydrologic modeling, and wetland design methods for sustainable watershed management.	PO1, PO2
CO5	Assess irrigation water management strategies, drought mitigation policies, and the role of water footprint in agricultural sustainability.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. T. O. Randhir, Watershed Management: Issues and Approaches, IWA Publishing, 2006
2. J. V. S. Murty, Watershed Management, New Age International, 2013

REFERENCE BOOKS:

1. D. K. Majumdar, Irrigation Water Management, Prentice Hall, 2014
2. K. N. Brooks, P. F. Folliott, J. A. Magner, Hydrology and the Management of Watersheds, Wiley-Blackwell, Fourth edition, 2012
3. E. M. Tideman, Watershed Management: Guidelines for Indian Conditions, Omega Scientific Publishers, 1996
4. R. Rajora, Integrated Watershed Management: Field Manual for Equitable, Productive and Sustainable Development, Rawat Publications, 2019

ONLINE LEARNING RESOURCES

<https://nptel.ac.in/courses/105101010>

<https://nptel.ac.in/courses/126105334>

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	2	2	2	1	2	3	1	-	2	-	2	2	2
CO-2	3	3	2	3	2	2	3	1	-	2	-	2	2	2
CO-3	3	3	3	3	3	2	3	2	-	2	-	2	3	3
CO-4	3	2	3	3	3	3	3	2	-	2	2	2	3	3
CO-5	3	3	3	3	3	3	3	2	-	2	2	2	3	3



III B. Tech– VI Semester					
Course Code	ADVANCED STRUCTURAL ANALYSIS (PE –III)	L	T	P	C
23CIV365A		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the fundamental concepts of arches, including three-hinged and two hinged arches, and analyze the effects of horizontal thrust, bending moment, normal thrust, and radial shear.
2. **Apply** the moment distribution method to analyze single-bay, single-story portal frames with and without side sway.
3. **Analyze** continuous beams and portal frames using Kani's Method, including cases with and without settlement of supports.
4. **Solve** structural problems using the flexibility method for continuous beams and single-bay portal frames, considering support settlements and side sway effects.
5. **Evaluate** the stiffness method for analyzing continuous beams and single-bay portal frames with and without side sway, ensuring structural stability and performance.

UNIT– I ARCHES: Three Hinged and Two Hinged Arches, Elastic Theory of Arches– Eddy's Theorem –Determination of Horizontal Thrust, Bending Moment, Normal Thrust and Radial Shear–Effect of Temperature–Determination of Horizontal Thrust Bending Moment, Normal Thrust and Radial Shear– Rib Shortening and Temperature Stresses.

UNIT– II MOMENT DISTRIBUTION METHOD FOR FRAMES: -Analysis of Single Bay Single Storey Portal Frame Including Sides Way–Substitute Frame Analysis By Two Cycle Method.

UNIT– III KANI'S METHOD: -

Analysis of Continuous Beams with and Without Settlement of Supports-Single Bay Single Storey Portal Frames with and Without Side Sway.

UNIT– IV FLEXIBILITY METHODS: -

Flexibility Methods- Introduction-Application to Continuous Beams Including Support Settlements— Analysis of Single Bay Single Storey Portal Frames Without and With Side Sway.

UNIT– V STIFFNESS METHODS:

Stiffness Methods – Introduction – Application to Continuous Beams Including Support Settlements – Analysis of Single Bay Single Storey Portal Frames Without and With Side Sway.



COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the behavior of three-hinged and two-hinged arches and analyze the effects of horizontal thrust, bending moment, normal thrust, and radial shear. (Bloom's Level: Understand - L2, Analyze - L4)	PO1, PO2, PO3
CO2	Apply the moment distribution method to analyze single-bay, single-story portal frames with and without side sway. (Bloom's Level: Apply - L3, Analyze - L4)	PO1, PO2, PO3
CO3	Analyze continuous beams and portal frames using Kani's Method, including cases with and without settlement of supports.	PO1, PO2, PO3, PO4
CO4	Solve structural problems using the flexibility method for continuous beams and single-bay portal frames, considering support settlements and side sway effects.	PO1, PO2
CO5	Evaluate the stiffness method for analyzing continuous beams and single-bay portal frames with and without side sway, ensuring structural stability and performance.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Analysis of structures by Vazrani & Ratwani– Khanna Publications.
2. Theory of structures by Ramamuratham, jain book depot , New Delhi.

REFERENCE BOOKS:

1. Structural analysis by R.S. Khurmi, S. Chand Publications, New Delhi.
2. Basic Structural Analysis by K.U. Muthu et al., I.K. International Publishing House Pvt. Ltd
3. Theory of Structures by Gupta SP, GSPundit and R Gupta, Vol II, Tata McGraw Hill Publications Company td.
4. D. S. Prakash Rao, —Structural Analysis: A Unified Approach, Universities Press

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/106/105106050/>

CO-MAPPING

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS 01	PS 02
CO-1	3	2	2	2	1	-	-	-	-	2	-	1	2	2
CO-2	3	3	2	2	2	-	-	-	-	2	-	2	2	2
CO-3	3	3	3	2	2	-	-	-	-	2	-	2	3	2
CO-4	3	2	3	3	3	-	-	-	-	2	1	2	3	3
CO-5	3	3	3	3	3	-	-	-	-	2	1	2	3	3



II B.Tech. - VI Semester

23CIV365C	REMOTE SENSING AND GIS	L	T	P	C
		3	-	-	3

PRE-REQUISITES: A Course on Surveying.

COURSE EDUCATIONAL OBJECTIVES:

1. To know the basics, importance, analysis and applications of RS and GIS
2. To study the various types of operating systems of RS and GIS
3. To know the applications of RS and GIS
4. To Gain experience in the applications of remote sensing and GIS to solving problems in the environmental and life sciences.
5. To Gain experience in the use of image processing and GIS software.

UNIT I: INTRODUCTION TO REMOTE SENSING (9)

Concept and scope of remote sensing: Definitions, Process and Characteristics of Remote Sensing System, Advantages, and limitations.

Concept of electromagnetic radiation (EMR): Wavelength-frequency-energy relationship of EMR, EMR Spectrum and its properties, EMR wavelength regions and their applications, Spectral signatures.

UNIT II: PLATFORMS AND SENSORS (9)

Introduction: Sensor materials, Sensor System - Framing and Scanning System, Whiskbroom scanners, Push-broom scanners.

Types and characteristics of sensor: Imaging and non-imaging sensors, Active and passive sensors, Resolution of Sensors - Spectral, Spatial, Radiometric & Temporal, Scale, Mapping unit, Multi-band concepts and False Colour Composites.

Remote sensor platforms and satellite orbits: Ground, Airborne and Space borne Platforms, Orbital Characteristics - Coverage, Passes, Pointing Accuracy, Geostationary, Sun synchronous, shuttle orbit.

Energy interaction in the atmosphere and with earth surface features: Scattering, absorption, transmission, atmospheric windows Spectral Reflectance Curve, Concept of signatures.

UNIT III: REMOTE SENSING APPLICATIONS (9)

Scope of Remote Sensing Applications - Potentials and Limitations. Applications in land use and land cover analysis. Resource evaluation - Soils, forest and agriculture. Water Resource Applications- Mapping, monitoring of surface water bodies, tanks, lakes/reservoirs. Environmental applications.

UNIT IV: GEOGRAPHIC INFORMATION SYSTEM (9)

Basic Concepts: Definition of GIS, Components of GIS, Variables - points, lines, polygon, Functionality of GIS, Areas of GIS application, Advantage and Limitation of GIS

**UNIT V: GIS DATA****(9)**

Spatial and Attribute Data, Information Organization and Data Structures – Raster and Vector data structures, Data file and database

Creating GIS Database: GIS Software's, file organization and formats, Geo-database, Database model, Rectification, Digitization and Map Composition

Total Hours: 45**COURSE OUTCOMES:**

On successful completion of the course, students will be able to		Pos
CO1	Explain the principles and applications of Remote Sensing and various types of platforms used in Remote Sensing.	PO1, PO2, PO3
CO2	Understand the principles of remote sensing and digital image processing;	PO1
CO3	Understand the principles of geographic information systems (GIS)	PO1, PO2, PO4
CO4	Gain experience in the applications of remote sensing and GIS to solving problems in the environmental and life sciences;	PO1, PO3
CO5	Gain experience in the use of image processing and GIS Software	PO3

TEXTBOOKS:

1. M. Anji Reddy, "Textbook of Remote Sensing and Geographic Information System", BS Publication.
2. Lo C.P. & Yeung A.K.W, "Concepts and Techniques of GIS", Prentice-Hall of India, New Delhi, 2004

REFERENCE BOOKS:

1. B.Bhatta, "Remote sensing and Geographic Information System", Oxford Publications.
2. Siddiqui, M.A., Sharda Pustak Bhavan, "Introduction to Geographical Information System", Allahabad, 2006
3. Paul J, Longman, "Principles of Remote Sensing", Curran, London, 1985.
4. Data User Handbook, NRSA, IRS, Hyderabad

REFERENCE WEBSITES:

<https://nptel.ac.in/courses/105/103/105103193/>

<https://nptel.ac.in/courses/105/108/105108077/>

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	1	2	2	-	-	-	-	-	-	-	-	-
CO.2	3	-	-	-	-	-	-	-	-	-	-	-
CO.3	1	2	-	2	-	-	-	-	-	-	-	-
CO.4	1	-	2	-	-	-	-	-	-	-	-	-
CO.5	-	-	2	-	-	-	-	-	-	-	-	-
CO*	1.5	2	2	2	-	-	-	-	-	-	-	-



23OEE361A	RENEWABLE ENERGY SOURCES	L	T	P	C
		3	-	-	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Describing the current energy scenario in terms of renewable energy plan.
2. To describe the solar energy sources for electricity generation.
3. To understand the functions of wind turbine and ocean thermal energy conversion process.
4. To describe the types bio-energy for electricity generation and geothermal energy.
5. To educate the various new and alternative sources such as MHD power and fuel cells.

UNIT-1: ENERGY SCENARIO

(9)

Indian energy scenario in various sectors of domestic, industrial, commercial, agriculture, transportation and others – Present conventional energy status – Present renewable energy status – Potential of various renewable energy sources – Global energy status – Per capita energy consumption in various countries – Future energy plans.

UNIT-2: SOLAR ENERGY

(9)

Solar radiation – Measurements of solar radiation and sunshine – Solar thermal collectors – Flat plate and concentrating collectors – Solar thermal applications – Solar cells – Solar thermal energy storage – Fundamentals of solar photovoltaic conversion – Solar PV systems – Solar PV applications.

UNIT-3: WIND ENERGY AND OCEAN THERMAL ENERGY

(9)

Wind Energy: Wind data and energy estimation – Betz limit – Site selection for wind farms – Characteristics – Horizontal and vertical axis wind turbine – Wind turbine generators and its performance – Hybrid systems – Environmental issues – Applications. Ocean Thermal Energy: Tidal energy – Wave energy – Open and closed OTEC cycles.

UNIT-4: BIOMASS ENERGY AND GEO THERMAL ENERGY

(9)

Biomass Energy: Bioresources – Bio mass direct combustion – Thermochemical conversion – Biogas plants – Digesters – Biochemical conversion – Mechanical conversion – Biomass gasifier – Types of biomass gasifiers – Cogeneration – Carbonization – Pyrolysis – Biodiesel production – Ethanol production – Applications. Geothermal Energy: Geothermal energy sources – Types of geothermal power plants – Applications – Environmental impact – Small hydro.

UNIT-5: NEW AND ALTERNATIVE ENERGY SOURCES

(9)

Fuel Cell: Principle – Types of fuel cells – Hydrogen energy – Properties – Hydrogen production – Storage – Transport and utilization – Safety issues. Magneto Hydro Dynamic & Power: Principles of Magneto hydro dynamic (MHD) power generation – MHD systems – MHD accelerator – MHD engine, power generation systems – Electron gas dynamic conversion.

Total Hours:45

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES****(Autonomous)****DEPARTMENT OF CIVIL ENGINEERING**

On successful completion of the course, students will be able to		POs
CO1	Explain the current energy scenario in terms of conventional renewable energy and future plan	PO1,PO2,PO7, PO12
CO2	Describe the types solar thermal collectors and solar energy sources for electricity generation	PO1,PO2,PO7, PO12
CO3	Understand the functions of wind turbine and Ocean Thermal Energy conversion process	PO1,PO2,PO7, PO12
CO4	Illustrate the bio-energy for electricity generation and advancement in geothermal Energy	PO1,PO2,PO7, PO12
CO5	Demonstrate the various new and alternative sources such as MHD Power and fuel cells	PO1,PO2,PO7, PO12

TEXTBOOKS:

1. G.D. Rai, "Non-Conventional Energy Sources", Khanna Publishers, Delhi,6/e,2017.
2. Khan.B.H, "Non-Conventional Sources", McGraw-HillEducationPvt.Ltd,3/e,2017.

REFERENCEBOOKS:

1. G.S.Sawhney, "Non-ConventionalEnergyResources",PHILearning,2012.
2. R.K.Rajput, "Non-Conventional Energy Sources and Utilisation (EnergyEngineering)", S. Chand Publishing, 2012.
3. AldoVieiradaRosa,"FundamentalsofRenewableEnergyProcesses",Elsevier Academic Press, 2005.
4. S.P.SukhatmeandJK.Nayak,"SolarEnergy",McGraw-HillEducation,4/e,2017.
5. Efsthathios E. (Stathis) Michaelides, "Alternative Energy Sources", Springer-Verlag Berlin Heidelberg, 2012.

REFERENCEWEBSITE:

1. <https://nptel.ac.in/courses/121/106/121106014/>
2. <https://nptel.ac.in/courses/112/105/112105221/>
3. <https://nptel.ac.in/courses/108/108/108108078/>
4. <https://nptel.ac.in/courses/103/103/103103206/>
5. <https://nptel.ac.in/courses/103/107/103107157/>
6. <https://nptel.ac.in/courses/109/101/109101171/>
7. <https://nptel.ac.in/courses/115/103/115103123/>
8. <https://nptel.ac.in/courses/108/105/108105058/>

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING
III B. Tech- VI Semester

230CS361A

PRINCIPLES OF OPERATING SYSTEM

L T P C
3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection.
2. Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
3. Illustrate different conditions for deadlock and their possible solutions.

UNIT -1: OPERATING SYSTEMS OVERVIEW & SYSTEM STRUCTURES

(9)

Operating Systems Overview: Introduction, Operating system functions, Operating systems operations, Computing environments, Free and Open-Source Operating Systems.

System Structures: Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, Operating system Design and Implementation, Operating system structure, Building and Booting an Operating System, Operating system debugging.

UNIT -2: PROCESSES, THREADS AND CONCURRENCY & CPU SCHEDULING (9)

Processes: Process Concept, Process scheduling, Operations on processes, Inter-process communication.

Threads and Concurrency: Multithreading models, Thread libraries, Threading issues.

CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processors scheduling.

UNIT III: SYNCHRONIZATION TOOLS & DEADLOCKS (9)

Synchronization Tools: The Critical Section Problem, Peterson's Solution, Mutex Locks, Semaphores, Monitors, Classic problems of Synchronization.

Deadlocks: system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock.

UNIT -IV: MEMORY-MANAGEMENT STRATEGIES & STORAGE MANAGEMENT (9)

Memory-Management Strategies: Introduction, Contiguous memory allocation, Paging, Structure of the Page Table, Swapping.

Virtual Memory Management: Introduction, Demand paging, Copy-on-write, Page replacement, Allocation of frames, Thrashing.

Storage Management: Overview of Mass Storage Structure, HDD Scheduling.

UNIT V: FILE SYSTEM & PROTECTION (9)

File System: File System Interface, File concept, Access methods, Directory Structure, File system Implementation, File-system structure, File-system Operations, Directory implementation, Allocation method, Free space management, File-System Internals: File System Mounting, Partitions and Mounting, File Sharing.

Protection: Goals of protection, Principles of protection, Protection Rings, Domain of protection, Access matrix.

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Describe the basics of the operating systems, mechanisms of OS to handle processes, threads, and their communication. (L1)	PO1, PO2
CO2	Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection. (L2)	PO1, PO3, PO4
CO3	Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system. (L3)	PO1, PO2, PO3, PO4, PO5
CO4	Illustrate different conditions for deadlock and their possible solutions. (L2)	PO1, PO2, PO4
CO5	Analyze the memory management and its allocation policies. (L4)	PO1, PO4

TEXT BOOKS:

1. Operating System Concepts, Silberschatz A, Galvin P B, Gagne G, 10th Edition, Wiley, 2018.
2. Modern Operating Systems, Tanenbaum A S, 4th Edition, Pearson, 2016

REFERENCE BOOKS:

1. Operating Systems -Internals and Design Principles, Stallings W, 9th edition, Pearson, 2018
2. Operating Systems: A Concept Based Approach, D.M Dhamdhare, 3rd Edition, McGraw- Hill, 2013

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/106/106/106106144/>
2. <http://peterindia.net/OperatingSystems.html>

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	-	3	3	-	-	-	-	-	-	-	-
CO3	2	2	3	2	3	-	-	-	-	-	-	-
CO4	2	2	-	3	-	-	-	-	-	-	-	-
CO5	3	-	-	2	-	-	-	-	-	-	-	-
CO*	2.4	2	3	25	3	-	-	-	-	-	-	-



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B.Tech. - VI Semester

23OML361A

INTRODUCTION TO MACHINE LEARNING
(Open Elective-II)

L	T	P	C
3	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

- Understand the fundamental concepts of machine learning, its types, applications, and data preprocessing techniques.
- Learn to select, train, evaluate, and improve machine learning models while applying feature engineering techniques.
- Explore Bayesian methods for concept learning and understand various classification algorithms.
- Understand regression techniques for predictive modeling and methods to enhance model accuracy.
- Learn unsupervised learning techniques such as clustering and association rule mining for pattern discovery.

UNIT I INTRODUCTION TO MACHINE LEARNING & PREPARING TO MODEL (9)

Introduction: What is Human Learning? Types of Human Learning, what is Machine Learning? Types of Machine Learning, Problems Not to Be Solved Using Machine Learning, Applications of Machine Learning, State-of-The-Art Languages/Tools in Machine Learning, Issues in Machine Learning
Preparing to Model: Introduction, Machine Learning Activities, Basic Types of Data in Machine Learning, Exploring Structure of Data, Data Quality and Remediation, Data Pre-Processing

UNIT II MODELING AND EVALUATION & BASICS OF FEATURE ENGINEERING (9)

Introduction, selecting a Model, training a Model (for Supervised Learning), Model Representation and Interpretability, Evaluating Performance of a Model, Improving Performance of a Model Basics of Feature Engineering: Introduction, Feature Transformation, Feature Subset Selection

UNIT III BAYESIAN CONCEPT LEARNING & SUPERVISED LEARNING: CLASSIFICATION (9)

Introduction, Why Bayesian Methods are Important? Bayes' Theorem, Bayes' Theorem and Concept Learning, Bayesian Belief Network .

Supervised Learning: Classification: Introduction, Example of Supervised Learning, Classification Model, Classification Learning Steps, Common Classification Algorithms-k-Nearest Neighbour (kNN), Decision tree, Random forest model, Support vector machines

UNIT IV SUPERVISED LEARNING: REGRESSION (9)

Introduction, Example of Regression, Common Regression Algorithms-Simple linear regression, Multiple linear regression, Assumptions in Regression Analysis, Main Problems in Regression Analysis, Improving Accuracy of the Linear Regression Model, Polynomial Regression Model, Logistic Regression, Maximum Likelihood Estimation.

UNIT V UNSUPERVISED LEARNING (9)

Introduction, Unsupervised vs Supervised Learning, Application of Unsupervised Learning, Clustering – Clustering as a machine learning task, Different types of clustering techniques, Partitioning methods, K-Medoids: a representative object-based technique, Hierarchical clustering, Density-based methods-DBSCAN Finding Pattern using Association Rule- Definition of common terms, Association rule, Theapriori algorithm for association rule learning, Build the a priori principle rules.

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Explain the significance of machine learning types, applications, and data quality in model building	PO1,PO2,PO3,PO4
CO2	Apply feature engineering methods to improve model performance and interpretability. Implement classification models such as k-NN, Decision Trees, and Random Forest for predictive tasks	PO1,PO2,PO3,PO4
CO3	Implement classification algorithms such as k-NN, Decision Trees, and Random Forests.	PO1,PO2,PO3,PO4
CO4	Analyze regression algorithms and improve model accuracy using optimization techniques.	PO1,PO2,PO3,PO4
CO5	Design clustering models using partitioning and density-based techniques for pattern recognition.	PO1,PO2,PO3,PO4

TEXT BOOKS:

1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, Machine Learning, Pearson, 2019.

REFERENCE BOOKS:

1. Ethern Alpaydin, — Introduction to Machine Learning, MIT Press, 2004.
2. Stephen Marsland, — Machine Learning - An Algorithmic Perspective, Second Edition, Chapman and Hall / CRC Machine Learning and Pattern Recognition Series, 2014.
3. Andreas C. Müller and Sarah Guido —Introduction to Machine Learning with Python: A Guide for Data Scientists, Oreilly, 2016.

ONLINE RESOURCES & COURSES:

1. Andrew Ng, - Machine Learning || <https://www.coursera.org/instructor/andrewng>
2. Shai Shalev-Shwartz, Shai Ben-David, —Understanding Machine Learning: From Theory to Algorithms, Cambridge University Press, 2014.
3. <https://www.deeplearning.ai/courses/machine-learning-specialization/>
4. <https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/index.html>

CO-PO MAPPING:

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B.Tech. - VI Semester

23OECE361A

DIGITAL ELECTRONICS

L T P C
3 0 0 3

PRE-REQUISITES: Basic Mathematics

COURSE EDUCATIONAL OBJECTIVES:

1. To Learn Boolean algebra, logic simplification techniques, and combinational circuit design.
2. To analyze combinational circuits like adders, subtractors, and code converters.
3. To explore combinational logic circuits and their applications in digital design.
4. To understand sequential logic circuits, including latches, flip-flops, counters, and shift registers.
5. To gain knowledge about programmable logic devices and digital IC's.

UNIT –1 INTRODUCTION

(9)

Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms, Introduction to Logic Gates, Ex-OR, Ex-NOR operations, Minimization of Switching Functions: Karnaugh map method, Logic function realization: AND-OR, OR-AND and NAND/NOR realizations.

UNIT-II INTRODUCTION TO COMBINATIONAL DESIGN 1

(9)

Introduction to Combinational Design 1: Binary Adders, Subtractors and BCD adder, Code converters - Binary to Gray, Gray to Binary, BCD to excess3, BCD to Seven Segment display.

UNIT-III COMBINATIONAL LOGIC DESIGN 2

(9)

Combinational Logic Design 2: Decoders, Encoders, Priority Encoder, Multiplexers, Demultiplexers, Comparators, Implementations of Logic Functions using Decoders and Multiplexers.

UNIT-IV SEQUENTIAL LOGIC DESIGN

(9)

Sequential Logic Design: Latches, Flip-flops, S-R, D, T, JK and Master-Slave JK FF, Edge triggered FF, set up and hold times, Ripple counters, Shift registers.

UNIT-V PROGRAMMABLE LOGIC DEVICES AND DIGITAL ICs

(9)

Programmable Logic Devices: ROM, Programmable Logic Devices (PLA and PAL).

Digital IC's: Decoder (74x138), Priority Encoder (74x148), multiplexer (74x151) and de-multiplexer (74x155), comparator (74x85).

Total Hours: 45



On successful completion of the course, students will be able to		POs
C01	Learn Boolean algebra, logic simplification techniques, and combinational circuit design.	PO1, PO2
C02	Analyze combinational circuits like adders, subtractors, and code converters.	PO1, PO2, PO3
C03	Explore combinational logic circuits and their applications in digital design.	PO1, PO2, PO3
C04	Understand sequential logic circuits, including latches, flip-flops, counters, and shift registers.	PO1, PO2, PO3
C05	Gain knowledge about programmable logic devices and digital IC's.	PO1, PO2

1. Digital Design, M.Morris Mano & Michel D. Ciletti, 5th Edition, Pearson Education, 1999.
2. Switching theory and Finite Automata Theory, ZviKohavi and NirahK.Jha, 2nd Edition, Tata McGraw Hill, 2005.

1. Fundamentals of Logic Design, Charles H Roth,Jr., 5th Edition, Brooks/cole Cengage Learning, 2004.

1. <https://archive.nptel.ac.in/courses/108/105/108105132/>
2. <https://archive.nptel.ac.in/courses/108/105/108105113/>
3. <https://archive.nptel.ac.in/content/storage2/courses/106108099/Digital%20Systems.pdf>

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SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B Tech- VI Semester

23OSH361A	OPTIMIZATION TECHNIQUES FOR ENGINEERS	L	T	P	C
	OPEN ELECTIVE-II(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. Impart knowledge on theory of optimization and conditions for optimality for unconstrained and constraint optimization problems
2. Inculcate modeling skills necessary to describe and formulate optimization problems in design and manufacturing
3. Familiarize with the working principle of optimization algorithms used to solve linear and non-linear problems
4. Train the students to solve optimization problems using software tools

UNIT-I: Linear programming I

(09)

Introduction, Applications of Linear Programming, Standard form of a Linear Programming Problem, Geometry of Linear Programming Problems, Basic Definitions in Linear Programming. Simplex Method, Simplex Algorithm and Two phase Simplex Method, Big-M method.

