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 Syllabi
Under R23 Regulations

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

Department of Civil Engineering

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

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

i. Total duration of the of B. Tech (Regular) Programmed is four academic years.

ii. Each academic year of study is divided into two semesters.

iii. 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

i) For theory subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

ii) For practical subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.

iii) 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.

iv) 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

i) 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.

ii) 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: (25x0.8) + (20x0.2) = 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: (25x0.8) + (0x0.2) =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.

10. 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.

11. 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 programmer 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.

12. ACADEMIC BANK OF CREDITS (ABC)

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

i) Provide option of mobility for learners across the universities of their choice

ii) Provide option to gain the credits through MOOCs from approved digital platforms.

iii) Facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC

iv) Execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

13. 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.

14. 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.

i) The Minor program requires the completion of 12 credits in Minor stream chosen.

ii) 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.

iii) 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.

15. 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.

i) 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.

ii) 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).

iii) 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.

iv) The concerned Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.

v) 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.

vi) 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.

vii) The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.

viii) A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.

ix) 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.

x) 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.

xi) 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.

16. ATTENDANCE REQUIREMENTS:

i) 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).

ii) Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.

iii) A stipulated fee shall be payable towards condonation of shortage of attendance to the Institution.

iv) 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.

v) 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.

vi) If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

vii) 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.

viii) For induction programmed attendance shall be maintained as per AICTE norms.

17. PROMOTION RULES:

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

i) A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per university norms.

ii) 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.

iii) 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.

iv) 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.

v) 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.

18. 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

i) 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.

ii) 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.

iii) Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

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

$$SGPA = \Sigma (Ci \times Gi)/\Sigma Ci$$

where, Ci is the number of credits of the i^{th} subject and Gi 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.,

$$CGPA = \Sigma (Ci \times Si)/ \Sigma Ci$$

where "S_i" is the SGPA of the i^{th} semester and C_i 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	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 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

19. 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.

20. 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.

i) **UG Certificate in (Field of study/discipline)** - programmer duration: First year (first two semesters) of the undergraduate programmer, 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.

ii) **UG Diploma (in Field of study/discipline)** - programmer duration: First two years (first four semesters) of the undergraduate programmer, 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)**- programmer duration: First three years (first six semesters) of the undergraduate programmer, 120 credits.

(b) Entry Policy:

Modalities on multiple entry by the student into the B.Tech. programmer 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.

21. 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 programmer/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.

22.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.

23. MINIMUM INSTRUCTION DAYS FOR A SEMESTER:

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

24. MEDIUM OF INSTRUCTION

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

25. STUDENT TRANSFERS:

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

26. 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. programmer.

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).

****

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

Semester III (Second Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	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						-	-	-	-
Total credits						20	-	-	-
Total Marks							240	560	800

Semester IV (Second Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	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						-	-	-	-
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			18	01	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
Contact Hours per week			20	01	08	-	-	-	-
Total Hours per week			29			-	-	-	-
Total credits						23	-	-	-
Total Marks							300	630	900

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF MECHANICAL 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 Instructios 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 Instructios 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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES

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 to pics 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 to pics 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, 2023Empowering with Language byCengagePublications,2023

REFERENCE BOOKS:

Dubey, Sham Ji&Co. English for Engineers, VikasPublishers,2020

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

Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge UniversityPress,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 SCIENCE & HUMANITIES

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).

COURSE OUTCOMES:

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**

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, 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)

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/110/105/111105111/
2. https://www.youtube.com/watch?v=8D3WViAyJvc
3. https://www.youtube.com/watch?v=fKzDtjq0ks4
4. https://www.youtube.com/watch?v=wMd4YRyBmjA
5. https://www.youtube.com/watch?v=ArkDa6d5h9I
6. https://www.youtube.com/watch?v=KgItZSst2sU
7. https://www.youtube.com/watch?v=-I3HUeHi1Ys

CO-PO MAPPING

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

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.

COURSE OUTCOMES:

On successful completion of the course the student could be		PO
CO1	Demonstrate the ability to analyze and solve complex DC and AC circuits, and analyze the complex circuit configurations.	PO1, PO2, PO3,
CO2	Comprehend the construction, principles, and operation of DC and AC machines, and analyze the working principles of various measuring instruments	PO1, PO2, PO3,
CO3	Evaluate different energy resources and Calculate electricity bills and understand the importance of safety measures.	PO1, PO2, PO3,

TEXTBOOKS:

1. D. C. Kulshreshtha, Basic Electrical Engineering, Tata McGraw Hill, 2019, First Edition

2. P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpati Rai & Co, Power System Engineering, 2013

3. Rajendra Prasad, Fundamentals of Electrical Engineering, PHI publishers, 2014, Third Edition

REFERENCE BOOKS:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Mc Graw Hill, 2019, Fourth Edition 2. V.K. Mehtha, S. Chand Technical Publishers, "Principles of Power Systems", 2020

3.M.S. Naidu, S. kamakshiah "Basic Electrical Engineering", Mc Graw Hill, 2019, Fourth Edition

4.T.K. Nagsarkar, M.S. Sukilja "Basic Electrical Engineering", Oxford Higher education,

Web Resources: https://nptel.ac.in/courses/108105053

https://nptel.ac.in/courses/108108076

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
CO*	**3**	**2**	**2**									**2**

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 INSTRUMENTTAION

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. Boy listed & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. 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.

Web Resources:

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/

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
CO*	**3**	**2**	**2**									**2**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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, PO12**
CO2	Draw the projection of points, lines and plane surfaces.	**PO1, PO2, P03, P10, PO12**
CO3	Draw the projection of solids, like prisms, pyramids, cylinder, and cone.	**PO1, PO2, P03, P10, PO12**
CO4	Draw the section of solids and development of surfaces.	**PO1, PO2, P03, P10, PO12**
CO5	Draw the isometric projections and orthographic views.	**PO1, PO2, P03, P10, PO12**

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

REFERENCE WEBSITE:

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

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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 (Common to All Branches)	L	T	P	C
		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
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	2	3	-	-	-	-	-	-	-	-
CO4	3	3	-	-	3	-	-	-	-	-	-	-
CO5	3	-	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**2**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES

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

REEFERENCE 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, (3 rd 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 enable to		PO
CO1	Understand the different aspects of the English language proficiency with emphasis on LSR W skills.	PO1
CO2	Apply communication skills through various language learning activities.	PO5
CO3	Analyze the English speech sounds, stress, rhythm, into nation and syllable division for better listening and speaking comprehension.	PO6
CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.	PO2
CO5	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**
CO1	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO	**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' 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 on1D 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
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	
CO9												3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**		**3**

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

Course Outcomes:

On successful completion of the course the student could be:		POs related to COs
CO1	Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.	PO1, PO2, PO3
CO2	Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.	PO1, PO2, PO3
CO3	Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.	PO1, PO2, PO3 PO1,
CO4	Analyze various characteristics of electrical circuits, electrical machines and measuring instruments.	PO2, PO3, PO12 PO1,
CO5	Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.	**PO2,PO3,P012**

REFERENCE BOOKS:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition

2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013

3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

CO-PO MAPPING:

