COURSE STRUCTURE AND DETAILED SYLLABI

UNDER ACADEMIC REGULATIONS R20

FOR

B. Tech Regular (Full-Time) Four Year Degree Courses

(For the Batches Admitted From 2020-2021)

&

B. Tech (Lateral Entry Scheme)

(For the Batches Admitted From 2021-2022)

CIVIL ENGINEERING

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

Accredited by NBA, New Delhi & NAAC, Bengaluru │Affiliated to JNTUA, Ananthapuramu, Recognized by the UGC under Section 12(B) and 12(F)│ Approved by AICTE, New Delhi.

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ACADEMIC REGULATIONS (R20) for
B.Tech Regular Four-Year Degree Program

(For the batches admitted from the academic year 2020-21)

and

B.Tech. (Lateral Entry Scheme)

(For the batches admitted from the academic year 2021-22)

Applicability	All the rules specified herein, approved by theAcademic Council, will be in force and applicable tostudents admitted from the academic year2020-2021 onwards. Any reference to "College" inthese rules and regulations stands for SriVenkateswara College of Engineering andTechnology (Autonomous).
Extent	All the rules and regulations, specified herein aftershall be read as a whole for the purpose ofinterpretation and as and when a doubt arises, theinterpretation of the Chairman, Academic Council isfinal. As per the requirements of statutory bodies,Principal, Sri Venkateswara College of Engineeringand Technology (A) shall be the Chairman of theAcademic Council.

Admission

Admission in to first year of Four Year B.Tech., Degree Program of study in Engineering :

Eligibility : A candidate seeking admission into the first year of four year B.Tech., Degree Program should have Passed either Intermediate Public Examination conducted by the Board of Intermediate Education, Government of Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination recognized by the Board of Intermediate Education and JNTUA, Ananthapuramu) or Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or equivalent Diploma recognized by State Board of Technical Education, Government of Andhra Pradesh and JNTUA, Ananthapuramu) for admission.

3.1.2 Admission Procedure:

As per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year of four year B.Tech., Degree Program as follows:

Seats under various categories are filled as per the norms prescribed by the Government of Andhra Pradesh.

3.2 Admission into the second year of four Year B.Tech., Degree Program (Lateral Entry Scheme) in Engineering:

3.2.1Eligibility : Candidates qualified in ECET (FDH) and / or admitted by the Convener, ECET (FDH). In all such cases for admission, whenneeded, Permissions from the statutory bodies are to be obtained.

3.2.2Admission Procedure :

Lateral Entry seats are filled as perthenormsprescribed by the Government of Andhra Pradesh from time to time.

4. Programs of study offered leading to the award of B.Tech degree:

1. B.Tech (Civil Engineering)
2. B.Tech (Electrical and Electronics Engineering)
3. B.Tech (Mechanical Engineering)
4. B.Tech (Electronics and Communication Engineering)
5. B.Tech (Computer Science and Engineering)
6. B.Tech (Information Technology)
7. B.Tech (Computer Science and Engineering (Artificial Intelligence and Machine Learning)
8. B.Tech (Computer Science and Engineering (Data Science)

5. Choice Based Credit System:

The Indian Higher Education Institutions (HEI's) are changing from the conventional course structure to Choice Based Credit System (CBCS) along with introduction to semester system at first year itself. The semester system helps in accelerating the teaching-learning process and enables vertical and horizontal mobility in learning.

The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and adopt an interdisciplinary approach to learning.

Choice Based Credit System (CBCS) is a flexible system of learning and provides choice for students to select from the prescribed elective courses. A course defines learning objectives and learning outcomes and comprises of Lectures / Tutorials / Laboratory Work / Field Work / Project Work / MOOCS / Internship / Comprehensive Examination / Seminars / Presentations / self-study etc. or a combination of some of these.Under the CBCS, the requirement for awarding a degree is prescribed in terms of number

of credits to be completed by the students.
The CBCS permits students to:

1. Choose electives from a wide range of elective courses offered by the departments.
2. Undergo additional courses of interest.
3. Adopt an interdisciplinary approach in learning.
4. Make the best use of expertise of the available faculty.

6. Medium of instruction:

The medium of instruction shall be English for all courses, examinations, seminar presentations and project work. The curriculum will comprise courses of study as given in course structure, in accordance with the prescribed syllabi.

7. Types of Courses:

Courses in a programme may be of five kinds: **Foundation, Skill, Core, Elective and Mandatory.**

7.1 Foundation / Skill Course:

Foundation courses are the courses based upon the content leads to enhancement of skill and knowledge as well as value based and are aimed at man making education. Skill subjects are those areas in which one needs to develop a set of skills to learn anything at all. They are fundamental to learning any subject.

7.2 Core Course:

There may be a core course in every semester. This is the course which is to be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

7.3 Elective Course:

Electives provide breadth of experience in respective branch and applications areas. Elective course is a course which can be chosen from a pool of courses. It may be:

- Supportive to the discipline of study
- Providing an expanded scope
- Enabling an exposure to some other discipline / domain
- Nurturing student's proficiency / skill.

An elective may be discipline centric (Professional Elective) focusing on those courses which add generic proficiency to the students or may be chosen from an interdisciplinary area called as "Open Elective".

There are five professional elective groups. Students can choose not more than one elective from each of the five groups. Also there are four open elective groups, students can choose not more than one elective from each of the four groups.

8. Academic Year:

8.1 Course Duration:

8.1.1. Course duration for B. Tech program of study is 4 years and the maximum duration to complete the program is 8 years excluding the gap year.

8.1.2. For lateral entry students the course duration is 3 years and the maximum duration to complete the program is 6 years excluding the gap year.

8.2 Each academic year is divided into two semesters and each semester shall have a minimum of 16 Instructional Weeks.

8.3. Students admitted on transfer from JNTU affiliated institutes, Universities and other institutes in the subjects in which they are required to earn credits so as to be on par with regular students as prescribed by concerned 'Board of Studies'.

9. Unique course identification code:

Every course of the B. Tech program will be placed in one of the eleven groups of courses as listed in the table 1. The various courses and their two-letter codes are given below.

Table 1: Group of Courses

S.No.	Branch	Code
1	Civil Engineering	CE
2	Electrical and Electronics Engineering	EE
3	Mechanical Engineering	ME
4	Electronics and Communication Engineering	EC
5	Computer Science and Engineering	CS
6	Information Technology	IT
7	Computer Science and Engineering(Artificial Intelligence and Machine Learning)	CM
8	Computer Science and Engineering(Data Science)	CD
9	Humanities and Basic Sciences	HS
10	MBA	MB
11	MCA	MC

10. Curriculum and Course Structure:

The curriculum shall comprise Foundation / Skill Courses, Core Courses, Elective Courses, Laboratory Courses, Audit Courses, Mandatory Courses, Comprehensive Examination, Mini Project, Internship and Project work. The list of elective courses may include subjects from allied disciplines also.

Assigning of Credits: Depending on the complexity and volume of the course, the number of contact hours per week will be assigned. Each Theory and Laboratory course carries credits based on the number of hours / week as follows.

- **Contact classes (Theory):** 1 credit per lecture hour per week.
- **Laboratory Hours (Practical):** 1 credit for 2 Practical hours, per week.
- **Project Work:** 1 credit for 2 hours of project work per week.
- **Mini Project:** 1 credit for 2 hours per week.

10.1 Course Structure:

Every program of study shall be designed to have 38-42 theory courses and 20-26 laboratory courses. Every course of the B.Tech program will be placed in one of the eight categories with average credits as listed in the Table 2. In this, a student has to carry out a mini project, project work and comprehensive Examination also.

Table 2: Category-wise Distribution of Credits

S.No.	Category	Subject Area and% ofCredits	Average No. of Credits
1	Humanities and Social Sciences(HS), including Management courses	HS (05% to 10%)	10.5
2	Basic Sciences (BS) including Mathematics, Physics andChemistry.	BS (15% to 20%)	21
3.	Engineering Sciences (ES), including Workshop, Drawing, Basics of Electrical / Electronics / Mechanical / Computer Engineering.	ES (15% to 20%)	24
4	Professional Subjects-Core (PC), relevant to the chosen specialization / branch.	PC (30% to 40%)	51
5	Professional Elective Courses(PE), relevant to the chosenspecialization / branch.	PE (10% to 15%)	15
6	Open Elective Courses (OE), from other technical and / or emerging subject area.	OE (05% to 10%)	12
7	Project Work , Internship Mini ProjectandComprehensiveExamination.	10% to 15%	16.5
8	Mandatory Courses	MC	Non-credit
9	Skill Oriented Courses	SC	10
TOTAL			160

10.2 There shallbe mandatory student induction program for freshers, with a three-weekduration 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., as perthe guidelines issued by AICTE.

10.3 All undergraduate students shall register for NCC / NSS activities. A student will berequired to participate in an activity for two hours in a week during second and thirdsemesters. Grade shall be awarded as Satisfactory or Unsatisfactory in the grade sheet on the basis of participation, attendance, performance and behavior. If a student gets an unsatisfactory Grade, he / she shall repeat the above activity in the subsequent semesters, in order to complete the degree requirements.

10.4 Courses like Environmental Science, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge etc., are included in thecurriculum as non-credit mandatory courses. Environmental Science is offered as mandatory course for all branches. A student has to secure 40% of themarks allotted in the internal evaluation for passing the course. No marks or letter grade shall be allotted for all mandatory non-credit courses.

10.5 There shall be 05 Professional Elective courses and 04 Open Elective courses. All the Professional & Open Elective courses shall be offered for 03 credits. All Open Electives are offered to students of all branches in general. However, a student shall choose an open Elective from the list in such a manner that he / she has not studied the same course in any form during the Programme.

10.6 A student shall be permitted to pursue up to a maximum of two open elective courses under MOOCs during the Programme as mentioned in course structure. Each of the courses must be of minimum 12 weeks induration. Attendance will not be monitored for MOOC courses. Student has to pursue and acquire a certificate for a MOOC course only from the organizations/agencies approved by the BoS in order toearn the 3 credits. The Head of the department shall notify the list of such courses at the beginning of the semester.

10.6.1 In case a student fails to complete the MOOC / MOOCs in the stipulated semester he / she has to re-register and complete the same. In case any provider discontinues the course, Institution shall allow the student to opt for any other course from the list provided by the department from time to time.

10.6.2 Students have to acquire a certificate from the agencies approved by the BOS with grading or percentage of marks in order to earn 3 credits.

10.6.3 The certificate submitted by the student will be duly verified and attested bythe concerned BOS chairman, and the same will be forwarded to examination branch before the end of the stipulated semester.

10.7 The department shall invite registration forms from the students at the beginning of the semester for offering professional and open elective courses. Elective course shall be offered by the Department only if a minimum of 20 percent of students in the class / section strength register for that course.

10.8 Students shall undergo mandatory summer internships for a minimum of six weeks duration at the end of second and third year of the Programme. There shall also be mandatory full internship in the final semester of the Programme along with theproject work.

10.9 There shall be 05 skill-oriented courses offered during II B.Tech I Semester to IV B.TechI Semester. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain courses and the remaining one shall be a soft skills course.

10.10 Under graduate Degree with Honors/Minor shall be issued by the University, upon the recommendation of the college, to the students who fulfill all the academic eligibility requirements for the B.Tech program and Honors/Minor program. The objective is to provide additional learning opportunities to academically motivated students.

11. Evaluation Methodology:

11.1 Theory Course:

Each theory course will be evaluated for a total of 100 Marks, with 40 Marks for Continuous Internal Assessment (CIA) and 60 Marks for Semester End Examination (SEE).

11.2 Continuous Internal Assessment (CIA):

The distribution of marks for Continuous Internal Assessment is as follows:

Two Sessional Examinations	: 30 Marks
Five Assignments	: 10 Marks
	40Marks

11.3 Question Paper Pattern for Sessional Examinations:

11.3.1 Each sessional exam question paper consists of two parts, namely Part A and Part B. Part A is compulsory which carries 10 marks and consists of five short answer type questions with each carrying 2 mark. In Part B, 4 questions with each carrying 5 marks may be given and the student is expected to answer anythree of the four questions. The questions may be set as per Bloom's Taxonomy. Time duration for each sessional exam is 2 hours. Internal marks for sessional examinations shall be arrived at byconsidering the marks secured by the student in both the sessional examinations with 80% weightage to the better sessional exam and 20% to the other.

However if any of the students is absent for both the sessional exams, he may be permitted to appear for one make up examination after second sessional examination with valid medical / emergency grounds. Internal marks for sessional examinations shall be arrived as per the Weightage given above.

11.3.2 Five assignments, each one for 10 marks shall be given to the students at the end of each unit. Internal marks for the assignments shall be awarded by considering the average of the five assignments.

11.4 Semester End Examination (SEE):

The SEE is conducted for 60 marks of 3 hours duration. The syllabus for the theory course is divided into FIVE units. SEE Question Paper consists of two parts, Part A and Part B. Part A consists of 5 short answer type questions, each carries 2 marks for a total of 10 marks with no choice.

Part B Consists of 5 questions with one question from each of the 5 units with internal choice with 10 marks for each question.

The emphasis on the questions is broadly based on objective skill, analytical skill and application skill following the outcome based education.

11.5 Laboratory Course:

Each Laboratory Course will be evaluated for a total of 100 marks, consisting of 40 marks for internal assessment (CIA) and 60 marks for semester end lab examination. Out of 40marks of CIA, continuous lab assessment (SEE) for day to day performance will be done for 20 marks, final internal lab examination carries 15 marks and Viva-Voce carries 5 marks.

The semester end lab examination for 60 marks shall be conducted by two examiners, one of them being internal examiner (subject teacher) and the other being external examiner (other than the teacher handled) to be nominated by the Principal from the panel of experts as recommended by the Chairman, BOS. The scheme of valuation for the 60 Marks will be informed to the students in advance by the concerned Chairman, BOS and displayed in the laboratory during the beginning of the semester.

11.6. Drawing Courses:

All the **drawing** related courses are evaluated in line with laboratory courses. The distribution shall be 40 marks for internal evaluation (20 marks for day to day work and 20 marks for final internal test) and 60 marks for semester end examinations.

- **Question paper pattern for drawing courses will be followed as mentioned in the syllabus.**

The following course is considered as theory subject, but for all practical purposes examination will be conducted like practical.

i. Computer Aided Engineering Drawing

11.7 Mandatory Courses:

Mandatory courses will not carry any credits; but, a pass in the examination during the programme shall be necessary requirement for student to qualify for the award of Degree. The student is declared pass in each such course after securing40% of the marksin Internal examination.

Evaluation will be done by conducting descriptive examination at the end of the semester for 100 marks, internally.Its result shall be declared with “satisfactory” (Pass) or Not Satisfactory (Fail) performance.Attendance is mandatory for these courses**.**

The examination will be conducted for 100 marks of 3 hours duration. The syllabus for the course is divided into FIVE units. The Question Paper consists of two parts, Part A and Part B.

Part A consists of 5 short answer type questions, each carries 5 marks for a total of 25 marks with no choice.Part B Consists of 5 questions with one question from each of the 5 units with internal choice with 15 marks for each question.

The emphasis on the questions is broadly based on objective skill, analytical skill and application skill following the outcome based education.

11.8 Community Service Project: 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.

11.9 Project Work:

There shall be a Project Work in the IV year second semester which carries 12 credits. Out of 100 marks allotted for the project work, 40 marks shall be for Internal Evaluation and 60 marks for the End Semester Examination (Viva – Voce). The Viva – Voce shall be conducted by a committee consisting of HOD, Project Supervisor and an External Examiner nominated by the

Principal from the panel of examiners recommended by Chairman, BOS. The Evaluation of project work shall be conducted at the end of the IV year – II semester. The Internal Evaluation shall be made by the departmental committee, on the basis of two seminars given by each student on the topic of his project.

11.10. Framework for Mandatory Internships:

11.10.1 Two summer internships each with a minimum of six weeks duration, done at the endofsecond and third years, respectively are mandatory.

The internship can be done bythe students at local industries, Govt. Organizations, construction agencies, Industries,Hydel andthermal power projects and also in software MNCs.

11.10.2 Evaluation of the summer internships shall be through the departmental committee.A student will be required to submit a summer internship report to the concerneddepartmentand appear for an oral presentation before the departmental committee.The report and theoral presentation shall carry 40% and 60% weightages respectively.

11.10.3 In the final semester, the student should mandatorily undergo internship and parallellyhe/she should work on a project with well-defined objectives. At the end of thesemester the candidate shall submit an internship completion certificate and a projectreport. 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 externalexaminer.

11.10.4 The College shall facilitate and monitor the student internship programs. Completion ofinternships is mandatory, if any student fails to complete internship, he / she will not beeligible for the award of degree. In such cases, the student shall repeat and completethe internship.

11.11 Framework for Skill Oriented Courses:

11.11.1 For skill oriented/skill advanced courses, one theory and 2 practical hours or two theory hours may be allotted as per the decision of concerned BOS.

11.11.2 Out of the five skill courses two shall be skill-oriented courses from the same domainand shall be completed in second year. Of the remaining 3 skill courses, one shall benecessarily be a soft skill course and the remaining 2 shall be skill-advanced courseseither from the same domain or Job oriented skill courses, which can be of interdisciplinary nature.

11.11.3 A pool of interdisciplinary job-oriented skill courses shall be designed by a CommonBoard of studies by the participating departments / disciplines and the syllabus alongwith the prerequisites shall be prepared for each of the laboratory infrastructurerequirements.

The list of such courses shall be included in the curriculum structure ofeach branch of Engineering, so as to enable the student to choose from the list.

11.11.4 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 / APSSDC or any other accredited bodies as approved by the concerned BoS.

11.11.5 The Board of studies of the concerned discipline of Engineering shall review the skill advanced courses being offered by eligible external agencies and prepare afresh list every year incorporating latest courses based on industrial demand.

11.11.6 If a student chooses to take a Certificate Course offered by industries / Professionalbodies / APSSDC or any other accredited bodies, in lieu of the skill advancedcourseoffered by the Department, the credits shall be awarded to the student upon producingthe Course Completion Certificate from the agency / professional bodies as approved by the Board of studies.

11.11.7 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 concerned Board ofStudies, the student is deemed to have fulfilled the attendance requirement of the course and acquire the credits assigned to the course.

11.11.8 A committee shall be formed at the level of the college to evaluate the grades / marksgiven for a course by external agencies and convert to the equivalent marks / grades.There commended conversions and appropriate grades/marks are to be approved by the Academic Council.

11.12 Gap Year:

Gap Year – concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after II year to pursue entrepreneurship full time. 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 HOD of the respective department shall forward such proposals submitted by the students to the Principal. An evaluation committee shall be constituted by the Principal to evaluate the proposal submitted by the student and the committee shall decide whether or not to permit student (s) to avail the Gap Year.

11.13 Frame work for Minor Degree in a Discipline (Minor Degree / Programme):

The concept of Minor degree is introduced in the curriculum of all B. Tech. programs offering a Major degree. The main objective of Minor degree in a discipline is to provide additional learning opportunities for academically motivated students and it is an optional feature of the B.Tech Program. In order 20 to earn a Minor degree in a discipline, a student has to earn 20 extra credits (By studying SIX theory and TWO laboratory courses) from the core courses of the minor discipline.

a) Students who are desires of pursuing their special interest areas other than the chosen discipline of Engineering may opt for additional courses in minor specialization groups offered by a department other than their parent department. For example, if Mechanical Engineering student selects subjects from Civil Engineering under this scheme, he / she will get Major degree of Mechanical Engineering with minor degree of Civil Engineering.

b) Student can also opt for industry relevant tracks of any branch to obtained the minor degree. For example, a B.Tech Mechanical Engineering student can opt for the industry relevant tracks like Data Mining track, IOT track, Machine learning track, etc.