UNIT-II: Linear programming II: Duality in Linear Programming

(09)

Symmetric Primal-Dual Relations, General Primal-Dual Relations, Duality Theorem, Dual Simplex Method, Transportation Problem and assignment problem, Complementary slackness Theorem

UNIT-III: Non - linear programming: Unconstrained optimization techniques

(09)

Introduction: Classification of Unconstrained minimization methods,

Direct Search Methods: Random Search Methods: Descent Method and Fletcher Powell Method, Grid Search Method

UNIT-IV: Non-linear programming: Constrained optimization techniques

(09)

Introduction, Characteristics of a constrained problem, Random Search Methods, complex method, Sequential linear programming, Basic approach in methods of Feasible directions, Zoutendijk's method of feasible directions: direction finding problem, determination of step length, Termination criteria.

UNIT-V: Geometric Programming

(09)

Unconstrained Minimization Problems: solution of unconstrained geometric programming using differential calculus and arithmetic-geometric inequality.

Constrained minimization Problems: Solution of a constrained geometric programming problem, primal-dual programming in case of less-than inequalities, geometric programming with mixed inequality constraints.

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
C01	Understand the meaning, purpose, tools of Operations Research and linear programming in Solving practical problems in industry.	PO1,PO2,PO3,PO4,PO5,PO12
C02	Interpret the transportation models' solutions and infer solutions to the real-world problems.	PO1,PO2,PO3,PO4,PO5,PO12
C03	Develop mathematical skills to analyze and solve non linear programming models arising from a wide range of applications.	PO1,PO2,PO3,PO4,PO5,PO12
C04	Apply the concept to non-linear programming for solving the problems involving non-linear constraints and objectives	PO1,PO2,PO3,PO4,PO5,PO12
C05	Apply the concept of unconstrained geometric programming for solving the problems involving non-linear constraints and objectives.	PO1,PO2,PO3,PO4,PO5,PO12

TEXTBOOKS:

1. Singiresu S Rao., Engineering Optimization: Theory and Practices, New Age International (P) Ltd. Publishers, New Delhi.
2. J.C. Panth, Introduction to Optimization Techniques, (7-e) Jain Brothers, New Delhi.

REFERENCE BOOKS:

1. Harvey M. Wagner, Principles of Operation Research, Printice-Hall of India Pvt. Ltd. New Delhi.
2. Peressimi A.L., Sullivan F.E., Vhl, J. J. Mathematics of Non-linear Programming, Springer –Verlag.

REFERENCE WEBSITE:

- https://onlinecourses.nptel.ac.in/noc24_ee122/preview
- <https://archive.nptel.ac.in/courses/111/105/111105039/>
- https://onlinecourses.nptel.ac.in/noc21_ce60/preview

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	2	2	-	-	-	-	-	-	-	1
C02	3	2	2	2	-	-	-	-	-	-	-	1
C03	3	2	2	1	-	-	-	-	-	-	-	1
C04	2	2	2	1	-	-	-	-	-	-	-	1
C05	3	3	2	1	-	-	-	-	-	-	-	1

1- Slightly, 2-Moderately, 3-Substantially.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B.Tech. - VI Semester

23OME361A	PRINCIPLES OF AUTOMATION AND ROBOTICS	L	T	P	C
	(Mechanical Branch)	3	0	0	3

PRE-REQUISITES: The objectives of the course are to

COURSE EDUCATIONAL OBJECTIVES:

1. Fundamentals of industrial automation, production types, automation strategies, and hardware elements used in modern manufacturing processes.
2. Understanding of automated manufacturing systems, and strategies for improving productivity and flexibility in industrial automation.
3. Knowledge of industrial automation and robotics, sensors, and end-effector design for modern manufacturing environments.
4. Explain industrial automation and robotics, and trajectory planning for intelligent and efficient manufacturing applications.
5. Familiarity of industrial automation and robotics, and practical applications in manufacturing processes.

UNIT -1: INTRODUCTION TO AUTOMATION: (9)

Introduction to Automation, Need, Types, Basic elements of an automated system, Manufacturing Industries, Types of production, Functions in manufacturing, Organization and information processing in manufacturing, Automation strategies and levels of automation, Hardware components for automation and process control, mechanical feeders, hoppers, orienters, high speed automatic insertion devices.

UNIT -2: AUTOMATED FLOW LINES:(9)

Automated flow lines, Part transfer methods and mechanisms, types of Flow lines, flow line with/without buffer storage, Quantitative analysis of flow lines. Assembly line balancing: Assembly process and systems assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT -3: INTRODUCTION TO INDUSTRIAL ROBOTICS: (9)

Introduction to Industrial Robotics, Classification of Robot Configurations, functional line diagram, degrees of freedom. Components common types of arms, joints grippers, factors to be considered in the design of grippers. Robot actuators and Feedback components: Actuators, Pneumatic, Hydraulic actuators, Electric & Stepper motors, comparison. Position sensors - potentiometers, resolvers, encoders - velocity sensors, Tactile sensors, Proximity sensors.

UNIT -4: MANIPULATOR KINEMATICS: (9)

Manipulator Kinematics: Manipulator Kinematics, Homogenous transformations as applicable to rotation and transition - D-H notation, Forward inverse kinematics. Manipulator Dynamics: Differential transformations, Jacobians, Lagrange - Euler and Newton - Euler formations. Trajectory Planning: Trajectory Planning and avoidance of obstacles path planning, skew motion, joint integrated motion - straight line motion.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

UNIT -5: ROBOT PROGRAMMING AND APPLICATIONS: (9)

Robot Programming: Lead through programming – Robot language structure – Motion commands of move, speed control, workplace, path, frames, end effector operation, sensor operation and react statement – Program sequence and subroutine – Teach pendant programming – VAL II programming. Robot Applications: Material transfer and machine loading / unloading – Processing applications in spray coating, spot and arc welding – Assembly and inspection automation – Selection of robots in industry applications

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand and analyze the structure and functions of automated manufacturing systems, and evaluate hardware components for efficient production.	L2,L4,L5
CO2	Analyze and design automated flow lines with or without buffer storage, perform quantitative evaluations, apply assembly line balancing techniques.	L4,L5,L6
CO3	Classify robot configurations, select suitable actuators and sensors, analyze and apply automation and robotics principles to optimize production efficiency and flexibility	L2,L3,L4
CO4	Apply kinematic and dynamic modeling using D-H notation and select appropriate hardware and control strategies for real-world industrial scenario to analyze and design automated and robotic systems.	L3,L4,L5
CO5	Design, program, and implement robotic systems, understand and apply robotics technology to manufacturing tasks.	L1,L3,L6

TEXT BOOKS:

1. Automation , Production systems and CIM,M.P. Groover /Pearson Edu.
2. Industrial Robotics - M.P. Groover, TMH.

REFERENCE BOOKS:

1. Robotics , Fu K S, McGraw Hill, 4th edition, 2010.
2. An Introduction to Robot Technology, P. Coiffet and M. Chaironze, Kogam Page Ltd. 1983 London.
3. Robotic Engineering , Richard D. Klafter, Prentice Hall
4. Robotics, Fundamental Concepts and analysis – Ashitave Ghosal ,Oxford Press, 1/e, 2006
5. Robotics and Control , Mittal R K &Nagrath IJ , TMH



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(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

REFERENCE WEBSITE:

1. <https://www.youtube.com/watch?v=yxZm9WQJUA0&list=PLRLB5WCqU54UJG45UnazSYmnmhl-gt76o>
2. <https://www.youtube.com/watch?v=6f3bvIhSWyM&list=PLRLB5WCqU54X5Vy4DwjfSODT3ZJgwEjyE>

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B Tech- VI Semester

23OSH361B	MATHEMATICAL FOUNDATION OF QUANTUM TECHNOLOGIES	L	T	P	C
	OPEN ELECTIVE-II(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To provide students with essential linear algebra foundations including vector spaces, inner products, and operators for quantum mechanical applications.
2. To develop understanding of the transition from finite-dimensional systems to infinite-dimensional function spaces and Hilbert space concepts.
3. To establish quantum mechanical formalism including measurement theory, uncertainty relations, and time evolution principles.
4. To enable students to apply quantum mechanical principles to solve problems in simple quantum systems and understand statistical interpretation.
5. To introduce advanced concepts in composite systems, measurement processes, and modern perspectives in quantum mechanics.

UNIT I: Linear Algebra Foundation for Quantum Mechanics

[09]

Vector spaces definition and examples ($\mathbb{R}^2$, $\mathbb{R}^3$, function spaces), Inner products (dot product, orthogonality, normalization), Linear operators (matrices, eigenvalues, eigenvectors), Finite-dimensional examples (2×2 matrices, spin-1/2 systems), Dirac notation introduction ($|\psi\rangle$, $\langle\phi|$, $\langle\phi|\psi\rangle$), Change of basis (transformations, unitary matrices).

UNIT II: From Finite to Infinite Dimensions

[09]

Function spaces (L^2 space, square-integrable functions), Inner products for functions ($\int \psi^* \phi dx$), Orthogonal function sets (Fourier series, basis functions), Introduction to Hilbert space concept (complete inner product spaces), Position and momentum representations (wave functions), Operators on functions (d/dx , multiplication by x).

UNIT III: Quantum Mechanical Formalism

[09]

Mathematical formulation (states as vectors, observables as operators), Measurement theory (Born rule, expectation values, probabilities), Uncertainty relations (mathematical derivation from commutators), Time evolution (Schrödinger equation, unitary evolution).

UNIT IV: Applications and Statistical Interpretation

[09]

Simple applications (infinite square well, harmonic oscillator), Statistical interpretation (ensembles, pure vs mixed states), Measurement process (von Neumann measurement scheme).

UNIT V: Advanced Topics

[09]

Composite systems (tensor products basic introduction), Reversibility and irreversibility (unitary evolution vs measurement), Thermodynamic connections (equilibrium states, entropy), Modern perspectives (decoherence, measurement problem conceptual).

TOTAL HOURS: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Blooms level
C01	Understand vector spaces, inner products, and linear operators with applications to quantum systems.	PO1,PO2,PO3,PO4,PO5,PO12
C02	Apply linear algebra concepts to function spaces and analyze the transition from finite to infinite dimensional systems.	PO1,PO2,PO3,PO4,PO5,PO12
C03	Analyze quantum mechanical formalism including measurement theory, uncertainty relations, and time evolution.	PO1,PO2,PO3,PO4,PO5,PO12
C04	Apply quantum mechanical principles to solve problems in simple quantum systems and evaluate statistical interpretations.	PO1,PO2,PO3,PO4,PO5,PO12
C05	Evaluate advanced concepts in composite systems and synthesize understanding of measurement processes and modern quantum theory.	PO1,PO2,PO3,PO4,PO5,PO6,PO12

TEXT BOOKS:

1. David J. Griffiths, Darrell F. Schroeter, "Introduction to Quantum Mechanics", 3rd Edition, Cambridge University Press (2018).
2. R. Shankar, Principles of Quantum Mechanics, 2nd Edition, Kluwer Academy/Plenum Publishers (1994).

REFERENCE BOOKS:

1. George. F. Simmons, "Introduction to Topology and Modern Analysis", MedTech Science Press.
2. Gilbert Strang, Linear Algebra and Its Applications, 4th Edition, Cengage Learning (2006).
3. John von Neumann and Robert T Beyer, Mathematical Foundations of Quantum Mechanics, Princeton Univ. Press (1996).

REFERENCE WEBSITE:

1. <https://eclass.uoa.gr/modules/document/file.php/CHEM248/Griffiths%20-%20Introduction%20to%20Quantum%20Mechanics%203rd%20ed%202018.pdf>
2. <https://fisica.net/mecanica-quantica/Shankar%20-%20Principles%20of%20quantum%20mechanics.pdf>

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	2	2	1	-	-	-	-	-	-	2
C02	3	3	2	3	2	-	-	-	-	-	-	2
C03	3	3	3	3	2	-	-	-	-	-	-	2
C04	3	3	3	3	2	-	-	-	-	-	-	2
C05	3	3	3	3	2	1	-	-	-	-	-	3

• 3 = Strong Mapping, 2 = Moderate Mapping, 1 = Slight Mapping, - = No Mapping



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B.Tech. - VI Semester

23OSH361C	PHYSICS OF ELECTRONIC MATERIALS AND DEVICES (Open Elective-II)	L	T	P	C
	(Common to all branches)	3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To **facilitate** a deeper understanding of **crystal growth, defects in crystals, and thin-films**.
2. To examine and understand the **properties, characteristics, and applications of various semiconducting materials**, and their role in advancing technology.
3. To establish a solid foundation in the principles and practices of semiconductor physics and devices engineering.
4. To examine the fundamental principles governing excitonic and luminescent processes in **solid-state materials, and their significance in optoelectronic applications**.
5. To gain insight into the principles, innovations, and applications of **modern display systems**.

UNIT-I Fundamentals of Materials Science (9)

Introduction, Phase rule, Phase Diagram, Elementary idea of Nucleation and Growth, Methods of crystal growth. The basic idea of point, line, and planar defects. Concept of thin films, preparation of thin films, Deposition of thin film using sputtering methods (RF and glow discharge).

UNIT II Semiconductors (9)

Introduction, charge carriers in semiconductors, effective mass, Diffusion and drift, Diffusion and recombination, Diffusion length. The Fermi level & Fermi-Dirac distribution, Electron and Hole in quantum-well, Change of electron-hole concentration- Qualitative analysis, Temperature dependency of carrier concentration, Conductivity and mobility, Effects of temperature and doping on mobility, High field effects.

UNIT III Physics of Semiconductor Devices: (9)

Introduction, Band structure, PN junctions and their typical characteristics under equilibrium and under bias, Hetero junctions, Transistors, MOSFETs.

UNIT IV Excitons and Luminescence: (9)

Luminescence: Different types of luminescence, basic definitions, Light emission in solids, Inter-band luminescence, Direct and indirect gap materials. Photoluminescence: General Principles of photoluminescence, Excitation and relaxation, OLED, Quantum-dot. Electro-luminescence: General Principles of electroluminescence, light emitting diode, diode laser.

UNIT V Display devices: (9)

LCD, three-dimensional display: Holographic display, light-field displays: Head-mounted display, MOEMS (Micro-Opto-Electro-Mechanical Systems) and MEMS displays.

TOTAL HOURS: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

	Course Outcomes On successful completion of the course, students will be able to	Pos
CO1	Understand the principles of crystal growth and techniques for thin film fabrication	PO1, PO2,PO3,PO4,PO5
CO2	Summarize fundamental concepts of semiconductors and their classification	PO1, PO2,PO3,PO4,PO5
CO3	Illustrate the operating principles of various semiconductor devices	PO1, PO2,PO3,PO4,PO5
CO4	Analyze different luminescent phenomena and the functioning of devices based on these mechanisms	PO1, PO2,PO3,PO4
CO5	Explain the construction and working principles of various types of display devices	PO1, PO2,PO3,PO4

Course Articulation Matrix:

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

Text books:

1. Principles of Electronic Materials and Devices-S.O. Kasap, McGraw-Hill Education (India) Pvt. Ltd., 4th edition, 2021.
2. Semiconductor physics & devices: basic principles, 4th Edition, McGraw-Hill, 2012.

Reference Books:

3. Solid State Electronic Devices-B.G.Streetman and S.Banerjee, PHI Learning, 6th edition.
4. An Introduction to Electronic Materials for Engineers-Wei Gao, Zhengwei Li, Nigel Sammes, World Scientific Publishing Co. Pvt. Ltd. 2nd Edition, 2011.

NPTEL course links:

1. <https://nptel.ac.in/courses/113/106/113106062/>
https://onlinecourses.nptel.ac.in/noc20_ph24/preview



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B Tech- II Semester

23OSH361D	CHEMISTRY OF POLYMERS AND APPLICATIONS	L	T	P	C
	OPEN ELECTIVE-II(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To understand the basic principles of polymers
2. To understand natural polymers and their applications.
3. To impart knowledge to the students about synthetic polymers, their preparation and importance.
4. To enumerate the applications of hydrogel polymers
5. To enumerate applications of conducting and degradable polymers in engineering

Unit-I: Polymers-Basics and Characterization: (09)

Basic concepts: monomers, repeating units, degree of polymerization, linear, branched and network polymers, classification of polymers, Polymerization: addition, condensation, copolymerization and coordination polymerization. Average molecular weight concepts: number, weight and viscosity average molecular weights, polydispersity and molecular weight distribution. Measurement of molecular weight: End group, viscosity, light scattering, osmotic and ultracentrifugation methods, analysis and testing of polymers.

Unit-II: Natural Polymers & Modified cellulosic (09)

Natural Polymers: Chemical & Physical structure, properties, source, important chemical modifications, applications of polymers such as cellulose, lignin, starch, rosin, shellac, latexes, vegetable oils and gums, proteins.

Modified cellulosic: Cellulose esters and ethers such as Ethyl cellulose, CMC, HPMC, cellulose acetals, Liquid crystalline polymers; speciality plastics- PES, PAES, PEEK, PEA.

Unit-III: Synthetic Polymers (09)

Addition and condensation polymerization processes– Bulk, Solution, Suspension and Emulsion polymerization. Preparation and significance, classification of polymers based on physical properties. Thermoplastics, Thermosetting plastics, Fibers and elastomers, General Applications. Preparation of Polymers based on different types of monomers, Olefin polymers (PE, PVC), Butadiene polymers (BUNA-S, BUNA-N), nylons, Urea-formaldehyde, phenol – formaldehyde, Melamine Epoxy and Ion exchange resins.

Unit-IV: Hydrogels of Polymer networks (09)

Definitions of Hydrogel, polymer networks, Types of polymer networks, Methods involved in hydrogel preparation, Classification, Properties of hydrogels, Applications of hydrogels in drug delivery.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Unit-V: Conducting and Degradable Polymers:

(09)

Conducting polymers: Introduction, Classification, Mechanism of conduction in Poly Acetylene, Poly Aniline, Poly Thiophene, Doping, Applications.

Degradable polymers: Introduction, Classifications, Examples, Mechanism of degradation, poly lactic acid, Nylon-6, Polyesters, applications.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
C01	Classify the polymers, explain polymerization mechanism, differentiate addition, condensation polymerizations, Describe measurement of molecular weight of polymer	PO1, PO2, PO2, PO4, PO5
C02	Describe the physical and chemical properties of natural polymers and modified cellulosic.	PO1, PO2, PO2, PO4, PO6
C03	Differentiate Bulk, solution, Suspension and emulsion polymerization, describe fibers and elastomers, Identify the thermosetting and thermos polymers.	PO1, PO2, PO2, PO4, PO5, PO12
C04	Identify types of polymer networks, describe methods involve in hydrogel preparation, Explain applications of hydrogels in drug delivery.	PO1, PO2, PO2, PO4, PO5
C05	Explain classification and mechanism of conducting and degradable polymers.	PO1, PO2, PO2, PO4, PO5

TEXT BOOKS:

1. A Text book of Polymer science, Billmayer
2. Polymer Chemistry – G.S. Mishra
3. Polymer Chemistry – Gowarikar

REFERENCE BOOKS:

1. Organic polymer Chemistry, K.J. Saunders, Chapman and Hall
2. Advanced Organic Chemistry, B. Miller, Prentice Hall
3. Polymer Science and Technology by Premamoy Ghosh, 3rd edition, McGraw-Hill, 2010.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Mapping between Course Outcomes and Programme Outcomes

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

3=StrongMapping,2=ModerateMapping,1=Slight Mapping, -=No Mapping



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

III B Tech- VI Semester

230SH361E	ACADEMIC WRITING AND PUBLIC SPEAKING	L	T	P	C
	(Open Elective-II) (Common to All Branches of Engineering)	3	0	0	3

Course Objectives:

1. To encourage all round development of the students by focusing on writing skills
2. To make the students aware of non-verbal skills
3. To develop analytical skills
4. To deliver effective public speeches

UNIT-I Introduction to Academic Writing

LectureHrs-9

Introduction to Academic Writing –Essential Features of Academic Writing – Courtesy– Clarity– Conciseness–Correctness–Coherence–Completeness–Types–Descriptive, Analytical, Persuasive, Critical writing

UNIT-II Academic Journal Article

LectureHrs-9

Art of condensation-summarizing and paraphrasing-Abstract Writing, writing Project Proposal, writing application for internship, Technical/Research/Journal Paper Writing – Conference Paper writing - Editing, Proof Reading - Plagiarism

UNIT-III Essay & Writing Reviews

LectureHrs-9

Compare and Contrast –Argumentative Essay– Exploratory Essay–Features and Analysis of Sample Essays – Writing Book Report, Summarizing, Book/film Review- So P.

UNIT-IV Public Speaking

LectureHrs-9

Introduction, Nature, characteristics, significance of Public Speaking – Presentation –4Ps of Presentation–StageDynamics–AnsweringStrategies–AnalysisofImpactfulSpeeches–Speechesfor Academic events

UNIT-V Public Speaking and Non-Verbal Delivery

LectureHrs-9

BodyLanguage–FacialExpressions–Kinesics–Oculesics–Proxemics–Haptics–Chronemics–Paralanguage–Si



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

	Course Outcomes(CO):	Blooms Level
	By the end of the program students will be able to	
1	Understand various elements of Academic Writing	L1,L2
2	Identify sources and avoid plagiarism	L1,L2
3	Demonstrate the knowledge in writing a Research chapter	L3
4	Analyse different types of essays	L4
5	Assess the speeches of other and know the positive strengths of speakers	L5
6	Build confidence in giving an impactful presentation to the audience	L3

TextBooks:

1. Critical Thinking, Academic Writing and Presentation Skills: MG University Edition Paperback– 1 January 2010 Pearson Education; First edition (1 January 2010)
2. Pease, Allan & Barbara. The Definitive Book of Body Language RHUS Publishers, 2016

ReferenceBooks:

1. Alice Savage, Masoud Shafiei Effective Academic Writing, 2Ed., 2014.
2. Shalini Verma, Body Language, S.Chand Publications 2011.
3. Sanjay Kumar and Pushpalata, Communication Skills 2E 2015, Oxford.
4. Sharon Gerson, Steven Gerson, Technical Communication Process and Product, Pearson, New Delhi, 2014
5. Elbow, Peter. Writing with Power. OUP USA, 1998

Online Services:

1. <https://youtu.be/NNhTIT81nH8>
2. <https://www.youtube.com/watch?v=478ccrWKY-A>
3. <https://www.youtube.com/watch?v=nzGo5ZC1gMw>
4. <https://www.youtube.com/watch?v=Qve0ZBmJMh4>
5. <https://courses.lumenlearning.com/publicspeakingprinciples/chapter/chapter-12-nonverbal-aspects-of-delivery/>
6. https://onlinecourses.nptel.ac.in/noc21_hs76/preview
7. <https://archive.nptel.ac.in/courses/109/107/109107172/#>
8. <https://archive.nptel.ac.in/courses/109/104/109104107/>



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

CO\ P O	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	-	-	-	-	-	1
CO2	3	3	2	3	2	-	-	-	-	-	-	2
CO3	3	3	3	3	2	1	-	-	-	-	-	2
CO4	3	3	2	2	1	-	-	-	-	-	-	1
CO5	3	3	3	3	2	-	-	-	-	-	-	2



III B. Tech- VI Semester					
Course Code	HIGHWAY ENGINEERINGLAB	L	T	P	C
23CIV368L		0	0	3	1.5

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the properties and behavior of aggregates and bitumen used in highway construction.
2. **Perform** standard laboratory tests on aggregates and bitumen to evaluate their suitability for road construction.
3. **Analyze** the strength, durability, and performance characteristics of pavement materials.
4. **Assess** the quality and compliance of highway materials with standard specifications.
5. **Develop** hands-on skills for material testing and interpretation of test results.

List of Experiments: -

I. TEST ON AGGREGATES

1. Specific Gravity Determination of the Coarse Aggregate Sample
2. Determination of Abrasion Value of the Coarse Aggregate Sample.
3. Determination of Impact Value of Coarse Aggregate
4. Determination of Elongation Index of Coarse Aggregate
5. Determination of Flakiness Index of Coarse Aggregate
6. Determination of Aggregate Crushing Value of Coarse Aggregate
7. Determination of Water Absorption Capacity of the Coarse Aggregate Sample.