CO-P0	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	**3**	**2**	**2**	-	-	-	-	-	-	-	-	**2**
CO2	**3**	**3**	**2**	-	-	-	-	-	-	-	-	**2**
CO3	**3**	**2**	**2**	-	-	-	-	-	-	-	-	**2**
CO4	**3**	**3**	**2**	-	-	-	-	-	-	-	-	**2**
CO5	**3**	**3**	**2**	-	-	-	-	-	-	-	-	**2**
CO*	**3**	**2.6**	**2**	-	-	-	-	-	-	-	-	**2**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PART B: ELECTRONICS ENGINEERING LAB

COURSE EDUCATIONAL OBJECTIVES:

1 Identify & testing of various electronic components.

2 Understand the usage of electronic measuring instruments.

3 Evaluate the performance of rectifiers

4 Study the characteristics of various electron devices

5 Obtain the operation of a digital circuit.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

COURSE OUTCOMES:

On successful completion of the course the student could be		**POs**
CO1	Identify & testing of various electronic components.	PO1, PO2, PO3,
CO2	Understand the usage of electronic measuring instruments.	PO1, PO2, PO3,
CO3	Evaluate the performance of rectifiers	PO1, PO2, PO3,
CO4	Plot and discuss the characteristics of various electron devices	PO1, PO2, PO3, PO12
CO5	Obtain the operation of a digital circuit.	PO1, PO2, PO3, PO12

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**

I B.Tech. – I /II Semester

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."

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:

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

Reference Books:

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

CO-PO Mapping

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES (AUTONOMOUS)

DEPARTMENT OF SCIENCE & HUMANITIES

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 SCIENCE & HUMANITIES

I B.Tech II sem

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

COURSE EDUCATIONAL OBJECTI VES:

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, Wronskean, 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
CO1	Solve the first order differential equations related to various engineering fields	**PO1, PO2,PO3**
CO2	Solve the higher order differential equations related to various engineering fields.	**PO1, PO2,PO3**
CO3	Identify solution methods for partial differential equations that model physical processes.	**PO1, PO2,PO3**
CO4	Interpret the physical meaning of different operators such as gradient, curl and divergence.	**PO1, PO2,PO3**
CO5	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.

REFERRENCE 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

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES
I B.Tech II sem

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-Heineman,1992.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES

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	-	-	-	-	-

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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.

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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
CO1	Identify the importance and applications Wave Optics in various Streams of Engineering	**PO1, PO2**
CO2	Explain the fundamental of crystals and their structures	**PO1, PO2**
CO3	Elucidate the importance, properties and applications of Magnetic materials and dielectrics	**PO1, PO2**
CO4	Use ideas with mathematical solutions to Quantum mechanics and its applications in various atomic phenomena	**PO1, PO2**
CO5	Provide knowledge about 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=6QUFuZpCgGw

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

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

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

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,Prahu 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

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**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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 theorm – 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, P03, 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, P03, PO4**
CO3	Find the location of centroid, center of gravity and moment of inertia for the given appropriate sections.	**PO1, PO2, P03, PO4**
CO4	Analyze the kinematics of a body undergoing rectilinear, curvilinear motion.	**PO1, PO2, P03, PO4**
CO5	Apply the dynamic equilibrium principles and work energy equations to solve appropriate problems.	**PO1, PO2, P03, 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/

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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 SCIENCE & HUMANITIES

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 SCIENCE & HUMANITIES

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	-	3

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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*

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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	P04
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

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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.

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/

OURSE 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**

CO-MAPPING

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

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES
(Autonomous)

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

CO-MAPPING

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

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

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 GUDIELINES:

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

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

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., NewDelhi11thedition, 2024.
2. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
3. Fluid Mechanics by Fran kM. White, Henry Xue, TataMcGrawHill,9thedition, 2022.
4. C.S.P.Ojha, R.Berndtsson andP.N.Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
5. Introduction to Fluid Mechanics & Fluid Machines by S K Som, Gautam Biswas, SChakraborty Tata McGraw Hill, 3rd edition 2011

Online Learning Resources:
https://archive.nptel.ac.in/courses/112/105/112105269/https://nptel.ac.in/courses/112104118https://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

		L	T	P	C
23CIV232T	**STRENGTH OF MATERIALS**	**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

UNITI: **(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 — Bars of varying section- Temperature stress— stresses in composite bars.

UNITII: **(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**.**

UNITIII: **(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.

UNITIV: **(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)**

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

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.SSrinath,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— EPPopov, Prentice Hall, 2nd Edition, 2015.
5. A Textbook of Strength of Materials, by R. K. Rajput (Mechanics of Solids) SI Units S. Chand & Co, NewDelhi 7thedition 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.

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 Press1stEdition, 2011.

Reference Books:

1. Surveying Vol–1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain- Laxmi Publications (P) ltd., New Delhi, 18thedition 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, 3rdEdition, 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.srmap.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.

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	-	-	-	-	-	-	-

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

LISTOFEXPERIMENTS:

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

-

II Year B. Tech.CE–IV Semester

23HSM232	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	L	T	P	C
		2	0	0	2

Course Objectives:

- To in culcate 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
- ToKnowtheVarioustypesofmarketstructureandpricingmethodsandstrategy
- 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- VFinancial Accounting and Analysis

Introduction– Concept sand 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 shoulder 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: BusinessEconomicsandFinancialAnalysis,4/e,MGH.

Reference Books:

1. Ahuja Hl Managerial economics Schad.
2. S.A. SiddiquiandA.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph. Nell sand 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	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

II Year B.Tech. CE–IV Semester

23HSM233	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, leader ship 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 - Hertzberg's Two Factor Theory - Vroom's theory of expectancy – Mc Cleland'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 shoulder 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:

1. Luthans, Fred, Organizational Behavior, McGraw-Hill,12Thedition.
2. 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
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 Year B.Tech. CE–IV Semester

		L	T	P	C
23HSM231	**BUSINESS ENVIRONMENT**	2	0	0	2

Course Objectives:

- To make the student to understand about the business environment
- To enable them in knowing the importance off is calm and monitory 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 shoulder 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 monitory policy	**PO1, PO2, PO3,PO4,PO5**

Textbooks:

1. Francis Cherunilam, International Business: Text and Cases, Prentice Hall of India.
2. K. Aswath Appa, Essentials of Business Environment: Texts and Cases &Exercises13th Revised Edition. HPH

Reference Books:

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

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-69561982https://www.slideshare.net/ShikhaGupta31/indias-trade-policyppthttps://www.slideshare.net/viking2690/wto-ppt-60260883https://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	-	-	-	-	-	-	-

II Year B.Tech. CE–IV Semester

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, Khond alite 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 bells, 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 shoulder 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.2nd Edn2014.
2. Engineering & General Geology by Parbin Singh Katson educational series 8th2023

References:

1. Engineering Geology by Supino Gango pad hay Oxford University press1st edition, 2012.
2. Engineering Geology by D. Venkat Reddy, VikasPublishing,2nd Edn,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:

1. http://nptel.iitm.ac.in/video.php?subjectId=105105106
2. 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

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:Portlandcement–Chemicalcomposition–Hydration,Settingofcement, Fineness of cement, Structure of hydrate cement– Test for physical properties – Different gradesofcements– Admixtures–Mineralandchemicaladmixtures–accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & othermechanicalpropertiesofaggregates– Specificgravity,Bulkdensity,porosity, adsorption&moisturecontentofaggregate–Bulkingofsand– Deleterioussubstances– Soundness–Alkaliaggregatereaction–Thermalproperties–Sieveanalysis– Fineness modulus–Gradingcurves–Gradingoffine&coarseAggregates–Maximumaggregate 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 – Factorsaffectingstrength–Relationbetweencompression&tensilestrength–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 shoulder 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	Familiarizethebasicconceptsofspecialconcreteandtheirproductiona nd 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	-	-	-	-	-	-	-

II Year B.Tech. CE–IV Semester

23CIV243T	STRUCTURAL ANLAYSIS	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

FIXEDBEAMS& CONTINUOUSBEAMS: 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 shoulder 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	Analyzecontinuousbeamsandportalframesbyusingslope-deflectionmethod	**PO1,PO2,PO3,PO5**
CO5	Analyze continuous beams and portal frames by using Moment–distribution method	**PO1, PO2, PO3, PO4,P5**

Textbooks:

1. Analysis of Structures – Vol-I&II by V.N. Vazirani&M.M.Ratwani, Khanna Publications, New Delhi.
2. Basic Structural Analysis by C.S.Reddy, Tata McGraw-Hill Publishers.3rd edition 2017.