11.13.1 Students having a CGPA of 8.0 (for SC / ST Students CGPA of 7.5) or above up toII B.Tech I-Semester without any backlogs shall be permitted to register for Minor degree.

11.13.2 An SGPA and CGPA of 7.5 (for SC / ST Students CGPA of 7.0) has to be maintained in the subsequent semesters without any backlog subjects in order to keep the Minor discipline registration live or else it shall be cancelled.

11.13.3 Students aspiring for a Minor degree must register from III B.Tech I-Semester onwardsand must opt for a Minor in a discipline other than the discipline he is registered in or any industry relevant track of any branch.

11.13.4 A Student shall register for two theory courses in III B.Tech I-Semester, and two theory courses and one laboratory course in III BTech II Semester as well as in IV B.Tech I-Semester.

11.13.5 The Evaluation pattern of the courses shall be similar to the regular program courses evaluation.

11.13.6 Minimum strength required for offering a Minor in a discipline is considered as 20% of the class size and Maximum should be 80% of the class size.

11.13.7 Minor degree program should be completed by the end of IV B. Tech II-Semester along with the Major discipline.

11.13.8 A student registered for Minor degree shall pass in all subjects that constitute the requirement for the Minor degree program. No class / division (i.e., second class, first class and distinction, etc.) shall be awarded for Minor degree program.

11.13.9 The Minor degree shall be mentioned in the degree certificate as Bachelor of Technology in XXX with Minor in YYY. For example, Bachelor of Technology in Computer Science & Engineering with Minor in Electronics & Communication Engineering or the chosen industry relevant track. This shall also be reflected in the transcripts, along with the list of courses taken for Minor degree program with CGPA mentioned separately.

11.13.10 Separate course/class work and time table shall be arranged for the various Minor degree programs. Attendance regulations for these Minor discipline programs shall be as per regular courses.

NOTE: Interested meritorious students shall be permitted to register either for Minor degree in a discipline or industry relevant track of any branch (or) Honors Degree in a discipline only, but not both.

11.14 Framework for Honors Degree in a Discipline:

11.14.1 This concept is introduced in the curriculum for all conventional B. Tech. programmes.

The main objective of Honors degree in a discipline is to provide additional learning opportunities for academically motivated students and it is an optional feature of the B. Tech. programme. In order to earn a Honors degree in his/her discipline, a student has to earn 20 extra credits by studying five advanced courses for 15 credits and by carrying out a mini project for 5 credits in the concerned branch of Engineering. In place of advanced courses, he/she can study equivalent MOOC courses available under SWAYAM / Other platform, as decided by the institution from time to time. The Evaluation pattern of theory subjects will be similar to the regular programme evaluation. The mini project shall be evaluated by the committee consisting of Head ofthe department, Supervisor and External examiner. Students aspiring for Honors degree must register from III B.Tech, I Semester onwards. However, Honors degree registrations are not allowed before III B.Tech, I Semester and after III B.Tech, II Semester. Student may register for mini project from III B.Tech, II Semester onwards and complete the same by the end of IVB.Tech, I Semester after completing at least two advanced courses or equivalent.

11.14.2 Procedure for Conduct and Evaluation of Honors degree Mini project: Out of a total of 100 marks for the Mini project, 40 marks shall be for Internal Evaluation and 60 marks for the End Semester Examination (Viva-voce). The Viva-Voce shall be conducted by a committee consisting of HOD, Project Supervisor and an ExternalExaminer nominated by the Chief Controller of Examinations. The evaluation ofproject work shall be conducted at the end of IV B.Tech, II semester. The Internal Evaluation shall be made by the departmental committee (Head of the Department and one senior faculty member of the Department and Supervisor).

11.14.3 Students having a CGPA of 8.0 (for SC / ST Students CGPA of 7.5) or above up to II year-I semester and without any backlog subjects will be permitted to register for degree with Honors. The SGPA and CGPA of 7.5 (for SC / ST Students CGPA of 7.0) has to be maintained in the subsequent semesters without any backlogsubjects in order to keep the degree with Honors registration live or else it will be cancelled.

NOTE: Interested meritorious students shall be permitted to register either for Honors degree or additional Minor Engineering but not both.

12. Attendance Requirements and Detention Policy:

12.1 A student shall be eligible to appear for Semester – End examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.

12.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted on medical grounds by the College Academic Committee. A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

12.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned and the candidate will be detained.

12.4 Detained students are not eligible to take their end examination of that class and their registration shall stand cancelled.

12.5 A student detained due to shortage of attendance, will have to repeat that semester when offered next.

13. Conduct of Semester End Examination and Evaluation:

13.1 Semester end examination shall be conducted by the Controller of Examination (COE) by inviting 50% Question Papers from the External and 50% Question papers from the Internal Subject Experts. Principal will decide the External and Internal subject experts.

13.2 The answer papers of semester end examination should be evaluated externally / internally.

13.3 The marks for the internal evaluation components will be added to the external evaluation marks secured in the Semester – End examinations, to arrive at total marks for any subject in that semester.

13.4 Performance in all the subjects is tabulated program-wise and will be scrutinized by the office of the Controller of Examinations. Total marks obtained in each subject are converted into letter grades. Finally subject-wise marks and grades details, subject-wise and branch-wise pass percentages are calculated through software.

13.5Results Committee:

Results Committee comprising of Principal, Controller of Examinations, Additional Controller of Examinations (Confidential) and one Senior Professornominated by the Principal and the University Nominee will oversee the details of marks, grades and pass percentages of all the subjects and branch-wise pass percentages.

13.6 Office of the Controller of Examinations will generate student-wise result sheets and the same will be published through college website.

13.7 Student-wise Grade Sheets are generated and issued to the students.

14. Academic Requirements for Promotion / Completion of Regular B.Tech Programme of Study:

The following academic requirements have to be satisfied in addition to the attendancerequirements for promotion / completion of regular B.Tech Program of study.

14.1 For Students Admitted in B.Tech (Regular) Program:

i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design drawing subject or project, if he secures not less than 35% of marks in the Semester End examination and a minimum of 40% of marks in the sum total of the internal evaluation and Semester-End examination taken together.

ii. A student shall be promoted from second year to third year only if he fulfills the academic requirement of securing **33** credits from:

a) Two Regular and two Supplementary Examinations of I-Year I Semester.

b) Two Regular and one Supplementary Examinations of I-Year II Semester.

c) One Regular and one Supplementary Examination of Second Year I semester.

d) One Regular Examination of II-Year II Semester.

Irrespective of whether the candidate appear for Semester-End Examination or not as per the normal course of study.

iii. A student shall be promoted from third year to fourth year Program of study only if he fulfills the academic requirements of securing **50** credits from:

a) Three Regular and Three Supplementary Examinations of I-Year I Semester.

b) Three Regular and Two Supplementary Examinations of I-Year II Semester

c) Two Regular and Two Supplementary Examination of Second Year I Semester.

d) Two Regular and One Supplementary Examinations Second Year II Semester.

e) One Regular and One Supplementary examination of Third Year I Semester.

f) One Regular Examination of Third year II semester.

Irrespective of whether the candidate appears for the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits by sections 14.1 (ii) and 14.1 (iii) above, the student may make up the credits through supplementary examinations before the date of commencement of class work for III Year I Semester or IV Year I Semester as the case may be.

iv. A student shall register for all the **160** credits and earn all the **160** credits. Marks obtained in all the **160** credits shall be considered for the award of the class based on CGPA.

v. A student who fails to earn **160** credits as indicated in the course structure within eight academic years from the year of his admission shall forfeit his seat in B. Tech., Program and his admission stands cancelled.

vi. A student will be eligible to get under graduate degree with Honours or additional Minor Engineering, if he / she completes an additional **20** credits.

vii. A student will be permitted to register either for Honours degree or additional Minor Engineering but not both.

14.2 For Lateral Entry Students:

i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the Semester-End examination and a minimum of 40% of marks in the sum total of the internal evaluation and Semester-End examination taken together.

ii. A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing **34** credits from the following examinations.

a) Two Regular and Two Supplementary Examinations of II Year I Semester.

b) Two Regular and One Supplementary Examination of II Year II Semester.

c) One Regular and One Supplementary Examination of III Year I Semester.

d) One Regular Examination of Third Year II Semester.

Irrespective of whether the candidate appear the Semester-End examination or not as per the normal Course of study and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV Year I Semester.

iii. A student shall register for all **121.5** credits and earn all the **121.5** credits. Marks obtained in all **121.5** credits shall be considered for the award of the class based on CGPA.

iv. A student who fails to earn **121.5** credits as indicated in the course structure within six academic years from the year of his admission shall forfeit his seat in B.Tech., Program and his admission stands cancelled.

v. A student will be eligible to get under graduate degree with Honours or additional Minor Engineering, if he/she completes an additional **20** credits.

vi. A student will be permitted to register either for Honours degree or additional Minor Engineering but not both.

15. Letter Grades and Grade Points:

15.1 Performances of students in each course are expressed in Letter Grades based on absolute grading system. The UGC recommends a 10-point grading system with the following letter grades as given in the Table 3.

Table 3: Grade Points Scale (Absolute Grading)

Range of Marks	Grade Point	Letter Grade
90-100	10	S (Outstanding)
80-89	9	A+ (Excellent)
70-79	8	A (Very Good)
60-69	7	B+ (Good)
50-59	6	B (Above Average)
45-49	5	C (Average)
40-44	4	D (Pass)
Below 40	0	F (Fail)
Absent	0	N (Absent)

15.2 A student obtaining Grade F shall be considered Failed and will be required to re-appear in the examination.

15.3 For non credit courses, ‘P’ for ‘Satisfactory’ or ‘F’ for ‘Not Satisfactory’ is indicated and this will not be counted for the computation of SGPA / CGPA.

15.4 At the end of each semester, the institute issues grade sheet indicating the SGPA and CGPA of the student. However, grade sheet will not be issued to the student if he has any outstanding dues.

16.0 Computation of SGPA and CGPA:

16.1 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 ith subject and Gi is the grade point scored by the student in the ith course

16.2 The Cumulative Grade Point Average (CGPA) will be computed in the samemanner taking

into account all the courses undergone by a student over all thesemesters of a program, i.e.

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

where ‘Si’ is the SGPA of the ith semester and Ci is the total number ofcredits in that semester

16.3 Both SGPA and CGPA shall be rounded off to 2 decimal points and reported inthe transcripts.

16.4 While computing the SGPA/CGPA, the subjects in which the student is awardedZero grade points will also be included.

16.5 Grade Point: It is a numerical weight allotted to each letter grade on a 10-pointscale.

16.6 Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters S, A+, A, B+, B, C, D, F and N.

16.7 As per AICTE regulations, conversion of CGPA into equivalent percentage is as follows:

Equivalent Percentage to SGPA = (SGPA – 0.50) x 10

Equivalent Percentage to CGPA = (CGPA – 0.50) x 10

17. Grade Sheet:

A grade sheet will be issued to each student indicating his performance in all subjects registered in that semester indicating the SGPA and CGPA. SGPA and CGPA will be rounded off to the second place of decimal.

18. Consolidated Grade Sheet:

After successful completion of the entire Program of study, a Consolidated Grade Sheet containing performance of all academic years will be issued as a final record. Transcripts will also be issued, if required, after payment of requisite fee.

19. Award of Degree:

The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendation of the Principal of SVCET (Autonomous), Chittoor

19.1 Eligibility:

A student shall be eligible for the award of B.Tech Degree if he fulfills all the following conditions:

- Registered and successfully completed all the components prescribed in the program of study for which he is admitted.

- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained CGPA greater than or equal to 4.0 (Minimum requirement for declaring as passed.)

19.2. Award of Class:

Declaration of Class is based on CGPA

Cumulative Grade Point Average	**Class**
≥7.5	First Class with Distinction
≥6.5 and<7.5	First Class
≥5.5 and <6.5	Second Class
≥4.0 and<5.5	Pass Class

20. Personal Verification / Revaluation / Final Valuation

20.1 Personal Verification of Answer Scripts:

Candidates appear in a particular semester end examinations may appeal for verification of their answer script(s) for arithmetic correction in totaling of marks and any omission / deletion in evaluation within 7 days from the date of declaration of results at the office of the Controller of Examinations on the prescribed proforma and by paying the prescribed fee per answer script.

It is clarified that personal verification of answer script shall not tantamount to revaluation of answer script. This is only a process of reverification by the candidate. Any mistake / deficiency with regard to arithmetic correction in totaling of marks and any omission / deletion in evaluation if found, the institution will correct the same.

20.2 Recounting / Revaluation:

Students shall be permitted for request for recounting/revaluation of the Semester-End examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records are updated with changes if any and the student will be issued a revised grade sheet. If there are no changes, the same will be intimated to the students.

20.3 Final Valuation:

Students shall be permitted for request for final valuation of the Semester–End Examination answer scripts within a stipulated period after the publication of the revaluation results by paying the necessary fee. The final valuation shall be carried out by an expert not less than Associate Professor as per the scheme of valuation supplied by the examination branch in the presence of the student, Controller of Examinations and Principal. However students are not permitted to discuss / argue with the examiner. If the increase in marks after final valuation is equal to or more than 15% of the previous valuation marks, the marks obtained after final valuation shall be treated as final. If the variation of marks after final valuation is less than 15% of the previous valuation marks, then the earlier valuation marks shall be treated as the final marks.

21. Termination from the Program:

The admission of a student to the program may be terminated and the student is asked to leave the institute in the following circumstances:

- The student fails to satisfy the requirements of the program within the maximum period stipulated for the program.
- The student fails to satisfy the norms of discipline specified by the institute from time to time.

22. With-Holding of Results:

If the candidate has not paid any dues to the institute / if any case of indiscipline / malpractice is pending against him, the results of the candidate will be withheld. The issue of the degree is liable to be withheld in such cases.

23. Graduation Day:

The institute shall have its own annual Graduation Day for the award of Provisional Certificates to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute. The college shall institute prizes and medals to meritorious students and award them annually at the Graduation Day. This will greatly encourage the students to strive for excellence in their academic work.

24. Discipline:

Every student is required to observe discipline and decorum both inside and outside the institute and not to indulge in any activity which will tend to bring down the honor of the institute. If a student indulges in malpractice in any of the theory / practical examination, continuous assessment examinations he shall be liable for punitive action as prescribed by the Institute from time to time.

25. Grievance Redressal Committee:

The institute shall form a Grievance Redressal Committee for each course in each department with the Course Teacher and the HOD as the members. This Committee shall solve all grievances related to the course under consideration.

26. Transitory Regulations:

Students who got detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished

semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered and they continue to be in the academic regulations of the batch they join later. A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of eight years, and a lateral entry student within six years, for the award of B.Tech Degree.

27. Revision of Regulations and Curriculum:

The Institute from time to time may revise, amend or change the regulations, scheme of examinations and syllabi if found necessary and on approval by the Academic Council and the Governing Body shall come into force and shall be binding on the students, faculty, staff, all authorities of the Institute and others concerned.

28. General:

Where the words “he”, “him”, “his”, “himself” occur in the regulations, they include “she”, “her”, “herself”.

FAILURE TO READ AND UNDERSTAND THE REGULATIONS IS NOT AN EXCUSE

ANNEXURE – I

COMMUNITY SERVICE PROJECT

Allocation of Community Service Project for the students will be done as per the decision of the concerned BOS Chairman

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 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 2months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships. The specific objectives are;

- To sensitize the students to the living conditions of the people who are around them,
- To help students to realize the stark realities of the 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 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 coordinationwith 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, socialproblems, 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 minimum of 180 hours 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 countersigned 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 a twofold one –

➢ First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the village or ward volunteers, rather, it could be another primary source of data.

➢ Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like –

- ❖ Agriculture
- ❖ Health
- ❖ Marketing and Cooperation
- ❖ Animal Husbandry
- ❖ Horticulture
- ❖ Fisheries
- ❖ Sericulture
- ❖ Revenue and Survey
- ❖ Natural Disaster Management
- ❖ Irrigation
- ❖ Law & Order
- ❖ Excise and Prohibition
- ❖ Mines and Geology
- ❖ Energy
- ❖ Internet
- ❖ Free Electricity
- ❖ Drinking Water

EXPECTED OUTCOMES:

BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS:

Learning Outcomes:

• Positive impact on students' academic learning

• Improves students' ability to apply what they have learned in "the real world"

• Positive impact on academic outcomes such as demonstrated complexity of understanding,
problem analysis, problem-solving, critical thinking, and cognitive development

• Improved ability to understand complexity and ambiguity Personal Outcomes

• Greater sense of personal efficacy, personal identity, spiritual growth, and moral development

• Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills Social Outcomes

• Reduced stereotypes 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 THE INSTITUTION:
• 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.

RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices / Improper Conduct	Punishment
	If the candidate	
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
6.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject

		and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred and forfeits of seat.
7.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he will be handed over to the police and a case is registered against him.
8.	Refuses to obey the orders of the Chief Superintendent / Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction or property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Examination committee for further action to award suitable punishment.	

VISION

To be a centre of excellence in Civil Engineering education by making every effort continuously for improvement in education and undertaking research as well as to contribute to the technology for the infrastructure development leading to sustainable development of the society.

MISSION

To provide quality education for successful career and higher studies in Civil Engineering that emphasizes academic and technical excellence in profession and research, effective communication, team work and leadership to meet the challenges of the society.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- ✓ PEO1: To achieve a high level of technical expertise to shine in higher education / profession by obtaining knowledge in basic sciences, design and drawing and engineering principles.
- ✓ PEO2: To explore and apply the modern engineering tools for planning, design, execution and maintenance of works that is technically viable, economically and socially acceptable.
- ✓ PEO3: To develop good communication skills, team work in their responsibilities with excellence and to be ready to take up challenges in the current scenario

PROGRAM OUTCOMES

Defined Program Outcomes of the Department:

- ✓ PO1. Capability to apply knowledge of mathematics, science and engineering.
- ✓ PO2. Capability to propose and conduct experiments, as well as to evaluateand understand data in civil engineering.
- ✓ PO3. Capability to design a system, component, or process to meet desired needs within economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
- ✓ PO4. Capability to task with multidisciplinary teams
- ✓ PO5. Capability to recognize, make, and clarify civil engineering crisis
- ✓ PO6. Ability to take up professional and ethical responsibility
- ✓ PO7. Capability to correspond professionally

✓ PO8. Capability to understand the impact of engineering solutions inaglobal, economic, environmental and societal context.

✓ PO9. Ability to engage in life-long learning

✓ PO10.Capability of accepting current issues.

✓ PO11.Capability to employ the talent, technique and contemporaryengineering tools

✓ PO12.Capability to apply the engineering and management principles to one's individual work and to supervise the projects as a member and team leader.

Programme Specific Objectives (PSO's)

- The Graduates of the Programme will achieve excellence in engineering decision-making and design.
- Attain leadership careers in engineering practice and pursue advanced study and research in engineering.
- Complete graduate professional engineering education with ethical and societal responsibility and Engage in diverse, alternative career choices.

Programme Specific Outcomes (PSOs)

PSO 1 – UNDERSTANDING: Graduates will have an ability to describe, analyse and solve problems using mathematics and systematic problem solving technique.

PSO 2 – ANALYTICAL SKILL &EXECUTIVE SKILL: Graduates will have an ability to interact and work seamlessly in multi disciplinary teams.: Graduates will have an ability to plan, execute, manage, maintain and rehabilitate civil engineering systems and processes.