II. TEST ON BITUMEN

1. Specific Gravity Determination of the Bitumen/Asphalt Sample.
2. Penetration Test on Bitumen.
3. Viscosity Determination of Bituminous Binder.
4. Determination of Softening Point of The Asphalt/Bitumen Sample
5. Determination of Ductility Value of The Bitumen Sample
6. Estimation of Loss of Bitumen on Heating
7. Bitumen Extraction Test

COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Understand the fundamentals of sustainability, the carbon cycle, and the environmental impact of construction materials.	PO1, PO2, PO3
CO2	Analyze sustainable construction materials, their durability, and life cycle assessment.	PO1, PO2, PO3
CO3	Apply energy calculations in construction materials and assess their embodied energy.	PO1, PO2, PO3, PO4
CO4	Evaluate green building standards, energy codes, and performance ratings.	PO1, PO2
CO5	5. Assess the environmental effects of energy use, climate change, and global warming.	PO1, PO2, PO3, PO4

TEXT BOOKS:

Highway Material Testing Manual, Khanna, Justo and Veera Raghavan, Nem Chand Brothers

REFERENCE BOOKS:

1. IS 383 :1993 —Specification for Coarse and Fine Aggregates From Natural Sources for Concrete||
2. IS 1201 -1220 (1978) —Methods for testing tars and bituminous materials||
3. IRC SP 53 -2010 —Guidelines on use of modified bitumen||
4. MS-2 Manual for Marshalls Mix design 2002.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

ONLINE LEARNING RESOURCES

<https://ts-nitk.vlabs.ac.in/>

CO-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	PS 01	PS 02
CO-1	3	2	2	2	1	3	3	1	-	1	-	2	3	3
CO-2	3	3	3	2	2	2	2	1	-	-	-	1	3	3
CO-3	3	3	3	2	2	2	3	1	-	-	-	1	3	3
CO-4	3	3	3	2	2	2	3	1	-	-	-	1	3	3
CO-5	2	2	2	1	3	3	3	1	-	1	1	2	2	2



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

III B. Tech- VI Semester					
Course Code	ENVIRONMENTAL ENGINEERING LAB	L	T	P	C
23CIV367T		0	0	3	1.5

Course Objectives:

The objectives of this course are to make the student to:

1. Understand the principles and methods of water and wastewater sampling and preservation.
2. Perform standard laboratory tests to determine water quality parameters.
3. Analyze wastewater characteristics and assess pollution levels.
4. Evaluate the effectiveness of treatment processes using chemical and biological tests.
5. Develop hands-on skills in advanced laboratory techniques for environmental monitoring.

LIST OF EXPERIEMENTS: -

II. ANALYSIS of WATER SAMPLE

1. Sampling and preservation methods for water and wastewater (Demonstration only)
2. Measurement of Electrical conductivity and turbidity
3. Determination of fluoride in water by spectrophotometric method /ISE
4. Determination of iron in water (Demo)
5. Determination of Sulphate in water
6. Determination of Optimum Coagulant Dosage by Jar test apparatus
7. Determination of available Chlorine in Bleaching powder and residual chlorine in water

III. ANALYSIS of WASTEWATER SAMPLE

1. Estimation of suspended, volatile and fixed solids
2. Determination of Sludge Volume Index in waste water
3. Determination of Dissolved Oxygen
4. Estimation of B.O.D.
5. Estimation of C.O.D.
6. Determination of TKN and Ammonia Nitrogen in wastewater
7. Determination of total dandiacal coliform (Demonstration only)

Note: Minimum 10 out of the above experiments are to be carried out.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO1	Apply appropriate sampling and preservation techniques for water and wastewater.	PO1, PO2, PO3
CO2	Measure physical and chemical parameters such as turbidity, conductivity, and chlorine content.	PO1, PO2, PO3
CO3	Analyze key water and wastewater quality indicators like BOD, COD, and TKN.	PO1, PO2,PO3,PO4
CO4	Assess the efficiency of water treatment processes through laboratory tests.	PO1,PO2
CO5	Perform microbiological analysis forcoli form detection and sludge characterization.	PO1, PO2,PO3,PO4

TEXT BOOKS:

1. Manual on Water Supply and Treatment. Ministry of Urban Development, New Delhi.
2. Manual on Sewerage and Sewage Treatment Systems, Part A, B and C. Central Public Health and Environmental Engineering Organization, Ministry of Urban Development.

REFERENCEBOOKS:

Environmental Engineering Laboratory Manual by Dr. S.K. Panigrahi, L. Mohanty, S.K. Kataria& Sons



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

ONLINE LEARNING RESOURCES

<https://ee1nitk.vlabs.ac.in/>

<https://ee2-nitk.vlabs.ac.in/>

CO-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	PS O1	PS O2
CO-1	3	1	1	-	-	2	2	-	-	-	1	1	1	1
CO-2	2	2	1	-	-	1	1	-	-	-	1	1	2	2
CO-3	2	1	2	-	1	1	2	-	-	-	2	1	1	1
CO-4	1	1	1	1	-	1	1	-	-	-	1	1	2	2
CO-5	2	1	2	-	-	1	2	1	-	-	1	1	1	1



III B. Tech– VI Semester					
Course Code	BUILDING INFORMATION MODELING				L
23CIV366L					T
					P
					C
					0
					1
					2
					2

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the fundamentals of Building Information Modeling (BIM) and Autodesk Revit.
2. **Develop** proficiency in Revit's basic drawing and editing tools for structural and architectural modeling.
3. **Create** 3D models of buildings, including walls, floors, ceilings, roofs, stairs, and railings.
4. **Analyze** different components such as curtain walls, doors, windows, and structural elements.
5. **Apply** various visualization and detailing techniques to generate callouts, elevations, and sections.

List of Experiments: -

1. INTRODUCTION to BIM & AUTODESK REVIT - About Autodesk and Autocad, Workflow and BIM, Revit Terms, Overview of The Interface, Starting Projects, Viewing Commands.
2. BASIC DRAWING and EDITING tools - Using General Drawing tools, Editing Elements, Working with Modification tools.
3. SETTING UP LEVELS and GRIDS - Setting up Levels and Grids, Creating Structural Grids, Adding Columns, Linking and Importing CAD files.
4. MODELING WALLS Modelling Walls, Modifying Walls, Model Exterior Shell, Add Interior Walls.
5. WORKING WITH DOORS and WINDOWS Inserting Doors and Windows, Loading Door and Window Types from Library, Creating Additional Door and Window Sizes.
6. WORKING WITH CURTAIN WALLS Creating Curtain Walls, Adding Curtain Grids, Working with Curtain Wall Panels, Attaching Mullions to Curtain Grids.
7. WORKING WITH VIEWS Setting the View Display, Duplicating Views, Adding Callout Views, Elevations and Sections.
8. ADDING COMPONENTS Adding Component, Modifying Component, Working With Elements.
9. MODELING FLOORS Modelling & Modifying Floors, Joining Geometry, Creating Shaft Openings, Creating Sloped Floors
10. MODELING CEILINGS & ROOFS Modelling Ceilings, Adding Ceiling Fixtures, Creating Ceiling Soffits, Modelling Roofs
11. MODELING STAIRS and RAILING Creating Component Stairs, Modifying Component Stairs, Working with Railings, Sketching Custom Stairs, Creating Ramps.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO1	Apply appropriate sampling and preservation techniques for water and wastewater.	PO1, PO2, PO3
CO2	Measure physical and chemical parameters such as turbidity, conductivity, and chlorine content.	PO1, PO2, PO3
CO3	Analyze key water and wastewater quality indicators like BOD, COD, and TKN.	PO1, PO2, PO3, PO4
CO4	Assess the efficiency of water treatment processes through laboratory tests.	PO1, PO2
CO5	Perform microbiological analysis for coli form detection and sludge characterization.	PO1, PO2, PO3, PO4



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

TEXT BOOKS:

1. Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston —BIM HANDBOOK, Wiley, 2nd Edition, 2011
2. Wing, Eric. Autodesk Revit Architecture 2017: No Experience Required. Indianapolis: John Wiley & Sons, 2016

REFERENCEBOOKS:

1. Kim, Marcus, Lance Kirby, and Eddy Krygiel. Mastering Autodesk Revit 2017 for architecture. 1st ed. INpolis, IN: John Wiley & Sons, 2016.
2. Garber, Richard. BIM Design: Realizing the Creative Potential of Building Information Modeling. AD Smart 02. Chichester, U.K.: Wiley, 2004
3. Peter B. and Nigel D., —BIMin Principle and in Practice, 1 st Edition, ICE Publishing, 2014.
4. BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors,
5. Chuck Eastman, Paul Teicholz, Rafael Sacks and Kathleen Liston, John Wiley & Sons, 2008.
6. BIM and Construction Management: Proven tools, Methods, and Workflows, Brad Hardin, Sybex, 2009.
7. Building Information Modeling: BIMin Current and Future Practice, Karen Kensek and Douglas Noble, Wiley, 2014, First Edition.

ONLINE LEARNING RESOURCES

<https://minnodillc.com/building-information-modeling-bim/>

<https://www.skyfilabs.com/online-courses/building-information-modelling course>

CO-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	PS O1	PS O2
CO-1	3	2	2	2	3	1	-	-	-	1	-	2	3	3
CO-2	3	3	3	3	3	2	-	-	-	-	-	2	3	3
CO-3	3	3	3	3	3	3	1	-	-	-	-	2	3	3
CO-4	3	3	3	3	3	3	1	-	-	-	-	2	3	3
CO-5	2	2	2	2	3	3	1	-	-	1	1	2	2	2



III B.Tech. - V Semester

23CIV361P	DOMAIN SPECIFIC WORKSHOP	L	T	P	C
	(Common to All Branches)	-	-	-	0

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To provide students with hands-on exposure to advanced and emerging technologies relevant to their domain of study.
2. To enhance practical knowledge, technical competency, and industry-oriented skills through intensive workshop sessions.
3. To bridge the gap between academic learning and current industrial practices by engaging students in application-based learning experiences.

INSTRUCTION GUIDELINES:

1. A Department Specific Workshop (DSW) shall be conducted after the completion of the III Year – V Semester.
2. The details of the workshop shall be reflected in the III Year – VI Semester marks memorandum with "0" credits.
3. Every student shall undergo a One-Week Domain Specific Workshop after the completion of the III Year – V Semester examinations. The workshop shall focus on advanced and emerging technologies relevant to the respective department/discipline.
4. Participation in the workshop is mandatory for all students. Attendance shall be recorded for all sessions conducted during the workshop period.
5. An examination for 50 marks shall be conducted on the last day of the workshop. A student must secure a minimum of 40% marks (20 out of 50) to qualify for the successful completion certificate.
6. Students who fail to secure the minimum qualifying marks shall appear for a supplementary examination in the subsequent semester.
7. The workshop shall be organized by the respective department in association with industry experts, academic professionals, or recognized training organizations, wherever applicable.
8. The concerned department shall maintain a Complete Program Report (CPR) comprising the workshop brochure, invitation letters to resource persons, bio-data of the experts, session-wise reports with attendance records, photographic evidence, participant feedback analysis, and detailed session-wise content coverage. The complete report shall be preserved in the department for academic and accreditation purposes. Further, the award list of shall be submitted to the Examination Section for the further necessary academic processing.
9. The evaluation and certification process shall be monitored by the concerned department and approved by the Head of the Institution.



COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
C01	Demonstrate knowledge of advanced concepts, tools, and technologies related to the selected domain-specific workshop.	PO1
C02	Analyze real-world engineering problems using appropriate domain-specific techniques and methodologies.	PO2
C03	Design and develop simple solutions, models, or applications using the tools and technologies covered in the workshop.	PO3
C04	Apply modern engineering and IT tools effectively for solving domain-related problems.	PO5
C05	Understand and follow professional ethics, safety practices, and responsible conduct while carrying out workshop activities.	PO8
C06	Work effectively as an individual and as a member of a multidisciplinary team during hands-on sessions and project activities.	PO9
C07	Communicate technical ideas, observations, and outcomes effectively through reports, presentations, and discussions.	PO10
C08	Recognize the need for continuous learning and skill enhancement in emerging technologies relevant to their professional career.	PO12

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
CO	3	3	3	-	3	-	-	3	3	3	-	3



IV B. Tech-VII Semester					
Course Code	FINITE ELEMENT METHODS	L	T	P	C
23CIV471T		3	0	0	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

The objectives of this course are to make the student to:

1. **Understand** the fundamental principles of the Finite Element Method (FEM) and its applications in structural analysis.
2. **Apply** the concepts of elasticity, stress-strain relationships, and displacement functions in FEM.
3. **Develop** finite element formulations for 1D, 2D, and 3D elements.
4. **Analyze** bar, beam, and plane stress/strain problems using shape functions and stiffness matrices.
5. **Implement** solution techniques such as numerical integration, static condensation, and element assembly.

UNIT- I

Introduction to Finite Element Method – Basic Equations in Elasticity Stress – Strain Equation – Concept of Plane Stress – Plane Strain Advantages and Disadvantages of FEM. Element Shapes – Nodes – Nodal Degree of Freedom Displacement Function – Natural Coordinates – Strain Displacement Relations.

UNIT- II

Lagrangian – Serendipity Elements – Hermite Polynomials – Regular, Irregular 2D & 3D – Element – Shape Functions Up to Quadratic formulation. Finite Element Analysis (FEA) of – One-Dimensional Problems – Bar Element – Shape Functions Stiffness Matrix – Stress – Strain Relation

UNIT- III

FEA Beam Elements – Stiffness Matrix – Shape Function – Analysis of Continuous Beams.

UNIT- IV

FEA Two-Dimensional Problem – CST – LST Element – Shape Function – Stress – Strain. Isoperimetric formulation – Concepts of, Isoperimetric Elements for 2D Analysis – Formulation of CST Element.

UNIT- V

Solution Techniques: Numerical Integration, Static Condensation, Assembly of Elements and Solution Techniques for Static Loads.



COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the basic principles, advantages, and limitations of FEM in engineering applications.	PO1, PO2, PO3
CO2	Derive shape functions and stiffness matrices for 1D bar and beam elements.	PO1, PO2, PO3
CO3	Analyze continuous beams and plane stress/strain problems using FEM.	PO1, PO2, PO3, PO4
CO4	Develop is parametric formulation for 2D elements such as CST and LST.	PO1, PO2
CO5	Implement solution techniques for assembling elements and solving FEM equations.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. A first course in Finite Element Method by Daryl L. Logan, 5th Edition, Cengage Learning India Pvt. Ltd.
2. Introduction to finite Elements in Engineering by Tirupathi R. Chandru Patla, and Ashok D. Bele Gundu, Prentice Hall of India

REFERENCE BOOKS:

1. Finite Element Analysis by P. Seshu, PHI Learning Private Limited
2. Concepts and applications of Finite Element Analysis by Robert D. Cook et al., Wiley India Pvt. Ltd.
3. Applied Finite Element Analysis by G. Ramamurti, I.K. International Publishing House Pvt. Ltd.

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/105/105105041/#>

<https://archive.nptel.ac.in/noc/courses/noc22/SEM1/noc22-me43/>

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	2	2	2	2	-	-	-	-	-	-	2	3	3
CO-2	3	3	3	3	3	-	-	-	-	-	-	2	3	3
CO-3	3	3	3	3	3	-	-	-	-	-	-	2	3	3
CO-4	3	3	3	3	3	-	-	-	-	-	-	2	3	3
CO-5	2	2	2	2	3	-	-	-	-	1	-	2	2	2



IV B.Tech. - VII Semester

23HSM471C	MANAGEMENT ELECTIVE	L	T	P	C
		2	0	0	2

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES: The objectives of this course are

- 1 To provide fundamental knowledge on Management, Administration, Organization & its concepts.
- 2 To make the students understand the role of management in Production
- 3 To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training & Development, job evaluation and Merit rating concepts
- 4 To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management
- 5 To make the students aware of the contemporary issues in modern management

UNIT- I INTRODUCTION TO MANAGEMENT :

(9)

Management - Concept and meaning - Nature-Functions - Management as a Science and Art and both. Schools of Management Thought- Taylor's Scientific Theory-Henry Fayal's principles - Elton Mayo's Human relations.

Organizational Designs - Line organization - Line & Staff Organization - Functional Organization - Matrix Organization-Project Organization - Committee form of Organization - Social responsibilities of Management.

UNIT - II OPERATIONS MANAGEMENT:

(9)

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), Work Study- Statistical Quality Control- **Material Management** - Objectives - Inventory- Functions - Types, Inventory Techniques - EOQ-ABC Analysis - **Marketing Management** - Concept - Meaning - Nature-Functions of Marketing - Marketing Mix - Channels of Distribution - Advertisement and Sales Promotion - Marketing Strategies based on Product Life Cycle.

UNIT - III HUMAN RESOURCES MANAGEMENT (HRM):

(9)

HRM - Definition and Meaning - Nature - Managerial and Operative functions - Job Analysis - Human Resource Planning(HRP) - Employee Recruitment-Sources of Recruitment - Employee Selection - Process - Employee Training and Development - methods - Performance Appraisal Concept - Methods of Performance Appraisal - Placement - Employee Induction - Wage and Salary Administration

UNIT - IV STRATEGIC & PROJECT MANAGEMENT:

(9)

Definition& Meaning - Setting of Vision - Mission - Goals - Corporate Planning Process - Environmental Scanning - Steps in Strategy Formulation and Implementation - SWOT Analysis

- **Project Management** - Network Analysis - Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Probability of Completing the project within given time - Project Cost- Analysis - Project Crashing (Simple problems).

UNIT - V CONTEMPORARY ISSUES IN MANAGEMENT:

(9)

Customer Relations Management(CRM) - Total Quality Management (TQM) - Six Sigma Concept

Supply Chain Management(SCM) - Enterprise Resource Planning (ERP) - Performance Management - employee engagement and retention - Business Process



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Re-engineering and
Bench Marking - Knowledge Management – change management –sustainability and
corporate social responsibility.

TOTAL HOURS: 45

Text Books:

Frederick S. Hillier, Mark S. Hillier. *Introduction to Management Science*, October 26, 2023

A.R Aryasri, *Management Science*, TMH, 2019

References:

1. Stoner, Freeman, Gilbert. *Management*, Pearson Education, New Delhi, 2019.
2. Koontz & Weihrich, *Essentials of Management*, 6/e, TMH, 2005.
3. Thomas N.Duening & John M.Ivancevich, *Management Principles and Guidelines*, Biztantra.
4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2004.
5. Samuel C.Certo, *Modern Management*, 9/e, PHI, 2005

ONLINE RESOUECES:

1. <https://www.slideshare.net/slideshow/introduction-to-management-and-organization-231308043/231308043>
2. <https://nptel.ac.in/courses/112107238>
3. <https://archive.nptel.ac.in/courses/110/104/110104068/>
4. <https://archive.nptel.ac.in/courses/110/105/110105069/>
5. https://onlinecourses.nptel.ac.in/noc24_mg112/



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

IV B.Tech. - VII Semester

23CIV472A	BRIDGE ENGINEERING	L	T	P	C
		3	-	-	3

PRE-REQUISITES: A Course on Structural analysis and design of reinforced structures.

COURSE EDUCATIONAL OBJECTIVES:

1. To explain the loading standards
2. To study the design of deck slab bridge.
3. To study the design of the T-beam bridge
4. To study the design of the plate girder bridge and rocker and roller bearings
5. To explain features, forces acting on piers and abutments

UNIT I: INTRODUCTION TO LOADING STANDARDS (9)

Highway Bridge Loading Standards- Impact Factor- Railway Bridge Loading Standards (B.G. ML Bridge) Various Loads in Bridges. IRC Bridge loading standards.

UNIT II: DECK SLAB BRIDGE (9)

Introduction – Effective Width Method of Analysis Design of Deck Slab Bridge (Simply Supported) Subjected to Class AA Tracked Vehicle Only.

UNIT III: BEAM AND SLAB BRIDGE (T-BEAM BRIDGE) (9)

General Features – Design of Interior Panel of Slab – Pigeauds Method – Design of a T-Beam Bridge Subjected to Class AA Tracked Vehicle Only.

UNIT IV: DESIGN OF PLATE GIRDER BRIDGE AND BEARINGS (9)

Plate Girder Bridge: Introduction – Elements of a Plate girder and their Design. Design of a Deck Type Welded Plate Girder.

Bridge bearings: General Features – Types of Bearings – Design Principles of Steel Rocker & Roller Bearings.

UNIT V: INTRODUCTION TO PIERS & ABUTMENTS (9)

General Features – Bed Block – Materials Piers & Abutments Types of Piers – Forces Acting on Piers – Stability Analysis of Piers – General Features of Abutments – Forces Acting on Abutments – Stability Analysis of Abutments.

Total Hours: 45



COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the loading standards	PO1, PO2
CO2	Design the deck slab bridge	PO1, PO2, PO3, PO5
CO3	Design the T-beam bridge	PO1, PO2, PO3, PO5
CO4	Design the plate girder bridge and rocker and roller Bearings	PO1, PO2, PO4
CO5	Understand the Stability analysis of pier and abutment	PO1, PO4

TEXTBOOKS:

1. Ponnu Swami," Bridge Engineering", Tata Mcgraw Hill Company, New Delhi
2. N. Krishnam Raju," Design of Bridges", Oxford & IBH, Publishing Company Pvt.Ltd. Delhi

REFERENCE BOOKS:

1. B.C. Punmia, Ashok Kumar Jain and Arun KumarJain," Design of Steel Structures", Laxmi Publications, New Delhi.
2. D.J.Victor, " Essentials of Bridge Engineering", Oxford IBH Publishers Ltd
3. T.R.Jagadish & M.A.Jayaram, "Design of Bridges Structure", Prentice Hall of India Pvt., Delhi.
4. Relevant – IRC & Railway Bridge Codes.

REFERENCE WEBSITES:

<https://nptel.ac.in/courses/105/105/105105165/>

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	2	3	-	-	-	-	-	-	-	-	-	-
CO.2	1	2	2	-	1	-	-	-	-	-	-	-
CO.3	1	2	2	-	1	-	-	-	-	-	-	-
CO.4	2	2	-	1	-	-	-	-	-	-	-	-
CO.5	2	-	-	1	-	-	-	-	-	-	-	-
CO*	1.6	2.25	2	1	1	-	-	-	-	-	-	-



IV B. Tech-VII Semester					
Course Code	GEO SYNTHETICS AND REINFORCED EARTH STRUCTURES (PE – IV)	L	T	P	C
23CIV472C		3	0	0	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

The objectives of this course are to make the student to:

1. Understand the concept and applications of reinforced earth, including friction coefficient determination.
2. Analyze the classification, functions, and durability aspects of geosynthetics and their advantages over conventional materials.
3. Design reinforced earth retaining walls considering stability mechanisms and material selection.
4. Evaluate the performance of reinforced embankments and their foundation mattresses for settlement and stability control.
5. Develop reinforced soil beds and analyze reinforced pavements using standard design approaches.

UNIT- I Reinforced Earth: Concept, Effects of Reinforcement on Soils – Equal Confining and Pseudo Cohesion Concepts, Materials, Friction Coefficient – Definition, Laboratory Determination, Factors Affecting Friction Coefficient; Application of Reinforced Earth

UNIT- II Geosynthetics - Advantages Over Conventional Materials - Classification Based on Material Type and Function - Types of Geosynthetics - Functions of Geosynthetics - Tests on Geosynthetics - Durability Aspects of Geosynthetics - Applications of Geosynthetics

UNIT- III Reinforced Earth Retaining Walls: Introduction, Stability Mechanisms, Design of Reinforced Earth Retaining Wall - Selection of Materials - Geotechnical Analysis - Reinforcement Layout and Spacing - Stability Analysis -Advantages Over Conventional Retaining Walls

UNIT- IV Reinforced Embankments: Introduction, Design of Reinforced Embankment, Foundation Mattress Below the Embankment - Purpose and Function of Foundation Mattresses - Components of Reinforced Mattress - Design of Reinforced Mattress - Design Calculations for Settlement Control, Bearing Capacity, and Long-Term Performance. Field Implementation and Monitoring Techniques

UNIT- V Reinforced Soil Beds: Introduction, Factors Affecting the Behavior of Reinforced Soil Beds, Analysis and Design Reinforced Pavements: Benefits of Placing Reinforcement in Flexible Pavement Layers, Design of Reinforced Pavements by Giroud and Noi ray Approach and Modified CBR Method.



COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Explain the fundamentals of reinforced earth and analyze the effects of reinforcement on soil properties.	PO1, PO2, PO3
CO2	Compare different types of geo synthetics, their functions, and durability aspects in geotechnical applications.	PO1, PO2, PO3
CO3	Design reinforced earth retaining walls considering stability mechanisms and reinforcement layouts.	PO1, PO2, PO3, PO4
CO4	Evaluate reinforced embankments and foundation mattresses with respect to settlement and load-bearing capacity.	PO1, PO2
CO5	Design and analyze reinforced pavements and soil beds using standard methodologies.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. An Introduction to Soil Reinforcement and Geosynthetics|| By G.L. Siva Kumar Babu, University Press
2. Fundamentals of Geosynthetics Engineering, Sanjay Kumar Shukla and Jian-Hua Yin, CRC Press, 2017, 1st edition.
3. Reinforced Soil and its Engineering Applications, Swami Saran, I.K. International Publishing House Pvt. Ltd., 2019, 1st edition.