Reference Books:

1. Structural analysis by Aslam Kassimali Cengage publications6th edition2020.
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. Prakasarao-Univeristy 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
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

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. Franci'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 shoulder 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. ModiandS.M. Seth, Hydraulics and Fluid Mechanics, StandardBookHouse22nd, 2019.
2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata Mc GrawHill,2nd edition 2018

Reference Books:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi 11thedition, 2024.
2. Fluid Mechanics by Fran Km. White, Henry Xue, Tata Mc Graw Hill, 9thedition,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 Chakra borty 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	-	-	-	-	-	-	-

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 shoulder 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–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

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,2019,2ndEdition.
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	-	-	-	-	-	-	-	-

II Year B.Tech. CE–II Semester

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.

LISTOFEXPERIMENTS

1. **Physical properties of minerals: Mega-scop 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 Poryphery, Basalt, etc.
   b) Sedimentary rocks–Sandstone, Ferruginous sandstone, Limestone, Shale, Laterite, Conglamorate, etc.
   c) Metamorphic rocks–Biotite–Granite Gneiss, Slate, Muscovite & Biotite schist, Marble, Khond alite, 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, SponPress,3rdedition,

II Year B.Tech. CE–IV Semester

232HSM241L	SOFTSKILLS	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. Providingopportunitiesfortheparticipantstonarratecertaincrisisandstress–ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates

UNITV 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 SkillsS.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&FernandezAgna, 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.UshaJain,LifeSkills(Paperback English)Publisher: Vayu Education of India, 2014

OnlineLearningResources:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
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

II Year B. Tech CE–IV Semester

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.

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_mg60/preview

II Year B. Tech CE–IV Semester

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 starker alities 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.
- Thelogbookhastobecountersignedbytheconcernedmentor/facultyincharge.
- 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

PersonalOutcomes

- 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 in volvement 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 PROJECTT OF ACULTY MEMBERS

- Satisfaction with the quality of student learning
- New avenues for research and publication via new relationships between faculty and community
- Providingnetworkingopportunitieswithengagedfacultyinotherdisciplinesorinstitutions
- A stronger commitment to one's research.

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

- Improved in situational commitment.
- Improved student retention
- Enhancedcommunityrelations

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 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 programmers
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.
- AsandwhenrequiredtheCollegefacultythemselvesactasResourcePersons.
- 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 (OneWeek)**
   - 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 bed rafted 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.

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

LIMITSTATE 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.

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.

REFRENCEBOOKS:

1. N. Krishnaraju, —Structural Design and Drawing, Universities Press Pvtltd, Hyderabad.4rdedition 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

Exam Pattern:

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.

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/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

STRESSDISTRIBUTION AND SETTLEMENT

Stress Distribution in Homogeneous and Isotropic Medium – BoussinesqTheory – (Point Land, Line Land 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. - √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

REFRENCEBOOKS:

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/105101201https://nptel.ac.in/courses/10510515

CO-MAPPING

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
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	**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

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

DIVERSIONHEADWORKS:

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

REFRENCEBOOKS:

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	PSO1	PSO2
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

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 eflections 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, NarosaPublishingHouse2ndedition 2017

REFRENCE BOOKS:

1. Design of Prestressed Concrete Structures by T.Y.Lin& NedH.Burns,John Wiley& Sons 3rd edition 2010
2. Prestressed Concrete Design by Praveen Nagrajan, Pearson publications, 2013.
3. Prestressed Concrete by Ramamuratam, Dhanpatrai Publications2020edition
4. BIScode on—prestressed concrete‖,IS:1343to 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

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

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.

REFRENCEBOOKS:

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., RoweD.R.andTchobanoglousG., 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	PSO1	PSO2
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

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 Impacton 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.

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 ucation Edi (1996)

REFRENCEBOOKS:

1. Environmental Engineering, by Peavy,H.S, Rowe,D.R, Tchobanoglous, G.Mc-Graw 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, byJ.Glynn and GaryW.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	PSO1	PSO2
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					
23OAI351A	FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE	L	T	P	C
		0	0	3	3

COURSEEDUCATIONAL 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-FirstSearch, Depth- first search, Hill-climbing search, Simulate 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 Russell and Peter Norvig, Pearson Education.

REFERENCEBOOKS:

1. Artificial Intelligence,3rdEdn.,E.RichandK.Knight(TMH)
2. Artificial Intelligence,3rdEdn., Patrick Henny Winston, Pearson Education.
3. Artificial Intelligence, Shivani Goel, Pearson Education.
4. Artificial Intelligence and Expert systems–Patterson, Pearson Education.
5. **CO-POMAPPING:**

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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

230CS351A **JAVA PROGRAMMING** L T P C

(Common to CSE, CSM, CAI, CSD) 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. Learnthe 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
CO1	Analyse problems, design solutions using OOP principles, and implement them efficiently in Java. (L4)	PO1, PO2, PO5
CO2	Design and implement classes to model real-world entities, with a focus on attributes, behaviours, and relationships between objects (L4)	PO1, PO4,PO5
CO3	Demonstrate an understanding of inheritance hierarchies and polymorphic behaviour, including method overriding and dynamic method dispatch. (L3)	PO1,PO3,PO4, PO5

CO4	Apply Competence in handling exceptions and errors to write robust and fault-tolerant code. (L3)	PO1,PO4, PO5
CO5	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, 11thedition, 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:

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	**2.6**	**3**	**3**	**3**	**2.8**	**-**	**-**	**-**	**-**	**-**	**-**	-

III B.Tech - V Semester

23OAI351A	FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE	L	T	P	C
		0	0	3	3

COURSEEDUCATIONAL 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.

REFERENCEBOOKS:

1. ArtificialIntelligence,3rdEdn.,E.RichandK.Knight(TMH)
2. ArtificialIntelligence,3rdEdn.,PatrickHennyWinston,PearsonEducation.
3. ArtificialIntelligence,ShivaniGoel,PearsonEducation.
4. ArtificialIntelligenceandExpertsystems–Patterson,PearsonEducation.