PSO 3 – RESPONSIBILITY: Graduates will have requisite understanding on impact of civil engineering projects and processes in a global, economic and societal context.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

DEPARTMENT OF CIVIL ENGINEERING

Induction Program: 3 weeks

(Common for All Branches of Engineering)

Semester-0 **Regulations:R20**

S.No	Category	Coursecode	Course title	Hours per week			Credits
				L	T	P	
1	MC		Physical Activities -- Sports, Yoga and Meditation, Plantation	0	0	6	0
2	MC		Career Counselling	2	0	2	0
3	MC		Orientation to all branches -- career options, tools, etc.	3	0	0	0
4	EC		Orientation on admitted Branch -- corresponding labs, tools and platforms	2	0	3	0
	ES		Proficiency Modules & Productivity Tools	2	1	2	0
5	MC		Assessment on basic aptitude and mathematical skills	2	0	3	0
6	MC		Remedial Training in Foundation Courses	2	1	2	0
7	MC		Human Values & Professional Ethics	3	0	0	0
8	BS		Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	2	1	2	0
9	ES		Concepts of Programming	2	0	2	0
Total				20	3	22	**0**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

Course Structure and Scheme of Examination

I B.TechI Semester - CE **Regulations : R20**

S. No	Category	Course Code	Course Name	Hours/week			Credits	Scheme of Examination Maximum Marks		
				L	T	P	C	CIA	SEE	Total
1.	BS	20AHS02	Differential Equations and Multivariable calculus	3	1	0	3	30	70	100
2.	BS	20AHS03	Engineering Chemistry	3	0	0	3	30	70	100
3.	HS	20AHS01	Communicative English	3	0	0	3	30	70	100
4.	ES	20ACS01	C Programming and Data Structures	3	1	0	3	30	70	100
5.	ES	20AEE01	Basic Electrical Engineering and Mechanical Engineering	3	0	0	3	30	70	100
6.	BS	20AHS06	Engineering Chemistry Lab	0	0	3	1.5	40	60	100
7.	HS	20AHS05	Communicative English Lab	0	0	3	1.5	40	60	100
8.	ES	20ACS03	C Programming and Data Structures Lab	0	0	3	1.5	40	60	100
9.	MC	20AMB01	Design Thinking	2	0	0	0	100	00	100
TOTAL				**17**	**2**	**9**	**19.5**	**370**	**530**	**900**

I B.Tech II Semester - CE **Regulations : R20**

S. No	Category	Course Code	Course Name	Hours/week			Credits	Scheme of Examination Maximum Marks		
				L	T	P	C	CIA	SEE	Total
1.	BS	20AHS04	Engineering Physics	3	0	0	3	30	70	100
2.	BS	20AHS08	Algebra and Transformation Techniques	3	1	0	3	30	70	100
3.	ES	20ACE01	Engineering Mechanics	3	1	0	3	30	70	100
4.	ES	20ACS04	Problem Solving and Programming using Python	3	1	0	3	30	70	100
5.	ES	20AME01	Computer Aided Engineering Drawing	1	0	4	3	30	70	100
6.	BS	20AHS07	Engineering Physics Lab	0	0	3	1.5	40	60	100
7.	ES	20AME02	Engineering Practice Lab	0	0	3	1.5	40	60	100
8.	ES	20ACS05	Problem Solving and Programming using Python Lab	0	0	3	1.5	40	60	100
9.	MC	20AHS09	Environmental Sciences	2	0	0	0	100	00	100
TOTAL				**15**	**3**	**13**	**19.5**	**370**	**530**	**900**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

DEPARTMENT OF CIVIL ENGINEERING

Course Structure & Scheme of Examination

II B.Tech. I Semester-CE **Regulations: R20**

S.No.	Category	Course code	Course Name	Hours/ week			Credits	Scheme of Examination (Maximum Marks)		
				L	T	P	C	CIA	SE E	Total
1	BS	20AHS10	Numerical Methods	3	0	0	3	40	60	100
2	PC	20ACE18	Strength of Materials	3	0	0	3	40	60	100
3	PC	20ACE04	Building Materials and Construction Technology	3	0	0	3	40	60	100
4	PC	20ACE05	Transportation Engineering	3	0	0	3	40	60	100
5	PC	20ACE06	Surveying	3	0	0	3	40	60	100
6	PC	20ACE07	Concrete Technology Lab	0	0	3	1.5	40	60	100
7	PC	20ACE08	Surveying Lab	0	0	3	1.5	40	60	100
8	PC	20ACE09	Strength of Materials Lab	0	0	3	1.5	40	60	100
9	SC	20ACE10	Building Planning and Computer Aided Drafting Lab (Auto CAD-2D)	1	0	2	2	40	60	100
10	MC	20AMB02	Universal Human Values – I	2	0	0	0	100	-	100
11	AC	20AHS11	Quantitative Aptitude and Reasoning - I	2	0	0	0	0	0	0
12	20ANSS1/ 20ANCC1		NSS /NCC	2	-	-				
Total				**22**	**0**	**11**	**21.5**	**460**	**540**	**1000**
TOTAL CREDITS							21.5			
TOTAL MARKS										1000
Category										credits
Basic science course										3
Professional core courses										16.5
Skill oriented course										2
Total credits										21.5

Course Structure & Scheme of Examination

II B.Tech. II Semester- CE **Regulations: R20**

S.No.	Category	Course code	Course Name	Hours / week			Credits	Scheme of Examination (MaximumMarks)		
				L	T	P	C	CIA	SEE	Total
1	ES	20ACE13	Engineering Geology	3	0	0	3	40	60	100
2	BS	20AHS13	Probability and Statistics	3	0	0	3	40	60	100
3	PC	20ACE14	Structural Analysis-1	3	0	0	3	40	60	100
4	PC	20ACE15	Hydraulics and Fluid Machinery	3	0	0	3	40	60	100
5	HS	20AMB03	Managerial Economics and Financial Analysis	3	0	0	3	40	60	100
6	ES	20ACE16	Engineering Geology Lab	0	0	3	1.5	40	60	100
7	PC	20ACE17	Transportation Engineering lab	0	0	3	1.5	40	60	100
8	PC	20ACE20	Hydraulics & Fluid Machinery Lab	0	0	3	1.5	40	60	100
9	SC	20ACE19	Total station surveying and Gps lab	1	0	2	2	40	60	100
10	AC	20AHS15	Quantitative Aptitude and Reasoning - II	2	0	0	0	-	-	-
Total				**18**	**0**	**11**	**21.5**	**360**	**540**	**900**
TOTAL CREDITS							21.5			
TOTAL MARKS										900
Internship 2 Months (Mandatory) during summer vacation/ Community Serve Project										
Minor courses (The hours distribution can be 4-0-0 or 3-1-0 or 3-0-2)				3	0	2	4			
Honors/ courses (The hours distribution can be 4-0-0 or 3-1-0 or 3-0-2)				4	0	0	4			

Category	Credits
Basic Science Courses	3
Professional core Courses	9
Engineering Science Courses	4.5
Skill oriented course course*	2
Humanities and Social Sciences	3
TOTAL CREDITS	21.5

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Course Structure & Scheme of Examination

III B.Tech I Semester-CE **Regulations:R20**

S.No.	Category	Course code	Course Name	Hours / week L	T	P	Credits C	Scheme of Examination Maximum Marks CIA	SEE	Total
1	PC	20ACE22	Soil Mechanics	3	0	0	3	40	60	100
2	PC	20ACE23	Design of Reinforced Concrete Structures	3	0	0	3	40	60	100
3	PC	20ACE24	Structural Analysis - II	3	0	0	3	40	60	100
4	OE/JOE	Open Elective Course / Job Oriented Elective Course - 1								
		20AMB13	Human Resource Development and Organizational Behavior	3	0	0	3	40	60	100
		20AHS22	History of Science & Engineering							
		20AME23	Renewable Energy Technology							
		20ACE33	Pavement Analysis and Design							
		20ACE34	Building Materials and Composites							
5	PE	Profession Elective Course - 1								
		20ACE25	Architecture & Town Planning	3	0	0	3	40	60	100
		20ACE26	Ground Water Development and Management							
		20ACE27	Hydrology and Irrigation Engineering							
		20ACE28	Construction Management							
		20ACE29	Surface Hydrology							
6	PC	20ACE30	GIS Lab	0	0	3	1.5	40	60	100
7	PC	20ACE31	Structural Engineering Design Lab-I	0	0	3	1.5	40	60	100
8	SC	20ACE32	Computer Aided Drafting Lab	1	0	2	2	40	60	100
9	MC	20AHS21	Indian Constitution	2	0	0	0	100	00	100
10	AC	20AHS17	Quantitative Aptitude and Reasoning - III	2	0	0	0	0	0	0
11	AC	20AHS18	French Language	2	0	0	0	0	0	0
		20AHS19	German Language							
		20AHS20	Japanese Language							
12	20ACE37/ 20ACEB8		Summer Internship/Community Service Project	0	0	0	1.5	40	60	100
			Total	**22**	**0**	**8**	**21.5**	**460**	**540**	**1000**

Honor Degree hours distribution **3-1-0-4**

Minor General Degree hours distribution **3-0-2-4** and Minor Industrial Relevant Track Degree hours distribution 3-**1-0-4**

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Course Structure & Scheme of Examination

III B.Tech II Semester-CE **Regulations:R20**

S.No.	Category	Course code	Course Name	Hours / week			Credits	Scheme of Examination Maximum Marks		
				L	T	P	C	CIA	SEE	Total
1	PC	20ACE38	Design of Steel Structures	3	0	0	3	40	60	100
2	PC	20ACE39	Foundation Engineering	3	0	0	3	40	60	100
3	PC	20ACE40	Environmental Engineering	3	0	0	3	40	60	100
4	PE	Professional Elective Course - II								
		20ACE41	Fundamentals of GIS	3	0	0	3	40	60	100
		20ACE42	Advanced Structural Design							
		20ACE43	Ground Improvement Techniques							
		20ACE44	Masonry Structures							
		20ACE45	Prestressed Concrete Structures							
5	OE/JOE	Open Elective Course / Job Oriented Elective Course - II								
		20AME31	Operations Research	3	0	0	3	40	60	100
		20ACS21	Computer Graphics							
		20AEE45	Electrical Safety							
		20ACE49	Urban Transport Systems Planning							
		20ACE50	Estimation Costing and Valuation							
6	PC	20ACE46	Soil mechanics Lab	0	0	3	1.5	40	60	100
7	PC	20ACE47	Structural Engineering Design Lab II	0	0	3	1.5	40	60	100
8	PC	20ACE48	Environmental Engineering Lab	0	0	3	1.5	40	60	100
9	SC	20AHS16	Advanced English Communication Skills	1	0	2	2	40	60	100
10	MC	20AHS23	Essence of Indian Traditional Knowledge	2	0	0	0	100	00	100
Total				**18**	**0**	**11**	**21.5**	**460**	**540**	**1000**

Honor Degree hours distribution **3-1-0-4**

Minor General Degree hours distribution **3-0-2-4** and Minor Industrial Relevant Track Degree hours distribution 3-**1-0-4**

Industrial/Research Internship (Mandatory) 2 Months during summer vacation (to be evaluated during IV year, I Sem)

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DEPARTMENT OF CIVIL ENGINEERING

Course Structure & Scheme of Examination

IV B.Tech I Semester-CE **Regulations:R20**

S.No.	Category	Course code	Course Name	Hours / week L	T	P	Credits C	Scheme of Examination Maximum Marks CIA	SEE	Total
1	PE		Professional Elective Course - III							
		20ACE51	Air Pollution and Control	3	0	0	3	40	60	100
		20ACE52	Solid Waste Management							
		20ACE53	Advanced Foundation Design							
		20ACE54	Bridge Engineering							
		20ACE55	Seismology to Earthquake Engineering							
2	PE		Professional Elective Course - IV							
		20ACE56	Hydro-Power Engineering	3	0	0	3	40	60	100
		20ACE57	Health Monitoring and Retrofitting of Structures							
		20ACE58	Environmental Impact Assessment and Management							
		20ACE59	Traffic Engineering							
		20ACE60	Disaster Mitigation and Management							
3	PE		Professional Elective Course - V							
		20ACE61	Design and Drawing of Irrigation Structures	3	0	0	3	40	60	100
		20ACE62	Integrated Water Resources and Planning							
		20ACE63	Finite Element Methods for Civil Engineering							
		20ACE64	Earth and Earth Retaining Structures							
		20ACE65	Rural Water Supply and Sanitation							
4	OE/JOE		Open Elective Course / Job Oriented Elective Course - III							
		20AMB14	Economic Policies in India	3	0	0	3	40	60	100
		20ACS38	Crypto Currencies and Block Chain Technologies							
		20AME54	Optimization Techniques							
		20ACE68	Aerosol and Gas Measurement Devices							
		20ACE69	Atmospheric chemistry							
5	OE/JOE		Open Elective Course / Job Oriented Elective Course - IV							
		20AEC67	Industrial Electronics	3	0	0	3	40	60	100
		20AMB09	Intellectual Property Rights							
		20ACM02	Artificial Intelligence for Engineers							
		20ACE70	Metro Rail Transport – Design & Construction							
		20ACE71	Concrete Engineering and Technology							
6	HSS	20AMB04	Creativity and Innovation	3	0	0	3	40	60	100
		20AMB05	Leadership Essentials							
		20AMB06	Law for Engineers							
		20AMB07	Entrepreneurship Essentials							
		20AMB08	Essentials of Management Science							
7	SC	20ACE66	Project Management Software Lab	1	0	2	2	40	60	100
8	MC	20AMB12	Professional Ethics	2	0	0	0	100	-	100
9	20ACE67		Industrial/ Research Internship						60	
Total				**21**	**0**	**2**	**23**	**420**	**480**	**900**

Honor Degree hours distribution **3-1-0-4**

Minor General Degree hours distribution **3-0-2-4** and Minor Industrial Relevant Track Degree hours distribution 3**-1-0-4**

Course Structure & Scheme of Examination

IV B.Tech II Semester- CE Regulations:R20

S.No.	Category	Course code	Course Name	Hours / week			Credits	Scheme of Examination Maximum Marks		
				L	T	P	C	CIA	SEE	Total
1	Major Project	20ACE72	Project work, Seminar and Internship in industry	0	0	24	12	40	60	100
	Internship (6 months)									
Total				0	0	24	12	40	60	100

B.Tech. Honors in a Discipline (Civil Engineering)

S.No.	Offered in	Course Code	Course Name	Hours / week			Credits	Scheme of Examination Maximum Marks			Pre-Requisites	Offered To
				L	T	P	C	CIA	SEE	Total		
POOL 1												
1	II B.Tech., II Semester (Any 1 Course from Pool -1)	20ACE73	Industrial Structures (SE)	3	1	0	4	40	60	100	Strength of Materials	CE
2		20ACE74	Pavement Materials and Construction (TE)	3	1	0	4	40	60	100	Transportation Engineering	CE
3		20ACE75	Alternate Building Materials (BS)	3	1	0	4	40	60	100	Building materials and Construction	CE
4		20ACE76	Water Treatment Technology (EC)	3	1	0	4	40	60	100	Engineering Chemistry	CE
POOL 2												
1	III B.Tech., I Semester(Any 1 Course from Pool -2)	20ACE77	Nanotechnology and its Application in Civil Engineering (SE)	3	1	0	4	40	60	100	Strength of Materials	CE
2		20ACE78	Railway infrastructure Planning and Design (TE)	3	1	0	4	40	60	100	Transportation Engineering	CE
3		20ACE79	Water Power Engineering(HE)	3	1	0	4	40	60	100	Hydraulics and Hydraulic Machinery	CE
4		20ACE80	Planning and Management of Environmental Projects (EE)	3	1	0	4	40	60	100	Construction Project Management	CE
POOL 3												
1	III B.Tech., II Semester(Any 1 Course from Pool -3)	20ACE81	Advanced Design of Metal Structures(SE)	3	1	0	4	40	60	100	Steel Structures	CE
2		20ACE82	Geotechnical Earthquake Engineering (GE)	3	1	0	4	40	60	100	Structural Analysis	CE
3		20ACE83	Stochastic Hydrology (HE)	3	1	0	4	40	60	100	Hydrology	CE
4		20ACE84	Road Transport Management and Economics (TE)	3	1	0	4	40	60	100	Transportation Engineering	CE
POOL 4												
1	III B.Tech.,	20ACE85	Sustainability Concepts in Civil Engineering (SE)	3	1	0	4	40	60	100	Building Materials	CE

2	II Semester(Any 1 Course from Pool -4)	20ACE86	Optimization Techniques in Geo Technical Engineering (GE)	3	1	0	4	40	60	100	Geo Technical Engineering	CE
3		20ACE87	River Morphology (HE)	3	1	0	4	40	60	100	Fluid Mechanics	CE
4		20ACE88	Soil Mechanics for Highway Engineering (TE)	3	1	0	4	40	60	100	Transportation Engineering	CE
POOL 5												
1	IV B.Tech., I Semester(Any 1 Course from Pool -5)	20ACE89	Design of High-Rise Buildings (SE)	3	1	0	4	40	60	100	Reinforced Cement Concrete	CE
2		20ACE90	Soil Dynamics (GE)	3	1	0	4	40	60	100	Engineering Mechanics	CE
3		20ACE91	Urban flood Planning and Management (HE)	3	1	0	4	40	60	100	Hydrology	CE
4		20ACE92	Environmental Impact Assessment of Transport Projects (TE)	3	1	0	4	40	60	100	Transportation Engineering	CE

(a) Minor (General – for students opting from other disciplines of Engineering)

S.No.	Offered in	Course code	Course Name	Hours / week			Credits	Scheme of Examination Maximum Marks		
				L	T	P	C	CIA	SEE	Total
1	II B.Tech., II Semester	20ACE93	Fundamental of Strength of Materials	3	0	2	4	40	60	100
2	III B.Tech., I Semester	20ACE94	Introduction to Fluid Mechanics	3	0	2	4	40	60	100
3	III B.Tech., II Semester	20ACE95	Basic Surveying	3	0	2	4	40	60	100
4	III B.Tech., II Semester	20ACE96	Essentials of Engineering Geology	3	0	2	4	40	60	100
5	IV B.Tech., I Semester	20ACE97	A simplified Approach to Concrete Technology	3	0	2	4	40	60	100
TOTAL							20			
TOTAL MARKS										500

(b) Minor (General – Specialization – Industry Relevant Track)

S.No.	Offered in	Course code	Course Name	Hours / week			Credits	Scheme of Examination Maximum Marks			Pre-Requisites	Offered To
				L	T	P	C	CIA	SEE	Total		
TRACK 1 (Structural Engineering)												
1	II B.Tech., II Semester	20ACE98	Fundamentals of Building Design	3	1	0	4	40	60	100	Engineering Mechanics	CE
2	III B.Tech., I Semester	20ACE99	Geometric Design of Transportation Infrastructure	3	1	0	4	40	60	100	Transportation Engineering	CE
3	III B.Tech., II Semester	20ACEA0	Non-Destructive Testing and Health Monitoring of Civil Structures	3	1	0	4	40	60	100	Reinforced Concrete Structures	CE
4	III B.Tech., II Semester	20ACEA1	Ferro Cement Technology	3	1	0	4	40	60	100	Engineering Mechanics	CE
5	IV B.Tech., I Semester	20ACEA2	Prefabricated Structures	3	1	0	4	40	60	100	Strength of Materials	CE
TRACK 2 (Geo Technical Engineering)												
1	GE II - II	20ACEA3	Construction Materials and Building Design	3	1	0	4	40	60	100	Geo Technical Engineering	CE
2	GE III- I	20ACEA4	Testing Methods for CNS Soil	3	1	0	4	40	60	100	Geo Technical Concepts	CE
3	GE III - II	20ACEA5	Ground Water Development and Management	3	1	0	4	40	60	100	Foundation Engineering	CE
4	GE III - II	20ACEA6	Design of Earth Retaining structures	3	1	0	4	40	60	100	Reinforced Concrete Structures	CE
5	GE IV - I	20ACEA7	Deep Excavations and Tunnels	3	1	0	4	40	60	100	Reinforced Concrete Structures	CE
TRACK3 (Environmental Engineering and Water Resources Engineering)												
1	HE II - II	20ACEA8	Advanced Surveying	3	1	0	4	40	60	100	Surveying	CE
2	HE III- I	20ACEA9	Environmental Biotechnology	3	1	0	4	40	60	100	Hydraulics and Hydraulic Machinery	CE
3	HE III - II	20ACEB0	Ground Water Hydrology	3	1	0	4	40	60	100	Hydrology	CE
4	HE III - II	20ACEB1	Water Quality Modeling	3	1	0	4	40	60	100	Water Resources Engineering	CE
5	HE IV - I	20ACEB2	Surface Water Hydrology	3	1	0	4	40	60	100	Hydrology	CE