REFERENCEBOOKS:

1. Designing with Geosynthetics by Robert M Koerner, R.M. Pearson Education Inc., 2012, 6th edition
2. Advances in Geosynthetics by G. Venkatappa Rao, Sai Master Geo environmental Services Pvt. Ltd. Publications
3. Designing with Geosynthetics, Koerner, R.M., Pearson Education Inc., 2012, 6th edition
4. IS:13162-1992; IS:14293& 94-1995; IS:14324-1995; IS:14714-1999, Geotextiles – Methods of Tests
5. IRC: SP:102-2014: Guidelines for design and construction of reinforced soil walls

ONLINE LEARNING RESOURCES

<https://archive.nptel.ac.in/courses/105/106/105106052/>
https://onlinecourses.nptel.ac.in/noc20_ce06/preview

CO-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	PS 01	PS 02
CO-1	2	1	1	1	-	1	1	-	-	1	-	1	1	1
CO-2	2	1	2	1	1	-	1	-	-	-	-	1	1	1
CO-3	2	1	2	1	1	-	1	-	-	-	-	1	1	1
CO-4	2	1	2	1	1	1	1	-	-	-	-	1	1	1
CO-5	2	1	2	1	1	1	2	-	-	-	-	1	2	1



IV B. Tech-VII Semester					
Course Code	RAILWAYS, AIRPORTS, DOCKS AND HARBOR ENGINEERING (PE-IV)	L	T	P	C
23CIV472D		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the components and geometric design principles of railway tracks.
2. **Analyze** the principles of railway track design, signaling, and interlocking.
3. **Evaluate** airport site selection, runway orientation, and terminal area planning.
4. **Design** runways and taxiways based on aircraft characteristics and geometric elements.
5. **Assess** the requirements and classification of ports, harbors, docks, and navigation aids.

UNIT- I Railway Engineering

Introduction – Permanent Way Components – Cross Section of Permanent Way – Functions and Requirements of Rails, Sleepers and Ballast – Types of Gauges – Creep of Rails – Theories Related to Creep – Coning of Wheels – Adzing of Sleepers – Rail Fastenings

UNIT- II Geometric Design of Railway Track

Gradients – Grade Compensation – Can't and Negative Super Elevation – Can't Deficiency – Degree of Curves – Safe Speed on Railway Track – Points and Crossings – Layout and Functioning of Left Hand Turn Out and Right-Hand Turn Outs – Station Yards – Signaling and Interlocking

UNIT- III Airport Engineering

Airport Site Selection – Factors Affecting Site Selection and Surveys- Runway Orientation – Wind Rose Diagram – Basic Runway Length – Correction for Runway Length – Terminal Area – Layout and Functions – Concepts of Terminal Building – Simple Building, Linear Concept, Pier Concept and Satellite Concept – Typical Layouts

UNIT- IV Geometric design of run way sand taxiways

Aircraft Characteristics – Influence of Characteristics on Airport Planning and Design – Geometric Design Elements of Runway – Standards and Specifications - Functions of Taxiways – Taxiway Geometric Design – Geometric Elements and Standard Specifications – Runway and Taxiway Lighting.

UNIT V – Ports and Harbors

Harbours - Requirements of Ports and Harbors – Types of Ports – Classification of Harbors – Docks and Types of Docks – Dry Docks, Wharves and Jetties – Breakwaters: Layouts of Different Types of Harbors and Docks – Dredging Operations – Navigation Aids



COURSE OUTCOMES:

After successful completion of this course, students will be able to:		POs related to COs
CO1	Explain railway track components, functions, and requirements.	PO1, PO2, PO3
CO2	Apply geometric design principles to railway track layout and interlocking systems.	PO1, PO2, PO3
CO3	Evaluate airport planning aspects, including site selection, runway design, and terminal planning.	PO1, PO2, PO3, PO4
CO4	Design runways and taxiways based on geometric standards and safety regulations.	PO1, PO2
CO5	Analyze ports and harbor structures, including docks, breakwaters, and navigation aids.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. A Text Book of Railway Engineering-S.C. Saxena and S. Arora, Dhan Patrai and Sons, New Delhi 2010
2. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian, Scitech Publishers

REFERENCEBOOKS:

1. Harbour, Dock and Tunnel Engineering – R. Srinivasan, Cha Rotar Publishing House Pvt. Limited, 200
2. Railway Track Engineering by J.S. Mundrey McGraw Hill Education 5th edition 2017
3. A Text book of Transportation Engineering – S.P. Chandola – S. Chand & Co. Ltd. – (2001)

Online Learning Resources:

<https://nptel.ac.in/courses/105107123>

<https://archive.nptel.ac.in/courses/114/106/114106025/>

<https://www.mkube.co.in/product-detail/railways-airports-docks-and-harbour-engineering>

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	1	1	-	-	1	-	-	-	1	-	1	1	1
CO-2	3	2	2	1	2	-	-	-	-	-	-	1	2	1
CO-3	3	2	3	2	2	-	1	-	-	-	-	1	2	2
CO-4	3	1	2	2	3	1	-	-	-	-	-	1	2	2
CO-5	3	2	2	1	2	1	-	-	-	-	-	1	2	1



IV B. Tech-VII Semester					
Course Code	EXPERIMENTAL STRESS ANALYSIS (PE-IV)	L	T	P	C
23CIV472B		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. Understand the principles and advantages of experimental stress analysis.
2. Explain strain measurement techniques using strain gauges and their applications.
3. Analyze strain rosettes and apply non-destructive testing methods for concrete.
4. Understand the fundamental principles of photoelasticity and its applications.
5. Apply two-dimensional photoelasticity methods for stress analysis in materials.

UNIT- I PRINCIPLES OF EXPERIMENTAL APPROACH

Merits of Experimental Analysis Introduction, Uses of Experimental Stress Analysis Advantages of Experimental Stress Analysis, Different Methods –Simplification of Problems

UNIT- II STRAIN MEASUREMENT USING STRAIN GAUGES

Definition of Strain and Its Relation of Experimental Determinations Properties of Strain-Gauge Systems-Types of Strain Gauges –Mechanical, Acoustic and Optical Strain Gauges. Introduction to Electrical Strain Gauges - Inductance Strain Gauges – LVDT – Resistance Strain Gauges – Various Types –Gauge Factor – Materials of Adhesion Base

UNIT- III STRAIN ROSSETTE S AND NON-DESTRUCTIVETESTING OF CONCRETE

Introduction – The Three Elements Rectangular Rosette – The Delta Rosette Corrections for TransverseStrainGauge.UltrasonicPulseVelocityMethod–ApplicationtoConcrete. Hammer Test–Application to Concrete.

UNIT- IV THEORY OF PHOTO ELASTICITY

Introduction –Temporary Double Refraction – The Stress Optic Law –Effects of Stressed Modeling A Polar Scope for Various Arrangements – Fringe Sharpening. Brewster `s Stress Optic Law

UNIT- V TWO-DIMENSIONAL PHOTO ELASTICITY

Introduction – Isocratic Fringe Patterns- Isoclinic Fringe Patterns Passage of Light Through Plane Polariscope and Circular Polariscope - Isoclinic Fringe Patterns – Compensation Techniques – Calibration Methods – Separation Methods – Scaling Model to Prototype Stresses – Materials for Photo – Elasticity Properties of Photo elastic Materials.



COURSE OUTCOMES:

Upon successful completion of the course, students will be able to:		POs related to COs
CO1	Explain the principles and merits of experimental stress analysis.	PO1, PO2, PO3
CO2	Demonstrate strain measurement using various strain gauge techniques.	PO1, PO2, PO3
CO3	Analyze strain rosette data and evaluate concrete structures using NDT methods.	PO1, PO2, PO3, PO4
CO4	Apply the theory of photoelasticity to determine stress distributions in materials.	PO1, PO2
CO5	Utilize two-dimensional photoelasticity techniques for experimental stress analysis.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Experimental stress analysis by J.W. Dally and W.F. Riley, College House Enterprises 2005
2. Experimental stress analysis by Dr. Sadhu Singh. Khanna Publishers 4th edition

REFERENCEBOOKS:

1. Experimental Stress analysis by U.C Jindal, Pearson Publications 2012 edition
2. Experimental Stress Analysis by L.S. Srinath, MC. Graw Hill Company Publishers

ONLINE LEARNING RESOURCES

<https://archive.nptel.ac.in/courses/112/106/112106068/#>

<https://archive.nptel.ac.in/courses/112/106/112106198/#>

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	2	-	-	-	2	-	-	-	1	-	1	1	1
CO-2	3	2	2	2	2	3	-	-	-	-	-	1	2	2
CO-3	2	2	3	2	2	3	2	-	-	-	-	1	2	2
CO-4	3	2	2	2	2	3	2	-	-	-	-	1	2	2
CO-5	2	2	2	2	2	3	2	-	-	-	-	1	2	2



IV B. Tech-VII Semester					
Course Code	GROUND IMPROVEMENT TECHNIQUES (PE-V)	L	T	P	C
23CIV473A		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** various dewatering methods, including sumps, well points, and electro osmosis, for effective groundwater control.
2. **Analyze** the properties and applications of grouts, grouting techniques, and post grouting tests for soil and rock stabilization.
3. **Evaluate** different densification techniques for granular and cohesive soils, such as vibro-compaction, preloading, and thermal methods.
4. **Apply** stabilization techniques, including mechanical, chemical, and bituminous stabilization, to improve soil properties.
5. **Assess** the design principles of reinforced earth walls and the role of geosynthetics in soil improvement and slope stability. (Bloom's Level: Evaluate - L5)

UNIT- I EXPANSIVE SOILS: Problems of Expansive Soils – Tests for Identification – Methods of Determination of Swell Pressure. Improvement of Expansive Soils – Foundation Techniques in Expansive Soils – Under Reamed Piles.

UNIT- II DEWATERING: Methods of De-Watering- Sumps and Interceptor Ditches- Single, Multi Stage Well Points - Vacuum Well Points- Horizontal Wells-Foundation Drains-Blanket Drains- Criteria for Selection of Fill Material Around Drains –Electro-Osmosis

GROUTING: Objectives of Grouting- Grouts and Their Properties- Grouting Methods-Ascending, Descending and Stage Grouting- Hydraulic Fracturing in Soils and Rocks- Post Grout Test

UNIT- III DENSIFICATION METHODS IN GRANULAR SOILS: -In – Situ Densification Methods in Granular Soils: – Vibration at the Ground Surface, Impact at The Ground Surface, Vibration at Depth, Impact at Depth. **DENSIFICATION METHODS IN COHESIVE SOILS:**

– In – Situ Densification Methods in Cohesive Soils: – Preloading or Dewatering, Vertical Drains – Sand Drains, Sand Wick Geo drains – Stone and Lime Columns – Thermal Methods

UNIT- IV STABILISATION: Methods of Stabilization-Mechanical-Cement- Lime-Bituminous Chemical Stabilization with Calcium Chloride, Sodium Silicate and Gypsum

UNIT- V REINFORCED EARTH: Principles – Components of Reinforced Earth – Factors Governing Design of Reinforced Earth Walls – Design Principles of Reinforced Earth Walls.

GEOSYNTHETICS: Geotextiles- Types, Functions and Applications – Geogrids and Geo Membranes – Functions and Applications



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to:		POs related to COs
CO1	Explain the principles and merits of experimental stress analysis.	PO1, PO2, PO3
CO2	Demonstrate strain measurement using various strain gauge techniques.	PO1, PO2, PO3
CO3	Analyze strain rosette data and evaluate concrete structures using NDT methods.	PO1, PO2, PO3, PO4
CO4	Apply the theory of photoelasticity to determine stress distributions in materials.	PO1, PO2
CO5	Utilize two-dimensional photoelasticity techniques for experimental stress analysis.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Engineering Principles of Ground Modification, Haussmann M.R. , McGraw-Hill International Edition (1990).
2. Ground Improvement Techniques, Dr. P. Purushottam Raj. Laxmi Publications, New Delhi University science press, New Delhi 2nd edition 2016

REFERENCE BOOKS:

1. Ground Improvement, Moseley M.P. Blackie Academic and Professional, Boca Taton, Florida, USA(1993).
2. Ground Improvement Techniques, Nihar Ranajan Patra Vikas Publications, New Delhi
3. Ground Control and Improvement, Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) John Wiley and Sons, New York, USA.

ONLINE LEARNING RESOURCES

<https://archive.nptel.ac.in/courses/105/108/105108075/>
<https://archive.nptel.ac.in/courses/105/105/105105210/>

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	2	2	2	1	-	-	-	-	2	-	1	2	2
CO-2	3	3	2	2	2	-	-	-	-	2	-	2	2	2
CO-3	3	3	3	2	2	-	-	-	-	2	-	2	3	2
CO-4	3	2	3	3	3	-	-	-	-	2	1	2	3	3
CO-5	3	3	3	3	3	-	-	-	-	2	1	2	3	3



IV B. Tech-VII Semester					
Course Code	SUBSURFACE INVESTIGATION AND INSTRUMENTATION (PE-V)	L	T	P	C
23CIV473B		3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. **Understand** the fundamental concepts of soil formation, classification, and stratification processes.
2. **Analyze** various soil exploration methods, including boring, drilling, and sampling techniques.
3. **Evaluate** borehole logging methods and groundwater observations for site investigation.
4. **Apply** field testing techniques such as SPT, PLT, PMT, CPT, and geophysical methods to assess soil properties.
5. **Assess** soil exploration report preparation, including instrumentation and data interpretation.

UNIT- I Introduction: Soil formation, Types of Soils, Physical and Chemical Weathering, Soil Transport, Deposition and Stratification Phenomena and Soil Classification.

UNIT- II Methods of Soil Exploration: Methods of Boring, Auguring and Drilling. Machinery Used for Drilling, Types of Augers and Their Usage for Various Projects. Soil Sampling: Sampling Methods, Types of Samples, Storage of Samples and Their Transport. Sample Preparation, Sample Sizes, Types of Samplers 's Specifications for Testing.

UNIT- III Borehole Logging: Logging of Boreholes - Logging Methods - Groundwater Observations - Water Table Fluctuations and Effects - Preparation of Soil Profiles and Exploration Report.

UNIT- IV Field Testing of Soils: Methods and Specifications - Visual Identification Tests, Standard Penetration Test (SPT), Plate Load Test (PLT), Pressure Meter Test (PMT) Dilatometer Test (DMT) Vane Shear Test (VST), Cone Penetration Test (CPT), Becker Penetration Test (BPT), Analysis of Test Results. Geophysical Methods of Soil Exploration- Seismic Refraction, Electrical Resistivity, Cross Hole Test.

UNIT- V Report Writing: Soil Exploration Reports- Identification, Calculations and Preparation. Field Instrumentation: Strain Gauges, Piezometer, Pressure Cells, Inclometers, Proving Ring, Load Cells, Displacement Gauges



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to:		POs related to COs
CO1	Explain the principles and merits of experimental stress analysis.	PO1, PO2, PO3
CO2	Demonstrate strain measurement using various strain gauge techniques.	PO1, PO2, PO3
CO3	Analyze strain rosette data and evaluate concrete structures using NDT methods.	PO1, PO2, PO3, PO4
CO4	Apply the theory of photoelasticity to determine stress distributions in materials.	PO1, PO2
CO5	Utilize two-dimensional photoelasticity techniques for experimental stress analysis.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Site Investigation, Clayton C. R., Matthews M. C and Simons N. E., Blackwell Science. 2005
2. Geotechnical Instrumentation for Monitoring Field Performance, John Dunn cliff, Wiley Inter science, 2008

REFERENCE BOOKS:

1. Basic and Applied Soil Mechanics- A.S. Rao and Gopal Ranjan, New Age International.
2. IS:1892-Code of Practice for subsurface investigation for foundation, 1979
3. IS: SP36 Part 1-Compendium of India Standards on Soil Engineering-Laboratory Testing of Soils for Civil Engineering Purposes, 1987.
4. IS: SP36 Part 2-Compendium of India Standards on Soil Engineering-Field Testing of Soils for Civil Engineering Purposes, 1988.

ONLINE LEARNING RESOURCES

<https://archive.nptel.ac.in/courses/105/103/105103182/>

https://onlinecourses.nptel.ac.in/noc25_ce27/preview

https://onlinecourses.nptel.ac.in/noc22_ce81/preview

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO-1	3	2	1	2	1	2	2	1	-	2	-	2	2	2
CO-2	3	3	2	3	2	2	3	1	-	2	-	2	2	2
CO-3	3	3	3	3	3	2	3	2	-	2	-	2	3	3
CO-4	3	2	3	3	3	3	3	2	-	2	2	2	3	3
CO-5	3	3	3	3	3	3	3	2	-	2	2	2	3	3



IV B. Tech-VII Semester					
Course Code	TRANSPORTATION ECONOMICS	L	T	P	C
23CIV473C	(PE-V)	3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. Understand the fundamentals of transportation project development and decision making.
2. Analyze transportation costs, including agency and user costs.
3. Evaluate vehicle operating costs and traffic congestion economics.
4. Apply economic evaluation methods for transportation projects.
5. Assess financing methods and risk analysis in transportation projects.

UNIT- I

Introductory Concepts in Transportation Decision Making: Overall Transportation Project Development, Budgeting, Financial Planning, The Process of Transportation Project Development, Models Associated with Transportation Impact Evaluation Professional Ethics.

UNIT- II

UNIT - II Transportation Costs - Classification of Transportation Costs, Transportation Agency Costs, Transportation User Costs, General Structure and Behavior of Cost Functions and Road Pricing. Estimating Transportation Demand and Supply - Supply Equilibration, Dynamics of Transportation Demand and Supply, Elasticity of Travel Demand and Supply, Classification of Elasticity

UNIT- III

Vehicle Operating Costs: Fuel Costs - Maintenance and Spares, Depreciation - Crew Costs - Value of Travel Time Savings - Accident Costs. Economics of Traffic Congestion - Pricing Policy

UNIT- IV

Economic Analysis of Projects - Methods of Evaluation - Cost-Benefit Ratio, First Year Rate of Return, Net Present Value, and Internal-Rate of Return Methods; Indirect Costs and Benefits of Transport Projects

UNIT- V

Financing of Road Projects - Methods - Private Public Partnership (PPP) - toll Collection - Economic Viability of Design-Build-Operate-Transfer Schemes - Risk Analysis - Value for Money Analysis - Case Studies.



COURSE OUTCOMES:

Upon successful completion of the course, students will be able to:		POs related to COs
CO1	Explain the principles and merits of experimental stress analysis.	PO1, PO2, PO3
CO2	Demonstrate strain measurement using various strain gauge techniques.	PO1, PO2, PO3
CO3	Analyze strain rosette data and evaluate concrete structures using NDT methods.	PO1, PO2, PO3, PO4
CO4	Apply the theory of photoelasticity to determine stress distributions in materials.	PO1, PO2
CO5	Utilize two-dimensional photoelasticity techniques for experimental stress analysis.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Winfrey, Economic analysis for Highways, International Textbook Company, Pennsylvania, 1969.
2. Sarkar, P. K., and Maitri, V., Economics in Highway and Transportation Planning, Standard Publisher, New Delhi, 2010.

REFERENCE BOOKS:

1. IRC, Manual on Economic Evaluation of Highway Projects in India, SP30, 2007
2. David, H., and Brewer, A., Transport: An Economics and Management Perspective. Oxford University Press, UK, 2000.
3. Quinet, E., and Vickerman, R., Principles of Transport Economics, Edward Elgar Pub, 2005
4. Button, K. J., Transport Economics, Elgar, 2010

Online Learning Resources

<https://archive.nptel.ac.in/courses/105/104/105104098/>
<https://archive.nptel.ac.in/content/storage2/courses/105101087/01-Ltexhtml/p2/p.html>

CO-MAPPING

Cours e Outco me	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	PS O1	PS O2
CO-1	3	2	2	1	2	-	-	-	-	2	-	2	2	2
CO-2	3	3	3	3	3	-	-	-	-	2	-	2	3	2
CO-3	3	3	3	3	2	-	-	-	-	2	-	2	3	3
CO-4	3	3	3	3	2	-	-	-	-	2	-	2	3	3
CO-5	3	3	3	3	3	3	3	3	-	2	-	2	3	3



IV B.Tech. - VII Semester

23CIV473D	TRAFFIC ENGINEERING	L	T	P	C
		3	-	-	3

PRE-REQUISITES: A Course on Surveying.

COURSE EDUCATIONAL OBJECTIVES:

1. To understand traffic, its properties, measurement, simulation and control
2. To explain Survey methods and data analysis techniques required by traffic engineers
3. To demonstrate Traffic control regulation and signal design.
4. To define the functional area of an intersection and Identify key design elements for intersections.
5. To discuss the pollution due to traffic & its effect on environment

UNIT I: TRAFFIC PLANNING AND CHARACTERISTICS (9)

Road Characteristics – Road user characteristics – PIEV theory – Vehicle – Performance characteristics – Fundamentals of Traffic Flow –PCU, peak hour factor -Traffic Stream Characteristics and Description Using Distributions. Microscopic and Macroscopic Study of Traffic Stream Characteristics - Flow, Speed and Concentration.

UNIT II: TRAFFIC SURVEYS (9)

Traffic Surveys – Speed, journey time and delay surveys – Vehicles Volume Survey including non-motorized transports – Methods and interpretation – Origin Destination Survey – Methods and Presentation – Parking Survey – Accident analyses -Methods, interpretation, and presentation –Statistical applications in traffic studies and traffic forecasting – Level of service – Concept, applications and significance.

UNIT-III: TRAFFIC CONTROL, REGULATION SIGNAL COORDINATION (9)

Traffic Signals –Types of Signals; Principles of Phasing; Timing Diagram; Signal Coordination - Signal Co-ordination methods, Simultaneous, Alternate, Simple progression, and Flexible progression Systems. Measurement, Design of Isolated Traffic Signal by Webster method, Warrants for signalization.

UNIT IV: INTERSECTION DESIGN (9)

Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelization: Objectives –Traffic Islands and Design Criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT V: TRAFFIC SAFETY AND ENVIRONMENT (9)

Road accidents – Causes, effect, prevention, and cost – Street lighting – Traffic and environment hazards – Air and Noise Pollution, causes, abatement measures – Promotion and integration of public transportation – Promotion of non-motorized transport.

Total Hours: 45



COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Analyze traffic Characteristic and plan for traffic systems for various uses	PO1, PO2
CO2	Understanding about traffic studies and methods for carry out traffic studies	PO1, PO2, PO3
CO3	Develop Traffic control, regulation management Systems	PO1, PO4
CO4	Analysis and design intersection	PO1, PO2, PO3
CO5	Understand about traffic safety and environment hazards	PO1, PO2, PO3, PO8

TEXTBOOKS:

1. Kadiyali.L.R, Traffic Engineering and Transport Planning, Khanna Publishers, Delhi, 2013
2. Salter. R.I and Hounsell N.B, Highway Traffic Analysis and design, Macmillan Press Ltd.1996.

REFERENCE BOOKS:

1. Neufert: Architects Data by Wiley- Blackwell, 4 th Edition, Blackwell Publishing Ltd, 2012
2. Traffic Engineering - Theory & Practice, Louis J.Pignataro, Prentice Hall Publication.
3. Principles of Highways Engineering and Traffic Analysis, Fred Mannering & Walter Kilareski, John Wiley & Sons Publication.
4. Transportation Engineering - An Introduction, C.Jotin Khisty, Prentice Hall Publication.
5. Fundamentals of Transportation Engineering, C.S.Papacostas, Prentice Hall India.
6. I.T.E. Traffic Engineering Handbook.

REFERENCE WEBSITES:

<https://nptel.ac.in/courses/105/101/105101008/>

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	2	3	3	-	-	-	-	-	-	-	-	-
CO.3	1	-	-	3	-	-	-	-	-	-	-	-
CO.4	2	3	3	-	-	-	-	-	-	-	-	-
CO.5	3	2	3	-	-	-	-	2	-	-	-	-
CO*	2.2	2.75	3	3	-	-	-	2	-	-	-	-



IV B. TECH.-VII SEMESTER

23HSM471A	BUSINESS ETHICS AND CORPORATE GOVERNANCE	L	T	P	C
		3	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To make the student understand the principles of business ethics
2. To enable them in knowing about the ethics in management
3. To facilitate the student's role in corporate culture
4. To impart knowledge about the legal Frame-work
5. To provide awareness about the corporate governance

UNIT-I: INTRODUCTION TO ETHICS

(9)

Ethics Introduction – Meaning – Nature, Scope, significance, Loyalty, and ethical behavior. Value systems - Business Ethics - Types, Characteristics, Factors, Contradictions and Ethical Practices in Management Corporate Social Responsibility – Issues of Management – Crisis Management.

UNIT-II: ETHICS IN MANAGEMENT

(9)

Ethics in production, finance, Human resource management and Marketing Management - The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures - Culture and Individual Ethics – professional ethics and technical ethics.

UNIT-III: CORPORATE CULTURE

(9)

Introduction - Meaning, definition, Nature, and significance – Key elements of corporate culture, shared values, beliefs and norms, rituals, symbols and language - Types of corporate culture, hierarchical culture, market driven culture – Organization leadership and corporate culture, leadership styles and their impact on culture, transformational leadership and culture change.

UNIT- IV: LEGAL FRAME WORK

(9)

Law and Ethics -Agencies enforcing Ethical Business Behavior - Legal Impact – Environmental Protection, Fair Trade Practices, legal Compliances, Safeguarding Health and wellbeing of Customers – Corporate law, Securities and financial regulations, corporate governance codes and principles.

UNIT -V: CORPORATE GOVERNANCE

(9)

Introduction - Meaning – Corporate governance code, transparency & disclosure -Role of auditors, board of directors and shareholders. Global issues, accounting and regulatory frame work - Corporate scams - Committees in India and abroad, corporate social responsibility. BoDs composition, Cadbury Committee Various committees - Reports - Benefits and Limitations.