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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				
23OECE361A	DIGITAL ELECTRONICS (OPENELECTIVE– I)	L 3	T 0	P 0	C 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

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, P03
CO3	Analyzing Grounding Practices and Electrical Bonding	PO1, PO2, P03, PO4
CO4	Applying Safety Practices in Electrical Installations and Environments	PO1, PO2, P03, PO4
CO5	Evaluating Electrical Safety Standards and Regulatory Compliance	PO1, PO2, P03, PO4

TEXT BOOKS:

1. MassimoA.G. Mitolo, "Electrical Safety of Low-Voltage Systems", Mc Graw Hill, USA,2009.
2. MohamedEl-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	PO 2	PO3	PO 4	PO5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO1 2
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 MECHANICAL ENGINEERING

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 kills 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 Christop her 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–MathematicsforMachineLearninghttps://ocw.mit.edu
- StanfordCS229–MachineLearningCourse https://cs229.stanford.edu/
- Deep AI–MathematicalFoundationsforAIhttps://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

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

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) (Common to All Branches)	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-timeadverbs-Sequenceoftenses-IfClause-Voice- activevoiceandpassivevoice-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):	**Bloom s Level**
	By the end of the program students will be able to	
1.	Identify the basics of English grammar and its importance	**PO2**
2.	Explain the use of grammatical structures in sentences	**PO5**
3.	Demonstrate the ability to use various concepts in grammar and vocabulary and the applications in every day use and in competitive exams	**PO6,PO10**
4.	Analyze an unknown passage and reach conclusions about it.	**PO10**
5.	Choose the appropriate form of verbs in framing sentences	**PO4**
6.	Develop speed reading and comprehending ability thereby perform better in competitive exams	**PO4**

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/enlgish-grammar—reference/actve–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

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 – 16industries 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

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

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**

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,PO 4
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

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.

REFRENCEBOOKS:

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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 HYDRAULICMACHINES 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**theprinciplesoffluidmechanicsandvalidatefundamentalconcepts 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**theimpactofjetforcesonvanesandtheirapplicationsinhydraulic machinery.
5. **Assess**theperformancecharacteristicsofhydraulicturbinesandpumpsunder 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

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.

REFRENCEBOOKS:

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

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.

REFRENCEBOOKS:

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/previewhttps://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	PSO1	PSO2
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

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**
CO1	Design electronic circuits for variety of applications using series and parallel connections	**PO1**
CO2	Analyze and solve real time problems using Arduino boards	**PO2**
CO3	Design and analyze a real time circuit using Tinkercad	**P03**
CO4	Simulate and interface actuators using Arduino boards	**PO4**
CO5	Able to use modern simulation tools for interfacing the hardware components.	**PO5**
CO6	Follow ethical principles in designing, simulating and implementing various circuits.	**PO8**
CO7	Do experiments effectively as an individual and as a member in a group.	**PO9**
CO8	Communicate verbally and in written form, the understandings about the experiments.	**PO10**
CO9	Continue updating their skill related to 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 Year - V Semester

Course Code		L	T	P	C
23CIV351P	EVALUATION OF COMMUNITY SERVICE PROJECT	-	-	-	2

Introduction **Experiential learning through community engagement**

- 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 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.

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 student store a lize the stark realities of the society.
- To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
- Tomakestudentsawareoftheirinnerstrengthandhelpthemtofindn ew/outofboxsolutions to the 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 a 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, house-wives, etc
- A log book has to be maintained by each of the student, where the activities undertaken/involved to be recorded.
- The log book has to be counter signed by the concerned mentor/faculty in charge.

- 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 programmes of NSS/NCC/Green Corps/Red Ribbon Club, etc.
- Minor project report should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.
- Award of marks shall be made as per the guidelines of Internship/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, so as to enable them to commute from their residence and return back by evening or so.
- The Community Service Project is at wofol 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—there al world‖
- Positive impact on academic out comes 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 professionals 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 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
- A stronger commitment to one's research

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

- Improved institutional 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 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.

For Engineering Students

1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programmed
5. Horticulture
6. Herbal plants
7. Botanical survey

8. Zoological survey
9. Marine products
10. Aquaculture
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 programmed and their impact
24. Use of chemicals on fruits and vegetables
25. Organic farming
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 of free electricity to farmers and related issues
40. Gender ration in schooling level-observation.

Complimentingthecommunityserviceprojectthestudentsmaybeinvolve dtotakeupsomeawareness campaigns on social issues/special groups. The suggested list of programmed are;

Programmed for School Children

1. Reading Skill Programmed (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 Programmed on Good Touch and Bad Touch(Sexual abuse)
7. Awareness Programmed on Socially relevant themes.

Programmed 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. Programmed on Environment
10. Health and Hygiene
11. Hand wash programmed
12. Commemoration and Celebration of important days

programmer for Youth Empowerment

1. Leadership
2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Development

Common programmer

1. Awareness on RTI
2. Health intervention programmed
3. Yoga
4. Tree plantation
5. Programmed 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 programmed 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 programmed is rolled out, the District Administration could be roped in for the successful deployment of the programmed.
- An in-house training and induction programmed 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: 8weeks

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 secretariat's 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 programmed to be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. **Community Immersion Programmed (Three Weeks)**
   Along with the Community Awareness Programmed, 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 the experiential learning about the community and its dynamics. Programmes 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 8 weeks work 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 particular 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 need to be maintained by the students batch, which should be countersigned by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them.

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 Lacings 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

PLASTICANALYSIS 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.

REFRENCEBOOKS:

1. Gambhir M L, Fundamentals of Structural Steel Design, McGraw Hill Education India Pvt Limited, 2013
2. Jack C. McCormac& Stephen F. Csernak - Structural Steel Design, Pearson, 7th Edition, 2023.
3. William T. Segui&FaridSoleimani - Steel Design, Cengage, 7th Edition, 2023.
4. SarwarAlamRaz, 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	PSO1	PSO2
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 – Clarifloccuator- 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 SEWAGETREATMENT 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.

REFRENCEBOOKS:

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. HammarJr.Wiley, 2007.

ONLINE LEARNING RESOURCES

https://nptel.ac.in/courses/103107084

CO-MAPPING

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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 developmentin 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 GEOMETRICDESIGN 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 TRAFFICENGINEERINGSTUDIES

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

REFRENCEBOOKS:

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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 RESISTANTSTRUCTURES (PE- II)**	L	T	P	C
23CIV364A		3	0	0	3

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 Deign 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 LoadResistingSystems-DeterminationofDesignLateralforcesasPerIs1893(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- DuctileDetailingConsiderationsasPerIs13920-2016-BehaviourofBeams,
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.

REFRENCEBOOKS:

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. Masory and Timber structures including earthquake Resistant Design –AnandS.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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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)		T	P	C
23CIV364C			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.3	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 Delhi2015
2. Flow through Open Channels, Rajesh Srivastava, Oxford Univ. Press. N Delhi, 2011
3. Open Channel Hydraulics, Chow, V.T., Mc Graw HillInc.NYork,1979.

REFRENCEBOOKS:

1. Open Channel Hydraulics, French, R.H., McGraw HillPubCo., NYork,1986
2. Open Channel Hydraulics, Terry Sturm, TataMcGrawHill Pub.N Delhi,2011

ONLINE LEARNING RESOURCES

https://nptel.ac.in/courses/105/106/105106114/

CO-MAPPING

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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 usedin 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 Programmer 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 Skemp ton 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.