TRACK 4 (Transportation Engineering)												
1	TE II - II	20ACEB3	Railways and Airports	3	1	0	4	40	60	100	Transportation Engineering	CE
2	TE III- I	20ACEB4	Housing Planning and Management	3	1	0	4	40	60	100	Traffic Control	CE
3	TE III – II	20ACEB5	Design and Construction of Highway Pavements	3	1	0	4	40	60	100	Building Planning	CE
4	TE III – II	20ACEB6	Airport and Sea Port Engineering	3	1	0	4	40	60	100	Building Planning	CE
5	TE IV – I	20ACEB7	Docks and Harbor Engineering	3	1	0	4	40	60	100	Railway Engineering	CE

Subjects offering to other departments (offered by Civil Engineering Department)

I B.Tech. I Semester

S.No.	Course Code	Subject	Branch	Offering Department
1	20ACE02	Applied Mechanics	Mechanical	Civil
2	20ACE03	Basic Civil and Mechanical Engineering	Mechanical	Civil

II B.Tech. I Semester

S.No.	Course Code	Subject	Branch	Offering Department
1	20ACE11	Mechanics of Solids	Mechanical	Civil

II B.Tech. II Semester

S.No.	Course Code	Subject	Branch	Offering Department
1	20ACE12	Fluid Mechanics and Hydraulics Machinery	Mechanical	Civil
2	20ACE21	Fluid Mechanics and Hydraulics Machinery Lab	Mechanical	Civil

III B.tech I Semester

S.No.	Course Code	Subject	Branch	Offering Department
1	20ACE35	Integrated Waste Management for Smart City	CSE,IT,CSM & CSD	Civil
2	20ACE36	Disaster Management	ME	Civil

IV B.tech I Semester

S.No.	Course Code	Subject	Branch	Offering Department
1	20ACE35	Integrated Waste Management for Smart City	ME	Civil

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CIVIL ENGINEERING

	L	T	P	C
	3	1	0	3

I B.Tech - I Semester (Common to All Branches)

20AHS02 DIFFERENTIAL EQUATIONS AND MULTIVARIABLE CALCULUS

Course Outcomes:
After completion of the course the student will be able to

CO1: Classify and interpret the solutions of ordinary differential equations.

CO2: Acquire the knowledge of maxima and minima of functions of several variables.

CO3: Apply multiple integral techniques in evaluating areas bounded by the region.

CO4: Illustrate the physical interpretation of concepts of vector calculus.

UNIT-I DIFFERENTIAL EQUATIONS: Exact differential equations **-** Linear differential equations - Bernoulli's equations – Non - homogenous linear differential equation of second and higher order with constant coefficients with R.H.S terms of the form e^{ax}, $sinax, Cosax,\ x^m,\ \ e^{ax}V(x),\ \ x^mV(x)$and $xV(x)$.

UNIT-II APPLICATIONS OF DIFFERENTIAL EQUATIONS: Orthogonal Trajectories (Cartesian and polar forms) -Newton's law of cooling- Law of natural Growth and Decay- L-R-C circuits - Mass spring System

UNIT-III FUNCTIONS OF SEVERAL VARIABLES: Partial derivatives- chain rule - Total derivative, Jacobians -Maxima and Minima for functions of two variables –Lagrange's method of multipliers of three variables only.

UNIT-IV MULTIPLE INTEGRALS:Double and Triple integrals-Change of variables-Change of Order ofIntegration (Cartesian and polar forms). Surface area and Volume of solid of revolution.

UNIT-V VECTOR CALCULUS: Gradient, Divergence, Curl and their properties (without identities).**Vector Integration**: Line Integral – Circulation- work done, surface integral-volume integral -Green's theorem, Stokes theorem& Gauss Divergence theorems (without proof) – Applications of these theorems.

TEXT BOOKS:

1) Higher Engineering Mathematics, Dr. B. S. Grewal, 44/e Kanna Publications, 2017.
2) A Text book of Engineering Mathematics –I, T. K. V. Iyengar, B. Krishna Gandhi and others, S. Chand and company. 13th Revised edition, 2014.

REFERENCE BOOKS:

1) Advanced Engineering Mathematics, Erwin Kreyszig,. 10/e, John Wiley & Sons, 2011.
2) B.V.Ramana, A Text book of Engineering Mathematics-I, Tata Mc Grawhill.
3) R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1									1
CO2	3	2	2	2								2
CO3	2	2		1								
CO4	3	2	1									1

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L	T	P	C
3	0	0	3

I B.Tech I Semester(Common to CE, ME & ECE)
I B.Tech II Semester(Common toEEE,CSE, IT, CSE(DS) & CSE(AI &ML))

20AHS03 ENGINEERING CHEMISTRY

Course Outcomes:

After completion of the course students will be able to

CO1: Understand the impact of hard water and its removal, formation of corrosion,

CO2: Know the selection of suitable engineering materials for specific applications.

CO3: Effect of corrosion and to know the designing of corrosion resistant articles.

CO4: Know the selection of suitable fuels based on analysis of coal, calorific value for a particular application, calculation of air requirements for combustion of fuel

UNIT – I

WATER TECHNOLOGY: Sources of water, impurities in water,Hardness of Water and its unit of expression , Estimation of hardness in water by EDTA titrationmethod – Numerical problems-Boiler troubles and prevention methods, specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards Water softening methods byInternal conditioning and External conditioning methods–Chlorination Of Domestic Water Treatment - Desalination of Brackish Water –Reverse Osmosis and electrodialysismethods.

UNIT – II

MATERIALS CHEMISTRY: High Polymers: Polymers- Definition – Nomenclature of polymers- Types of polymerization reactions – addition, condensation and copolymerization with examples. Plastics: Thermoplastics and thermosetting plastics and differences between them –Preparation, Properties and Engineering applications of PE, PTFE, PVC, Nylonand Bakelite. Conducting polymers–polyacetylene, polyaniline, polypyrroles–mechanism of conduction and applications.**Rubbers:** Natural Rubbers – Vulcanization– Synthetic

Rubbers(Buna-S, Silicone Rubber, Neoprene)–Preparation, properties and applications.**Lubricants:** Functions of Lubricants – Classification of Lubricants –various properties of Lubricants. **Refractories**: Important properties of refractories and their applications.

UNIT – III

CHEMISTRY OF CORROSION: Introduction on corrosion- causes and consequences of corrosion – Types of corrosion -Mechanism ofcorrosion - Factors influencing the corrosion – Control of corrosion – Cathodic protection by Sacrificial anodic and Impressed current cathodic protection- Electro Plating and Electroless plating (Copper and Nickel).

UNIT – IV

FUELS AND COMBUSTION: Fuels, Classification of Solid, Liquid and Gaseous fuels – Analysis of coal - Proximate and Ultimate analysis, Preparation of synthetic petrol – Bergius process - knocking and anti-knock agents,Octane and Cetanevalues, Calorific value – HCV, LCV -Numerical problems using Dulong-Petit's formula – Measurement of calorific value using Bomb calorimeter and Junkers gas calorimeter – Numerical problems.

Combustion: Calculation of air quantity requirement for Combustion -Numerical problems.

UNIT–V

ELECTRO CHEMICAL ENERGY SYSTEMS: Electrochemical Cells – Electrode potential - Standard electrode potential – Nernst equation, cell potential calculations, Working principles and applications of different batteries – Dry cell, Lithium-ion cell, Lead-acid cell and Nickel-cadmium cell- with discharging and Recharging reactions, Working principles and applications of hydrogen-oxygen fuel cell, Methanol-oxygen fuel cell.

TEXT BOOKS:

1. A text book of Engineering Chemistry, Jain & Jain, ,Dhanpat Rai Publishing Company, 15th edition, New Delhi, 2008.
2. Chemistry for Engineers,Prof. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C. Ramachandraiah, McGraw Hill Higher Education Hyd., 3rd edition, 2009.

REFERENCE BOOKS:

1) Engineering Chemistry, Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, ,Scitech Publications (India) Pvt. Limited, Hyderabad, 2009.
2) A text book of Engineering Chemistry, Dr. K. RaviKrishnan, , Sri Krishna Publications, Secunderabad, Telengana, New edition. July,2015.
3) Chemistry of Engineering Materials, C.V. Agarwal, C. Parameswara Murthy and Andra Naidu, BS Publications, Hyderabad, 9th edition, 2006.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1			2					1			1
CO2	1				2							
CO3	1				2							
CO4	1			2					1			

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L	T	P	C
3	0	0	3

I B.Tech I Semester(Common to CE, ME & ECE)

I B.Tech II Semester(Common toEEE,CSE, IT, CSE(DS) & CSE(AI &ML))

20AHS01 COMMUNICATIVE ENGLISH

Course Outcomes:

CO1: Retrieve the knowledge of basic grammatical concepts

CO2: Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English

CO3: Apply grammatical structures to formulate sentences and correct word forms

CO4: Analyze discourse markers to speak clearly on a specific topic in informal discussions

UNIT I : EXPLORATION

LESSON: A proposal to Girdle the Earth, Nellie Bly.

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

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

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

READING FOR WRITING: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

GRAMMAR AND VOCABULARY: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order insentences.

UNIT II: ON CAMPUS

LESSON: The District School As It Was by One Who Went It, Warren Burdon

LISTENING: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

SPEAKING: Discussion in pairs/ small groups on specific topics followed by short structured talks.

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

WRITING: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.

GRAMMAR AND VOCABULARY: Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article;prepositions.

UNIT III: WORKING TOGETHER

LESSON: The Future Of Work

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

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

READING: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

WRITING: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

GRAMMAR AND VOCABULARY: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

UNIT IV: FABRIC OF CHANGE

LESSON: H.G. Wells and the Uncertainities of progress, Peter J. Bowler.

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: Information transfer; describe, compare, contrast, identify significance/trendsbased on information provided in figures/charts/graphs/tables.

GRAMMAR AND VOCABULARY: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

UNIT V: TOOLS FOR LIFE

LESSON: Leaves from the Mental Portfolio of a Eurasian, Sui San Far.

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 - without the use of PPT slides.

READING: Reading for comprehension.

WRITING: Writing structured essays on specific topics using suitable claims and evidences

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

TEXT BOOKS

1) English all round: Communication Skills for under graduation LearnersVol. I,Orient Black Swan Publishers, First Edition2019.

REFERENCE BOOKS

1) Academic writing: A handbook for international students, Bailey, Stephen, Routledge. 2014.
2) Pathways: Listening, Speaking and Critical Thinking Chase. Becky Tarver,HeinleyELT; 2nd Edition,2018.

3) Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	1	0	3

I B.Tech - I Semester (Common to All Branches)

20ACS01 C PROGRAMMING & DATA STRUCTURES

Course Outcomes:

After Completion of the course the student will be able to

CO1: Analyse the basic concepts of C Programming language.

CO2: Design applications in C, using functions, arrays, pointers and structures.

CO3: Apply the concepts of Stacks and Queues in solving the problems.

CO4: Explore various operations on Linked lists.

CO5: Demonstrate various tree traversals and graph traversal techniques.

CO6: Design searching and sorting methods

UNIT-1

Introduction to C Language - C language elements, structure of C program ,A simple C program, variable declarations and data types, operators and expressions, decision statements - If and switch statements, loop control statements - while, for ,do-while statements, arrays, control statements-break and continue, programming examples.

UNIT – 2

Functions: Defining a function, Accessing a function, Function prototypes, Passing arguments to a function, Parameter passing mechanisms - Call-by-value, Call-by-reference, Recursion, Storage classes (auto, static, register, extern),**Arrays**: Declaration and Definition of an array, Processing an Array, Passing arrays to functions, Two dimensional and Multi-dimensional arrays**, Strings:** Defining and Initialization of Strings, NULL character, Reading and Writing a string , Processing the string , String handling functions.

UNIT-3

Pointers: Fundamentals, Pointer declarations, Pointers and One-dimensional array, Dynamic memory allocation, Operations on pointers**, Structures and Unions**: Declaration, Definition and Initialization of structures, Accessing structures, User defined data type (typedef), Enumerated Data types, Nested structures, Array of structures, Structures and pointers, Passing structures to functions, Unions.

UNIT – 4

Data Structures

Overview of data structures, stacks and queues, representation of a stack, operations on a stack, implementation of a stack, evaluation of arithmetic expressions, infix, prefix, and postfix notations, evaluation of postfix expression, conversion of expression from infix to postfix, recursion, queues - various positions of queue, representation of queue, insertion, deletion, searching operations.

Linked Lists – Singly linked list, dynamically linked stacks and queues, polynomials using singly linked lists, using circularly linked lists, insertion, deletion and searching operations, doubly linked lists and its operations, circular linked lists and its operations.

UNIT-5

Trees - Tree terminology, Binary trees, representation, binary tree traversals. Binary tree operations, Graphs - graph terminology, graph representation, elementary graph operations, Breadth First Search (BFS) and Depth First Search (DFS), connected components, spanning trees.

Searching and Sorting – sequential search, binary search, exchange (bubble) sort, selection sort, Insertion sort.

TEXT BOOKS:

1) Behrouz A. Forouzan, Richard F. Gilberg, ―C Programming & Data Structures‖, India Edition, Course Technology, 2010.
2) The C Programming Language, Brian W Kernighan and Dennis M Ritchie, Second Edition,Prentice Hall Publication.
3) Fundamentals of Data Structures in C, Ellis Horowitz, SartajSahni, Susan Anderson-Freed,Computer Science Press.

4) Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao,Pearson Education.

REFERENCE BOOKS:

1) Pradip Dey and Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition2011.
2) E. Balaguruswamy, “C and Data Structures”, 4th Edition, Tata Mc Graw Hill.
3) A.K. Sharma, Computer Fundamentals and Programming in C, 2nd Edition, UniversityPress.
4) M.T. Somashekara, “Problem Solving Using C”, PHI, 2nd Edition 2009.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1												1		
CO2	1	2												2	
CO3	1				1								1		
CO4		3											1		
CO5					1	2	3							3	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
CIVIL ENGINEERING

L	T	P	C
3	0	0	3

I B.Tech - I Semester

20AEE01 BASIC ELECTRICAL ENGINEERING AND MECHANICAL ENGINEERING
PART – A (Electrical Engineering)

Course Outcomes: After completion of the course the student will be able to

CO1: Demonstrate the knowledge to solve various Electrical Circuits.

CO2: Apply the concept of Electrical Machines and Transformer.

UNIT - I: DC CIRCUITS AND ELECTROMAGENTISM

D. C. Circuits: Ohm's Law and Kirchhoff's Laws - Analysis of series, parallel and series-parallel circuits excited by independent voltage sources - Power and Energy.

Electromagnetism: Faradays Laws, Lenz's Law, Fleming's Rules, Statically and dynamically induced EMF - Concepts of self inductance, mutual inductance and coefficient of coupling - Energy stored in magnetic fields.

UNIT - II: DC MACHINES

Working principle of DC machine as a generator and a motor - Types and constructional features - EMF equation of generator - Back EMF and its significance - torque equation - Types of D.C. motors - characteristics and applications - Necessity of a starter for DC motor

UNIT - III: AC MACHINES

Transformers: Principle of operation and construction of single phase transformers - EMF equation – losses - efficiency and voltage regulation.

Three Phase Induction Motors: Introduction to 3-phase Ac circuits- principle of operation of induction motor-slip-torque characteristics-applications. Principle of Operation of alternators-regulation by synchronous impedance method

TEXT BOOKS:

1) V.K.Mehta & Rohit Mehta, Principles of Electrical Engineering, S.Chand publications, 2nd Edition, 2003.
2) D.P.Kothari and I.J. Nagarath –"Basic Electrical & Electronics Engineering", Mc.Grawhill publications, 1st Edition, 2014.

Reference Books:

1) H.Cotton, Electrical Technology, CBS Publishers & Distributors, 7th Edition, 2004.
2) T.K.Nagasarkar, M.S.Sukhija, Basic Electrical Engineering, Oxford University press New Delhi, 2nd Edition, 2010.

PART-B (Mechanical Engineering)

Course Outcomes: After completion of the course the student will be able to

CO1: Suggest the joining process and various types of welding used in the infrastructure developments.

CO2: Judge the suitable material handling system and service for the infrastructure development.

CO3: Understand the working of IC Engines and Compressors and apply for the modern development of constructional equipment.

CO4: Construct a team to execute projects related to Refrigeration & Air Conditioning.

UNIT IV

JOINING PROCESSES - Types- Temporary and Permanent, Temporary joints-Threaded joints-Types, Terminology of screw thread, Materials, Foundation bolts-Types, Pipe joints-Types, Couplings-Types and applications.

Permanent joints- Riveted joints-Types, Materials and applications. Welded joints-Types, Welding processes-Arc welding, Gas welding, Soldering and Brazing. Under water Welding

MATERIAL HANDLING EQUIPMENT –Hoist crane, Fork lift, Bulldozer – Power shovels – Excavators (JCB) – Concrete mixer – Belt and Bucket Conveyers - Lift and Escalators in buildings, Crete pumps.

UNIT V

IC ENGINES - Description and working of I.C. Engines – 4 stroke and 2 stroke engines – Comparison and applications, S.I and C.I engine. Introduction to Diesel power plants, Types

COMPRESSORS- Reciprocating and Rotary compressors-Basic working principle and applications.**Rust**-Rust removal methods-Sand blasting.

AIR CONDITIONING & AIR HANDLING EQUIPMENT: Introduction to comfort air conditioning, Humidifiers, Dehumidifiers, Air filters, Fans and Blowers, Grills and Registers, Ducts, Supply ducts, Outlets, Return Outlets.

TEXT BOOKS

1) S.B Mathur & S.Domkundwar, Elements of Mechanical Engineering, Dhanpat Rai &Co
2) Pravin Kumar, Basic Mechanical Engineering, PERASON Delhi.

REFERENCE BOOKS

1) BasantAgrawal, C. M. Agrawal, Basic Mechanical Engineering- Wiley INDIAEdition.
2) Robert H. Todd, Dell K. Allen, Leo Alting, Manufacturing Processes Reference Guide, Industrial Press Inc.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**1**			**2**									**1**		
CO2	**1**	**3**										**2**		**2**	
CO3				**3**								**3**	**1**		
CO4		**3**		**3**									**1**		

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)
(CIVIL ENGINEERING)

L	T	P	C
0	0	3	1.5

I B.Tech I Semester (Common to CE, ME & ECE)
I B.Tech II Semester (Common toEEE,CSE, IT, CSE(DS) & CSE(AI &ML))

20AHS06 ENGINEERING CHEMISTRY LAB

Course Outcomes:After completion of practical, student will be able to

CO1: Use volumetric analysis for the estimation of metal ions, hardness of water, chlorides in water, acidity, alkalinity, dissolved oxygen in water.