Total Hours:45



At the end of the course, students will be able to		POS
CO1	Understand the Ethics and different types of ethics.	PO6,PO8,PO9,PO10,PO12
CO2	Understand business ethics and ethical practices in management	PO6,PO8,PO9,PO10,PO12
CO3	Understand the role of ethics in management	PO6,PO8,PO9,PO10,PO12
CO4	Apply the knowledge of professional ethics & technical ethics	PO6,PO8,PO9,PO10,PO12
CO5	Analyze corporate law, ethics, codes & principles, Evaluate corporate governance & corporate scams	PO6, PO8,P10,PO12

TEXT BOOKS:

1. Murthy CSV: Business Ethics and Corporate Governance, HPH July 2017
2. Bholananth Dutta, S.K. Podder – Corporation Governance, VBH. June 2010

REFERENCE BOOKS:

1. Dr. K. Nirmala, KarunakaraReaddy. Business Ethics and Corporate Governance, HPH
2. H.R.Machiraju: Corporate Governance, HPH, 2013
3. K. Venkataramana, Corporate Governance, SHBP.
4. N.M.Khandelwal. Indian Ethos and Values for Manager

REFERENCE WEBSITE:

1. https://onlinecourses.nptel.ac.in/noc21_mg46/
2. <https://archive.nptel.ac.in/courses/110/105/110105138/>
3. https://onlinecourses.nptel.ac.in/noc21_mg54/
4. https://onlinecourses.nptel.ac.in/noc22_mg54/
5. <https://archive.nptel.ac.in/courses/109/106/109106117/>

CO-PO MAPPING

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

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES**

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING**IV B. TECH.-VII SEMESTER**

23HSM471B	E-BUSINESS	L	T	P	C
		3	0	0	3

PRE - REQUISITES: NIL**COURSE EDUCATIONAL OBJECTIVES:**

1. To provide knowledge on emerging concept on E-Business related aspects
2. To understand various electronic markets & business models.
3. To impart the information about electronic payment systems & banking.
4. To create awareness on security risks and challenges in E-commerce.
5. To make the students aware on different e-marketing channels & strategies

UNIT – I: ELECTRONIC BUSINESS**(8)**

Introduction – Nature, meaning, significance, functions and advantages - Definition of Electronic Business - Functions of Electronic Commerce (EC)-Advantages & Disadvantages of E-Commerce –E-Commerce and E-Business, Internet Services, Online Shopping- E- Commerce Opportunities for Industries.

UNIT – II: ELECTRONIC MARKETS AND BUSINESS MODELS:**(9)**

Introduction –E-Shops-E-Malls E-Groceries - Portals - Vertical Portals-Horizontal Portals - Advantages of Portals -Business Models- Business to Business (B2B)-Business to Customers (B2C) - Business to Government(B2G)-Auctions-B2B Portals in India

UNIT – III: ELECTRONIC PAYMENT SYSTEMS:**(9)**

Introduction to electronic payment systems (EPS) -Types of electronic payments - Credit/debit cards, e- wallets, UPI, and crypto currencies -Smart cards and digital wallets: Features and usage - Electronic Fund Transfer (EFT): Role in business transactions - Infrastructure requirements and regulatory aspects of e-payments

UNIT – IV: E-SECURITY: (10)

Security risks and challenges in electronic commerce - Cyber threats - Phishing, hacking, identity theft, and malware - Digital Signatures & Certificates - Security protocols over public networks (HTTP, SSL, TLS) - Firewalls in securing e-business platforms.

UNIT – V: E-MARKETING: (9)

Introduction – Online Marketing – Advantages of Online Marketing – Internet Advertisement – Advertisement Methods – Conducting Online Market Research– – E- marketing planning: Online branding, social media marketing, and email marketing - E- business strategies: Digital advertising, content marketing, and analytics E-Customer Relationship Management (e CRM) E-supply chain management (e-SCM)

Total Hours: 45**COURSE OUTCOMES:**

On successful completion of the course, student will be able to		POs
CO1	Outline the concept of E-Business & its scope and functions.	PO9,PO11,PO12
CO2	Apply the E-market-Models in various business situations and organizations	PO9,PO11,PO12
CO3	Analyze the various E-payment systems & importance of net banking	PO8,PO9, PO11,PO12
CO4	Demonstrate the knowledge gained in E -security and its challenges	PO1,PO6,PO8, PO9, PO11,PO12
CO5	Evaluate market research strategies& E-advertisements.	PO8,PO9,PO10, PO11,PO12



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

TEXT BOOKS:

1. Arati Oturkar & Sunil Khilari. E-Business. Everest Publishing House, 2022
2. P.T.S Joseph. E-Commerce, Fourth Edition, Prentice Hall of India, 2011

REFERENCE BOOKS:

1. Debjani, Kamallesh K Bajaj. E-Commerce, Second Edition Tata McGraw-Hill's, 2005
2. Dave Chaffey. E-Commerce E-Management, Second Edition, Pearson, 2012.
3. Henry Chan. E-Commerce Fundamentals and Application, Raymond Leatham Wiley India 2007
4. S. Jaiswal. E-Commerce Galgotia Publication Pvt Ltd., 2003.

REFERENCE WEBSITE:

1. <https://www.slideshare.net/fatimahAlkreem/e-businessppt-67935771>
2. <https://www.slideshare.net/VikramNani/e-commerce-business-models>
3. <https://www.slideshare.net/RiteshGoyal/electronic-payment-system>
4. <https://www.slideshare.net/WelingkarDLP/electronic-security>

CO-PO MAPPING:

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



IV B. TECH.-VII SEMESTER

23HSM471C	MANAGEMENT SCIENCE	L	T	P	C
		3	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide fundamental knowledge on Management, Administration, Organization & its concepts;
2. To make the students understand the role of management in Production;
3. To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training & Development, Job Evaluation and Merit Rating concepts;
4. To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management;
5. To make the students aware of the contemporary issues in modern management.

UNIT- I INTRODUCTION TO MANAGEMENT

(9)

Management - Concept and meaning - Nature-Functions - Management as a Science and Art and both - Schools of Management Thought - Taylor's Scientific Theory - Henry Fayol's principles - Elton Mayo's Human relations - Organizational Designs - Line organization - Line & Staff Organization - Functional Organization - Matrix Organization - Project Organization - Committee form of Organization - Social Responsibilities of Management.

UNIT - II OPERATIONS MANAGEMENT

(9)

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), Work Study - Statistical Quality Control- Material Management - Objectives Inventory-Functions - Types, Inventory Techniques - EOQ - ABC Analysis - Marketing Management - Concept - Meaning - Nature - Functions of Marketing - Marketing Mix - Channels of Distribution - Advertisement and Sales Promotion - Marketing Strategies based on Product Life Cycle.

UNIT - III HUMAN RESOURCES MANAGEMENT (HRM)

(9)

HRM - Definition and Meaning - Nature - Managerial and Operative Functions - Job Analysis Human Resource Planning (HRP) - Employee Recruitment - Sources of Recruitment - Employee Selection - Process - Employee Training and Development - Methods - Performance Appraisal Concept - Methods of Performance Appraisal - Placement Employee Induction - Wage and Salary Administration.

UNIT - IV STRATEGIC & PROJECT MANAGEMENT

(9)

Definition & Meaning - Setting of Vision - Mission - Goals - Corporate Planning Process - Environmental Scanning - Steps in Strategy Formulation and Implementation - SWOT Analysis - Project Management - Network Analysis - Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Probability of Completing the project within given time - Project Cost- Analysis - Project Crashing (Simple problems).

UNIT - V CONTEMPORARY ISSUES IN MANAGEMENT

(9)

Customer Relations Management (CRM) - Total Quality Management (TQM) - Six Sigma Concept - Supply Chain Management (SCM) - Enterprise Resource Planning (ERP) - Performance Management - Employee Engagement and Retention - Business Process Re- engineering and Bench Marking - Knowledge Management - Change Management - Sustainability and Corporate Social Responsibility.

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Remember the concepts & principles of management and designs of organization in a practical world	PO6, PO9, PO10, PO11, PO12
CO2	Understand the knowledge of Work-study principles & Quality Control techniques in industry	PO2, PO9, PO10, PO11, PO12
CO3	Apply the process of Recruitment & Selection in organization.	PO9, PO10, PO11, PO12
CO4	Analyze the concepts of HRM & different training methods.	PO2, PO3, PO4, PO5, PO9, PO10, PO11, PO12
CO5	Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT	PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12

TEXT BOOKS:

1. Frederick S. Hillier, Mark S. Hillier. Introduction to Management Science, October 26, 2023.
2. A.R Aryasri, Management Science, TMH, 2019

REFERENCE BOOKS:

1. Stoner, Freeman, Gilbert. Management, Pearson Education, New Delhi, 2019.
2. Introduction to Management Science, 12e, Bernard W. Taylor, Pearson Education, New Delhi, 2016
3. Koontz & Weihrich, Essentials of Management, 6/e, TMH, 2005.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5. Samuel C. Certo, Modern Management, 9/e, PHI, 2005
6. R.K. Rajput, "A Textbook of Manufacturing Technology: Manufacturing Processes", 2/e, Laxmi Publications (P) Ltd., New Delhi, 2017.

REFERENCE WEBSITE:

1. <https://www.slideshare.net/slideshow/introduction-to-management-and-organization231308043/23130804>
2. <https://nptel.ac.in/courses/112107238>
3. <https://archive.nptel.ac.in/courses/110/104/110104068/>
4. <https://archive.nptel.ac.in/courses/110/105/110105069/>
5. https://onlinecourses.nptel.ac.in/noc24_mq112

CO-PO MAPPING:

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B. Tech-VII Semester

23OEE471A	SMART GRID TECHNOLOGIES	L	T	P	C
	(OE-III)	3	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the evolution, need, architecture, and enabling technologies of Smart Grids with a focus on Indian and international perspectives.
2. To provide fundamental knowledge of synchro-phasor technology and Wide Area Monitoring Systems using PMUs and PDCs.
3. To familiarize students with smart meters, AMR/AMI systems, and their role in demand-side integration and power quality management.
4. To impart understanding of communication technologies and protocols used in Smart Grid information and communication infrastructure.
5. To expose students to Smart Grid applications, renewable and distributed generation integration, advanced energy storage, and cyber security requirements

UNIT-1: Introduction to Smart Grid

(9)

Evolution of Electric Grid – Need for Smart Grid – Difference between conventional & smart grid – Overview of enabling technologies – International experience in Smart Grid deployment efforts – Smart Grid road map for India – Smart Grid Architecture.

UNIT -2: Wide Area Monitoring System

(9)

Fundamentals of Synchro phasor Technology – concept and benefits of Wide Area Monitoring System – Structure and functions of Phasor Measuring Unit (PMU) and Phasor Data Concentrator (PDC) – Road Map for Synchro phasor applications (NAPSI) – Operational experience and Blackout analysis using PMU - Case study on PMU.

UNIT -3: Smart Meters

(9)

Features and functions of Smart Meters – Functional specification – category of Smart Meters – Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) drivers and benefits – AMI protocol – Demand Side Integration: Peak load, Outage and Power Quality management.

UNIT -4: Information and Communication Technology

(9)

Overview of Smart Grid Communication system – Modulation and Demodulation Techniques: Radio Communication – Mobile Communication – Power Line Communication – Optical Fibre Communication – Communication Protocol for Smart Grid.

UNIT -5: Smart Grid Applications and Cyber Security

(9)

Applications: Overview and concept of Renewable Integration – Introduction to distributed generation - Role of Protective Relaying in Smart Grid – House Area Network – Advanced Energy Storage Technology: Flow battery – Fuel cell – SMES – Super capacitors – Plug – in Hybrid electric Vehicles - Cyber Security: Security issues in DG, Distribution Automation, AMI, Electric Vehicle Management Systems – Approach to assessment of smart grid cyber security risks – Methodologies. Cyber Security requirements – Smart Grid Information Model.

Total Hours: 45



COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understanding the Concept and Evolution of Smart Grids	PO1, PO2
CO2	Analyzing Wide Area Monitoring System and Synchrophasor Technology	PO1, PO2, PO3, PO4
CO3	Applying Smart Metering and Advanced Metering Infrastructure (AMI) Concepts	PO1, PO2, PO3,
CO4	Evaluating Information and Communication Technology (ICT) Systems in Smart Grids	PO1, PO2, PO3, PO4
CO5	Designing Smart Grid Applications and Cybersecurity Measures	PO1, PO2,

TEXT BOOKS:

1. James Momoh, "SMART GRID: Fundamentals of Design and Analysis", John Wiley and Sons, New York, 2012.
2. Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, "Smart Grid: Technology and Applications", John Wiley & Sons, New Jersey, 2012.

REFERENCE BOOKS:

1. Power Grid Corporation of India Limited, "Smart Grid Primer", 1st Edition, Power Grid Corporation of India Limited, Bangalore, India, 2013.
2. Fereidoon.P. Sioshansi, "Smart Grid – Integrating Renewable, Distributed and Efficient Energy", 1st Edition, Academic Press, USA, 2011.
3. Stuart Borlase, "Smart Grids: Infrastructure, Technology and Solutions", 1st Edition, CRC Press Publication, England, 2013.
4. Phadke A G, Thorp J S, "Synchronized Phasor Measurements and Their Applications", 1st Edition, Springer, Newyork, 2012.

ONLINE LINKS:

<https://nptel.ac.in/courses/108/107/108107113/>

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B.Tech. - VII Semester

23OCS471A

FUNDAMENTALS OF DATABASE SYSTEMS

L T P C

(OE-III)

3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES

1. Discuss the basic Database concepts and the applications, data models and ER Model.
2. Understand the Relational database design principles
3. Master the basics of SQL and construct queries using SQL.
4. Understand the Normalization process in Database Management System.
5. Familiar with the basic issues of transaction processing and concurrency control.

UNIT -1: INTRODUCTION TO DATABASE MANAGEMENT SYSTEM AND ENTITY RELATIONSHIP MODEL (9)

Database system - Characteristics (Database Vs File System) - Database Users - Advantages of Database systems - Database applications - Brief introduction of different Data Models - Concepts of Schema - Instance and data independence -Three tier schema architecture for data independence

- Database system structure environment - Centralized and Client Server architecture for the database - Introduction to Entity Relationship Model - Representation of entities - Attributes - Entity set - Relationship - Relationship set - Constraints - Sub classes - super class - Inheritance- Specialization -Generalization using ER Diagrams.

UNIT -2: RELATIONAL MODEL (9)

Introduction to Relational model - Concepts of domain - Attribute - Tuple - Relation importance of null values - Constraints (Domain, Key constraints, integrity constraints) and their importance - Relational Algebra, Relational Calculus - BASIC SQL: Simple Database schema - Data Base Language - types- Table definitions (create, alter), different DML operations (insert, delete, update).

UNIT -3: INTRODUCTION TO STRUCTURED QUERY LANGUAGE (9)

Basic SQL querying (select and project) using where clause arithmetic & logical operations - SQL functions(Date and Time, Numeric, String conversion) - Creating tables with relationship, Implementation of key and integrity constraints - Nested queries, sub queries, grouping, aggregation, ordering - Implementation of different types of Joins, view (updatable and non-updatable) - Relational set operations.

UNIT -4: NORMALIZATION (9)

Purpose of Normalization and schema refinement - Concept of functional dependency - normal forms based on functional dependency - Lossless join and dependency preserving decomposition (1NF, 2NF and 3 NF), concept of surrogate key - Boyce-Codd normal form(BCNF) - MVD - Fourth normal form(4NF) - Fifth Normal Form (5NF).

UNIT -5: TRANSACTION CONCEPT AND INDEXING CONCEPTS (9)

Transaction State - ACID properties - Concurrent Executions - Serializability - Recoverability, Implementation of Isolation - Testing for Serializability - Lock based - Time stamp based optimistic - Concurrency protocols - Deadlocks - Failure Classification - Storage, Recovery and



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

Atomicity - Recovery algorithm - Introduction to Indexing Techniques - B+ Trees, operations on B+ Trees - Hash Based Indexing

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrate knowledge on Data models and Database Languages and Design Entity Relationship model for a database	PO1, PO3
CO2	Analyze the relational database theory, and be able to write relational algebra and relational calculus expressions for queries	PO1, PO2
CO3	Analyze and evaluate the database using SQL DML/DDDL	PO1, PO2, PO3, PO5
CO4	Analyze databases using normal forms to provide solutions for real time applications	PO1, PO2
CO5	Understand the properties of transactions in a database system, analyze serializability and indexing techniques.	PO1, PO3, PO4

TEXT BOOKS:

1. Database Management Systems, 3rd edition, Raghurama Krishnan, Johannes Gehrke, TMH (For Chapters 2, 3, 4)
2. Database System Concepts, 5th edition, Silberschatz, Korth, Sudarsan, TMH (For Chapter 1 and Chapter 5)

REFERENCE BOOKS:

1. Introduction to Database Systems, 8th edition, C J Date, Pearson.
2. Database Management System, 6th edition, Ramez Elmasri, Shamkant B. Navathe, Pearson
3. Database Principles Fundamentals of Design Implementation and Management, Carlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

REFERENCE WEBSITE:

1. <https://www.w3schools.in/sql/database-concepts>
2. <https://www.javatpoint.com/dbms-tutorial>
3. <https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system-set-1/>
4. <https://nptel.ac.in/courses/106/105/106105175/>
5. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01275806667282022456_shared/overview

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

	IV B.Tech. - VII Semester	
23OCS471B	FUNDAMENTALS OF CYBER SECURITY (OE-III)	L T P C 3 0 0 3

COURSE OBJECTIVES

The course is designed to provide awareness on different cyber crimes, cyber offenses, tools and methods used in cybercrime.

COURSE OUTCOMES

After completion of the course, students will be able to

- Classify the cybercrimes and understand the Indian ITA 2000
- Analyse the vulnerabilities in any computing system and find the solutions
- Predict the security threats of the future
- Investigate the protection mechanisms
- Design security solutions for organizations

UNIT –1: Introduction to Cybercrime

(8)

Introduction, Cybercrime, and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, And Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes

UNIT –2: Cyber Offenses: How Criminals Plan Them

(9)

Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing

UNIT –3: Cybercrime: Mobile and Wireless Devices

(9)

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT –4: Tools and Methods Used in Cybercrime

(8)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT –5: Cyber Security: Organizational Implications

(8)

Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Total Hours: 42

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrated and applied the knowledge of the various methods to determine the resultant forces.	PO1, PO2, PO3, PO4
CO2	Analyze the equilibrium acting on a particle, bodies subjected to friction, simple frames and apply principle of virtual work to find reactions.	PO1, PO2, PO3, PO4
CO3	Find the location of centroid, center of gravity and moment of inertia for the given appropriate sections.	PO1, PO2, PO3, PO4
CO4	Analyze the kinematics of a body undergoing rectilinear, curvilinear motion.	PO1, PO2, PO3, PO4



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

C05	Apply the dynamic equilibrium principles and work energy equations to solve appropriate problems.	PO1, PO2, PO3, PO4
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TEXT BOOKS:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina

REFERENCE BOOKS:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security, Chwan- Hwa(john) Wu, J. David Irwin, CRC Press T&F Group,

REFERENCE WEBSITE:

1. <http://nptel.ac.in/courses/106105031/40>
2. <http://nptel.ac.in/courses/106105031/39>
3. <http://nptel.ac.in/courses/106105031/38>

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C0.1	3	2	2	2	-	-	-	-	-	-	-	-
C0.2	3	2	2	2	-	-	-	-	-	-	-	-
C0.3	3	2	2	2	-	-	-	-	-	-	-	-
C0.4	3	2	2	2	-	-	-	-	-	-	-	-
C0.5	3	2	2	2	-	-	-	-	-	-	-	-
C0*	3	2	2	2	-	-	-	-	-	-	-	-



IV B.Tech. - VII Semester

23OECE471A

**FUNDAMENTALS OF MICROPROCESSORS AND
MICROCONTROLLERS**

L T P C

3 0 0 3

PRE-REQUISITES: -

COURSE EDUCATIONAL OBJECTIVES:

1. To comprehend the architecture, operation, and configurations of the 8086 microprocessors.
2. To get familiar with 8086 programming concepts, instruction set, and assembly language development tools.
3. To study the interfacing of 8086 with memory, peripherals, and controllers for various applications.
4. To learn the architecture, instruction set, and programming of the 8051 microcontrollers.
5. To understand microcontroller interfacing techniques, peripheral programming, and processor comparisons.

UNIT I – 8085 AND 8086 ARCHITECTURE

(9)

8085 Architecture, Pin diagram, Addressing modes, Instruction set, 8086 Architecture: Introduction, Main features, pin diagram/description, 8086 microprocessor family, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response.

UNIT II - 8086 PROGRAMMING

(9)

8086 Programming: 8086 system timing, minimum mode and maximum mode configuration, Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tools.

UNIT III - 8086 INTERFACING

(9)

Introduction: Intel 8255 programmable peripheral interface, Interfacing with LEDs, Interfacing seven segment displays, software and hardware interrupt applications, Intel 8251 USART architecture and interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interrupt controllers.

UNIT IV - MICROCONTROLLER

(9)

Microcontroller: Architecture of 8051 – Special Function Registers (SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming, Comparison of Microprocessor, Microcontroller, PIC and ARM processors

UNIT V - INTERFACING MICROCONTROLLER

(9)

Interfacing Microcontroller: Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Gain knowledge on the architecture, operation, and configurations of the 8085 and 8086 microprocessors.	PO1
CO2	Get familiar with 8086 programming concepts, instruction set, and assembly language development tools.	PO1, PO2
CO3	Know the interfacing of 8086 with peripherals, and controllers for various applications.	PO1, PO2
CO4	Learn the architecture, instruction set, programming of the 8051 microcontrollers and processor comparisons.	PO1, PO2
CO5	Understand microcontroller interfacing techniques, peripheral programming.	PO1

TEXT BOOKS:

1. Microprocessors and Interfacing – Programming and Hardware by Douglas V Hall, SSSP Rao, Tata McGraw Hill Education Private Limited, 3rd Edition, 1994.
2. K M Bhurchandi, A K Ray, Advanced Microprocessors and Peripherals, 3rd edition, McGraw Hill Education, 2017.
3. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd edition, Pearson, 2012.

REFERENCE BOOKS:

1. Ramesh S Gaonkar, Microprocessor Architecture Programming and Applications with the 8085, 6th edition, Penram International Publishing, 2013.
2. Kenneth J. Ayala, The 8051 Microcontroller, 3rd edition, Cengage Learning, 2004.

REFERENCE WEBSITE:

1. <https://archive.nptel.ac.in/courses/108/105/108105102/>
2. <https://archive.nptel.ac.in/courses/106/108/106108100/>

[illegible]



IV B.Tech. - VII Semester		L	T	P	C
23OME471A	3D PRINTING TECHNOLOGIES				
	(Mechanical Branch)	3	0	0	3

PRE-REQUISITES: The objectives of the course are to

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the fundamental concepts of prototyping and distinguish between traditional and rapid prototyping methods.
2. Demonstrate the working principles, materials, and applications of solid-, liquid-, and powder-based RP systems.
3. Define the processes and classifications of rapid tooling and reverse engineering techniques.
4. Identify common errors in 3D printing and evaluate pre-processing, processing, and post-processing issues.
5. Familiarize RP-related software and its role in applications such as design, manufacturing, and medical fields.

UNIT –1: INTRODUCTION TO 3D PRINTING:

(9)

Introduction to 3D Printing Introduction to Prototyping, Traditional Prototyping Vs. Rapid Prototyping (RP), Need for time compression in product development, Usage of RP parts, Generic RP process, Distinction between RP and CNC, other related technologies, Classification of RP.

UNIT –2: SOLID AND LIQUID BASED RP SYSTEM:

(9)

Working Principle, Materials, Advantages, Limitations and Applications of Fusion Deposition Modelling (FDM), Laminated Object Manufacturing (LOM), Stereo lithography (SLA), Direct Light Projection System (DLP) and Solid Ground Curing (SGC).

UNIT –3: POWDER BASED & OTHER RP SYSTEMS:

(9)

Powder Based RP Systems: Working Principle, Materials, Advantages, Limitations and Applications of Selective Laser Sintering (SLS), Direct Metal Laser Sintering (DMLS), Laser Engineered Net Shaping (LENS) and Electron Beam Melting (EBM).

Other RP Systems: Working Principle, Materials, Advantages, Limitations and Applications of Three Dimensional Printing (3DP), Ballistic Particle Manufacturing (BPM) and Shape Deposition Manufacturing (SDM)

UNIT –4: RAPID TOOLING & REVERSE ENGINEERING RAPID TOOLING:

(9)

Rapid Tooling & Reverse Engineering Rapid Tooling: Conventional Tooling Vs. Rapid Tooling, Classification of Rapid Tooling, Direct and Indirect Tooling Methods, Soft and Hard Tooling methods. Reverse Engineering (RE): Meaning, Use, RE – The Generic Process, Phases of RE Scanning, Contact Scanners and Noncontact Scanners, Point Processing, Application Geometric Model, Development.