REFRENCEBOOKS:

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

III B. Tech– VI Semester					
Course Code	**COST EFFECTIVE HOUSINGTECHNIQUES (PE – III)**	L	T	P	C
23CIV365B		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 – ImpedimentlyIn 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 Lass - 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 Rooting/Flooring Systems -Economical Wall System

- Single Brick Thick Loading 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 Wall - 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 Railways 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 planningin 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. 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. 3. Low-cost Housing – G.C. Mathur by South Asia Books

REFRENCEBOOKS:

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. 3. Modern trendsin housing in developing countries – A.G. MadhavaRao, 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	PSO1	PSO2
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 footprintin agricultural sustainability.	PO1, PO2,PO3,PO4

TEXT BOOKS:

1. 1. T. O. Randhir, Watershed Management: Issues and Approaches, IWA Publishing, 2006
2. 2. J. V. S. Murty, Watershed Management, New Age International, 2013

REFRENCEBOOKS:

1. 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 toanalyze 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 Ramamuratam, jain book depot , New Delhi.

REFRENCEBOOKS:

1. Structural analysis by R.S. Khurmi, S. Chand Publications, NewDelhi.
2. Basic Structural Analysis by K.U. Muthuetal., I.K. International PublishingHousePvt.Ltd
3. Theoryof Structures by Gupta SP, GSPundit and R Gupta,Vol II, Tata McGraw Hill Publications Company td.
4. 4. D. S. PrakashRao, —Structural Analysis: AUnifiedApproach‖, UniversitiesPress

OnlineLearningResources:

https://archive.nptel.ac.in/courses/105/106/105106050/

CO-MAPPING

Course Outcomes	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

III B. Tech–II Semester					
Course Code	**DISASTER MANAGEM ENT (OE – II)**	L	T	P	C
		3	0	0	3

Course Objectives:

The objectives of this course are to make the student:

1. To understand the fundamental concepts of natural disasters, their occurrence, and disaster risk reduction strategies.
2. To analyze the impact of cyclones on structures and explore retrofitting techniques for adaptive reconstruction.
3. To apply wind engineering principles and computational techniques in designing wind-resistant structures.
4. To evaluate earthquake effects on buildings and develop strategies for seismic retrofitting.
5. To assess seismic safety planning, design considerations, and innovative construction materials for disaster-resistant structures.

UNIT– I

Introduction to Natural Disasters– Brief Introduction to Different Types of Natural Disasters, Occurrence of Disasters inDifferent Climatic and Geographical Regions, Hazard Maps (Earthquake and Cyclone) of The World and India, Regulations for Disaster Risk Reduction, Post-Disaster Recovery and Rehabilitation (Socioeconomic Consequences).

UNIT– II

Cyclones and Their Impact– Climate Change and Its Impact On Tropical Cyclones, Nature of Cyclonic Wind, Velocities and Pressure, Cyclone Effects, Storm Surges, Floods, and Landslides. Behavior of Structures in Past Cyclones and Windstorms, Case Studies. Cyclonic Retrofitting, Strengthening of Structures, and Adaptive Sustainable Reconstruction. Life-Line Structures Such as Temporary Cyclone Shelters.

UNIT– III

Wind Engineering and Structural Response– Basic Wind Engineering, Aerodynamics of Bluff Bodies, Vortex Shedding, and Associated Unsteadiness Along and Across Wind forces. Lab: Wind Tunnel Testing and Its Salient Features. Introduction to Computational Fluid Dynamics (CFD). General Planning and Design Considerations Under Windstorms and Cyclones. Wind Effects on Buildings, towers, Glass Panels, Etc., and Wind-Resistant Features in Design. Codal Provisions, Design Wind Speed, Pressure Coefficients. Coastal Zoning Regulations for Construction and Reconstruction in Coastal Areas. Innovative Construction Materials and Techniques, Traditional Construction Techniques in Coastal Areas.

UNIT– IV

Seismology and Earthquake Effects– Causes of Earthquakes, Plate Tectonics, Faults, Seismic Waves; Magnitude, Intensity, Epicenter, Energy Release, and Ground Motions. Earthquake Effects– On Ground, Soil Rupture, Liquefaction, Landslides. Performance of Ground and Buildings in Past Earthquakes– Behavior of Various Types of Buildings and Structures, Collapse Patterns; Behavior of Non-Structural Elements Such as Services, Fixtures, and Mountings – Case Studies. Seismic Retrofitting– Weakness in Existing Buildings, Aging, Concepts in Repair, Restoration, and Seismic

Strengthening.

UNIT– V

Planning and Design Considerations for Seismic Safety– General Planning and Design Considerations; Building forms, Horizontal and Vertical Eccentricities, Mass and Stiffness Distribution, Soft Storey Effects, Etc.; Seismic Effects Related to Building Configuration. Plan and Vertical Irregularities, Redundancy, and Setbacks. Construction Details– Various Types of Foundations, Soil Stabilization, Retaining Walls, Plinth Fill, Flooring, Walls, Openings, Roofs, Terraces, Parapets, Boundary Walls, Underground and Overhead Tanks, Staircases, and Isolation of Structures. Innovative Construction Materials and Techniques. Local Practices– Traditional Regional Responses. Computational Investigation Techniques.

COURSE OUTCOMES:

After successful completion of this course, students will be able to:		**POs related to COs**
CO1	Understand the fundamental concepts of natural disasters, their occurrence, and disaster risk reduction strategies.	PO1, PO2, PO3
CO2	Analyze the impact of cyclones on structures and explore retrofitting techniques for adaptive reconstruction.	PO1, PO2, PO3
CO3	Apply wind engineering principles and computational techniques in designing wind resistant structures.	PO1, PO2,PO3,PO4
CO4	Evaluate earthquake effects on buildings and develop strategies for seismic retrofitting.	PO1,PO2
CO5	Assess seismic safety planning, design considerations, and innovative construction materials for disaster-resistant structures.	PO1, PO2,PO3,PO4

TEXT BOOKS:

1. David Alexander, Natural Disasters, 1st Edition, CRC Press, 2017.
2. Edward A. Keller and Duane E. DeVecchio, Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes, 5th Edition, Routledge, 2019.

REFRENCEBOOKS:

1. Ben Wisner, J.C. Gaillard, and Ilan Kelman (Editors), Handbook of Hazards and Disaster Risk Reduction and Management, 2nd Edition, Routledge, 2012.
2. Damon P. Coppola, Introduction to International Disaster Management, 4th Edition, Butterworth-Heinemann, 2020.
3. BimalKanti Paul, Environmental Hazards and Disasters: Contexts, Perspectives and Management, 2nd Edition, Wiley-Blackwell, 2020.

OnlineLearningResources:

https://nptel.ac.in/courses/124107010
https://onlinecourses.swayam2.ac.in/cec19_hs20/preview

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	-	-	-	-	2	-	2	2	-	-	-	3	3
CO-2	-	3	-	-	2	-	-	-	-	-	-	2	3	-
CO-3	3	-	-	3	-	-	3	-	-	2	-	-	-	3
CO-4	-	-	3	-	3	-	-	2	-	-	-	-	3	-
CO-5	-	-	-	3	-	3	3	3	2	-	-	-	-	3

III B. Tech– VI Semester					
Course Code	SUSTAINABILITY IN ENGINEERING PRACTICES (OE – II)		T	P	C
			0	0	3

Course Objectives:

The objectives of this course are to make the student:

1. To understand the fundamentals of sustainability, the carbon cycle, and the environmental impact of construction materials.
2. To analyze sustainable construction materials, their durability, and life cycle assessment.
3. To apply energy calculations in construction materials and assess their embodied energy.
4. To evaluate green building standards, energy codes, and performance ratings.
5. To assess the environmental effects of energy use, climate change, and global warming.