CO2: Understand the importance of viscosity index, Flash point and fire point of lubricants.

CO3: Apply pH meter, conductivity meter and potentiometer to find the normality and amounts of substances in solution.

CO4: Prepare a polymer in the laboratory.

Any **TEN** of the following experiments

1. Estimation of Hardness of water by EDTA method.
2. Estimation of Chlorides in Water sample.
3. Determination of acid strength by using a pH meter (I) Strong acid VS Strong base (II) Weak acid Vs Strong base.
4. Estimation of Copper using EDTA by complexometricmethod.
5. Determination of effect of temperature on absolute and kinematic viscosity of oils through Redwood viscometer No.1.
6. Estimation of Ferrous Ion by Potentiometry using standard Potassium Dichromate in a Redox reaction.
7. Determination of rate of corrosion by weight loss method.
8. Determination of acid strength by Conductometric method – Strong acid VS Strong base.
9. Determination of Alkalinity of water sample.
10. Determination of Acidity of water sample.
11. Estimation of Dissolved Oxygen in water by Winkler's method.

12. Estimation of Ferrous Ion by Potassium Dichromate method.
13. Determination of Flash and Fire point by using Pensky Marten's apparatus.
14. Preparation of Phenol-Formaldehyde resin.
15. Determination of moisture content in a coal sample.

TEXT BOOKS:

1. Chemistry pre-lab manual by Dr K. N. Jayaveera and K.B. Chandra Sekhar, S.M. EnterprisesLtd., 2007.
2. Vogel'S text book of Quantitative Inorganic Analysis, ELBS Edition, 1994.

Equipment Required:

1. Glassware: Burettes, Pipettes, Standard Flasks, Beakers, Measuring jars, BOD bottles and Reagent bottles.
2. Analytical balance,
3. Pensky Marten's apparatus
4. Redwood viscometer,
5. Conductometer,
6. Potentiometer.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**1**	-	-	**1**	**2**	-	-	-	**1**	-	-	-
CO2	-	-	-	-	**2**	-	-	-	-	-	-	-
CO3	-	-	**1**	-	**1**	-	-	-	-	-	-	-
CO4	**1**	-	-	**1**	-	-	-	-	-	-	-	-

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

(CIVIL ENGINEERING)

L	T	P	C
0	0	3	1.5

I B.Tech I Semester(Common to CE, ME & ECE)
I B.Tech II Semester(Common toEEE,CSE, IT, CSE(DS) & CSE(AI &ML))

20AHS05 COMMUNICATIVE ENGLISH LAB

Course Outcomes: After completion of the course students will be able to

CO1: Remember and understand the different aspects of the English language proficiency with emphasis on LSRWskills

CO2: Apply communication skills through various language learningactivities

CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speakingcomprehension.

CO4: Evaluate and exhibit acceptable etiquette essential in social and professional settings

UNIT I

- Phonetics for listening comprehension of various accents
- Reading comprehension
- Describing objects/places/persons

UNIT II

- JAM
- Small talks on general topics
- Debates

UNIT III

- Situational dialogues – Greeting and Introduction
- Summarizing and Note making
- Group Discussion

UNIT IV

- Asking for Information and Giving Directions
- Information Transfer
- Non-verbal Communication – Dumb Charade

UNIT V

- Oral Presentations
- Précis Writing and Paraphrasing
- Reading Comprehension and spotting errors

PRESCRIBED SOFTWARE FOR PRACTICE:

Sky Pronunciation, Pro-power 2 & Globarena

REFERENCE BOOKS

1) Academic writing: A handbook for international students, Bailey, Stephen, Routledge, 2014.
2) Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
3) Cambridge Academic English (B2), Hewings, Martin. 2012.
4) Effective Technical Communication, Ashrif Rizvi, TataMcGrahill, 2011
5) Technical Communication by Meenakshi Raman & Sangeeta Sharma,3rd Edition, O U Press 2015

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	2	-	-	-	-	3	-	-	-	-	2
CO2	-	-	2	-	-	3	3	-	-	-	-	2
CO3	-	-	-	-	-	-	2	-	-	-	-	-
CO4	-	-	-	1	-	3	2	-	-	3	-	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

I B.Tech - I Semester (Common to All Branches)

20ACS03 C-PROGRAMMING & DATA STRUCTURES LAB

Course Outcomes: After completion of the course the students will be able to

CO1: Demonstrate basic concepts of C programming language.

CO2: Develop C programs using functions, arrays, structures and pointers.

CO3: Illustrate the concepts Stacks and Queues.

CO4: Design operations on Linked lists.

CO5: Develop searching and sorting methods.

Week l

- Programs using I/O statements andexpressions.
- Programs using decision-making constructs.

Week 2

Write C programs that use both recursive and non-recursive functions

- To find the factorial of a given integer.
- To solve Towers of Hanoi problem.

Week 3

- Write a C program to find both the largest and smallest number in a list of integers.
- Write a C program that uses functions to perform the following:
- Addition of Two Matrices
- Multiplication of Two Matrices

Week 4

Write a C program that uses functions to perform the following operations:

- To insert a sub-string in to a given main string from a given position.
- Given a string ―a$bcd./fg‖ find its reverse with out changing the position of special characters. (Example input:a@gh%;j and output:j@hg%;a)

Week 5

From a given paragraph perform the following using built-in functions:

- Find the total number ofwords.
- Capitalize the first word of each sentence.
- Replace a given word with another word.

Week 6

- Write a C Program to perform various arithmetic operations on pointer variables.
- Write a C Program to demonstrate the following parameter passing mechanisms:
    - call-by-value and call-by-reference

Week 7

Write C programs that implement stack (its operations) using

- Arrays
- Pointers

Week 8

Write C programs that implement Queue (its operations) using

- Arrays
- Pointers

Week 9

Write a C program that uses Stack operations to perform the following:

- Converting in fix expression into post fix expression
- Evaluating the post fix expression

Week 10

Write a C program that uses functions to perform the following operations on singly linked list.

- Creation
- Insertion
- Deletion
- Traversal

Week 11

Write a C program that uses functions to perform the following operations on Doubly linked list.

- Creation
- Insertion
- Deletion
- Traversal

Week 12

Write a C program that uses functions to perform the following operations on circular linked list.

- Creation
- Insertion
- Deletion
- Traversal

Week 13

Write a C program that uses functions to perform the following:

- Creating a Binary Tree ofintegers
- Traversing the above binary tree in preorder, inorder andpostorder.

Week 14

Write C programs that use both recursive and non-recursive functions to perform the following searching operations for a key value in a given list of integers:

- Linearsearch
- Binarysearch

Week 15

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

- Bubblesort
- Selectionsort
- Insertionsort

Week 16 (Case Study)

Create a-Railway reservation system with the following modules

- Booking
- Availability checking
- Cancellation
- Prepare chart

Text Books:

1) Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
2) B.A. Forouzon and R.F. Gilberg, “COMPUTER SCIENCE: A Structured Programming Approach Using C”, Third edition, CENGAGE Learning,2016.
3) Richard F. Gilberg & Behrouz A. Forouzan, “Data Structures: A Pseudocode Approach with C”, Second Edition, CENGAGE Learning,2011.

Reference Books:

1) Pradip Dey and Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition2011.
2) E.Balaguruswamy, “C and Data Structures”, 4thEdition, Tata Mc GrawHill.
3) A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press.
4) M.T.Somashekara, “Problem Solving Using C”, PHI, 2nd Edition 2009.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		2												
CO2	3	2													
CO3				3								2	3		
CO4		3		3									2		
CO5						2	3							2	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)
(CIVIL ENGINEERING)

L	T	P	C
2	0	0	0

I B.Tech I Semester(Common to CE, ME & ECE)
I B.Tech II Semester(Common toEEE,CSE, IT, CSE(DS) & CSE(AI &ML)

20AMB01 DESIGN THINKING

Course Outcomes:

After completion of the course the student will be able to

CO1: Analyze design thinking concepts and principles to perform human centered design process for creative problem solving.

CO2: Create empathy maps to visualize user attitudes and behavior for gaining insights of customers.

CO3: Develop innovative products or services for a customer base using ideation techniques.

CO4: Build prototypes for complex problems using gathered user requirements.

CO5: Apply design thinking tools techniques to produce good design and relevant products or services forspecific target market.

CO6: Improve prototype by testing it with a specific set of users for making it sustainable by following ethics.

UNIT I : INTRODUCTION TO DESIGN THINKING

Design Thinking Process:Types of the thinking process, Common methods to change the human thinking process,Design thinking: Definition, Origin of design thinking, Importance of design thinking,Design vs Design thinking, Problem solving, Understanding design thinking and its process model,Design thinking tools.

UNIT II: EMPATHIZE

Design thinking phases, How to empathize, Role of empathy in design thinking, purpose of empathy maps, Things to be done prior to empathy mapping, Activities during and after the session, Understanding empathy tools : Customer Journey Map, Personas.

UNIT III: IDEATION

Challenges in idea generation, need for systematic method to connect to user, Visualize, Empathize, and Ideate method, Importance of visualizing and empathizing before ideating,Applying the method**,**Ideation Tools: How Might We? (HMW), Story board, Brainstorming.

UNIT IV: PROTOTYPING

What is a prototype? - Prototyping as a mindset, prototype examples, prototyping for products; Why we prototype? Fidelity for prototypes, Process of prototyping- Minimum Viable prototype.

UNIT V: TESTING PROTOTYPES

Prototyping for digital products: What's unique for digital products, Preparation; Prototyping for physical products: What's unique for physical products, Preparation; Testing prototypes with users.

1) S.Salivahanan, S.Suresh Kumar, D.Praveen Sam, "Introduction to Design Thinking",Tata Mc Graw Hill, First Edition,2019.
2) Kathryn McElroy, "Prototyping for Designers: Developing the best Digital and Physical Products", O'Reilly,2017.

REFERENCE BOOKS:

1) Michael G. Luchs, Scott Swan , Abbie Griffin,"Design Thinking – New Product Essentials from PDMA", Wiley, 2015.
2) Vijay Kumar, "101 Design Methods: A Structured Approach for Driving Innovation in Your Organization", 2012.

ADDITIONAL LEARNING RESOURCES:

1) https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process
2) https://www.ibm.com/design/thinking/page/toolkit
3) https://www.interaction-design.org/literature/article/define-and-frame-your-design-challenge-by-creating-your-point-of-view-and-ask-how-might-we

4) https://hbr.org/2018/09/design-thinking-is-fundamentally-conservative-and-preserves-the-status-quo
5) https://hbr.org/2018/09/why-design-thinking-works
6) https://hbr.org/2015/09/design-thinking-comes-of-age
7) https://www.culturepartnership.eu/en/article/ten-tools-for-design-thinking

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

(CIVIL ENGINEERING)

L	T	P	C
3	0	0	3

I B.Tech I Semester(Common toEEE,CSE, IT, CSE(DS) & CSE(AI &ML))

I B.Tech II Semester(Common to CE, ME & ECE)

20AHS04 ENGINEERING PHYSICS

Course Outcomes:

After completion of the course the student will be able to

CO1: Applythe concepts optics and laser phenomena of physics to develop industrial applications.

CO2: Understand quantum mechanics and various properties of free electron.

CO3: Design and fabricate the semiconductors, superconductors and magnetic materials.

CO4: Understandthe increasing efficiency of bulk and nanomaterials, and apply it to industries.

UNIT I Optics:

Interference: Introduction - Principle of superposition - Conditions for sustained interference – interference in thin films by reflection – Newton’s Rings - Determination of wavelength of light and refractive index of liquid.

Diffraction: Introduction–Definition of Fresnel and Fraunhofer diffraction-Fraunhofer diffraction due to single slit and double slit.

UNIT II Lasers & Fiber Optics:

Lasers: Introduction - Laser Characteristics- spontaneous and stimulated emission of radiation -Einstein’s coefficients - population inversion - Ruby laser - He-Ne laser-Applications of laser.

Fiber Optics: Introduction - Principle of optical fiber - Acceptance angle and acceptance cone - Numerical aperture - Classification of Optical Fibers-Optical fiber communication system- Applications of optical fibers.

UNIT III Principle of Quantum Mechanics:

Wave and particles - de Broglie hypotheses - de Broglie’s wavelength for electron - Properties of Matter waves -Schrödinger time independent wave equation - Physical significance of wave function -Particle in one dimensional infinite potential box (qualitative only).

Crystal Physics: Single crystalline, Polycrystalline and amorphous materials -Fundamental of crystallography- Space lattice - Basis - unit cell - Lattice parameters - Crystal systems – Bravais lattice-Structure and packing fraction of Simple cubic and body centered cubic - Miller Indices- Bragg's law- X-ray diffraction by powder method.

Free Electron Theory: Electrical conductivity of Classical free electron theory and Quantum free electron theory - merits and demerits - Kronig penny model (qualitative only).

UNIT IV

Semiconductors: Introduction - Intrinsic and extrinsic Semiconductors - Fermi level- Drift and diffusion - Einstein's equation - Hall Effect – LED.

Superconductors: General properties of superconductors - Meissner effect - Penetration depth – Type I and Type II superconductors - Josephson effect - Application of superconductors.

UNIT V

Magnetism & Nanomaterials:

Magnetism: Introduction and basic definitions - Origin of magnetic moment -Classification of magnetic materials - Hysteresis curve - Hard and Soft Magnetic Materials - Applications.

Nanomaterials: Introduction - Significance of Nano scale - Types of nanomaterials -Ball milling -Chemical vapor deposition - Properties of nanomaterials, Optical and magnetic – application of nano materials.

TEXT BOOKS:

1. Engineering Physics, Thyagarajan K, Tata Mcgraw Hill Publishers,New Delhi, 2013.

2.A Text book of Engineering Physics, Avadhanuluand Kshirasagar, RevisedEdition, S.Chand,New Delhi, 2014.

3. Gaur R K and Gupta S L, Engineering Physics,DhanpatRai Publications, New Delhi, 2010.

REFERENCE BOOKS:

1. Solid State Physics, Pillai. S.O, , New Age International, New Delhi, 2005.

2.Introduction to Nanoscience and Technology, Chattapadhyay K.K, Banerjee A.N,New Delhi.

3.Engineering Physics, Vijaya kumara K, , S. Chand & Company Ltd., New Delhi .

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	3	2										
CO3	3	1		1								
CO4	2	-		1								1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	1	0	3

I B.Tech - II Semester (Common to All Branches)

20AHS08 ALGEBRA AND TRANSFORMATION TECHNIQUES

Course Outcomes: After completion of the course the student will be able to

CO1: Solving system of linear equations and determine the eigen values and eigen vectors.

CO2: Apply the knowledge of Laplace and Fourier transform Techniniques in solving differential equations.

CO3: Obtain the Fourier series expansions for given functions.

CO4: Analyze the principles of Z-transforms for solving the difference equation.

UNIT-I

MATRICES:Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous linear equations. Eigen values and Eigen vectors. Cayley-Hamilton theorem (without proof)–Finding inverse and power of a matrix by Cayley-Hamilton theorem. Diagonalization of a matrix.

UNIT-II

LAPLACE TRANSFORMS: Laplace transforms of standard functions - First Shifting Theorem -Transforms of derivatives and integrals- Unit step Function – Second Shifting Theorem –Laplace transforms of Periodic functions – Inverse Laplace transforms - Convolution theorem. Applications of Laplace Transforms to ODE

UNIT-III

FOURIER SERIES: Determination of Fourier coefficients- Fourier series- Even and odd functions-Fourier series in an arbitrary interval -Half-range Fourier sine and cosine expansions.

UNIT-IV

FOURIER TRANSFORMS:Fourier integral theorem (only statement) - Fourier sine and cosine integrals. Fourier Transforms - Fourier sine and cosine Transforms – properties – Inverse transforms – Infinite Fourier transforms.

UNIT-V

.**Z-TRANSFORMS:** Standard functions**-** Properties - Damping rule- Shifting rule - Initial and final value theorems. Inverse Z- transforms - Convolution theorem - Solution of difference equations by Z- transforms.

TEXT BOOKS:

1) Higher Engineering Mathematics, Dr. B. S. Grewal, 44/e Kanna Publications, 2017.
2) A Text book of Engineering Mathematics –II, T. K. V. Iyengar, B. Krishna Gandhi and others, S. Chand and company. 8^{th} Revised edition, 2013.

REFERENCE BOOKS:

1) A Text Book of Engineering Mathematics-I, B.V. Ramana, , Tata Mc Grawhill
2) Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons-2016.
3) Introductory Methods of Numerical Analysis S.S. Sastry, Printice Hall of India publications, 2012.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1									1
CO2	3	2	2	2								1
CO3	3	2	2									1
CO4	3	2	1									1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	1	0	3

I B.Tech - II Semester

20ACE01 ENGINEERING MECHANICS

Course Outcomes: After Completion of the course the student will be able to

CO1: Construct free body diagrams and develop appropriate equilibrium equations.

CO2: Apply the concepts of friction and to apply in real life problems.

CO3: Analyze the centroid and Moment of Inertia for composite sections.

CO4: Analyze the dynamic analysis of rigid body motion

CO5: Acquire and apply the work and energy relations.

UNIT I

Force Systems and Equilibrium: Types of force systems – Resultant of coplanar, concurrent and non concurrent force systems –Free body diagram- Concept of moment – Varignon's theorem - Equilibrium of coplanar force systems – Lami's Theorem – Typesof supports, Reactions and Loads – Reaction calculation for Simple Beams

UNIT II

Centroid: Introduction to centre of gravity and centroid– Centroids of simple figures – Centroids of composite figures- Theorems of Pappus and Guldinus

Moment of Inertia: Definition – Parallel axis and perpendicular theorems - Polar Moment of Inertia-Radius of gyration - Moments of Inertia of Basic Shapes, Composite Sections (Simple problems only)

UNIT III

Kinematics: Introduction to Dynamics - Rectilinear and Curvilinear motion – Displacement, Velocity and Acceleration – Motion of a Rigid Body – Types of their Analysis in Planar Motion

Kinetics: Bodies in rectilinear translation – Curvilinear translation - D'Alembert's Principle - Principle of Work and Energy – Principle of Impulse and Momentum- (Simple Problems only)

UNIT IV

Analysis of Simple Pin Jointed Frames: Definition – Perfect, Deficient and Redundant frames – Analysis of simple trusses by method of joints and method of sections.

UNIT V

Simple Stress and Strains: Elasticity – Stress – Strain – Types of stresses and strains – Elastic limit – Hooke's law – Young's Modulus – Lateral Strain, Poisson's ratio and Volumetric Strain – Relationship between Elastic constants, Deformation of bodies – Principle of superposition – Stresses in bars of varying section – Stresses in composite bars.