UNIT –5: ERRORS IN 3D PRINTING AND APPLICATIONS:

(9)

Pre-processing, processing and post-processing errors, Part building errors in SLA, SLS, etc. Software: Need for software, MIMICS, Magics, SurgiGuide, 3-matic, 3D-Doctor, Simplant, Velocity2, VoXim, Solid View, 3DView, etc., software, Preparation of CAD models, Problems with STL files, STL file manipulation, RP data formats: SLC, CLI, RPI, LEAF, IGES, HP/GL, CT, STEP. Applications: Design, Engineering Analysis and planning applications, Rapid Tooling, Reverse Engineering, Medical Applications of RP.

Total Hours: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define and explain the evolution and need for rapid prototyping in modern product development.	L1,L2,L6
CO2	Compare and contrast various 3D printing technologies based on working principles, materials, and limitations.	L2,L4,L5
CO3	Apply knowledge of rapid tooling and reverse engineering techniques for industrial and design applications.	L3,L5,L6
CO4	Diagnose and interpret different types of errors encountered in 3D printing processes and recommend solutions.	L2,L3,L5
CO5	Use RP-specific software tools to manipulate STL files and prepare models for printing in real-world scenarios	L1,L3,L6

TEXT BOOKS:

1. Chee Kai Chua and Kah Fai Leong, —3D Printing and Additive Manufacturing Principles and Applicationsll 5/e, World Scientific Publications, 2017.
2. Ian Gibson, David W Rosen, Brent Stucker, —Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturingll, Springer, 2/e, 2010.

REFERENCE BOOKS:

1. Frank W.Liou, —Rapid Prototyping & Engineering Applicationsll, CRC Press, Taylor & Francis Group, 2011.
2. Rafiq Noorani, —Rapid Prototyping: Principles and Applicationsin Manufacturingll,John Wiley&Sons, 2006.

REFERENCE WEBSITE:

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B Tech- VII Semester

230SH471A	WAVELET TRANSFORMS AND ITS APPLICATIONS	L	T	P	C
	OPEN ELECTIVE-III (COMMON TO ALL)	3	-	-	3

UNIT-I: Wavelets

(09)

Wavelets and Wavelet Expansion Systems - Wavelet Expansion-Wavelet Transform-Wavelet System - More Specific Characteristics of Wavelet Systems - Haar Scaling Functions and Wavelets - effectiveness of Wavelet Analysis -The Discrete Wavelet Transform - The Discrete-Time and Continuous Wavelet Transforms.

UNIT-II: A Multi resolution Formulation of Wavelet Systems

(09)

Signal Spaces -The ScalingFunction -Multiresolution Analysis -The Wavelet Functions -The Discrete Wavelet Transform- A Parseval's Theorem - Display of the Discrete Wavelet Transform and the Wavelet Expansion.

UNIT-III: Filter Banks and the Discrete Wavelet Transform

(09)

Analysis - From Fine Scale to Coarse Scale- Filtering and Down-Sampling or Decimating -Synthesis - From Coarse Scale to Fine Scale -Filtering and Up- Sampling or Stretching - Input Coefficients -Lattices and Lifting - -Different Points of View.

UNIT-IV: Time - Frequency and Complexity

(09)

Multi resolution versus Time - Frequency Analysis- Periodic versus Non periodic Discrete Wavelet Transforms -The Discrete Wavelet Transform versus the Discrete-Time Wavelet Transform- Numerical Complexity of the Discrete Wavelet Transform.

UNIT-V: Bases and Matrix Examples

(09)

Bases, Orthogonal Bases, and Bi orthogonal Bases -Matrix Examples - Fourier Series Example - Sine Expansion Example - Frames and Tight Frames - Matrix Examples - Sine Expansion as a Tight Frame Example.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
C01	Understand wavelets and wavelet basis and characterize continuous and discrete wavelet transforms	PO1,PO2,PO3,PO4,PO12
C02	Illustrate the multi resolution analysis adscaling functions	PO1,PO2,PO3,PO4,PO12
C03	Implement discrete wavelet transforms with multi rate digital filters	PO1,PO2,PO3,PO4,PO12
C04	Understand multi resolution analysis and identify various wavelets and evaluate their time-frequency resolution properties.	PO1,PO2,PO3,PO4,PO12
C05	Design certain classes of wavelets to specification and justify the basis of the application of Wavelet transforms to different fields	PO1,PO2,PO3,PO4,PO12



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

TEXT BOOKS:

1. C. Sidney Burrus, Ramesh A. Gopinath, — Introduction to Wavelets and Wavelets Transforms , Prentice Hall, (1997).
2. James S.Walker, — A Primer on Wavelets and their Scientific Applications ,CRC Press, (1999).

REFERENCE BOOKS:

1. Raghuveer Rao,—Wavelet Transforms || ,Pearson Education, Asia
2. C.S.Burrus,Ramose and A.Gopinath, Introduction to Wavelets and Wavelet Transform, Prentice Hall Inc.

REFERENCE WEBSITE:

1. <http://users.rowan.edu/~polikar/WAVELETS/WTtutorial.html>
2. <http://www.wavelet.org/>
3. <http://www.math.hawaii.edu/~dave/Web/Amara's%20Wavelet%20Page.htm>
4. <https://jqichina.wordpress.com/wp-content/uploads/2012/02/ten-lectures-of-waveletsefbc88e5b08fe6b3a2e58d81e8aeb2efbc891.pdf>

COURSE ARTICULATION MATRIX:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	2	2	-	-	-	-	-	-	-	1
C02	3	2	2	2	-	-	-	-	-	-	-	1
C03	3	2	2	1	-	-	-	-	-	-	-	1
C04	2	2	2	1	-	-	-	-	-	-	-	1
C05	3	3	2	1	-	-	-	-	-	-	-	1

1- Slightly, 2-Moderately,3-Substantially.



IV B.Tech. - VII Semester

23OSH472B	SMART MATERIALS AND DEVICES (OPEN ELECTIVE-III) (Common to all branches)	L	T	P	C
		3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

To understand the principles and applications of smart materials in engineering.

To understand the science behind smart materials and their behavior.

To elucidate the responsive characteristics of smart materials

To explore synthesis and characterization techniques for smart materials

To determine the appropriate smart material for a given application.

UNIT I Introduction to Smart Materials

(9)

Historical account of the discovery and development of smart materials, Shape memory materials, chromoactive materials, magneto rheological materials, photoactive materials, Polymers and polymer composites (Basics).

UNIT II Properties of Smart Materials

(9)

Optical, Electrical, Dielectric, Piezoelectric, Ferroelectric, Pyroelectric and Magnetic properties of smart materials.

UNIT III Synthesis of Smart Materials

(9)

Chemical route: Chemical vapour deposition, Sol-gel technique, hydrothermal method, Mechanical alloying and thin film deposition techniques: Chemical etching, Spray pyrolysis.

UNIT IV Characterization Techniques

(9)

Powder X-ray diffraction, Raman spectroscopy (RS), UV-Visible spectroscopy, Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Atomic force microscopy (AFM).

UNIT V Smart Materials based Devices

(9)

Devices based on smart materials: Shape memory alloys in robotic hands, piezoelectric based devices, MEMS and intelligent devices.

TOTAL HOURS: 45

	Course Out comes	POs
CO1	Describe the breakthroughs that transformed shape memory materials into practical applications. Describe the two phases in shape memory alloys.	PO1, PO2,PO3,PO4,PO5
CO2	Investigate how smart materials react to external influences like light, electricity, and heat.	PO1, PO2,PO3,PO4,PO5
CO3	Describe synthesis approaches for smart materials.	PO1, PO2,PO3,PO4,PO5
CO4	Overview of characterization techniques for understanding smart material behavior.	PO1, PO2,PO3,PO4, PO5
CO5	Highlight the advantages of using smart materials in device applications.	PO1, PO2,PO3,PO4



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

Text books:

1. Yaser Dahman, Nanotechnology and Functional Materials for Engineers-, Elsevier, 2017
2. E. Zschech, C. Whelan, T. Mikolajick, Materials for Information Technology: Devices, Interconnects and Packaging Springer-Verlag London Limited 2005.

REFERENCE BOOKS:

1. Gauenzi, P., Smart Structures, Wiley, 2009.
2. Mahmood Aliofkhazraei, Handbook of functional nanomaterials, Vol(1&2), Nova Publishers, 2014
3. Hand book of Smart Materials, Technologies, and Devices: Applications of Industry, 4.0, Chaudhery Mustansar Hussain, Paolo DiSia, Springer, 2022.
4. Fundamentals of Smart Materials, Mohsen Shahinpoor, Royal Society of Chemistry, 2020.

NPTEL COURSELINK:

https://onlinecourses.nptel.ac.in/noc22_me17/preview

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	2	2	1							
C02	3	3	2	1	1							
C03	3	3	1	1	1							
C04	3	2	1	1	1							
C05	3	3	1	1	-							



IV B.Tech VII-Semester

23OSH471C	INTRODUCTON TO QUANTUM MECHANICS (OPEN ELECTIVE III)	L	T	P	C
		3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To comprehend the fundamental distinctions between classical and quantum mechanics.
2. To analyze the concepts of wave-particle duality and the uncertainty principle, along with their physical implications.
3. To acquire knowledge and solve the Schrödinger equation for simple quantum systems.
4. To apply operator formalism and relevant mathematical techniques in the study of quantum mechanics.
5. To investigate the quantum mechanical representations of angular momentum and spin.

UNIT- I: PRINCIPLES OF QUANTUM MECHANICS (9)

Introduction: Limitations of classical Mechanics, Difficulties with classical theories of black body radiation and origin of quantum theory of radiation. Wave-particle duality: de Broglie wavelength, Heisenberg uncertainty principle. Schrödinger time independent and time dependent wave equation, Solution of the time dependent Schrödinger equation, Concept of stationary states, Physical significance of wave function (ψ), Orthogonal, Normalized and Orthonormal functions

UNIT- II: ONE DIMENSIONAL PROBLEMS AND SOLUTIONS (9)

Potential step – Reflection and Transmission at the interface. Potential well: Square well potential with rigid walls, Square well potential with finite walls. Potential barrier: Penetration of a potential barrier (tunneling effect). Periodic potential and Harmonic oscillator, Energy eigen functions and eigen values.

UNIT-III: OPERATOR FORMALISM (9)

Operators, Operator Algebra, Eigen values and Eigen vectors, Postulates of quantum mechanics, Matrix representation of wave functions and linear operators.

UNIT- IV: MATHEMATICAL TOOLS FOR QUANTUM MECHANICS (9)

The concept of row and column matrices, Matrix algebra, Hermitian operators – definition. Dirac's bra and ket notation, Expectation values, Heisenberg (operator) representation of harmonic oscillator, Ladder operators and their significance.

UNIT- V : ANGULAR MOMENTUM AND SPIN (9)

Angular momentum operators: Definition. Eigen functions and Eigen values of AM operators. Matrix representation of angular momentum operators, System with spin half($1/2$), Spin angular momentum, Pauli's spin matrices. Clebsch-Gordon coefficients. Rigid Rotator: Eigen functions and Eigen values.

TOTAL HOURS: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

	Course Outcomes After completing this course, students will be able to:	Pos
CO1	Explain the foundational principles of quantum mechanics	PO1,PO2,PO3,PO4,PO5
CO2	Apply Schrödinger equations to solve one-dimensional quantum problems	PO1,PO2,PO3,PO4,PO5
CO3	Solve quantum mechanical problems using operator and matrix formulations,	PO1,PO2,PO3,PO4,PO5
CO4	Evaluate quantum states using Dirac notation and expectation values.	PO1,PO2,PO3,PO4,PO5
CO5	Analyze angular momentum and spin systems using Pauli matrices and operators.	PO1,PO2,PO3,PO4,PO5

BOOKS FOR STUDY:

1. Quantum Mechanics. Vol 1, A. MessiaNoth-Holland Pub. Co., Amsterdam,(1961).
2. A Text Book of Quantum Mechanics. P.M.Mathews and K.Venkatesam, Tata McGraw Hill, New Delhi,(1976).
3. Introduction to Quantum Mechanics. R.H.Dicke and J.P.Witke, Addison-Wisley Pub.Co.Inc., London, (1960).
4. Quantum Mechanics. S.L.Gupta, V.Kumar, H.V.Sarama and R.C.Sharma, Jai PrakashNath& Co, Meerut, (1996).

REFERENCE BOOKS:

1. Quantum Mechanics. L.I. Schiff, McGraw Hill Book Co., Tokyo, (1968).
2. Introduction to Quantum Mechanics. Richard L. Liboff, Pearson Education Ltd (Fourth Edn.) 2003.

NPTEL courses link :

1. <https://archive.nptel.ac.in/courses/115/101/115101107/>
2. <https://archive.nptel.ac.in/courses/122/106/122106034/>
3. <https://nptel.ac.in/courses/115106066>

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2							
CO2	3	2	2	1	1							
CO3	3	3	2	1	1							
CO4	3	3	3	2	3							
CO5	3	3	1	1	1							



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B Tech- VII Semester

23OSH471D	Green chemistry and Catalysis for Sustainable Environment	L	T	P	C
	(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To Understand Principle and Concepts of Green Chemistry.
2. To Understand the Types of Catalysis and Industrial Applications.
3. To Apply Green Solvents in Chemical Synthesis.
4. To Enumerate Different Sourced of Green Energy.
5. To Apply Alternative Greener Methods For Chemical Reactions

UNIT I: PRINCIPLES AND CONCEPTS OF GREEN CHEMISTRY

[09]

Introduction, Green chemistry Principles, sustainable development and green chemistry, E factor, atom economy, atom economic Reactions: Rearrangement and addition reactions and atom un- economic reactions: Substitution, elimination and Wittig reactions, Reducing Toxicity. Waste - problems and Prevention: Design for degradation, Polymer recycling

UNIT 2: CATALYSIS AND GREEN CHEMISTRY

[09]

Introduction, Types of catalysis, Heterogeneous catalysis: Basics of Heterogeneous Catalysis, Zeolite and the Bulk Chemical Industry, Heterogeneous Catalysis in the Fine Chemical and Pharmaceutical Industries, Catalytic Converters, Homogeneous catalysis: Transition Metal Catalysts with Phosphine Ligands, Greener Lewis Acids, and Phase transfer catalysis, Biocatalysis and Photo- catalysis with examples.

UNIT 3: GREEN SOLVENTS IN CHEMICAL SYNTHESIS

[09]

Green Solvents: Concept, Tools and techniques for solvent selection, supercritical fluids: Super critical carbon dioxide, super critical water, Polyethylene glycol (PEG), Ionic liquids, Recycling of green solvents.

UNIT 4: EMERGING GREENER TECHNOLOGIES

[09]

Biomass as renewable resource, Energy: Energy from Biomass, Solar Power, Chemicals from Renewable Feedstock's, Chemicals from Fatty Acids, Polymers from Renewable Resources, Alternative Economies: The Syngas Economy, The Biorefinery, Design for energy efficiency, Mechanochemical synthesis.

UNIT 5: ALTERNATIVE GREENER METHODS

[09]

Photochemical Reactions - Examples, Advantages and Challenges, Photo redox catalysis, single electron transfer reactions (SET), Examples of Photochemical Reactions, Microwave-assisted Reactions and Sono chemical reactions, examples and applications.

Total Hours: 45



COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Apply the Green chemistry Principles for day-to-day life as well as synthesis, describe the sustainable development and green chemistry, explain economic and un-economic reactions, Demonstrate Polymer recycling.	PO1, PO2, PO3, PO4, PO5, PO7
CO2	Explain Heterogeneous catalyst and its applications in Chemical and Pharmaceutical Industries, Differentiate Homogeneous and Heterogeneous catalysis, Identify the importance of Bio and Photo Catalysis, Discuss Transition metal and Phase transfer Catalysis	PO1, PO2, PO3, PO4, PO5, PO7
CO3	Demonstrate Green solvents and importance, Discuss Supercritical carbon dioxide, Explain Supercritical water, recycling of green solvents.	PO1, PO2, PO3, PO4, PO5, PO7
CO4	Describe importance of Biomass and Solar Power, Illustrate Sonochemistry, Apply Green Chemistry for Sustainable Development; discuss the importance of Renewable resources, mechanochemical synthesis.	PO1, PO2, PO3, PO4, PO5, PO7
CO5	Discuss Alternative green methods like Photo redox catalysis, single electron transfer reactions (SET), Photochemical Reactions, Microwave-assisted Reactions and Sono chemical reactions, examples and applications.	PO1, PO2, PO3, PO4, PO5, PO7

TEXT BOOKS:

1. M. Lancaster, Green Chemistry an Introductory Text, Royal Society of Chemistry, 2002.
2. Paul T. Anastas and John C. Warner, Green Chemistry Theory and Practice, 4th Edition, Oxford University Press, Usa

REFERENCE BOOKS:

1. Green Chemistry for Environmental Sustainability, First Edition, Sanjay K. Sharma and AckmezMudhoo, CRC Press, 2010.
2. Edited by AlvisePerosa and Maurizio Selva, Hand Book of Green chemistry Volume 8: Green Nanoscience, wiley-VCH, 2013.

Mapping between Course Outcomes and Programme Outcomes

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

• **3** = Strong Mapping, **2** = Moderate Mapping, **1** = Slight Mapping, **-** = No Mapping



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B Tech- VII Semester

23OSH471E	EMPLOYABILITY SKILLS	L	T	P	C
	(Open Elective-III)	3	0	0	3
	(Common to All Branches)				

Course Objectives:

1. To encourage all round development of the students by focusing on productive skills
2. To make the students aware of Goal setting and writing skills
3. To enable them to know the importance of presentations skills in achieving desired goals.
4. To help them develop organizational skills group activities.
5. To function effectively with heterogeneous teams

UNIT-I Goal Setting and Self-Management

LectureHrs-9

Definition, importance, types of Goal Setting–SMART Goal Setting–Advantages–Motivation– IntrinsicandExtrinsicMotivation–Self-Management-Knowingaboutself–SWOCAanalysis

UNIT-II Writing Skills

LectureHrs-9

Definition, significance, types of writing skills –Resume writing Vs CV Writing -E-Mail writing, Cover Letters- E-Mail Etiquette –So P (Statement of Purpose)

UNIT-III Technical Presentation Skills

LectureHrs-9

Nature, meaning& significance of Presentation Skills– Planning, Preparation, Presentation, Stage Dynamics –Anxiety in Public speaking (Glossophobia)- PPT & Poster Presentation

UNIT-IV Group Presentation Skills

LectureHrs-9

Body Language – Group Behavior–Team Dynamics –Leadership Skills –Personality Manifestation –Group Discussion-Debate –Corporate Etiquette

UNIT-V Job Cracking Skills

LectureHrs-9

Nature, characteristics, importance &types of Interviews –Job Interviews–Skills for success–Job Searching skills – STAR method - FAQs-Answering Strategies–Mock Interviews

	Course Outcomes(CO):	Blooms Level
	By the end of the program students will be able to	
1	Understand the importance of goals and try to achieve them	PO2
2	Explain the significance of self-management	PO6,PO10
3	Apply the knowledge of writing skills in preparing eye-catchy resumes	PO10
4	Analyze various forms of Presentation skills	PO12
5	Judge the group behavior appropriately	PO4
6	Develop skills required for employability.	PO12, PO10



TextBooks:

1. Sabina Pillai, Agna Fernandez. Soft Skills & Employability Skills, 2014. Cambridge Publisher.
2. Alka Wadkar. Life Skills for Success, Sage Publications, 2016.

ReferenceBooks:

1. Gangadhar Joshi. Campus to Corporate Paperback, Sage Publications. 2015
2. Sherfield Montgomery Moody, Cornerstone Developing Soft Skills, Pearson Publications. 4Ed. 2008
3. Shikha Kapoor. Personality Development and Soft Skills-Preparing for Tomorrow. 1 Edition, Wiley, 2017.
4. M. Sen Gupta, Skills for Employability, Innovative Publication, 2019.
5. Steve Duck and David T. McMahan, The Basic of Communication Skills A Relational Perspective, Sage press, 2012.

Online Services:

<https://youtu.be/gkLsn4ddmTs>
<https://youtu.be/2bf9K2rWwo>
<https://youtu.be/FchfE3c2jzc>
https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHIsQFwJZel_j2PUy0pwjVUgj7KIj
<https://www.youtube.com/c/skillopedia/videos>
https://onlinecourses.nptel.ac.in/noc25_hs96/preview
https://onlinecourses.nptel.ac.in/noc21_hs76/preview
<https://archive.nptel.ac.in/courses/109/107/109107172/#>
<https://archive.nptel.ac.in/courses/109/104/109104107/>

CO \ P O	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	-	-	-	-	-	1
CO2	3	3	2	3	2	-	-	-	-	-	-	2
CO3	3	3	3	3	2	1	-	-	-	-	-	2
CO4	3	3	2	2	1	-	-	-	-	-	-	1
CO5	3	3	3	3	2	-	-	-	-	-	-	2



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B.Tech. - VII Semester

23OME472A	FUNDAMENTALS OF QUALITY MANAGEMENT	L	T	P	C
	(Mechanical Branch)	3	0	0	3

PRE-REQUISITES: The objectives of the course are to

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the fundamental concepts, definitions, and dimensions of quality and Total Quality Management (TQM).
2. To explore the evolution of quality management through historical perspectives and contributions of quality gurus.
3. To explain the core principles of TQM including customer satisfaction, employee involvement, and continuous improvement.
4. To analyze the various TQM tools such as Benchmarking, QFD, FMEA, Six Sigma, and their role in quality enhancement.
5. To provide an understanding of quality systems like ISO 9000, ISO 14000, QS 9000, and the processes for their implementation.

UNIT –1: INTRODUCTION TO QUALITY MANAGEMENT:

(9)

Introduction: Definition of Quality, Dimensions of Quality, Definition of Total quality management, Quality Planning, Quality costs – Analysis, Techniques for Quality costs, Basic concepts of Total Quality Management.

UNIT –2: HISTORICAL REVIEW:

(9)

Historical Review: Quality council, Quality statements, Strategic Planning, Deming Philosophy, Barriers of TQM Implementation, Benefits of TQM, Characteristics of successful quality leader, Contributions of Gurus of TQM, Case studies.

UNIT –3: PRINCIPLES OF QUALITY MANAGEMENT:

(9)

TQM Principles: Customer Satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment teams, Continuous Process Improvement – Juran Trilogy, PDCA Cycle, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure Case studies.

UNIT –4: TQM TOOLS:

(9)

TQM Tools: Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA, The seven tools of quality, Process capability, Concept of Six Sigma, New Seven management tools, Case studies.

UNIT –5: QUALITY SYSTEMS:

(9)

Need for ISO 9000 – ISO 9001-2008 Quality System – Benefits of ISO registration – ISO 9000 series of standards – AS 9100, TS16949 and TL 9000 – ISO 9001 Requirements – Implementation – Documentation – Internal and external audits – Registration – TQM implementation in manufacturing and service sectors. Environmental Management System: Introduction – ISO 14000 Series Standards – Concepts of ISO 14001—Requirements of ISO 14001 – Benefits of EMS.

Total Hours: 45



COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define and explain the basic concepts of quality, quality costs, and the scope of Total Quality Management.	L2,L4,L5
CO2	Summarize the philosophies and contributions of TQM pioneers and evaluate barriers and enablers for TQM implementation.	L4,L5,L6
CO3	Apply TQM principles such as employee empowerment, customer satisfaction, and supplier partnerships to real-world business scenarios.	L2,L3,L4
CO4	Analyze the application of tools like QFD, FMEA, Six Sigma, and Benchmarking in improving product and process quality	L3,L4,L5
CO5	Evaluate and formulate quality systems like ISO 9000 and ISO 14000, and design documentation and auditing processes.	L1,L3,L6

TEXT BOOKS:

1. Dale H Besterfield, Total Quality Management, Fourth Edition, Pearson Education, 2015.
2. Subburaj Ramaswamy, Total Quality Management, Tata Mcgraw Hill Publishing Company Ltd., 2005.
3. Joel E.Ross , Total Quality Management, Third Edition, CRC Press, 2017. Reference Books

REFERENCE BOOKS:

1. Narayana V and Sreenivasan N.S, Quality Management – Concepts and Tasks, New Age International, 1996.
2. Robert L.Flood, Beyond TQM, First Edition, John Wiley & Sons Ltd, 1993.
3. Richard S. Leavenworth & Eugene Lodewick Grant, Statistical Quality Control, Seventh Edition, Tata Mcgraw Hill, 2015
4. Samuel Ho , TQM – An Integrated Approach, Kogan Page Ltd, USA, 1995.

REFERENCE WEBSITE:

- <https://www.investopedia.com/terms/t/total-quality-management-tqm.asp>
- <https://blog.capterra.com/what-is-total-quality-management/>
- <https://nptel.ac.in/courses/110/104/110104080/>

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



230EE472A	ELECTRIC VEHICLES	L	T	P	C
	(OE-IV)	3	0	0	3

PRE-REQUISITES:NIL

COURSE EDUCATIONAL OBJECTIVES: To make the student

1. Remember and understand the differences between conventional Vehicle and Electric Vehicles, electro mobility and environmental issues of EVs.
2. Analyze various EV configurations, parameters of EV systems and Electric vehicle Dynamics.
3. Analyze the basic construction, operation and characteristics of fuel cells and battery charging techniques in HEV systems
4. Design and analyze the various control structures for Electric vehicle

UNIT -1: Introduction to EV Systems and Energy Sources

(9)

Past, Present and Future of EV - EV Concept- EV Technology- State-of-the Art of EVs- EV configuration- EV system- Fixed and Variable gearing- Single and multiple motor drive- In-wheel drives- EV parameters: Weight, size, force and energy, performance parameters. Electro mobility and the environment- History of Electric power trains- Carbon emissions from fuels- Green houses and pollutants- Comparison of conventional, battery, hybrid and fuel cell electric systems.