UNIT– I INTRODUCTION

Introduction and Definition of Sustainability - Carbon Cycle - Role of Construction Material: Concrete and Steel, Etc. - CO2Contribution From Cement and Other Construction Materials.

UNIT– II MATERIALS USED IN SUSTAINABLE CONSTRUCTION

Construction Materials and Indoor Air Quality - No/Low Cement Concrete - Recycled and Manufactured Aggregate - Role of QC and Durability - Life Cycle and Sustainability.

UNIT– III ENERGYCALCULATIONS

Components of Embodied Energy - Calculation of Embodied Energy for Construction Materials - Energy Concept and Primary Energy - Embodied Energy Via-A-Vis Operational Energy in Conditioned Building - Life Cycle Energy Use

UNIT– IV GREEN BUILDINGS

Control of Energy Use in Building - ECBC Code, Codes in Neighboring Tropical Countries - OTTV Concepts and Calculations – Features of LEED and TERI – GRIHA Ratings - Role of Insulation and Thermal Properties of Construction Materials - Influence of Moisture Content and Modeling - Performance Ratings of Green Buildings - Zero Energy Building

UNIT– V ENVIRONMENTALEFFECTS

Non-Renewable Sources of Energy and Environmental Impact– Energy Norm, Coal, Oil, Natural Gas - Nuclear Energy - Global Temperature, Green House Effects, Global Warming - Acid Rain: Causes, Effects and Control Methods - Regional Impacts of Temperature Change.

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:

1. Charles J Kibert, Sustainable Construction: Green Building Design & Delivery, 4th Edition, Wiley Publishers 2016.
2. Steve Goodhew, Sustainable Construction Process, Wiley Blackwell, UK, 2016.

REFRENCEBOOKS:

1. Craig A. Langston & Grace K.C. Ding, Sustainable Practicesin the Built Environment, Butterworth Heinemann Publishers, 2011.
2. William P Spence, Construction Materials, Methods & Techniques (3e), Yesdee Publication Pvt. Ltd, 2012.

ONLINE LEARNING RESOURCES

https://archive.nptel.ac.in/courses/105/105/105105157/

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	-	-	-	-	2	3	2	-	-	-	-	3	3
CO-2	-	3	-	-	2	-	3	-	-	-	-	2	3	3
CO-3	-	-	3	3	3	-	2	-	-	2	-	-	3	3
CO-4	-	-	3	3	3	-	3	2	-	-	-	-	3	3
CO-5	-	-	-	-	-	3	3	3	-	-	-	-	-	3

III B.Tech.-V Semester

23OEE361A	RENEWABLEENERGYSOURCES	L T P C
		3 - - 3

PRE-REQUISITES: Nil

COURSE EDUCATIONALOBJECTIVES:

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. Todescribethetypesbio-energyforelectricitygenerationandgeothermal energy.
5. To educate the various new and alternative sources such as MHD power and fuel cells.

UNIT–1: ENERGYSCENARIO (9)

Indian energy scenario in various sectors of domestic, industrial, commercial, agriculture, transportationandothers–Presentconventionalenergystatus–Presentrenewableenergy status – Potential of various renewable energy sources – Global energy status – Per capita energy consumption in various countries –Future energy plans.

UNIT–2: SOLARENERGY (9)

Solar radiation– Measurements of solar radiation and sunshine – Solar thermal collectors –Flatplateandconcentratingcollectors–Solarthermalapplications–Solarthermalenergy storage–Fundamentalsofsolarphotovoltaicconversion–Solarcells–SolarPVSystems– Solar PV applications.

UNIT–3: WINDENERGYANDOCEANTHERMALENERGY (9)

Wind Energy: Wind data and energy estimation–Betz limit–Site selection for windfarms – 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: BIOMASSENERGYANDGEOTHERMALENERGY (9)

Biomass Energy: Bioresources–Bio mass direct combustion–Thermochemical conversion – Biochemical conversion – Mechanical conversion – Biomass gasifier – Types of biomass gasifiers – Cogeneration – Carbonization – Pyrolysis – Biogas plants –Digesters – Biodiesel production – Ethanol production – Applications. **Geothermal Energy:** Geothermal energy sources –Types of geothermal powerplants–Applications–Environmental impact –Small hydro.

UNIT–5: NEWANDALTERNATIVEENERGYSOURCES (9)

Fuel Cell: Principle – Types of fuel cells – Hydrogen energy – Properties – Hydrogen production–Storage–Transportandutilization–Safetyissues.**MagnetoHydroDynamic Power:** Principles of magneto hydro dynamic (MHD) power generation – MHD systems – MHD accelerator – MHD engine, power generation systems – Electron gas dynamic conversion.

TotalHours:45

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. Efstathios 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					
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 usedin 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

REFRENCEBOOKS:

1. IS 383 :1993 —Specification for Coarse and Fine Aggregates From Natural Sources for Concrete‖
2. 1S 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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.

REFRENCEBOOKS:

Environmental Engineering Laboratory Manual by Dr. S.K. Panigrahi, L. Mohanty, S.K. Kataria& Sons

ONLINE LEARNING RESOURCES

https://ee1nitk.vlabs.ac.in/
https://ee2-nitk.vlabs.ac.in/

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

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

III B. Tech– VI Semester					
Course Code	BUILDING INFORMATION MODELING	L	T	P	C
23CIV366L		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

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

REFRENCEBOOKS:

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 Practicel, 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

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

III B. Tech– VI Semester					
Course Code	TECHNICAL PAPER WRITING AND INTELLECTUAL PROPER RIGHTS	L	T	P	C
23MAC351U		2	0	0	0

Course Objectives: ·

1. To enable the students to practice the basic skills of research paper writing
2. To make the students understand the importance of IP and to educate them on the basic concepts of Intellectual Property Rights.
3. To practice the basic skills of performing quality literature review
4. To help them in knowing the significance of real-life practice and procedure of Patents.
5. To enable them learn the procedure of obtaining Patents, Copyrights, & Trade Marks

UNIT – I:

Principles of Technical Writing: styles in technical writing; clarity, precision, coherence and logical sequence in writing-avoiding ambiguity- repetition, and vague language highlighting your findings- discussing your limitations -hedging and criticizing - plagiarism and paraphrasing.

UNIT–II:

Technical Research Paper Writing: Abstract- Objectives-Limitations-Review of Literature- Problems and Framing Research Questions- Synopsis

UNIT–III:

Process of research: publication mechanism: types of journals- indexing-seminars-conferences- proof reading –plagiarism style; seminar & conference paper writing; Methodology-discussion-results- citation rules

UNIT–IV:

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT–V:

Law of copy rights: Fundamentals of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer. Patent law, intellectual property audits.

Course Outcomes:

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

COURSE OUTCOMES: At the end of the course, students will be able to		**Blooms Level**
CO1	Identify key secondary literature related to their proposed technical paper Writing	L1,L2
CO2	Explain various principles and styles in technical writing	L1,L2
CO3	Use the acquired knowledge in writing a research/technical paper	L3
CO4	Annalise rights and responsibilities of holder of Patent, Copyright, trademark, International Trademark etc.	L4
CO5	Evaluate different forms of IPR available at national & international level	L5
CO6	Develop skill of making search of various forms of IPR by using Modern tools and techniques.	L3,L6

TEXTBOOKS:

1. Deborah. E. Bou choux, Intellectual Property Rights, Cengage Learning India, 2013
2. Meenakshi Raman, Sangeeta Sharma. Technical Communication: Principles and practices. Oxford.