TEXT BOOKS:

1) Engineering Mechanics 2nd Edition, Bhavikatti and Rajasekharappa, New Age Intl. Publications, NewDelhi, 2016.
2) A text book of Engineering Mechanics 6th Edition, R.K. Bansal, Laxmi Publications, NewDelhi, 2017
3) Engineering Mechanics (Statics and Dynamics) 4th Edition, A Nelson-Tata McGraw Hill Education Private Limited, NewDelhi, 2014

REFERENCE BOOKS:

1) Engineering Mechanics, Strength of Materials and Elements of Structural Analysis 1st Edition,
2) C.Venkatramaiah & A.V.Narasimha Rao- CBS Publishers & Distributors, NewDelhi. 2018
3) Engineering Mechanics by Timoshenko &Young
4) A Text Book of Engineering Mechanics by R.S.Khurmi- S.Chand & Company Limited, NewDelhi.
5) Engineering Mechanics by Irving H. Shames – Prentice – Hall, NewDelhi.
6) Engineering Mechanics by Ferdinand L. Singer Published by Row Publishers, NewYork.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**1**		**3**	**2**									**1**		
CO2	**1**	**3**												**2**	
CO3				**3**	**1**								**1**		
CO4		**3**		**3**									**1**		
CO5					**1**	**2**	**3**							**3**	

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)
CIVIL ENGINEERING

L	T	P	C
3	1	0	3

I B.Tech - II Semester (Common to All Branches)

20ACS04 PROBLEM SOLVING AND PROGRAMMING USING PYTHON

Course Outcomes: After Completion of the course the student will be able to

CO1: Demonstrate knowledge in Basics of python programming

CO2: Use the data structure lists, Dictionaries and Tuples.

CO3: Solve the problems by applying the modularity principle.

CO4: Demonstrate knowledge in OOP.

CO5: Demonstrate various mathematical operations using NumPy, Analyze Data using Pandas and visualizations using Matplot lib.

UNIT- I

INTRODUCTION TO PROBLEM SOLVING, EXPRESSION AND DATA TYPES

Fundamentals: what is computer science - Computer Algorithms - Computer Hardware - Computer software - Computational problem solving the Python programming language - Overview of Python, Environmental Setup, First program in Python, Python I/O Statement. **Expressions and Data Types:** Literals, Identifiers and Variables, Operators, Expressions. Data types, Numbers, Type Conversion, Random Number.

Problem solving: Restaurant Tab calculation and Age in seconds.

UNIT- II

CONTROL STRUCTURES& COLLECTIONS

Control Structures: Boolean expressions, Selection control and Iterative control. **Arrays -** Creation, Behavior of Arrays, Operations on Arrays, Built-In Methods of Arrays.**List** –Creation, Behavior of Lists, Operations on Lists, Built-In Methods of Lists. **Tuple** -Creation, Behavior of Tuples, Operations on Tuples, Built-In Methods of Tuples. **Dictionary** – Creation, Behavior of Dictionary, Operations on Dictionary, Built-In Methods of Dictionary. **Sets** – Creation, Behavior of Sets, Operations on Sets, Built-In Methods of Sets, Frozen set.

Problem Solving: A Food Co-op’s Worker Scheduling Simulation.

UNIT- III

STRINGS, FUNCTIONS AND FILES

Strings - String Literal, Assigning String to a variable, Multiline Strings, String Slicing, Built-in Functions and Methods. **Functions** – Creating functions, calling a function, passing arguments to functions, function with return statement, Recursive function, Lambda Function**. Files** – File Handling, Create, Write, Read and Delete Files

UNIT-IV

OBJECT ORIENTED PROGRAMMINGAND EXCEPTIONS

OOP - Classes and Objects, Encapsulation, Inheritance, Polymorphism, Constructor and Destructor, Self parameter, Local and Global Scope, Access Modifiers, Polymorphism, super() method. Modules in python. **Exceptions** – Handling Exceptions, Raising Exceptions, Exception Chaining, User Defined Exceptions.

Problem solving: Credit card calculation.

UNIT- V

INTRODUCTION TO NUMPY, PANDAS, MATPLOTLIB: Exploratory Data Analysis (EDA), Data Science life cycle, Descriptive Statistics, Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA. Data Visualization: Scatter plot, bar chart, histogram, boxplot, heat maps, etc.

Text Books:

1. Introduction to Computer Science using Python: A Computational Problem-Solving Focus, First Edition,Charles Dierbach, Wiley India , 2012.
2. Programming Python,Mark Lutz, O'Reilly Publications, Fourth Edition, 2011.

Reference Books:

1. Core Python Programming, 2 nd edition,R. Nageswara Rao, Dreamtech Press, 2018.
2. Fundamentals of Python,, Third Edition,Kenneth Lambert and B.L. Juneja,Cengage Learning, 2012.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**3**							**1**		**2**		**1**	
CO2	**2**	**2**												**2**
CO3	**2**	**2**											**1**	
CO4	**3**	**3**		**2**							**2**			**1**
CO5	**3**	**3**		**2**							**2**			**2**

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(CIVIL ENGINEERING)

L	T	P	C
1	0	4	3

I B.Tech I Semester(Common toEEE,CSE, IT, CSE(DS) & CSE(AI &ML))
I B.Tech II Semester(Common to CE, ME & ECE)
20AME01 COMPUTER AIDED ENGINEERING DRAWING

Course Outcomes:

1. After completion of this course, the student will be able to
2. Communicate his/her ideas effectively by using AutoCAD software.
3. Project the points, lines, planes, solids with digital environment
4. Represent sectional views of solids and develop the sectioned objectsurfaces.
5. Communicate his / her ideas effectively by using Orthographic Projections and Isometric Views using computer software.

Theory:

UNIT I

Geometrical constructions – construction of polygons (inscribing, circumscribing), special methods– circle-tangents, Conics-ellipse, parabola, hyperbola -properties of conics, special methods of construction.

UNIT II

Projections of points – Projections of straight lines- lines inclined to both the principal planes, determination of true length, traces and true inclinations.

UNIT III

Projections of planes – inclined to both the principal planes.Projection of regular solids – prisms, Pyramids, cylinders, tetrahedron and cones – axis inclined to one plane.

UNIT IV

Sections of solids such as prisms, pyramids, cylinders, tetrahedron and cones (solids in simple position) – True shape of the section.Development of surfaces of simple solids, as above and part solids.

UNIT V

Principles of isometric projection – isometric scale – isometric projection of planes and solids– conversion of orthographic views into isometric views and vice- versa.

Practice:

1. **Geometrical constructions:**
   - Sketching of polygons - Triangles, Square, Rectangle, Pentagon, Hexagon, Circle at different positions.
   - Sketching of Tangents to thecircles.

2. **Conics:**

   Constructions of Ellipse, Parabola, Hyperbola

3. **Points:**

   Drawing the quadrants and positioning of the points with reference to H.P and V.P with dimensions.

4. **Lines:**

   Sketching of lines when theyare

   - Parallel to both H.P &V.P
   - Parallel to V.P/H.P and perpendicular to H.P/V.P
   - Parallel to V.P/H.P and inclined to H.P/V.P
   - Inclined to both theplanes
   - Sketching of the line to measure true length & true inclinations
   - Sketching of the line to determine the traces

5. **Planes:**

   Sketching of the planes when they are

   - Perpendicular to V.P/H.P and parallel to H.P/V.P
   - Inclined to V.P/H.P and perpendicular to H.P/V.P
   - Perpendicular to both V.P andH.P.
   - Inclined to both V.P andH.P.

6. Solids:

- Sketching of 2D shapes and convert it to 3D solids (Prisms, Pyramids, cube, cylinder, one, tetrahedron)
- Sketching of projections of solids when the position of axis is
- Perpendicular to V.P/H.P and parallel to H.P/V.P.
- Inclined to V.P/H.P and parallel to H.P/V.P.
- Parallel to both V.P and H.P.

7. Sections of solids:

- Different types of hatching on thepolygons.
- Sketching of sections of solids when the section/cutting plane is
- Parallel to V.P/H.P and perpendicular to H.P/V.P.
- Inclined to V.P/H.P and perpendicular to H.P/V.P.
- Perpendicular to both principalplanes.
- Sketching of sections when the cutting plane passing through different positions- base, axis, corner, apex/vertex, generator, lateral edge.
- Sketching of true shapes.

8. Development of surfaces:

- Sketching of developed surfaces of
- cylinder, prisms using parallel line method
- cone, pyramids using radial line method
- truncated solids and frustum

9. Orthographic Projections:

- Sketching of 2D views of front, top and side views of 3D objects.

10. Isometric projections:

- Setting of isometric grid

- Sketching of isometric views of 3D models /shapes.

Text Books

1. K. L. Narayana and S. Bheemanjaneyulu, Engineering Drawing with AutoCAD 2016, New Age Publishers, New Delhi,2017.
2. Basant Agrawal and C.M.Agrawal, Engineering Drawing, Mc Graw Hill Education 2ndedition.

Reference Books:

1. K.Venugopal, Engineering Drawing and Graphics + AutoCad , New Age International (P) Ltd,Publishers, New Delhi, Fourth Edition
2. Siddiquee Arshad. N., Zahid A. Khan, Mukhtar Ahmad, Engineering Drawing: With primer on AUTOCAD, PHI Learning Pvt.Ltd.,

Internal examination : (Max 40 Marks) Average day-to-day evaluation = 20 marks Internal Test = 20 marks

Internal Test Question paper pattern (Max 20 Marks)

Paper setting: Answer any two out of three questions. Prepare sketches to scale in the sketch book and later on execute in the computer using AutoCAD. 10 marks for work in the sketch book and 10 marks for computer work.

1. First question from unit I or Unit II, Second question from Unit III or Unit IV, Third question from Unit V.
2. Internal exam duration 2 Hours.

External /Final examination Question paper pattern **(Max 60 Marks)**

(Internal Evaluation & Paper setting)

Paper setting:

1. Answer any three out of five questions. Prepare sketches to scale in the sketch book and later on execute in the computer using AutoCAD. 30 marks for work in the sketch book and 30 marks for computer work.
2. Five questions with one question from each unit.

3. Final exam duration 3 Hours

Internal examination : (Max 40 Marks)

Average day-to-day evaluation = 20 marks

Internal Test = 20 marks

Internal Test Question paper pattern (Max 20 Marks)

Paper setting: Answer any two out of three questions. Prepare sketches to scale in the sketch book and later on

execute in the computer using AutoCAD. 10 marks for work in the sketch book and 10 marks for computer work.

1. First question from unit I or Unit II, Second question from Unit III or Unit IV, Third question from Unit V.
2. Internal exam duration 2 Hours.

External /Final examination Question paper pattern **(Max 60 Marks)**

(Internal Evaluation & Paper setting)

Paper setting:

1. Answer any three out of five questions. Prepare sketches to scale in the sketch book and later on execute inthe computer using Auto CAD. 30 marks for work in the sketch book and 30 marks for computer work.
2. Five questions with one question from each unit.
3. Final exam duration 3 Hours

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1		1		2					2		2	2	2	2
2	1		2		2							2	2	2	2
3	1		2		2							2	2	2	2
4	1	2	2		3	2	2	1	2			3	2	2	2

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L	T	P	C
0	0	3	1.5

I B.Tech I Semester(Common toEEE,CSE, IT, CSE(DS) & CSE(AI &ML))
I B.Tech II Semester(Common to CE, ME & ECE)

20AHS07 ENGINEERING PHYSICS LAB

Course Outcomes:

After completion of practical, student will be able to

CO1: Recognize the Importance of optical phenomenon like Interference and diffraction of light.

CO2: Gain the practical knowledge of optical fiber, semiconductor, magnetic materials, lasers and their relative parameters.

CO3: Recognize the importance of optical fibers in the field of communication.

A minimum of 10 experiments to be conducted during the academic year

- Determine the wavelengths of given light source - Spectrometer.
- Dispersive power of prism
- Determine the thickness of thin wire by Interference.
- Determine the wavelength of given laser source - Diffraction grating.
- Determine the radius of curvature of given piano convex lens by forming Newton Rings.
- Magnetic field along the axis of a current carrying coll - Stewart and Gee's method.
- Numerical Aperture of an optical fiber.
- Bending losses In Optical Fiber.
- Determine the wavelength of Laser source using optical fiber.
- Determine Hall Coefficient and Carrier concentration of the given Semi conductor.
- Determine the energy loss of ferromagnetic sample by plotting B-H curve
- Energy gap of a given semi conductor,
- Solar Cell: To study the V-I Characteristics of solar cell.

- Determine the particle size using laser source.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	1	1								
CO2	2		3									1
CO3	2		1									1

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
(CIVIL ENGINEERING)

L	T	P	C
0	0	3	1.5

I B.Tech I Semester (Common to EEE, CSE, IT, CSE (DS) & CSE (AI &ML))
I B.Tech II Semester(Common to CE, ME & ECE)

20AME02 ENGINEERING PRACTICE LAB

Course Outcomes:
After completion of the study of this lab a student will be able to:

1. Perform a different prototype models in the carpentry trade such as Mortise and tenon joint, and Table stand using wood turning lathe.
2. Prepare models such as Dove tail joint and Half Round joint using Fitting tools and rectangular tray, and funnel prototypes in the trade of Tinsmithy.
3. Perform various basic House Wiring techniques such Staircase wiring (i.e. control of one lamp by two switches fixed at two different places), and wiring for tube light (Fluorescent Lamp) / Focus light.
4. Fabricate different models in a foundry shop such as single and two pieces patterns and prototypes in the trade of Welding such asT-Joint and H-Joint.

1. TRADES FOR EXERCISES:

a. Carpentry shop.

1. Prepare a Mortise and tenon joint from a given 300 x 40 x 25 mm soft wood stock.
2. Prepare a Table stand (desired shape) by using wood turning Lathe from a given 300 x 40 x 25 mm soft wood stock.

b. Fitting shop

1. Prepare a Dove tail joint from a given 100 x 50 x 5 mm M.S.stock.
2. Prepare a Half Round joint from a given100 x 50 x 5 mm M.S.stock.

c. Sheet metal shop

1. Prepare a Funnel from given G.I.sheet.
2. Prepare a Rectangular Tray from given G.I.sheet.

d. House-wiring

1. Stair case wiring (i.e. control of one lamp by two switches fixed at two different places).
2. Prepare a wiring for tube light (“Fluorescent Lamp”) / Focus light

e. Foundry

1. Prepare a mould for a single piece pattern (Connecting rod)
2. Prepare a mould for a Double piece pattern (Stepped Pulley)

f. Welding

1. Prepare a T-Joint from given M.S Flat plates using Arc Welding.
2. Prepare a H-Joint from given M.S Flat plates using Arc Welding.

2. TRADES FOR DEMONSTRATION:

1. Plumbing
2. Machine Shop
3. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

Text Books:

1. Work shop Manual, P.Kannaiah and K.L.Narayana, SciTech Publishers.

2. Engineering Practices Lab Manual, Jeyapoovan and Saravana Pandian, 4/e Vikas.

Reference Books:

1. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

2. Engineering Workshop by Vishnu Universal Learning.

3. Engineering Workshop by GRIE institute.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	3							1		3
CO2	2	1									
CO3	2										2
CO4	2	2									

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0	0	3	1.5

I B.Tech II Semester

20ACS05 PROBLEM SOLVING AND PROGRAMMING USING PYTHON LAB

Course Outcomes: After Completion of the course the student will be able to

1. Write, Test and Debug Python Programs
2. Implement Conditionals and Loops for Python Programs
3. Use functions and represent Compound data using Lists, Tuples and Dictionaries
4. Read and write data from & to files in Python

WEEK 1

a. Write a python script to display a simple message

b. Write a python script to perform basic arithmetic operations on two values which are accepted
from the user.

WEEK 2

a. Write a python script to calculate the factorial of a given number.

b. Write a python script to calculate sum of individual digits of a given number.

c. Write a Python program that prompts the user for two floating-point values and displays the result of the first number divided by the second with exactly six decimal places displayed.

WEEK 3

a. Write a python script to find the largest number among three numbers and display them in ascending order using if-else construct.

b. Write a python script to display Fibonacci sequence of numbers using while loop, for loop and do-while loop constructs.

c. Write a python script to display the prime number series up to the given N Value.’

WEEK 4

a. Write a Python program

i. To calculate sum all the items in a list.

ii . To remove duplicates from a list.

iii. To find the list of words that are longer than n from a given list of words.

iv. To get the difference between the two lists.

v. To append a list to the second list.

b.Write a Python program to print a specified list after removing the 0^{th}, 4^{th} and 5^{th} elements.

Sample List : ['Red', 'Green', 'White', 'Black', 'Pink', 'Yellow']

Expected Output : ['Green', 'White', 'Black']

c.Write a python script to arrange the given list of elements in ascending or descending order.

WEEK 5

a. To write a python program to create, slice, change, delete and index elements using Tuple.

b. Write a Python program to replace last value of tuples in a list.

Sample list: [(10, 20, 40), (40, 50, 60), (70, 80, 90)]

Expected Output: [(10, 20, 100), (40, 50, 100), (70, 80, 100)]

WEEK 6

a. Write a program to demonstrate working with dictionaries in Python

WEEK 7

a. Write a Python program

i. To create a set.

ii. To remove item(s) from a set.

iii. To remove an item from a set if it is present in the set.

iv. To create a union and intersection of sets.

v. To create set difference.

WEEK 8

a. Write a python script to demonstrate string methods.

b. Write a Python program to count the number of characters (character frequency) in a string.

Sample String: google.com'

Expected Result : {'g': 2, 'o': 3, 'l': 1, 'e': 1, '.': 1, 'c': 1, 'm': 1}

c. Write a Python program to reverse a string.

Sample String : "1234abcd"

Expected Output : "dcba4321"

d. Write a Python script that takes input from the user and displays that input back in upper and lower cases.

e. Write a Python script to get a string made of 4 copies of the last two characters of a specified string (length must be at least 2).

Sample Input /Output

Input: Python – Output: onononon

Input: Exercises – Output: eseseses

f. Write a Python function that checks whether a passed string is palindrome or not.

WEEK 9

a. Write a python script to find GCD of two numbers using recursive and non recursive functions.

b. Write a python script to convert the following using functions:

1. Fahrenheit to Celsius temperature.
2. Celsius to Fahrenheit temperature.

WEEK 10

a. Write a python script to demonstrate the Exception Handling.

WEEK 11

a. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order

b. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be the input that to be written to the second file.

WEEK 12

a. Write a program to demonstrate a) arrays b) array indexing such as slicing, integer array indexing and Boolean array indexing along with their basic operations in NumPy.

b. Write a program to compute summary statistics such as mean, median, mode, standard deviation and variance of the given different types ofdata.

WEEK 13

a. Write a python script to implement inheritance.

b. Write a python script to implement constructor.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3							2		3		1	
CO2	2	2												2
CO3	2	2											2	
CO4	2	2												2

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2	0	0	0

I B.Tech I Semester(Common toEEE,CSE, IT, CSE(DS) & CSE(AI &ML))

I B.Tech II Semester(Common to CE, ME & ECE)

20AHS09 ENVIRONMENTAL SCIENCES

Course Outcomes:

After completion of practical, student will be able to

1. Understand what constitutes the environment, how to conserve the precious resources and maintain the ecological balance.
2. Aware of maintain the ecological balance based on the cultural and biological diversity can realize the importance of ecosystem, biodiversity and its conservation.
3. Identify the major pollutants and abatement devices in order to protect the environment from pollution for effective environmental management.
4. Manage social issues related to the environment and be aware of the enforcement of environment acts in our constitution.

UNIT I

ECO SYSTEMS AND BIODIVERSITY AND ITS CONSERVATION:

Definition, scope and importance, Need for public awareness. Concept of an ecosystem - Structure and function of an ecosystem.-Producers, consumers, decomposers - Energyflow in theeco systems - Ecological succession - Food chains, foodwebs and ecological pyramids -Introduction, types, characteristic features, structure and function of the following eco systems: -Forest ecosystem -Grass land ecosystem -Desert ecosystem - Aquatic eco systems(lakes, rivers, oceans) –Introduction-Definition: genetics, species and ecosystem diversity – Biogeographical classification ofIndia. - Value of biodiversity: consumptive use, productive use,social, ethical, aesthetic and option values - Indiaas a mega diversitynation - Hot-spots of biodiversity. - Threats to biodiversity: habitats loss, poaching of wild life, man wildlife conflicts- Endangered and endemic species of India- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT II

NATURAL RESOURCES:

a)Forest resources- Use and over-exploitation – deforestation -case studies -Timber extraction – mining- dams and their effects on forests and tribal people. – Water resources – Use and over-utilization of surface and ground water - floods, drought –conflicts over water -dam's benefits and problems. - Mineral Resources –Use and exploitation – environmental effects of extracting and using mineral resources - casestudies - Food Resources - World food problems – effects of modern agriculture - fertilizers-pesticides problems -Energy Resources - Growing energy needs- renewable and non- renewable energy sources, use of alternate energy sources -case studies.

b) Role of an individual in conservation of natural resources.

c) Equitable use of resources for sustainable life styles.