UNIT -2: EV Propulsion and Dynamics

(9)

Choice of electric propulsion system- Block diagram- Concept of EV Motors- Single and multi- motor configurations- Fixed and variable geared transmission- In-wheel motor configuration- Classification - Electric motors used in current vehicle applications - Recent EV Motors- Vehicle load factors- Vehicle acceleration.

UNIT -3: Fuel Cells

(9)

Introduction of fuel cells- Basic operation- Model - Voltage, power and efficiency- Power plant system - Characteristics- Sizing - Example of fuel cell electric vehicle - Introduction to HEV- Brake specific fuel consumption - Comparison of Series-Parallel hybrid systems- Examples.

UNIT -4: Battery Charging and Control

(9)

Battery charging: Basic requirements- Charger architecture- Charger functions- Wireless charging- Power factor correction.

Control: Introduction- Modelling of electro mechanical system- Feedback controller design approach- PI controller's designing- Torque-loop, Speed control loop compensation- Acceleration of battery electric vehicle

UNIT -5: Energy Storage Technologies

(9)

Role of Energy Storage Systems- Thermal- Mechanical-Chemical- Electrochemical- Electrical - Efficiency of energy storage systems- Super Capacitors-Superconducting Magnetic Energy Storage (SMES)- SOC- SoH -fuel cells - G2V- V2G- Energy storage in Micro-grid and Smart grid- Energy Management with storage systems- Battery SCADA

Total Hours: 45



COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	To understand and differentiate between Conventional Vehicle and Electric Vehicles, electro mobility and environmental issues of EVs	PO1, PO2, PO3, PO4
CO2	Understand Various dynamics of Electric Vehicles	PO1, PO2, PO3
CO3	To remember and understand various configurations in parameters of EV system and dynamic aspects of EV	PO1, PO2, PO3, PO4
CO4	To analyze fuel cell technologies in EV and HEV systems	PO1, PO2, PO3, PO4
CO5	To analyze the battery charging and controls required of EVs	PO1, PO2, PO3,

TEXT BOOKS:

1. C.C Chan, K.T Chau: Modern Electric Vehicle Technology, Oxford University Press Inc., New York 2001,1st Edition
2. Ali Emadi, "Advanced Electric Drive Vehicles", CRC Press, 2017,1st Edition.

REFERENCE BOOKS:

1. Electric and Hybrid Vehicles Design Fundamentals, Iqbal Husain, CRC Press 2021, 3rd Edition.
2. Francisco Díaz-González, Andreas Sumper, Oriol Gomis-Bellmunt," Energy Storage in Power Systems" Wiley Publication, ISBN: 978-1-118-97130-7, Mar 2016,1st Edition
3. A.G.Ter-Gazarian, "Energy Storage for Power Systems", the Institution of Engineering and Technology (IET) Publication, UK, (ISBN – 978-1-84919-219-4), Second Edition, 2011.
4. Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, "Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 2004,1st Edition.
5. James Larminie, John Lowry, "Electric Vehicle Technology Explained", Wiley, 2003,2nd Edition.

ONLINE LEARNING RESOURCES:

1. <https://nptel.ac.in/courses/108/102/108102121/>
2. <https://nptel.ac.in/syllabus/108103009>

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



23OCS472A

COMPUTER NETWORKS

L	T	P	C
3	0	0	3

PRE-REQUISITES:

COURSE OBJECTIVES:

The main objectives of the course is to

- To understand the different types of networks
- To discuss the software and hardware components of a network
- To develop an understanding the principles of computer networks.
- To familiarize with OSI model and the functions of layered structure.
- To explain networking protocols, algorithms and design perspectives

COURSE OUTCOMES:

After completion of the course, students will be able to

- Identify the software and hardware components of a Computer network, (L1)
- Explain the functionality of each layer of a computer network, (L2)
- Identify and analyze flow control, congestion control, and routing issues.(L3)
- Analyze and interpret the functionality and effectiveness of the routing protocols. (L4)

UNIT –1: INTRODUCTION

Types of Computer Networks, Broadband Access Networks, Mobile and Wireless Access Networks, Content Provider Networks, Transit networks, Enterprise Networks, Network technology from local to global, Personal Area Networks, Local Area Networks, Home Networks, Metropolitan Area Networks, Wide Area Networks, Internetworks, Network Protocols, Design Goals, Protocol Layering, Connections and Reliability, Service Primitives, The Relationship of Services to Protocols, Reference Models, The OSI Reference Model, The TCP/IP Reference Model, A Critique of the OSI Model and Protocols, A Critique of the TCP/IP Reference Model and Protocols.

UNIT –2: THE DATA LINK LAYER

(10)

Guided Transmission Media, Persistent Storage, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Data Link Layer Design Issues, Services Provided To The Network Layer, Framing Error Control, Flow Control, Error Detection And Correction, Error- Correcting Codes, Error-Detecting Codes, Elementary Data Link Protocols, Initial Simplifying Assumptions Basic Transmission And Receipt, Simplex Link-Layer Protocols, Improving Efficiency, Bidirectional Transmission, Multiple Frames In Flight, Examples Of Full-Duplex, Sliding Window Protocols, The Channel Allocation Problem, Static Channel Allocation, Assumptions For Dynamic Channel Allocation, Multiple Access Protocols, Aloha, Carrier Sense Multiple Access Protocols, Collision-Free Protocols, Limited- Contention Protocols, Wireless LAN Protocols, Ethernet, Classic Ethernet Physical Layer, Classic Ethernet Mac Sublayer Protocol, Ethernet Performance, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet, 40- And 100-Gigabit Ethernet, Retrospective On Ethernet.

UNIT –3: THE NETWORK LAYER

(10)

Network Layer Design Issues, Store-And-Forward Packet Switching, Services Provided To The Transport Layer, Implementation Of Connectionless Service, Implementation Of Connection-Oriented Service, Comparison Of Virtual-Circuit And Datagram Networks, Routing Algorithms In A Single Network, The Optimality Principle, Shortest Path Algorithm, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing Within a Network, Broadcast Routing, Multicast Routing, Anycast Routing, Traffic Management at The Network Layer, The Need for Traffic Management: Congestion, Approaches To Traffic Management, Internetworking, Internetworks: An Overview, How Networks differ, Connecting Heterogeneous Networks, Connecting Endpoints Across Heterogeneous Networks, Internetwork Routing: Routing Across Multiple Networks



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

Supporting **Different** Packet Sizes: Packet Fragmentation, The Network Layer In The Internet, The IP Version 4 Protocol, IP Addresses, IP Version 6, Internet Control Protocols, Label Switching and MPLS, OSPF—An Interior Gateway Routing Protocol, BGP—The Exterior Gateway Routing Protocol, Internet Multicasting.

UNIT -4: THE TRANSPORT LAYER

(10)

The Transport Service, Services Provided To The Upper Layers, Transport Service Primitives, Berkeley Sockets, An Example Of Socket Programming: An Internet File Server, Elements Of Transport Protocols, Addressing, Connection Establishment, Connection Release, Error Control And Flow Control, Multiplexing, Crash Recovery, Congestion Control, Desirable Bandwidth Allocation, Regulating The Sending Rate, Wireless Issues, The Internet Transport Protocols: UDP, Introduction To UDP, Remote Procedure Call, Real-Time Transport Protocols, The Internet Transport Protocols: TCP, Introduction To TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release..

UNIT -5: THE APPLICATION LAYER

(10)

Electronic Mail, Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery, The World Wide Web, Architectural Overview, Static Web Objects, Dynamic Web Pages and Web Applications, HTTP and HTTPS, Web Privacy, Content Delivery, Content and Internet Traffic, Server Farms and Web Proxies, Content Delivery Networks, Peer-To-Peer Networks, Evolution of The Internet

Total Hours: 50

On successful completion of the course, students will be able to		POS
CO1	Identify the various bugs and correcting them after knowing the consequences of the bug.	PO1, PO2, P03,
CO2	Perform functional testing using controlflow and transaction flow graphs.	PO1, PO2, P03,
CO3	Design the path expression and reduce them very well when needed.	PO1, PO2, P03,
CO4	Test logic or an application and identifying the nice and ugly domains.	PO1, PO2, P03,
CO5	Use appropriate software testing tools, techniques and methods for even more effective systems during both the test planning and test execution phases of a software development project.	PO1, PO2, P03,

TEXT BOOKS:

Andrew Tanenbaum, Feamster Wetherall, Computer Networks, 6th Edition, Global Edition

REFERENCE BOOKS:

1. Behrouz A. Forouzan, Data Communications and Networking, 5th Edition, McGraw Hill Publication, 2017.
2. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.



IVB.Tech – VII Semester

L T P C
3 0 0 3

230CS472B IOT CONCEPTS AND APPLICATIONS

Course Objectives:

- Understand the basics of Internet of Things and protocols.
- Discuss the requirement of IoT technology
- Introduce some of the application areas where IoT can be applied.
- Understand the vision of IoT from a global perspective, understand its applications, determine its market perspective using gateways, devices and data management

Course Outcomes:

- After completion of the course, students will be able to
- Understand general concepts of Internet of Things.
- Apply design concept to IoT solutions
- Analyze various M2M and IoT architectures
- Evaluate design issues in IoT applications
- Create IoT solutions using sensors, actuators and Devices

UNIT-I Introduction to IoT

Definition and Characteristics of IoT, physical design of IoT, IoT protocols, IoT communication models, IoT Communication APIs, Communication protocols, Embedded Systems, IoT Levels and Templates

UNIT- II Prototyping IoT Objects using Microprocessor/Microcontroller

Working principles of sensors and actuators, setting up the board – Programming for IoT, Reading from Sensors, Communication: communication through Bluetooth, Wi-Fi.

UNIT-III IoT Architecture and Protocols

Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model, Protocols- 6LowPAN, RPL, CoAP, MQTT, IoT frameworks- Thing Speak.

UNIT- IV Device Discovery and Cloud Services for IoT

Device discovery capabilities- Registering a device, Deregister a device, Introduction to Cloud Storage models and communication APIs Web-Server, Web server for IoT.

UNIT-V UAV IoT

Introduction to Unmanned Aerial Vehicles/Drones, Drone Types, Applications: Defense, Civil, Environmental Monitoring; UAV elements and sensors- Arms, motors, Electronic Speed Controller(ESC), GPS, IMU, Ultra sonic sensors; UAV Software –Arudpilot, Mission Planner, Internet of Drones(IoD)- Case study FlytBase.

Text books:

1. Bahga, — Internet of Things (A Hands-on-Approach)), 1st Edition, Vijay Madiseti and Arshdeep VPT, 2014.
2. Handbook of unmanned aerial vehicles, K Valavanis;George J Vachtsevanos, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Reference Books:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, — From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligencel, 1st Edition, Academic Press, 2014.
2. ArshdeepBahga, Vijay Madiseti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
3. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.
4. Francis daCosta, —Rethinking the Internet of Things: A Scalable Approach to Connecting Everythingl, 1st Edition, Apress Publications, 2013
5. Cuno Pfister, Getting Started with the Internet of Things, O'Reilly Media, 2011, ISBN: 9781-4493-9357-1
6. DGCA RPAS Guidance Manual, Revision 3 – 2020
7. Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs, John Baichtal

Online Learning Resources:

1. <https://www.arduino.cc/>
2. <https://www.raspberrypi.org/>
3. <https://nptel.ac.in/courses/106105166/5>
4. <https://nptel.ac.in/courses/108108098/4>



IV B.Tech. - VII Semester

23OECE472A

TRANSDUCERS AND SENSORS
(OE-IV)

L T P C
3 0 0 3

PRE-REQUISITES: -

COURSE EDUCATIONAL OBJECTIVES:

1. To understand characteristics of Instrumentation System and the operating principle of motion transducers.
2. To explore working principles, and applications of different temperature transducers and Piezo-electric sensors.
3. To provide knowledge on flow transducers and their applications.
4. To study the working principles of pressure transducers.
5. To introduce working principle and applications of force and sound transducers.

UNIT I -INTRODUCTION

(9)

Introduction: General Configuration and Functional Description of measuring instruments, Static and Dynamic Characteristics of Instrumentation System, Errors in Instrumentation System, Active and Passive Transducers and their Classification.

Motion Transducers: Resistive strain gauge, LVDT, RVDT, Capacitive transducers, Piezo- electric transducers, seismic displacement pick-ups, vibrometers and accelerometers.

UNIT II - TEMPERATURE TRANSDUCERS

(9)

Temperature Transducers: Standards and calibration, fluid expansion and metal expansion type transducers - bimetallic strip, Thermometer, Thermistor, RTD, Thermocouple and their characteristics.

Hall effect transducers, Digital transducers, Proximity devices, Bio-sensors, Smart sensors, Piezo-electric sensors.

UNIT III - FLOW TRANSDUCERS

(9)

Flow Transducers: Bernoulli's principle and continuity, Orifice plate, Nozzle plate, Venture tube, Rotameter, Anemometers, Electromagnetic flow meter, Impeller meter and Turbid flow meter.

UNIT IV - PRESSURE TRANSDUCERS

(9)

Pressure Transducers: Standards and calibration, different types of manometers, elastic transducers, diaphragm bellows, bourdon tube, capacitive and resistive pressure transducers, high and low pressure measurement.

UNIT V - FORCE AND SOUND TRANSDUCERS

(9)

Force and Sound Transducers: Proving ring, hydraulic and pneumatic load cell, dynamometer and gyroscopes. Sound level meter, sound characteristics, Microphone.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand characteristics of Instrumentation System and the operating principle of motion transducers.	PO1, PO2
CO2	Explore working principles, and applications of different temperature transducers and Piezo-electric sensors.	PO1, PO2
CO3	Gain knowledge on flow transducers and their applications.	PO1, PO2
CO4	Learn the working principles of pressure transducers.	PO1, PO2
CO5	Understand the working principle and applications of force and sound transducers.	PO1, PO2

TEXT BOOKS:

1. A.K. Sawhney, "A course in Electrical and Electronics Measurements and Instrumentation", Dhanpat Rai & Co. 3rd edition Delhi, 2010.
2. Rangan C.S, Sarma G.R and Mani V S V, "Instrumentation Devices and Systems", TATA McGraw Hill publications, 2007.

REFERENCE BOOKS:

1. Ramesh Doebelin. E.O, "Measurement Systems Application and Design", McGraw Hill International, New York, 2004.
2. Nakra B.C and Chaudhary K.K, "Instrumentation Measurement and Analysis", Second Edition, Tata McGraw-Hill Publication Ltd.2006.

REFERENCE WEBSITE:

1. https://onlinecourses.nptel.ac.in/noc23_ee105/preview
2. https://onlinecourses.nptel.ac.in/noc25_ee76/preview

[illegible]



23OSH472A	FINANCIAL MATHEMATICS	L	T	P	C
	OPEN ELECTIVE - IV(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To provide mathematical foundations for financial modelling, risk assessment and asset pricing.
2. To introduce stochastic models and their applications in pricing derivatives and interest rate modelling.
3. To develop analytical skills for fixed-income securities, credit risk, and investment strategies.
4. To equip students with computational techniques for pricing financial derivatives.

UNIT-I: Asset Pricing and Risk Management

(09)

Fundamental financial concepts: Returns, arbitrage, valuation, and pricing. Asset/Liability management, investment income, capital budgeting, and contingent cash flows. One-period model: Securities, payoffs, and the no-arbitrage principle. Option contracts: Speculation and hedging strategies, CAP Model, Efficient market hypothesis.

UNIT-II: Stochastic Models in Finance

(09)

Random Walks and Brownian Motion. Introduction to Stochastic Differential Equations (SDEs): Drift and diffusion. Ito calculus: Ito's Lemma, Ito Integral, and Ito Isometry.

UNIT-III: Interest Rate and Credit Modelling

(09)

Interest rate models and bond markets. Short-rate models: Vasicek, Cox-Ingersoll-Ross (CIR), Hull & White models, Credit risk modelling: Hazard function and hazard rate.

UNIT-IV: Fixed-Income Securities and Bond Pricing

(09)

Characteristics of fixed-income products: Yield, duration, and convexity. Yield curves, forward rates, and zero-coupon bonds. Stochastic interest rate models and bond pricing PDE. Yield curve fitting and calibration techniques, Mortgage Backed Securities.

UNIT-V: Exotic Options and Computational Finance

(09)

Stochastic volatility models and the Feynman-Kac theorem. Exotic options: Barriers, Asians, and Look backs. Monte Carlo methods for derivative pricing, Black-Scholes-Merton model: Derivation and applications.

Total Hours: 45



COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Explain fundamental financial concepts, including arbitrage, valuation, and risk.	PO1,PO2,PO5,PO11,PO12
CO2	Apply stochastic models, including Brownian motion and Stochastic Differential Equations (SDEs), in financial contexts.	PO1,PO2,PO3,PO4,PO5, PO11,PO12
CO3	Analyze mathematical techniques for pricing options and financial derivatives.	PO1,PO2,PO3,PO4,PO5,PO 6, PO11,PO12
CO4	Evaluate interest rate models and bond pricing methodologies.	PO1,PO2,PO3,PO4,PO5, PO11,PO12
CO5	Utilize computational techniques such as Monte Carlo simulations for financial modeling.	PO1,PO2,PO3,PO4,PO5, PO11,PO12

TEXT BOOKS:

1. Ales Cerny, *Mathematical Techniques in Finance: Tools for Incomplete Markets*, Princeton University Press.
2. S.R.Pliska, *Introduction to Mathematical Finance: Discrete-Time Models*, Cambridge University Press.

REFERENCE BOOKS:

1. Ioann is Karatzas & Steven E.Shreve, *Methods of Mathematical Finance*, Springer, NewYork.
2. John C.Hull,*Options,Futures,and Other Derivatives*, Pearson.

REFERENCE WEBSITE:

- MIT–Mathematics for Machine Learning <https://ocw.mit.edu>
- Coursera – Financial Engineering and Risk Management (Columbia University) <https://www.coursera.org/>
- National Stock Exchange (NSE) India-Financial Derivatives <https://www.nseindia.com/>

COURSE ARTICULATION MATRIX:

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

• **3**=StrongMapping,**2**=ModerateMapping,**1**=SlightMapping,**-**=NoMapping



IV B.Tech -VII Semester

23OSH472B	SENSORS AND ACTUATORS FOR ENGINEERING APPLICATIONS (Open Elective-IV)	L	T	P	C
	(Common to all branches)	3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To provide comprehensive exposure to various types of sensors and actuators, along with their engineering applications.
2. To impart fundamental knowledge of the laws and phenomena governing the operation of sensors and actuators.
3. To explain the working principles and functionality of different sensors and actuators.
4. To educate students on the fabrication techniques and processes involved in sensor development.
5. To identify and explain the appropriate sensors and actuators required for interdisciplinary applications.

UNIT-I -INTRODUCTION TO SENSORS AND ACTUATORS

(9)

Sensors: Types of sensors: temperature, pressure, strain, active and passive sensors, General characteristics of sensors (Principles only), Deposition: Chemical Vapor Deposition, Pattern: photolithography and Etching: Dry and Wet Etching.

Actuators: Functional diagram of actuators, Types of actuators and their basic principle of working: Pneumatic, Electromagnetic, Piezo-electric and Piezo-resistive actuators, Applications of Actuators.

UNIT-II- TEMPERATURE AND MECHANICAL SENSORS

(9)

Temperature Sensors: Types of temperature sensors and their basic principle of working: Thermo-resistive sensors: Thermistors, Thermo-electric sensors: Thermocouples, PN junction temperature sensors

Mechanical Sensors: Types of Mechanical sensors and their basic principle of working: Force sensors: Strain gauges, Tactile sensors, Pressure sensors: Piezoresistive, Variable Reluctance Sensor (VRP).

UNIT-III OPTICAL AND ACOUSTIC SENSORS

(9)

Optical Sensors: Basic principle and working of: Photodiodes, Phototransistors and Photoresistors based sensors, Photomultipliers, Infrared sensors: thermal, Passive Infra-Red, Fiber based sensors and Thermopiles Acoustic Sensors: Principle and working of Ultrasonic sensors, Piezo-electric resonators, Microphones

UNIT-IV- Magnetic and Electromagnetic Sensors

(9)

Motors as actuators (linear, rotational, stepping motors), magnetic valves, inductive sensors (LVDT, RVDT, and Proximity), Hall Effect sensors, Magneto-resistive sensors, Magneto strictive sensors and actuators.

UNIT-V-Chemical and Radiation Sensors

(9)

Chemical Sensors: Principle and working of Electro-chemical, Thermo-chemical, Gas, pH, Humidity and moisture sensors.

Radiation Sensors: Principle and working of Ionization detectors, Scintillation detectors, Semiconductor radiation detectors and Microwave sensors (resonant, reflection, transmission)

TOTAL HOURS: 45



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

	Course Outcomes On successful completion of the course, students will be able to	POs
C01	Classify various types of sensors and actuators along with their key characteristics.	PO1,PO2,PO3, PO4,PO5
C02	Review the working principles and applications of temperature and mechanical sensors.	PO1,PO2,Po3, PO4,PO5
C03	Explain the construction and functionality of different optical and mechanical sensors.	PO1,PO2,Po3, PO4,PO5
C04	Analyze the operational principles and applications of optical and acoustic sensors.	PO1,PO2,PO3, PO4
C05	Interpret the significance of smart materials in the design and development of advanced devices.	PO1,PO2,PO3, PO4

Textbooks:

1. Sensors and Actuators – Clarence W. de Silva, CRC Press, 2nd Edition, 2015
2. Sensors and Actuators, D.A.Hall and C.E.Millar, CRC Press, 1999

Reference Books:

1. Sensors and Transducers- D.Patranabis, Prentice Hall of India (Pvt) Ltd. 2003
2. Measurement, Instrumentation, and Sensors Handbook-John G.Webster, CRC press 1999
3. Sensors – A Comprehensive Sensors- Henry Bolte, John Wiley.
4. Handbook of modern sensors, Springer, Stefan Johann Rupitsch.

NPTEL course link: https://onlinecourses.nptel.ac.in/noc21_ee32/preview

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	2	2	1							
C02	3	3	2	1	1							
C03	3	3	1	1	1							
C04	3	2	1	1	-							
C05	3	3	1	1	-							



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B Tech- VII Semester

23OSH472C	CHEMISTRY OF NANOMATERIALS AND APPLICATIONS	L	T	P	C
	OPEN ELECTIVE-IV(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

- To understand basics and characterization of nanomaterials.
- To understand synthetic methods of nanomaterials.
- To apply various techniques for characterization of nanomaterials.
- To understand Studies of Nano-structured Materials
- To enumerate the applications of advanced nanomaterials in engineering

Unit – I Basics and Characterization of Nanomaterials:

[09]

Introduction, Scope of nanoscience and nanotechnology, nanoscience in nature, classification of nanostructured materials, importance of nanomaterials.

Unit – II Synthesis of nanomaterials:

[09]

Top-Down approach, Inert gas condensation, arc discharge method, aerosol synthesis, plasma arc technique, ion sputtering, laser ablation, laser pyrolysis, and chemical vapour deposition method, electrodeposition method, high energy ball milling method.

Synthetic Methods: Bottom-Up approach, Sol-gel synthesis, microemulsions or reverse micelles, co-precipitation method, solvothermal synthesis, hydrothermal synthesis, microwave heating synthesis and sonochemical synthesis.

UNIT-III Techniques for characterization:

[09]

Diffraction technique, spectroscopy techniques, electron microscopy techniques for the characterization of nanomaterials, BET method for surface area analysis, dynamic light scattering for particle size determination.

UNIT-IV Studies of Nano-structured Materials:

[09]

Synthesis, properties and applications of the following nanomaterials -fullerenes, carbon nanotubes, 2D-nanomaterial (Graphene), core-shell, magnetic nanoparticles, thermoelectric materials, non-linear optical materials.

UNIT-V Advanced Engineering Applications of Nanomaterials:

[09]

Applications of Nano Particle, nanorods, nano wires, Water treatment, sensors, electronic devices, medical domain, civil engineering, chemical engineering, metallurgy and mechanical engineering, food science, agriculture, pollutants degradation.

Total Hours: 45



COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Classify the nanostructure materials; describe scope of nanoscience and importance technology.	PO1, PO2, PO3, PO4, PO5, PO7
CO2	Describe the top-down approach, explain aerosol synthesis and plasma arc technique, differentiate chemical vapor deposition method and electrode position method, Discuss about high energy ball milling.	PO1, PO2, PO3, PO4, PO5, PO7
CO3	Discuss different technique for characterization of nanomaterial, explain electron microscopy techniques for characterization of nanomaterial, Describe BET method for surface area analysis.	PO1, PO2, PO3, PO4, PO5, PO7
CO4	Explain synthesis and properties and applications of nanomaterials, discuss about fullerenes and carbon nanotubes, Differentiate nanomagnetic materials and thermoelectric materials, nonlinear optical materials.	PO1, PO2, PO3, PO4, PO5, PO7
CO5	Illustrate advance engineering applications of Water treatment, sensors, electronic devices, medical domain, civil engineering, chemical engineering, metallurgy and mechanical engineering, food science, agriculture, pollutants degradation.	PO1, PO2, PO3, PO4, PO5, PO7

TEXT BOOKS:

1. **NANO: The Essentials:** T Pradeep, MaGraw-Hill, 2007.
2. **Textbook of Nanoscience and nanotechnology:** B S Murty, P Shankar, Baldev Rai, BB Rath and James Murday, Univ. Press, 2012.