REFERENCEBOOKS:

1. R. Myneni, Law of Intellectual Property, 9th Ed, Asia law House, 2019.
2. Prabuddha Ganguli, Intellectual Property Rights Tata McGraw Hill, 2001
3. P. Naryan, Intellectual Property Law, 3rd Ed, Eastern Law House, 2007.
4. Adrian Wallwork. English for Writing Research Papers Second Edition. Springer Cham Heidelberg New York ,2016
5. Dan Jones, Sam Dragga, Technical Writing Style

Online Resources

1. https://theconceptwriters.com.pk/principles-of-technical-writing/
2. https://www.ewh.ieee.org/soc/emcs/acstrial/newsletters/summer10/TechPaperWritin g.html
3. https://www.ewh.ieee.org/soc/emcs/acstrial/newsletters/summer10/TechPaperWritin g.html
4. https://www.manuscriptedit.com/scholar-hangout/process-publishing-research-paper- journal/
5. https://www.icsi.edu/media/website/IntellectualPropertyRightLaws&Practice.pdf
6. https://lawbhoomi.com/intellectual-property-rights-notes/
7. https://www.extension.purdue.edu/extmedia/ec/ec-723.pdf

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

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 for1D, 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.ElementShapes–Nodes–NodalDegreeofFreedomDisplacementFunction–Natural Coordinates– Strain Displacement Relations.

UNIT– II

Lagrangian– Serendipity Elements – Hermite Polynomials – Regular, Irregular 2 D &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 for2D 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 FEMin 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

REFRENCEBOOKS:

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.

OnlineLearningResources:

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

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

IV B. Tech–VII Semester					
Course Code	GEO SYNTHETICS AND REINFORCED EARTHSTRUCTURES (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 Fiction 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.

REFRENCEBOOKS:

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

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

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

REFRENCEBOOKS:

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)

OnlineLearningResources:

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

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

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

REFRENCEBOOKS:

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

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

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 COHESIVESOILS: –** 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

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

REFRENCEBOOKS:

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

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

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, Inclinometers, Proving Ring, Load Cells, Displacement Gauges

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. 1. Site Investigation, Clayton C. R., Matthews M. C and Simons N. E., Blackwell Science. 2005
2. 2. Geotechnical Instrumentation for Monitoring Field Performance, John Dunn cliff, Wiley Inter science, 2008

REFRENCEBOOKS:

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. 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	PSO1	PSO2
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

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

IV B. Tech–VII Semester					
Course Code	TRANSPORTATION ECONOMICS (PE–V)	L	T	P	C
23CIV473C		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.

REFRENCEBOOKS:

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

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

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

IV B. Tech–VII Semester					
Course Code	**BUILDING MATERIALS AND SERVICES (OE – III)**	L	T	P	C
		3	0	0	3

Course Objectives:

The objectives of this course are to make the student:

1. To understand the properties, classifications, and applications of building materials like stones, bricks, tiles, wood, aluminum, glass, paints, and plastics.
2. To analyze the composition, manufacturing process, and properties of cement and admixtures.
3. To apply knowledge of building components such as lintels, arches, walls, stairs, floors, roofs, foundations, and joinery.
4. To evaluate masonry, mortars, finishing techniques, and formwork systems.
5. To assess various building services including plumbing, ventilation, air conditioning, acoustics, and fire protection.

UNIT– I Stones and Bricks, Tiles: Building Stones – Classifications and Quarrying – Properties – Structural Requirements – Dressing. Bricks – Composition of Brick Earth – Manufacture and Structural Requirements, Fly Ash, Ceramics. Timber, Aluminum, Glass, Paints and Plastics: Wood - Structure – Types and Properties – Seasoning – Defects; Alternate Materials for Timber – GI / Fiber – Reinforced Glass Bricks, Steel & Aluminum, Plastics.

UNIT– II Cement &Admixtures: Types of Cement - Ingredients of Cement – Manufacture – Chemical Composition – Hydration - Field & Lab Tests – Fineness – Consistency– Initial &Final Setting – Soundness. Admixtures – Mineral & Chemical Admixtures – Uses

UNIT– III Building Components: Lintels, Arches, Walls, Vaults – Stair Cases – Types of Floors, Types of Roofs – Flat, Curved, Trussed; Foundations – Types; Damp Proof Course; Joinery – Doors – Windows – Materials – Types.

UNIT– IV Mortars, Masonry and Finishing `s Mortars: Lime and Cement Mortars Brick Masonry – Types – Bonds; Stone Masonry – Types; Composite Masonry – Brick-Stone Composite; Concrete, Reinforced Brick. Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP form Work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

UNIT– V Building Services: Plumbing Services: Water Distribution, Sanitary – Lines &Fittings; Ventilations: Functional Requirements Systems of Ventilations. Air-Conditioning - Essentials and Types; Acoustics – Characteristic – Absorption – Acoustic Design; Fire Protection – Fire Hazards – Classification of Fire-Resistant Materials and Constructions.

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. Building Materials and Construction – Arora &Bindra, Dhanpati Roy Publications.
2. Building Materials and Construction by G C Sahu, Joy Gopal Jena McGraw hill Pvt Ltd 2015.

REFRENCEBOOKS:

1. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
2. P. C. Varghese, Building Materials, Prentice Hall of India, 2015.
3. N. Subramanian Building Materials Testing and Sustainability‖, Oxford Higher Education, 2019.
4. R. Chudley, Construction Technology, Longman Publishing Group, 1973.
5. S. K. Duggal, Building Materials, Oxford & IBH Publishing Co. Ltd., New Delhi, 2019

ONLINE LEARNING RESOURCES
https://archive.nptel.ac.in/courses/105/102/105102088/

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	-	-	-	2	-	-	-	-	-	-	-	3	3
CO-2	3	3	-	-	2	-	-	-	-	-	-	2	3	3
CO-3	3	-	3	2	3	-	-	-	-	-	-	-	3	3
CO-4	-	-	3	3	3	-	2	-	-	-	-	-	3	3
CO-5	-	-	-	-	-	3	3	2	-	-	-	-	-	3

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

IV B. Tech–VII Semester					
Course Code	ENVIRONMENTAL IMPACT ASSESSMENT (OE–III)	L	T	P	C
		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. 2. Analyze the impact of developmental activities on land use, soil, and water resources.
3. 3. Evaluate the impact of development on vegetation, wildlife, and assess environmental risks.
4. 4. Develop environmental audit procedures and assess compliance with environmental regulations.
5. 5. Understand and apply environmental acts, notifications, and legal frame works 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.