UNIT III

ENVIRONMENTAL POLLUTION: •

Definition Causes, effects and control measures of: - a. Air pollution - b. Water pollution - c. Soil pollution - d. Marine pollution - e. Noisepollution - f. Thermal pollution g. Nuclear hazards - Solid waste Management: - Causes, effects and control measures of urbanand industrial wastes - Role of an individual in prevention of pollution - Pollution casestudies - Disaster management: Floods, earth quake, cyclone and landslides.

UNIT IV

SOCIAL ISSUES AND THE ENVIRONMENT:

Form unsustainable to sustainable development - Urban problems related to energy -Water conservation, rainwater harvesting, water shed management - Resettlement and rehabilitation of people; its problems and concerns, case studies - Environmental ethics: issues and possible solutions - Climate change,global warming,acid rain, ozone layer depletion, nuclear accidents and holocaust,case studies –Waste land reclamation - Consumerism and waste products - Environment protectionAct – Air (prevention and control of pollution)Act -Water (prevention and control of pollution) Act –Wild life protection act - Forest conservation act -Issues involved in enforcement of environmental legislations -Public awareness. Visit to a local area to document environment assets river / forest / grassland / hill / mountain.

UNIT V

HUMAN POPULATION AND THE ENVIRONMENT

Population growth and variation amongnations – Population explosion-family welfare program - Environment and human health -Human rights -Value education - HIV /AIDS - Women and child welfare - Role ofinformation technologyin environment and human health -Casestudies. Visit to a local polluted site- urban / rural / industrial / agricultural. Study of common plants, insects,birds.Study of simple ecosystems -pond, river, hill slopes, etc

Text Books:

1) Textbook of Environmental studies, Erach Bharucha, , UGC.
2) Fundamental concepts in Environmental Studies, D D Mishra, , S Chand & Co Ltd

References Books:

1) Environmental Science G. Tyler Miller and Scottt Spoolman, , Cengage Learning Publishers, 15lh Edition, 2015.
2) Environmental Encyclopedia Cunningham, W. P, Cooper T.H, Gorhani, , Jaico publications, Mumbai, 2001.
3) Environmental Chemistry ,B.K.Sharma, Krishna Prakashan Media (p) Ltd, 2011.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1					1				2	2		3
CO2		1		2	3		2		2	2		3
CO3		1		2	3				2			3
CO4	1						2		2			3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

(Common to All Branches)

L	T	P	C
3	0	0	3

II B.Tech - I Semester

20AHS10 NUMERICAL METHODS

Course Outcomes:

At the end of the course, students should be able to:

CO1: Analyze the transcendental equations and solve them using different methods.

CO2: Apply numerical techniques to solve engineering problems.

CO3: Analyze the data using Correlation and regression to draw the valid conclusion.

CO4: Apply the solutions of ordinary differential equations and partial differential equations to real world problems.

UNIT-I

SOLUTION OF TRANSCENDENTAL EQUATIONS AND INTERPOLATION:

Introduction - Intermediate value theorem - The Bisection method - The method of false position - Newton - Raphson Method - Problems.

INTERPOLATION: Forward Differences - backward differences-Newton's forward and backward differences formulae for interpolation –Problems on Interpolation - Lagrange's interpolation formula - Inverse interpolation - Problems.

UNIT-II

NUMERICAL DIFFERENTIATION AND INTEGRATION

Approximation of derivatives using interpolation polynomials-First and Second order derivatives – Problems on numerical differentiation. Newton Cotes formulae - Numerical integration using Trapezoidal rule, Simpson's $\frac{1}{3}$ rule and Simpson's $\frac{3}{8}$Rule.

UNIT-III

CURVE FITTING Fitting of Curves by method of Least - squares – Fitting of Straight lines – Fitting of second degree Parabola-Fitting of the exponential curve- Fitting of the power curve – Problems –Regression- Correlation – Problems on interpretation of data – Drawing conclusions.

UNIT-IV

NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS

Taylor's series - Picard's method of successive Approximations - Euler's and Modified Euler's Method - Problems on single step methods - Runge - Kutta Methods – Predictor - corrector method - Milne's method.

UNIT-V

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions - Method of separation of variables - Solution of one dimensional wave equation, heat equation and two – dimensional Laplace's equation.

Text Books:

1. Dr.B.S.GREWAL, Higher Engineering Mathematics. Khanna publication Publications, 42th edition.
2. B.V.Ramana, A Text Book of Engineering Mathematics-I, TATA MC GRAWHILL
3. Jain.M.K, Iyengart.K.V,.Jain.R.K. Numerical Methods For Scientific And Engineering Computation. Newage International Publishers.(Text book)

References Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics. JOHN WILEY & SONS-2016.
2. N.Bail, M.Goyal&C.Walking, A Text Book Of Advanced Engineering Mathematics- A Computer Approach.
3. S.S. Sastry, Introductory Methods of Numerical Analysis, Printice Hall of India publications, 2012.

CO-PO's Mapping:

CO/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	1	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

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II B.Tech - I Semester

20ACE18 STRENGTH OF MATERIALS

Course Outcomes:

At the end of the course, students should be able to

CO1: Apply engineering basics and mathematics shear force and bending moment diagrams can be drawn.

CO2: Apply engineering basics and mathematics and shear stress distribution can be drawn.

CO3: Classify the beams with different types of loading and by using engineering basics and mathematics slope and deflection amount can be calculated.

CO4: Apply engineering basics and mathematics to draw Mohr's stress circle the types of cylinders can be classified.

CO5: Apply engineering basics todraw SFD and BMD for propped cantilevers.

UNIT -I

SHEAR FORCE AND BENDING MOMENTS: –Introduction- SFD and BMD for statically determinate beams subjected to various loads.

UNIT-II

THEORY OF SIMPLE BENDING: Derivation of bending equation (M/I = f/y = E/R) – Determination bending stresses-Section modulus calculation for various shape of sections.

SHEAR STRESS DISTRIBUTION: Derivation of formula – Shear stress distribution in various shapes of sections.

UNIT-III

DEFLECTIONS OF BEAMS: Slope, deflection calculation of statically determinate beams subjected to various loads- Double integration, Macaulay's and Moment area method

COLUMNS AND STRUTS: Introduction -Euler's formulae for long columns with different end conditions – Rankine's and I.S. Code formulae- Combined direct and bending stresses – Eccentric loading.

UNIT-IV

PRINCIPAL STRESSES AND STRAINS: Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses.

THEORIES OF FAILURES: Study of various theories of failures.

THIN CYLINDERS & THICK CYLINDERS: Derivation of formula for longitudinal and circumferential stresses - volumetric strains - Introduction Lame's theory for thick cylinders - design of thick cylinders – compound cylinders

UNIT-V

TORSION OF CIRCULAR SHAFTS: Derivation of Torsion equation – Power transmitted by shafts – Combined bending and torsion and– Design of shafts according to theories of failure.

SPRINGS: Introduction –springs in series and parallel- Deflection calculation.

PROPPED CANTILEVERS: Analysis of propped cantilevers subjected to different loads– Shear force and bending moment diagrams.

Text Books:

1.B.C. Punmia, Ashok Kumar Jain &Arun Kumar Jain, Theory of structures, twelfth edition,2005 Laxmi Publications (P) Ltd., New Delhi

2. S.S. Bhavikatti, Strength of Materials, Third edition 2009, Vikas publishers, New Delhi.

3. A.R.Basu, Strength of Materials, Dhanpat Rai & Co., Nai Sarah, New Delhi.

Reference Books:

1. Subramaniyan, Strength of Materials, Second Edition 2010, Oxford University Press, New Delhi.

2. C.Venkatramaiah&A.V.Narasimha Rao., "Engineering Mechanics, Strength of Materials and Elements of Structural Analysis, CBS Publishers., New Delhi, 2012.

3. S.B.Junnarkar&Adavi, Mechanics of structures –1, Charotor Publications House, Anand, Gujrat, 2000 4. R.K.Bansal, A Text book of Strength of materials, Fourth edition 2010 Laxmi Publications (P) Ltd., New Delhi.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

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II B.Tech - I Semester

20ACE04 BUILDING MATERIALS AND CONSTRUCTION TECHNOLOGY

Course Outcomes:

At the end of the course, students should be able to

CO 1: Discuss the physical and mechanical properties of a variety of construction materials.

CO 2: Explain the functional components of a building and to develop fundamental knowledge in the fresh and hardened properties of concrete

CO 3: To impart the knowledge on the behavior of concrete with response to stresses developed.

CO 4: To impart the knowledge on the special concretes and design a concrete mix which fulfils the required properties for fresh and hardened concrete

UNIT I

INTRODUCTION TO BUILDING MATERIALS: Physical and mechanical properties, parameters to define strength, durability and performance for the following materials.

STRUCTURAL CLAY PRODUCTS: Bricks, Concrete blocks, manufacturing process of bricks.

NATURAL STONE: Types, qualities of good stone for construction.

LIME, CEMENT, ADMIXTURES: Properties and uses, Types, field test and manufacturing process.

OTHER BUILDING MATERIALS: Iron and Steel, Paints and enamels, Glass, water proofing material

TIMBER: Natural timber, properties, Timber products. Plywood, veneers, laminates

DOORS AND WINDOWS: Definition of technical terms, Location of doors and windows, Types of Doors, Types of windows. Sound and fire resistant doors. Specifications for the provision of windows**.**

UNIT II

MASONRY: Definition of terms used in Masonry, Classification of Masonry, Bonds in Brick work, Reinforced Brick Masonry, Joints in stone masonry, Introduction to load bearing, cavity and partition walls.

ROOFS AND FLOORS: Types of Roofs & Roofing materials, Types of flooring, Factors affecting selection of flooring materials, Flat roof (RCC), Types of pitched roofs. Cantering and shuttering, Scaffolding, Underpinning.

PLASTERING AND PAINTING: Plastering, Purpose, Materials, Types and Methods of plastering, Paints: Constituents, types, Purpose, defects.

DAMP PROOFING, WATER PROOFING AND ANTITERMITE TREATMENT: Definition of technical terms, Defects, causes and sources of dampness, damp proofing and terrace water proofing methods, Pre and post constructional anti termite treatment.

UNIT III

Cement-chemical composition-hydration process-Bogue's compound-Tests on properties of cement-Types of cement - I.S. Specifications. Aggregates- classification of aggregate – tests on properties of aggregates - characteristics of aggregate - I.S. Specifications. Water-quality of water - characteristics of water - I.S. Specifications. Admixtures – classification of chemical admixtures – properties and limitations – classification of mineral admixtures – properties and limitations - I.S. Specifications.

UNIT IV

Fresh concrete: Mixing of concrete-workability-factors influencing workability measurement of workability for conventional concrete (Slump Cone, Compaction Factor and Vee-Bee test) & SCC (V-Funnel, L-Box, U- Box, Slump Flow and J–Ring). Hardened concrete: Water/Cement Ratio(Abram's Law)-Gel Space Ratio-tests on hardened concrete -Destructive Tests (Compression, Split Tensile and Flexural)-Semi Destructive Tests (Core Cutter and Pull out test) and Non Destructive Tests (Rebound Hammer-UPV - Radiological methods).

UNIT V

Concrete Mix Design and Special Concretes

IS Code Methods- IS 456 provisions on Durability-Quality Control, Applications of : Light Weight Concretes - Cellular Concrete - No Fines Concrete-High Density Concrete – Fiber Reinforced Concrete-Polymer Concrete-Self Compacting Concrete .

Text Books:

1) A. M. Neville,“Properties of Concrete”, Pearson Publication – 4th Edition

2) M.S. Shetty, A. K. Jain, “Concrete Technology Theory and Practice”, S. Chand and Company Limited, New Delhi.

3) A Text Book Building Materials, by P.G. Varghese, Prentice-Hall of India Pvt. Ltd., Publication. 2nd Edition,.2015

4) Building Construction, Sushil Kumar, Standard Publication and Distributors, New Delhi, 19th Edition, 2001.

References:

1) Advances in Building Materials and Construction by Mohan Rai and M.P. Jain Singh – publication by CBRI, Roorkee.
2) Building Materials (3rd revised edition), S.K. Duggal, New Age International publishers, India.
3) Building Construction, by Dr. B. C. Punmia, Ashok Kr. Jain, Arun Kr. Jain,Laxmi Publications Pvt Ltd.

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	--	3	--	--	--	--	--	--	--	--	3	1	3
CO2	3	3	--	2	--	--	--	--	--	--	--	--	3	3	3
CO3	3	2	1		--	2	--	--	--	--	--	--	3	3	1
CO4	3	3	--	1	--	--	--	--	--	--	--	--	2	1	1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

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II B.Tech - I Semester

20ACE05 TRANSPORATION ENGINEERING

Course Outcomes:

At the end of the course, students should be able to

CO1: Plan highway networks

CO2: Carry out surveys involved in planning and highway alignment

CO3: Design highway geometrics and pavements

CO4: Estimate traffic for various studies

CO5: Determine the characteristics of pavement materials

UNIT-1

HIGHWAY DEVELOPMENT AND PLANNING: Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway AlignmentFactors affecting Alignment-Engineering Surveys – Drawings and Reports

UNIT-2

HIGHWAY GEOMETRIC DESIGN: 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-3

TRAFFIC STUDIES: Basic Parameters of Traffic-Volume, Speed and Density – Definitions and their inter relation – Highway capacity and level of service concept – factors affecting capacity and level of service - Traffic Volume Studies- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking

Studies and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams.

UNIT-4

INTERSECTION DESIGN: Conflicts at Intersections- Channelization: Objectives –Traffic Islands and Design criteriaTypes of At-Grade Intersections – Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection

TRAFFIC REGULATION AND MANAGEMENT: Road Traffic Signs – Types and Specifications – Road markings-Need for Road MarkingsTypes of Road Markings-Specifications - Design of Traffic Signals –Webster Method – Saturation flow – phasing and timing diagrams – Numerical problems.

UNIT-5

HIGHWAY MATERIALS:Stone aggregates – Desirable properties of road aggregates – Test for road aggregate – Tests on Bitumen – Cutback bitumen – Bituminous Emulsion

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 37-2002) –Design of Rigid pavements – Critical load positions – Westergaard‟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 ofDowel bars and Tie bars.

Text Books:

1. Kadiyali.L.R. “Traffic Engineering and Transport Planning”, Khanna Publishers, Delhi, 2013

2. S K Khanna and CEG Justo and A Veeraragavan, “Highway Engineering”, Nem Chand and Bros.

3. Indian Roads Congress (IRC) Specifications: Guidelines and Special Publications on Traffic Planning and Management

4. Salter. R.I and Hounsell N.B, "Highway Traffic Analysis and design", Macmillan Press Ltd.1996.

Reference Books:

1. Fred L. Mannering, Scott S. Washburn and Walter P. Kilareski, Principles of Highway Engineering and Traffic Analysis, Wiley India Pvt. Ltd., New Delhi, 2011

2. Garber and Hoel, "Principles of Traffic and Highway Engineering", CENGAGE Learning, New Delhi, 2010

3. SP:43-1994, IRC Specification, "Guidelines on Low-cost Traffic Management Techniques" for Urban Areas, 1994

4. John E Tyworth, "Traffic Management Planning, Operations and control", Addison Wesly Publishing Company, 1996

5. Hobbs.F.D. "Traffic Planning and Engineering", University of Brimingham, Peragamon Press Ltd, 2005

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	--	--	--	--	--	--	--	--	--	--	2	3	2
CO2	3	2	3	--	--	--	--	--	--	--	--	--	3	1	1
CO3	3	3	2	1	2	--	--	--	--	--	--	--	3	2	1
CO4	3	3	--	1	--	1	--	--	--	--	--	--	3	2	1
CO5	3	2	2	1	--	2	2	--	--	--	--	--	2	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	0	0	3

II B.Tech - I Semester

20ACE06 SURVEYING

Course Outcomes:

At the end of the course, students should be able to:

CO1: Explain concepts of linear, direction, angular and elevation measurements, discuss recording methods and Instruments used.

CO2: Calculate various parameters of linear, direction, angular measurement and elevation of objects.

CO3: Explain latest technologies and modern instruments used for surveying.

CO4: Conduct experiments on linear, direction, angular and elevation measurements, record and interpret the data.

CO5: Conduct experiments using modern methods of surveying such as GIS,GPS,EDM.

UNIT-I INTRODUCTION:

Historical perspective of surveying, comparison between geometry & surveying. Necessity of surveying, Principles, plans and maps, classification, Basic measurements, control surveys,- horizontal and vertical. Cardinal principles of surveying, coordinate system, topomaps of survey of India, their numbering, Measurement errors and their adjustments - numerical, precision and accuracy-numerical. Linear measurements: methods, instruments-chain, tape, ranging rods, area measurement, numerical.

UNIT-II COMPASS SURVEY:

Definitions, meridians, azimuth, bearings, error adjustment Compass, uses, types, local attraction, dip, declination, numerical on - finding bearing, error adjustment. Plane table survey: Definitions, Plane table accessories, principles, Advantages & Disadvantages, orientation, Methods of plotting- Radiation, Intersection & Traversing, two-point problem.

UNIT III ELEVATION MEASUREMENT:

Leveling: Concepts of leveling, instruments used. Terms and definitions. Reductions of level, Booking of levels, Classification of leveling. Curvature and refraction effects, Reciprocal levelling, Errors. Numerical examples on booking and reduction of levels, calculation of gradients, correction for curvature and refraction, true difference in height using reciprocal observations. Contouring, characteristics and applications., Trigonometric levelling Introduction, Base of the object accessible, Base of the object inaccessible: instruments stations in same and different vertical plane, Determination of height of an elevated object, Numerical problems.

UNIT IV ANGULAR MEASUREMENTS-:

THEODOLITE SURVEYING: Essentials of transit Theodolite, Definitions and terms, Temporary and permanent adjustments, Measurement of horizontal and vertical angles, Fundamental lines and desired relations, Sources of error in Theodolite. Curves; Introduction, TYPES- simple, circular, transition, reverse curve, their elements, setting out, numerical on angular method Triangulation, Classification, Signals and towers, Base line measurement, Computations.

UNIT V MODERN METHODS OF SURVEYING:

Photogrammetric and aerial survey: Introduction, definitions, basics principles, methods, importance of scale, height, applications. Remote sensing: Introduction, Principle of Remote sensing, EMR, types, resolutions, types of satellites, type of sensors, LIDAR, visual and digital image processing and its applications. Global Positioning System: Definition, Principles of GPS and applications. Geographical Information System: Introduction and principe of Geographical Information System, components of GIS, applications Advanced instrumentation in surveying: classification, measuring principles, electronic theodolite, EDM, Total Station, Drones

TEXTBOOKS:

1. T.P.Kanetkar and S.V.Kulkarni, Surveying and Levelling, Parts1 & 2, Pune Vidyarthi Griha Prakashan, Pune, 2008

2. Dr.B.C.Punmia, Ashok K.Jain and Arun K Jain, Surveying Vol.I & II, Lakshmi

Publications Pvt Ltd,New Delhi, 2005.