REFERENCES:

1. Concepts of Nano chemistry; Ludovico Cademrtiri and Geoffrey A. Ozin & Geoffrey A. Ozin, Wiley-VCH, 2011.
2. Nanostructures & Nanomaterials; Synthesis, Properties & Applications: Guozhong Cao, Imperial College Press, 2007.

Mapping between Course Outcomes and Programme Outcomes

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

3 = Strong Mapping, 2 = Moderate Mapping, 1 = Slight Mapping, - = No Mapping



23OSH472D	LITERARY VIBES (Open Elective -IV) (Common to all branches)	L	T	P	C
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Course Objectives:

1. To inculcate passion for a esthetic sense and reading skills
2. To encourage respecting others' experiences and creative writing
3. To explore emotions ,communication skills and critical thinking
4. To educate how books serve as the reflection of history and society
5. To provide practical wisdom and duty of responding to events of the times

UNIT-I: Poetry

1. Ulysses-Alfred Lord Tennyson
2. Night of the Scorpion – Nissim Ezekiel
3. The Second Coming-W.B.Yeats
4. Where the Mind is Without Fear-Rabindranath Tagore

UNIT- II: Drama: Twelfth Night-William Shakespeare

1. Shakespeare-life and works
1. Plot &sub-plot and Historical background of the play
2. Themes and Criticism
3. Style and literary elements
4. Characters and characterization

UNIT- III: Short Story

1. The Luncheon-Somerset Maugham
2. The Happy Prince-Oscar Wild
3. Three Questions–Leo Tolstoy
4. Grief–Antony Chekov

UNIT-IV:Prose:EssayandAutobiography

1. My Early Days – Dr. A.P.J. Abdul Kalam
2. The English Teacher – R.K, Narayan
3. The story of My Life-Helen Keller
4. Student Mobs-JB Priestly

UNIT-V : Novel :A Tale of Two Cities-Charles Dickens

1. Charles Dickens-Life and works
2. Plot and Historical background of the novel
3. Themes and criticism
4. Style and literary elements
5. Characters and characterization



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

Course Outcomes		PO
CO1	Identify genres, literary techniques and creative uses of language in literary texts.	PO1,
CO2	Explain the relevance of themes found in literary texts to contemporary, Personal and cultural values and to historical forces.	PO4
CO3	Apply knowledge and understanding of literary texts when Responding to others' problems and their own and make evidence-based arguments.	PO6,PO10
CO4	Analyze the under lying meanings of the text by using the elements of literary texts	PO5
CO5	Evaluate their own work and that of others critically	PO12
CO6	Develop as creative, effective, independent and reflective students who are able to make informed choices in process and performance	PO10

Text Books:

1. Charles Dickens. *Hard Times*. (Sangam A bridged Texts) Vantage Press, 1983
2. DENTJC. *William Shakespeare. Twelfth Night*. Oxford University Press, 2016.

References:

1. WJong. *History of English Literature*, Rupa Publications India; First Edition (4 October 2015)
2. R K Kaushik And S C Bhatia. *Essays, Short Stories and One Act Plays*, Oxford University Press .2018.
3. Dhanvel, SP. *English and Soft Skills*, Orient Blackswan, 2017.
4. *New Horizon*, Pearson publications, New Delhi 2014
5. Vimala Ramarao, *Explorations Volume-II*, Prasaraanga Bangalore University, 2014.
6. DevNeira, Anjana & Co. *Creative Writing: A Beginner's Manual*. Pearson India, 2008.

Online Resources

<https://www.litcharts.com/poetry/alfred-lord-tennyson/ulysses>
<https://www.litcharts.com/lit/ain-t-i-a-woman/summary-and-analysis>
https://englishliterature.education/articles/poetry-analysis/the-second-coming-by-w-b-yeats-critical-analysis-summary-and-line-by-line-explanation/#google_vignette
<https://sirjutorials.com/where-the-mind-is-without-fear-poem-notes-explanation/>
<https://www.litcharts.com/lit/twelfth-night/themes>
<https://smartenglishnotes.com/2021/11/28/the-luncheon-summary-characters-themes-and-irony/>
https://onlinecourses.nptel.ac.in/noc21_hs76/preview
<https://archive.nptel.ac.in/courses/109/107/109107172/#https://archive.nptel.ac.in/courses/109/104/109104107/>

Course Articulation Matrix:

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

3=Strong Mapping, 2=Moderate Mapping, 1=Slight Mapping, -No Mapping



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B. Tech-VII Semester

23CSE364C	Introduction to Quantum Computing (Qualitative Treatment)	L	T	P	C
		3	0	0	3

Course Objectives (COBJ):

- Introduce fundamental quantum concepts like superposition and entanglement.
- Understand theoretical structure of qubits and quantum information.
- Explore conceptual challenges in building quantum computers.
- Explain principles of quantum communication and computing.
- Examine real-world applications and the future of quantum technologies.

Course Outcomes (CO):

- Explain core quantum principles in a non-mathematical manner.
- Compare classical and quantum information systems.
- Identify theoretical issues in building quantum computers.
- Discuss quantum communication and computing concepts.
- Recognize applications, industry trends, and career paths in quantum technology.

Unit 1: Introduction to Quantum Theory and Technologies

The transition from classical to quantum physics, Fundamental principles explained conceptually: Superposition, Entanglement, Uncertainty Principle, Wave-particle duality, Classical vs Quantum mechanics – theoretical comparison, Quantum states and measurement: nature of observation, Overview of quantum systems: electrons, photons, atoms, The concept of quantization: discrete energy levels, Why quantum? Strategic, scientific, and technological significance, A snapshot of quantum technologies: Computing, Communication, and Sensing, National and global quantum missions: India's Quantum Mission, EU, USA, China

Unit 2: Theoretical Structure of Quantum Information Systems

What is a qubit? Conceptual understanding using spin and polarization, Comparison: classical bits vs quantum bits, Quantum systems: trapped ions, superconducting circuits, photons (non-engineering view), Quantum coherence and decoherence – intuitive explanation, Theoretical concepts: Hilbert spaces, quantum states, operators – only interpreted in abstract, The role of entanglement and non-locality in systems, Quantum information vs classical information: principles and differences, Philosophical implications: randomness, determinism, and observer role

Unit 3: Building a Quantum Computer – Theoretical Challenges and Requirements

What is required to build a quantum computer (conceptual overview)?, Fragility of quantum systems: decoherence, noise, and control, Conditions for a functional quantum system: Isolation, Error management, Scalability, Stability, Theoretical barriers:

Why maintaining entanglement is difficult, Error correction as a theoretical necessity, Quantum hardware platforms (brief conceptual comparison), Superconducting circuits, Trapped ions, Photonics, Vision vs reality: what's working and what remains elusive, The role of quantum software in managing theoretical complexities

Unit 4: Quantum Communication and Computing – Theoretical Perspective

Quantum vs Classical Information, Basics of Quantum Communication, Quantum Key Distribution (QKD), Role of Entanglement in Communication, The Idea of the Quantum Internet – Secure Global Networking, Introduction to Quantum Computing, Quantum Parallelism (Many States at Once), Classical vs Quantum Gates, Challenges: Decoherence and Error Correction, Real-World Importance and Future Potential



Unit 5: Applications, Use Cases, and the Quantum Future

Real-world application domains: Healthcare (drug discovery), Material science, Logistics and optimization, Quantum sensing and precision timing, Industrial case studies: IBM, Google, Microsoft, PsiQuantum, Ethical, societal, and policy considerations, Challenges to adoption: cost, skills, standardization, Emerging careers in quantum: roles, skillsets, and preparation pathways, Educational and research landscape – India's opportunity in the global quantum race

Textbooks:

1. Michael A. Nielsen, Isaac L. Chuang, *Quantum Computation and Quantum Information*, Cambridge University Press, 10th Anniversary Edition, 2010.
2. Eleanor Rieffel and Wolfgang Polak, *Quantum Computing: A Gentle Introduction*, MIT Press, 2011.
3. Chris Bernhardt, *Quantum Computing for Everyone*, MIT Press, 2019.

Reference Books:

1. David McMahon, *Quantum Computing Explained*, Wiley, 2008.
2. Phillip Kaye, Raymond Laflamme, Michele Mosca, *An Introduction to Quantum Computing*, Oxford University Press, 2007.
3. Scott Aaronson, *Quantum Computing Since Democritus*, Cambridge University Press, 2013.
4. Alastair I.M. Rae, *Quantum Physics: A Beginner's Guide*, Oneworld Publications, Revised Edition, 2005.
5. Eleanor G. Rieffel, Wolfgang H. Polak, *Quantum Computing: A Gentle Introduction*, MIT Press, 2011.
6. Leonard Susskind, Art Friedman, *Quantum Mechanics: The Theoretical Minimum*, Basic Books, 2014.
7. Bruce Rosenblum, Fred Kuttner, *Quantum Enigma: Physics Encounters Consciousness*, Oxford University Press, 2nd Edition, 2011.
8. Giuliano Benenti, Giulio Casati, Giuliano Strini, *Principles of Quantum Computation and Information, Volume I: Basic Concepts*, World Scientific Publishing, 2004.
9. K.B. Whaley et al., *Quantum Technologies and Industrial Applications: European Roadmap and Strategy Document*, Quantum Flagship, European Commission, 2020.
10. Department of Science & Technology (DST), Government of India, *National Mission on Quantum Technologies & Applications – Official Reports and Whitepapers*, MeitY/DST Publications, 2020 onward.

Online Learning Resources:

- [IBM Quantum Experience and Qiskit Tutorials](#)
- [Coursera – Quantum Mechanics and Quantum Computation by UC Berkeley](#)
- [edX – The Quantum Internet and Quantum Computers](#)
- [YouTube – Quantum Computing for the Determined by Michael Nielsen](#)
- Qiskit Textbook – IBM Quantum



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B. Tech-VII Semester

Course Code	Skills in Civil Engineering software. (STAADPRO/CAD/TEK LA)	L	T	P	C
23CIV474L		0	1	2	2

Course Objectives

The objectives of this course are to:

1. Provide fundamental knowledge of AutoCAD and **Tekla** for 2D drafting and 3D modeling.
2. Train students in **structural analysis and design** using **STAAD. pro**
3. Develop skills in **reinforcement detailing and structural component modeling**.
4. Introduce **seismic and nonlinear analysis** for structural safety evaluation.
5. Enable students to apply **civil engineering software tools** for real-world projects

List of Experiments: -

1. Determination of Basic Drawing and Editing Commands in Auto CAD
2. Creation of a 2D Floor Plan for a Residential Building in AutoCAD
3. Development of Structural Detailing for Beams and Columns in Auto CAD
4. Application of Reinforcement Detailing for Slab and Footings in AutoCAD
5. Creation and analysis of a steel column using TEKLA
6. Modelling a Roof Truss by TEKLA
7. Design of a Composite Beam by TEKLA Column Base Plate Design by TEKLA
8. Determination of STAAD.Pro Interface and Structural Model Setup
9. Analysis and Design of a Simply Supported Beam in STAAD.Pro
10. Development of Structural Analysis for a Multi-Story RCC Building in STAAD.Pro
11. Application of Seismic Load Analysis on a Building Structure in STAAD.Pro

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to:		POs related to COs
CO1	Explain the principles and merits of experimental stress analysis.	PO1, PO2, PO3
CO2	Demonstrate strain measurement using various strain gauge techniques.	PO1, PO2, PO3
CO3	Analyze strain rosette data and evaluate concrete structures using NDT methods.	PO1, PO2, PO3, PO4
CO4	Apply the theory of photoelasticity to determine stress distributions in materials.	PO1, PO2
CO5	Utilize two-dimensional photoelasticity techniques for experimental stress analysis.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. George Omura, Brian C. Benton – **Mastering Auto CAD 2025 and Auto CAD LT 2025**, Wiley, 2025 Edition
2. TEKLA Structural Designer 2023 Engineers Hand Book by Trimble Solutions Corporation

REFERENCE BOOKS:

1. Phil Read, Eddy Krygiel, James Vandezande – **BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, and Contractors**, John Wiley & Sons, 4th Edition, 2023
2. Nighat Yasmin Ph.D., **Introduction to AutoCAD 2025 for Civil Engineering Applications**, SDC Publications, 2024 Edition.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

CO-MAPPING

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO-1	3	1	1	-	2	-	-	1	-	1	1	1	2	1
CO-2	3	1	2	-	3	-	-	2	-	2	2	2	1	1
CO-3	3	1	2	-	3	-	-	2	-	2	2	2	2	2
CO-4	3	1	1	-	3	-	-	1	-	1	1	1	1	2
CO-5	3	1	1	-	3	-	-	1	-	1	1	1	1	1



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B.Tech. - VII Semester

23CIV471P	EVALUATION INDUSTRY INTERNSHIP	L	T	P	C
	(Common to All Branches)	-	-	-	2

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

4. To provide students with practical exposure to industrial, organizational, or professional work environments related to their engineering discipline.
5. To enable students to apply theoretical knowledge and technical skills acquired during the undergraduate program to solve real-world engineering problems.
6. To develop professional competencies such as teamwork, communication, leadership, ethical practices, and workplace discipline.
7. To enhance students' ability to identify, analyze, and execute engineering projects through experiential learning and industry interaction.
8. To prepare students for successful careers and lifelong learning by fostering industry readiness, innovation, and professional development.

INTERNSHIP SCHEME

10. At the end of the sixth semester, every student shall mandatorily register for and undergo an internship (onsite or virtual) of a minimum duration of 6–8 weeks with well-defined objectives. The evaluation of the internship shall be conducted during the seventh semester of the final year.
11. The internship shall be completed in collaboration with local industries, Government organizations, construction agencies, power projects, software MNCs, or other industries relevant to the student's area of specialization in the undergraduate program.
12. At the end of the internship, a certificate of successful completion issued by the industry/organization shall be included in the internship report.
13. The evaluation of the summer internship shall be carried out by a Departmental Committee. The student shall submit the Summer Internship Report to the concerned department and appear for an oral presentation before the Departmental Committee comprising the Head of the Department, the Internship Supervisor, and a senior faculty member of the department.
14. The Internship Report and the Oral Presentation shall carry 50% weightage each. The internship shall be evaluated for a total of 100 external marks. There shall be no internal marks for the Summer Internship. A student shall secure a minimum of 40% marks for successful completion of the internship.
15. The department shall facilitate and monitor student internship programs. Completion of the internship is mandatory. If a student fails to complete the internship, he/she shall not be eligible for the award of the degree. In such cases, the student shall repeat and successfully complete the internship.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B Tech VII Semester

23MAC471U	Gender Sensitization	L	T	P	C
	(common to all branches)	2	0	0	0

Course Objectives

1. To enable students to understand the gender related issues, vulnerability of women and men
2. To familiarize them about constitutional safeguard for gender equality
3. To expose the students to debates on the politics and economics of work
4. To help students reflect critically on gender violence
5. To make them understand that gender identities and gender relations are part of culture as they shape the way daily life is lived in the family as well as wider community and the workplace.

Unit-1 UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male .First lessons in Caste.

Unit-2 GENDER ROLES AND RELATIONS

Two or Many?-Struggles with Discrimination-Gender Roles and Relations – Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and its Consequences- Declining Sex Ratio- Demographic Consequences - Gender Spectrum .

Unit-3 GENDER AND LABOUR

Division and Valuation of Labour - Housework: The Invisible Labor- —My Mother doesn't Work.|| —Share the Load.|| -Work: Its Politics and Economics-Fact and Fiction-Unrecognized.

Unit-4 GENDER-BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment - Domestic Violence - Different forms of violence against women - Causes of violence, impact of violence against women - Consequences of gender-based violence

Unit-5 GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues - Gender Issues -Gender Sensitive Language- Just Relationships

Prescribed Books

1. A.Suneetha,Uma Bhrugu banda,etal. *Towards a World of Equals: A Bilingual Textbook on Gender*,Telugu Akademi, Telangana, 2015.
2. Butler,Judith. *Gender Trouble:Feminism and the Subversion of Identity*. UK Paper back Edn. March 1990

Reference Books

1. Wtatt,Robin and Massood, Nazia,*Broken Mirrors: The dowry Problems in India*, London : Sage Publications, 2011
2. Datt,R.andKornberg,J.(eds),*Women in Developing Countries, Assessing Strategies for*



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

- Empowerment, London: Lynne Rienner Publishers, 2002
3. Brush, Lisa D., Gender and Governance, New Delhi, Rawat Publication, 2007
 4. Singh, Direeti, Women and Politics WorldWide, New Delhi, Axis Publications, 2010
 5. Raj Pal Singh, Anupama Sihag, Gender Sensitization: Issues and Challenges (English, Hardcover), Raj Publications, 2019
 6. A. Revathy & Murali, Nandini, A Life in Trans Activism (Lakshmi Narayan Tripathi). The University of Chicago Press, 2016

Online Resources:

Understanding Gender chrome-extension://kdpelmjpfafjppnhbloffcjpeomlnpah/https://www.arvindguptatoys.com/arvindgupta/kamla-gender1.pdf
https://onlinecourses.swayam2.ac.in/nou24_hs53/preview

Gende Roles and Relations:

At the end of the course , students will be able to		POs
CO1	Understand the basic concepts of gender and its related terminology.	PO2
CO2	Identify the biological , sociological , psychological and legal aspects of gender.	PO5
CO3	Use the knowledge in understanding how gender discrimination works in our society and how to counter it.	PO2
CO4	Analyze the gendered division of labour and its relation to politics and economics.	PO6, PO10
CO5	Appraise how gender-role beliefs and sharing behavior are associated with more well-being in all culture and gender groups.	PO4
CO6	Develop students ` sensibility with regard to issues of gender in Contemporary India.	PO4

Course Articulation Matrix:

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

3=Strong Mapping, 2=Moderate Mapping, 1=Slight Mapping, -No Mapping



IV B.Tech. - VIII Semester

23CIV481P	INTERNSHIP	L	T	P	C
	(Common to All Branches)	-	-	-	4

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

9. To provide students with practical exposure to industrial, organizational, or professional work environments related to their engineering discipline.
10. To enable students to apply theoretical knowledge and technical skills acquired during the undergraduate program to solve real-world engineering problems.
11. To develop professional competencies such as teamwork, communication, leadership, ethical practices, and workplace discipline.
12. To enhance students' ability to identify, analyze, and execute engineering projects through experiential learning and industry interaction.
13. To prepare students for successful careers and lifelong learning by fostering industry readiness, innovation, and professional development.

INTERNSHIP SCHEME

16. In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives.
17. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program.
18. At the end of the semester the candidate shall submit an internship completion certificate and an internship project report.
19. Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department.
20. A certificate of successful completion from industry shall be included in the report.
21. The report and the oral presentation shall carry 50% weight age each. It shall be evaluated for 100 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion.
22. The department shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

COURSE OUTCOMES:

On successful completion of the course, students will be able to:

COs	Course Outcomes	POs
CO1	Apply engineering knowledge and technical skills to perform tasks in a professional work environment.	PO1
CO2	Identify, formulate, and analyze real-world engineering problems encountered during the internship.	PO2
CO3	Develop appropriate solutions using modern engineering principles and methodologies.	PO3
CO4	Investigate practical engineering problems through data collection, analysis, and interpretation.	PO4
CO5	Utilize modern engineering tools, software, and technologies relevant to the internship domain.	PO5
CO6	Understand the impact of engineering solutions on society, health, safety, legal, and cultural aspects.	PO6
CO7	Recognize the importance of sustainable practices and environmental considerations in engineering activities.	PO7
CO8	Demonstrate professional ethics, integrity, and responsibility in the workplace.	PO8
CO9	Function effectively as an individual and as a member of multidisciplinary teams.	PO9
CO10	Communicate technical information effectively through reports, presentations, and professional interactions.	PO10
CO11	Understand project management practices, organizational structures, and resource utilization in industry.	PO11
CO12	Develop self-learning ability, adaptability, and commitment to lifelong learning through industrial exposure.	PO12

[illegible]



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

IV B.Tech. - VIII Semester

23CIV482P	PROJECT WORK	L	T	P	C
	(Common to All Branches)	-	-	-	8

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

14. Identify and explore contemporary research problems and emerging areas in the field of Mechanical Engineering through comprehensive literature review and problem analysis.
15. Analyze, compare, and evaluate existing methodologies, technologies, and solutions related to the identified problem to determine research gaps and opportunities.
16. Formulate and develop a systematic project plan by applying engineering principles, design methodologies, and appropriate tools to address the identified problem.
17. Execute experiments, simulations, or design activities collaboratively as a team, and collect, analyze, and interpret the obtained results for effective decision-making.
18. Prepare technical reports, dissertations, and presentations to communicate project outcomes, findings, and recommendations effectively to academic and professional audiences.

PROJECT WORK SCHEME

23. **Objective of Project Work:** The Project Work aims to provide students with an opportunity to apply the knowledge and skills acquired during the course of study to solve real-world engineering problems. The project may involve design, fabrication, analysis, simulation, research, product development, management studies, or computer-based applications relevant to industry and society. Students shall select the project topic in consultation with the faculty guide and with the approval of the concerned department.
24. **Industry/Research Organization Projects:** In exceptional cases, students may be permitted to carry out their project work in an Industry, Research Organization, or other approved institution based on the recommendation of the Head of the Department. Such projects shall be jointly supervised by a faculty member from the department and an expert from the host organization. Students are required to maintain regular contact with both supervisors and participate in all project review meetings conducted by the department.
25. **Project Monitoring and Reviews:** The project work shall be continuously monitored through a minimum of three review presentations conducted by the Departmental Project Review Committee. The reviews are intended to assess the progress of work, technical competence, problem-solving ability, and adherence to the project schedule. Students shall also be trained in technical report writing, seminar presentation, and viva-voce examination skills.
26. **Project Report Submission:** The project report shall be prepared in accordance with the prescribed guidelines of the institution and submitted to the Head of the Department before the commencement of the Viva-Voce Examination.



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF CIVIL ENGINEERING

27. **Project Presentation:** Each student or project team shall present the progress and outcomes of the project before the Review Committee at scheduled intervals. The presentation shall demonstrate the objectives, methodology, results, conclusions, and contributions of the project.
28. **Evaluation Procedure:** The Review Committee shall be constituted by the Head of the Department. The final evaluation of the project work shall be based on the quality of the project report, project demonstration, oral presentation, and Viva-Voce Examination.
29. **Distribution of Marks: Total: 200 Marks**
 - **Internal Evaluation – 60 Marks**
 - **Departmental Project Review Committee – 30 Marks**
 - Evaluation based on project progress, demonstration, presentation, and overall performance.
 - **Project Report : 15 Marks**
 - **Seminar/Presentation : 15 Marks**
 - **External Evaluation – 140 Marks**
 - Viva-Voce Examination conducted jointly by an Internal Examiner and an External Examiner appointed by the Principal.
30. **Project Exhibition:** At the end of the semester, all completed projects shall be showcased within the department for the benefit of students, faculty members, and other stakeholders. The exhibition shall facilitate knowledge sharing and promote innovation and research culture.
31. **Requirement for Successful Completion:** Successful completion and evaluation of the Project Work are mandatory for the award of the degree. Students who fail to complete the project work or fail to secure the minimum required performance shall not be eligible for the award of the degree and shall be required to repeat and successfully complete the project work as per the regulations of the institution.



On successful completion of the course, students will be able to:

COs	Course Outcomes	POs
CO1	Demonstrate in-depth knowledge and understanding of the selected project domain and its underlying engineering principles.	PO1
CO2	Identify, analyze, and formulate complex engineering problems through literature review, data collection, and critical evaluation to arrive at substantiated conclusions.	PO2
CO3	Design and develop innovative engineering solutions, systems, components, or processes to address the identified project problem.	PO3
CO4	Conduct investigations, experiments, simulations, or analytical studies and interpret the results to validate the proposed solution.	PO4
CO5	Apply appropriate modern engineering tools, techniques, software, and resources necessary for the successful execution of the project work.	PO5
CO6	Evaluate the societal relevance and applicability of project outcomes for sustainable development and community welfare.	PO6
CO7	Assess the environmental impact and sustainability aspects associated with the proposed project solution.	PO7
CO8	Demonstrate professional ethics, integrity, and responsibility while planning and executing project activities.	PO8
CO9	Function effectively as an individual, team member, or team leader in a multidisciplinary project environment.	PO9
CO10	Communicate technical ideas, project progress, findings, and outcomes effectively through reports, presentations, demonstrations, and viva-voce examinations.	PO10
CO11	Apply project management principles, including planning, scheduling, resource allocation, cost estimation, and time management during project execution.	PO11
CO12	Recognize the importance of lifelong learning and continuously enhance technical competence in the chosen area of specialization.	PO12

[illegible]