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 Ain 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 an 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

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:

	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. 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 Edi (1996)

REFRENCEBOOKS:

1. 1. Environmental Engineering, by Peavy, H. S, Rowe, D. R, Tchobanoglous, G.Mc-Graw Hill International Editions, New York 1985.
2. 2. Environmental Science and Engineering, by Suresh K. Dhaneja, S.K., Katania& Sons Publication, New Delhi
3. 3. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke, Prentice Hall Publishers.
4. 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

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

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

IV B. Tech–I Semester					
Course Code	GEO-SPATIAL TECHNOLOGIES (OE – IV)	L	T	P	C
		3	0	0	3

Course Objectives:

The objectives of this course are to make the student:

1. To understand raster-based spatial analysis techniques, including query, overlay, and cost-distance analysis.
2. To analyze vector-based spatial analysis techniques such as topology, overlay, and proximity analysis.
3. To apply network analysis techniques for geocoding, shortest path analysis, and location-allocation problems.
4. To evaluate surface and geostatistical analysis methods, including terrain modeling, watershed analysis, and spatial interpolation.
5. To assess GIS customization, Web GIS, and mobile mapping techniques for real world applications.

UNIT– I RASTERANALYSIS

Raster Data Exploration: Query Analysis - Local Operations: Map Algebra, Reclassification, Logical and Arithmetic Overlay Operations—Neighborhood - Operations: Aggregation, Filtering – Extended Neighborhood-Operations- Zonal Operations - Statistical Analysis – Cost-Distance Analysis-Least Cost Path.

UNIT– II VECTOR ANALYSIS

Non-Topological Analysis: Attribute Database Query, Structured Query Language, Co Ordinate Transformation, Summary Statistics, Calculation of Area, Perimeter and Distance – topological Analysis: Reclassification, Aggregation, Overlay Analysis: Point-In-Polygon, Line-In-Polygon, Polygon-On-Polygon: Clip, Erase, Identity, Union, Intersection – Proximity Analysis: Buffering

UNIT– III NETWORK ANALYSIS

Network – Introduction - Network Data Model – Elements of Network - Building A Network Database - Geocoding – Address Matching - Shortest Path in A Network – Time and Distance Based Shortest Path Analysis – Driving Directions – Closest Facility Analysis – Catchment / Service Area Analysis-Location-Allocation Analysis

UNIT– IV SURFACE and GEOSTATISTICALANALYSIS

Surface Data – Sources of X,Y, Z Data – DEM, TIN – Terrain Analysis – Slope, Aspect, Viewshed, Watershed Analysis: Watershed Boundary, Flow Direction, Flow Accumulation, Drainage Network, Spatial Interpolation: IDW, Spline, Kriging, Variogram.

UNIT– V CUSTOMISATION, WEBGIS, MOBILEMAPPING

Customization of GIS: Need, Uses, Scripting Languages –Embedded Scripts – Use of Python Script - Web GIS: Web GIS Architecture, Advantages of Web GIS, Web Applications- Location Based Services: Emergency and Business Solutions - Big Data

Analytics.

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. Kang – Tsung Chang, Introduction to Geographical Information System, 4th Ed., Tata McGraw Hill Edition, 2008.
2. Lo, C.P. and Yeung, Albert K.W., Concepts and Techniques of Geographic Information Systems Prentice Hall, 2002.

REFRENCEBOOKS:

1. Michael N. Demers, Fundamentals of Geographic Information Systems, Wiley,2009
2. Ian Heywood, Sarah Cornelius, Steve Carver, Srinivasa raju, —An Introduction to Geographical Information Systems, Pearson Education, 2nd Edition, 2007.
3. John Peter Wilson, The Handbook of Geographic Information Science, Blackwell Pub.,2008

ONLINE LEARNING RESOURCES

https://archive.nptel.ac.in/courses/105/105/105105202/
https://onlinecourses.nptel.ac.in/noc19_cs76/preview

CO-MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	-	-	-	2	-	-	-	-	-	-	-	3	3
CO-2	3	3	-	-	2	-	-	-	-	-	-	2	3	3
CO-4	-	-	3	3	3	-	2	-	-	-	-	-	3	3
CO-5	-	-	-	-	3	3	3	2	-	-	-	-	3	3

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

IV B. Tech–I Semester					
Course Code	SOLID WASTE MANAGEMENT (OE – IV)	L	T	P	C
		3	0	0	3

Course Objectives:

The objectives of this course are to make the student:

1. To understand the types, sources, and characteristics of solid waste, along with regulatory frameworks.
2. To analyze engineering systems for solid waste collection, storage, and transportation.
3. To apply resource and energy recovery techniques for sustainable solid waste management.
4. To evaluate landfill design, construction, and environmental impact mitigation strategies.
5. To assess hazardous waste management techniques, including biomedical and e- waste disposal.

UNIT– I Solid Waste: Definitions, Types of Solid Wastes, Sources of Solid Wastes, Characteristics, and Perspectives; Properties of Solid Wastes, Sampling of Solid Wastes, Elements of Solid Waste Management - Integrated Solid Waste Management, Solid Waste Management Rules 2016.

UNIT– II Engineering Systems for Solid Waste Management: Solid Waste Generation; On-Site Handling, Storage and Processing; Collection of Solid Wastes; Stationary Container System and Hauled Container Systems – Route Planning - Transfer and Transport; Processing Techniques;

UNIT– III Engineering Systems for Resource and Energy Recovery: Processing Techniques; Materials Recovery Systems; Recovery of Biological Conversion Products – Composting, Pre and Post Processing, Types of Composting, Critical Parameters, Problems with Composing -Recovery of Thermal Conversion Products; Pyrolysis, Gasification, RDF - Recovery of Energy from Conversion Products; Materials and Energy Recovery Systems.

UNIT– IV Landfills: Evolution of Landfills – Types and Construction of Landfills – Design Considerations – Life of Landfills- Landfill Problems – Lining of Landfills – Types of Liners – Leachate Pollution and Control – Monitoring Landfills – Landfills Reclamation

UNIT– V Hazardous Waste Management: – Sources and Characteristics, Effects on Environment, Risk Assessment–Disposal of Hazardous Wastes–Secured Landfills, Incineration -Monitoring– Biomedical Waste Disposal, E-Waste Management, Nuclear Wastes, Industrial Waste Management

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. Tchobanoglous G, Theisen H and Vigil SA _Integrated Solid Waste Management, Engineering Principles and Management Issues 'McGraw-Hill, 1993.
2. Vesilind PA, Worrell W and Reinhart D, _Solid Waste Engineering 'Brooks/Cole Thomson Learning Inc., 2002.

REFRENCEBOOKS:

1. Peavy, H.S, Rowe, D.R., and G. Tchobanoglous, _Environmental Engineering ', McGraw Hill Inc., New York, 1985.
2. Qian X, Koerner RM and Gray DH, _Geotechnical Aspects of Landfill Design and Construction 'Prentice Hall, 2002.

ONLINE LEARNING RESOURCES

https://archive.nptel.ac.in/courses/105/103/105103205/
https://archive.nptel.ac.in/courses/120/108/120108005/

CO-MAPPING

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	-	-	-	2	-	2	-	-	-	-	-	3	3
CO-2	3	3	-	-	2	-	3	-	-	-	-	2	3	3
CO-3	3	-	3	2	3	-	3	-	-	-	-	-	3	3
CO-4	-	-	3	3	3	-	3	2	-	-	-	-	3	3
CO-5	-	-	-	-	3	3	3	3	-	-	-	-	3	3

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 sand 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

REFRENCEBOOKS:

1. Phil Read, EddyKrygiel, James Vandezande **–** ***BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, and Contractors*****,** John Wiley & Sons**,** 4th Edition, 2023
2. Nigh at 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	PSO1	PSO2
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