REFERENCES:

1. R. Subramanian, Surveying and Levelling, Oxford University Press, Second Edition, 2012.

2. Bannister and S. Raymond, Surveying, Seventh Edition, Longman 2004

3. S.K. Roy, Fundamentals of Surveying, Second Edition, Prentice' Hall of India 2004

4. K.R. Arora, Surveying Vol I & II, Standard Book house , Twelfth Edition. 2013

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		--	--	1	--	--	--	--	--	--	3	3	2
CO2	3	2		1	--	1	--	--	--	--	1	--	2	3	1
CO3	3	1		3	--	2	--	--	--	--	1	--	2	3	3
CO4	3	1		3	--	3	--	--	--	--	1	--	1	3	2
CO5	2	2		2		2					1		1	1	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

II B.Tech - I Semester

20ACE07 CONCRETE TECHNOLOGY LAB

Course Outcomes:

At the end of the course, students should be able to:

CO1: Assess the quality of cement for preparation of cement mortar and concrete

CO2: Assess the quality of fine and coarse aggregates after testing the aggregates according to IS specifications.

CO3: Ability to fix Water cement ratio for suitable strength and workability.

CO4: Understand the procedure for NDT of concrete.

LIST OF EXPERIMENTS

Tests on Cement:

1. Specific Gravity of Cement

2.a) Consistency of cement

b) Initial and final setting of cement

3. Fineness of cement by Blane's apparatus

4. Compressive strength of cement

Tests on aggregates:

5. a) Specific gravity of Fine aggregate

b) Specific gravity and water absorption of Coarse Aggregate

6. Bulk density and Bulking of Fine aggregates & Coarse Aggregate

C. Tests on Fresh concrete:

7. Workability of concrete by Slump Test & Compaction factor test

8. NDT test on hardened concrete by rebound hammer

Text Books:

1. Neville, A.M. Properties of Concrete.4th edition, 2012, Pearson publication.
2. Shetty, M.S. Concrete Technology. S.Chand & Co, 2004
3. Gambhir, M.L. Concrete Technology. New Delhi. Tata Mc. Graw Hill Publishers, 2004.
4. Santha Kumar, A.R. Concrete Technology. New Delhi. Oxford University Press,2006

Reference Books:

1. All laboratory tests are as per IS, ASTM, AASHTO, TRL, IRC, BS procedures / specifications and guidelines.
2. S.K.Khanna-C.E.G,Justo-A.Veeraragavan, Nem, High materials and Pavement testing; Chand Publishers,2013

Course Outcome	**Program Outcomes**												**Program Specific 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**	**PSO3**
CO1	**3**	**2**	**1**	**--**	**--**		**--**	**--**	**--**	**--**	**--**	**--**	**3**	**3**	**2**
CO2	**3**	**2**	**1**	**1**	**--**		**--**	**--**	**--**	**--**	**1**	**--**	**2**	**3**	**1**
CO3	**3**	**1**	**3**		**--**		**--**	**--**	**--**	**--**	**1**	**--**	**2**	**3**	**3**
CO4	**3**	**1**			**--**		**--**	**--**	**--**	**--**	**1**	**--**	**1**	**3**	**2**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

II B.Tech - I Semester

20ACE08 SURVEYING LAB

Course Outcomes:

At the end of the course, students should be able to:

CO1: Gain knowledge and expertise in operation of various survey instruments for computation of area of a land.

CO2: Successfully carry out survey work in all civil Engineering projects, including the construction of buildings, roads and highways, rail track laying with curves, pipe lines, dams, ports and harbor as
well as delimitation of land and property, etc.

CO3: Gains in accurate measurement of horizontal and vertical angles by theodolite and total station.

CO4: Attains skills in computing the horizontal as well as vertical distance using tangential tachometry and expertise in handling of dumpy level, theodolite and total station for developing contour maps.

EXERCISE –1

Chain and tape Survey for plotting a land and its area computation.

Plane table Survey for plotting of a land and its area computation.

EXERCISE –2

Study of Prismatic Compass and determination of distance between two inaccessible points bythe compass and plain table survey.

Determination of the distance between inaccessible points by intersection method of plane tabling.

EXERCISE –3

Study of dumpy level and its determination of difference in elevation between two points by height of collimation and rise fall and methods

EXERCISE –4

Study of transit theodolite and Measurement of horizontal and vertical angles by Repetition method.

EXERCISE –5

Measurements of distances difference in elevation between two objects and their heights usingtheodolite.

EXERCISE –6

To set out simple curve using linear measurements methods – (Perpendicular offsets from longchord) and Rankine's deflection angle method.

EXERCISE –7

Study of total station instrument and Demonstration of Total Station Instrument

EXERCISE –8

To determine height of remote object using Total Station Instrument

EXERCISE –9

To determine horizontal distance using Total Station Instrument

EXERCISE –10

To determine Co-ordinates of points using Total Station Instrument.

EXERCISE –11

GPS Receiver (Using GPS- measure the building site, and set curves) Overview of GPS.

EXERCISE –12

Field Work – one week (survey) camp compulsory.

REFERENCES:

1. T.P.Kanetkar and S.V.Kulkarni, Surveying and Levelling, Parts1 & 2, Pune Vidyarthi Griha Prakashan, Pune, 2008

2. Dr.B.C.Punmia, Ashok K.Jain and Arun K Jain, Surveying Vol.I & II, Lakshmi Publications Pvt Ltd, New Delhi, 2005

3. James M.Anderson and Edward M. Mikhail, Surveying Theory and Practice, Tata McGraw Hill Education Private Limited, New Delhi, 2012

4. Bannister and S. Raymond, Surveying, Seventh Edition, Longman 200

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	--	--	1	--	--	--	--	--	--	3	3	2
CO2	3	2	1	1	--	1	--	--	--	--	1	--	2	3	1
CO3	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3
CO4	3	1	3	3	--	3	--	--	--	--	1	--	1	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

II B.Tech - I Semester

20ACE09 STRENGTH OF MATERIALS LAB

Course Outcomes:

At the end of the course, students should be able to:

CO1: By using engineering basics and mathematics modulus of elasticity, Torsional rigidity of steel rods can be calculated.

CO2: By using engineering basics and mathematics deflections of SSB can be calculated.

CO3: Analyze the strength of wood, concrete and bricks.

CO4: Efflorescence and salts presence can be determined as per IS code norms.

CO5: All experiments in the laboratory can be performed as an individual.

LIST OF EXPERIMENTS

1. Study the stress–strain characteristics of steel rod using universal testing machine.
2. Determination of compressive strength of wood and concrete cube using compressive testing machine.
3. Estimation of the modulus of elasticity of given material by measuring deflection in beams asimply supported beam, Cantilever beam.
4. Determination of the modulus of rigidity of given material using torsion testing machine.
5. Determination of the modulus of rigidity of given material using spring testing machine.
6. Determination of Rock well hardness numbers of given material.
7. Determination of impact strength (Charpy) using impact testing machine.

8. Test on bricks – Water absorption, Efflorescence, Compressive strength

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	

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L	T	P	C
1	0	2	2

II B.Tech - I Semester

20ACE10 Building Planning and Computer Aided Drafting Lab

(Auto CAD-2D)

Course Outcomes:

At the end of the course, students should be able to:

CO1: Ability to use the software package for drafting and modeling..

CO2: Ability to create 2D models of Engineering Components.

NAME OF THE EXPERIMENT

1 Introduction to computer aided drafting

2 Software for CAD- Auto CAD Commands

3 Practice exercises on CAD Commands

4 Drawing of plans of buildings using software for Single storied buildings

5 Drawing of plans of buildings using software for Multi storied buildings

6 Developing sections and elevations for Single storied buildings

7 Developing sections and elevations for Multi storied buildings

8 Detailing of building components like doors, windows using CAD software

9 Development of building components roof trusses using CAD software

Reference Books:

1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishes.

2. Introduction to AutoCAD 2020; 2D and 3D Design - Bernd S. Palm

Course Outcome	Program Outcomes											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	--	--	1	--	--	--	--	--	--	3	3	2
CO2	3	2	1	1	--	1	--	--	--	--	1	--	2	3	1

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CIVIL ENGINEERING

L	T	P	C
2	0	0	0

II B.Tech - I Semester

20AMB02 UNIVERSAL HUMAN VALUES-I (Mandatory course)

Course Outcomes:

After completion of the course students will be able to

CO1: Apply the principles of natural acceptance to design a happy and prosperous living with responsibility.
CO2: Analyze the elements of sentient 'I' and material human body to design a living with responsibility for happiness and prosperity.
CO3: Apply the principles of 'trust' and 'respect' for designing a society with universal human order.
CO4: Analyze the situations causing imbalance in nature and further design an ecosystem for peaceful co-existence.
CO5: Apply the principles of science technology and management to solve contemporary problems professionally and ethically.

UNIT–I: **Introduction-Need, Basic Guidelines, Content and Process for Value Education**

Purpose and motivation for the course, recapitulation from Universal Human Values-I; Self-Exploration–what is it?- Its content and process; 'Natural Acceptance' and Experiential Validation-as the process for self-exploration; Continuous Happiness and Prosperity-A look at basic Human Aspirations; Right understanding, Relationship and Physical Facility-the basic requirements for fulfillment of aspirations of every human being with their correct priority; Understanding Happiness and Prosperity correctly-Acritical appraisal of the current scenario; Method to fulfill the above human aspirations : understanding and living in harm at various levels.

UNIT–II: Understanding Harmony in the Human Being- Harmony in Myself

Understanding human being asaco-existence of the sentient'I'and the material Body; Understanding the needs of Self ('I') and 'Body'- happiness and physical facility ;Understanding the Body as an instrument of 'I' (Ibeing the doer, see rand enjoyer);

Understanding the characteristics and activities of'I'and harmony in 'I';Understanding the harmony of I with the Body :Sanyam and Health ;correct appraisal of Physical needs ,meaning of Prosperity in detail ; Programs to ensure Sanyam and Health.

UNIT–III:Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding values inhuman - human relationship ; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness ; Trust and Respect as the foundational values of relationship; Understanding the meaning of Trust ; Difference between intention and competence; Understanding the meaning of Respect, Difference between respect and differentiation ;the other salient values in relationship; Understanding the harmony in the society (society being an extension of family) : Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals; Visualizing a universal harmonious order in society- Un divided Society, Universal Order- from family to world family.

UNIT– IV:Understanding Harmony in the Nature and Existence -Whole existence as Coexistence

Understanding the harmony in the Nature; Inter connectedness and mutual fulfillment among the four orders of nature – recyclability and self – regulation in nature ; Understanding Existence as Co-existence of mutually interacting units in all- pervasive space ; Holistic perception of harmony at all levels of existence

UNIT–V: Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values ; Definitiveness of Ethical Human Conduct; Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order;

Competence in professional ethics :

a) Ability to utilize the professional competence for augmenting universal human order

b) Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Strategy for transition from the present state to Universal Human Order:

a. At the level of individual : as socially and ecologically responsible engineers, technologists and managers

b. At the level of society: as mutually enriching institutions and organizations.

Textbooks:

1) RRGaur, RAsthana, GP Bagaria, “A Foundation Course in Human Values and Professional Ethics”, 2nd Revised Edition, Excel Books, NewDelhi, 2019. ISBN978-93-87034-47-1.

Reference Books:

1) Jeevan Vidya: Ek Parichaya, ANagaraj, JeevanVidyaPrakashan, Amar kantak,1999.
2) N.Tripathi,“HumanValues”,New Age Intl. Publishers ,New Delhi,2004.The Story of Stuff (Book).

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

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3	0	0	0

II B.Tech - I Semester

20AHS11 Quantitative Aptitude and Reasoning-I

Course Outcomes:

At the end of the course, students should be able to:

CO1: Strengthen their ability to meet the challenges in solving real life problems.

CO2: The student will preserve maturity of the mind in solving linguistic problems.

CO3: Develop the thinking ability and apply Quadratic equations.

CO4: Apply the Analytical Reasoning puzzles to solve linear and circular arrangements

UNIT 1: QUANTITATIVE ABILITY - I

Vedic Maths – Square - Square root – Cube - Cube root –Fractions – Mathematical operations – Number System – Types of numbers - Divisibility Rule – Unit Digit – Factors and Factorials – Remainder Theorem – Factorization and Trailing Zeroes – LCM And HCF

UNIT 2: QUANTITATIVE ABILITY - II

Arithmetic Progression – Common Difference- Nth Term – Sum of terms – Geometric Progression – Common Ratio – Nth term – Sum of Terms – Averages - Weighted average – Percentages – Conversion – Increasing and Decreasing in quantity – Change in Percentage – Successive discount – Compound Growth

UNIT 3: REASONING ABILITY I

Coding and Decoding – Blood Relations – Directions – Number Series and Letter Series – Ranking and Ordering

UNIT 4: VERBAL I

Verbal analogy - Types - Parts of Speech – Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction and Interjection - Prepositions –Preposition of Place, Preposition of Placement, Preposition of Time and Preposition of Duration - Articles – Usage of a, an, the, Omission of articles - Sentences - Pattern and Types.

UNIT 5: SOFT SKILL I

Communication Skills - Self-Confidence - Introductions & Greetings - Presentation Skills - Self-Motivation.

Text Books:

1. GL Barrons, Tata Mc Graw Hills, ‘Thorpe’s Verbal reasoning,LSAT Materials. 2015.
2. R S Agarwal, ‘Quantitative Aptitude’ S. Chand Company Ltd. 2018.
3. R S Agarwal, ‘A Modern approach to Logical reasoning’, S chand Company Ltd. 2017.

Reference Books:

1. Abhjit Guha ‘Quantitative Aptitude’ Tata Mc Graw Hills, 4th Edition, 2011.
2. G.L BARRONS ‘Quantitative Aptitude’. Tata Mc Graw Hills, 2014

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

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L	T	P	C
3	0	0	3

II B.Tech - II Semester

20ACE13 ENGINEERING GEOLOGY

Course Outcomes:

At the end of the course, students should be able to:

CO1: Know the different types of Rocks and minerals

CO2: Understand about petrology.

CO3: Know the concepts structural geology, ground water and landslides.

CO4: Know the concepts of geology of dams and tunnels.

CO5 : Apply geological concepts while choosing site for Dams, Reservoirs.

UNIT I

INTRODUCTION: Importance of geology from Civil Engineering point of view. Brief study on case histories of Civil Engineering failures due to geological factors. Geological action of rivers, wind and glaciers.

WEATHERING OF ROCKS: Causes of weathering, importance of weathering in civil engineering operations. In situ and drift soils, common types of soil, their origin and occurrence n India. Formation of soils. Classification of soils and their origin. Distribution of Indian soils and their importance.

UNIT II

MINERALOGY: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Study of physical properties of following common rock forming minerals: Feldspar , Quartz , Olivine , Augite , Hornblende , Muscovite ,Biotite , Asbestos, Chlorite , Kyanite, Garnet, Talc , Calcite, Pyrite, Hematite, Magnetite, Galena, and Bauxite.

UNIT III

PETROLOGY: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of Igneous. Sedimentary and Metamorphic rocks. Their distinguishing features, Megascopic study of Granite, Dolerite, Basalt, Laterite, Breccia, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble andSlate.

STRUCTURAL GEOLOGY: Out crop, strike and dip. Study of common geological structures such as folds, faults unconformities, and joints – their importance.

UNIT IV

DAMS, TUNNELS, EARTH QUAKE & LAND SLIDES: Ground water, Water table, types of aquifers, springs, cone of depression, geological controls of ground water movement, ground water exploration/ Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas/ Landslides, their causes and effect; measures to be taken to prevent their occurrence.

EARTHQUAKE & LANDSLIDES: Importance of Geophysical studies. Principles of geophysical studies such as Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radiometric methods and Geothermal methods. Special importance of Electrical resistivity methods, and seismic refraction methods.

UNIT V

GEOLOGY OF DAMS, RESERVOIRS AND TUNNELS: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs. Purposes of tunneling, Geological Considerations (i.e. Lithological, structural and ground water) in tunneling. Over break and lining in tunnels.

Text Books:

1) N.Chennkesavulu, Engineering Geology, Second Edition, 2013, Laxmi Publications.
2) Parbinsingh, Engineering geology, 2012, KatsonPublications

Reference Books:

1) Vasudevkanthi, Engineering geology, First Edition, 2012, Universities press,Hyderabad.
2) Subinoy Gangopadhyay, Engineering Geology, 2012, Oxford University press.
3) K.V.G.K. Gokhale, Principles of Engineering Geology, First Edition, 2013, B.S publications
4) D.Venkata Reddy, Engineering Geology, First Edition, 2014, Vikas Publications, NewDelhi.

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Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	3	3	--	3	--	--	3	--	--	--	--	3	3	1	3
CO2	3	3	--	2	--	--	3	--	--	--	--	3	3	3	3
CO3	3	2	--		--	2	2	--	--	--	--	2	3	3	1
CO4	3	3	--	1	--	--	3	--	--	--	--	3	2	1	1
CO5	3	3	--	1	--	--	3	--	--	--	--	3	2	1	1

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L	T	P	C
3	0	0	3

II B.Tech - II Semester

20AHS13 PROBABILITY AND STATISTICS.

Course Outcomes:

At the end of the course, students should be able to:

CO1: Apply probability distributions to real life problems.

CO2: Analyze inference theory to make wise decisions about a population parameter.

CO3: Apply sampling methods in the day-to-day practical life to assess the quality of commodities.

CO4: Apply the testing of hypothesis for large and small samples.

UNIT-I

RANDOM VARIABLES & THEORETICAL DISTRIBUTIONS:

Introduction on Probability-Discrete and Continuous random variables – Distribution functions –Moment generating functions. Binomial distribution – Poisson distribution – Normal distribution – related properties.

UNIT-II

SAMPLING DISTRIBUTIONS & ESTIMATION:

Population - Sample - Parameter and Statistic –Characteristics of a good estimator - Consistency–Invariance property of Consistent estimator - Sufficient condition for consistency- Unbiasedness – Sampling distributions of means (known and unknown)- sums and difference. Estimation- Estimator, Estimate, Point estimation – Interval estimation – Bayesian estimation.

UNIT-III

TEST OF HYPOTHESIS: Null Hypothesis-Alternative hypothesis-Critical region – Level of Significance-Type I error and Type II errors-One tail test -Two tail tests - Hypothesis concerning one and two means – Hypothesis concerning one and two proportions.

UNIT-IV

TEST OF SIGNIFICANCE: Student's t-test, test for a population mean, equality of two population means, paired t-test, F-test for equality of two population variances, χ^2- Chi-square test for goodness of fit and test for attributes.

ANALYSIS OF VARIANCE - One way and two-way classifications.

UNIT-V

QUEUING THEORY: Introduction - Queues with impatient customers: Balking and reneging-Classification, stationary process, Binomial process, Poisson process, Birth and death process, - M/M/1 Model –Problems on M/M/1 Model.

Text Books:

1. Miller and John Freund. E, Probability & Statistics for Engineers, New Delhi, Pearson Education, 2014.
2. S.P.Gupta, Statistical Methods, 33rd Edition, publications SultanChand& Sons.2021.
3. Iyengar, T.K.V., Krishna Gandhi B., Probability & Statistics, New Delhi, S. Chand & Company, 2014.

References Books:

1. Arnold O Allen, Probability & Statistics, Academic Press. 2014.
2. Manoj Kumar Srivastava and Namita Srivastava, Statistical Inference Testing of Hypotheses, Prentice Hall of India,2014.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3										
CO2	3	3		1								
CO3	3	2										
CO4	3	2										

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L	T	P	C
3	0	0	3

II B.Tech - II Semester

20ACE14 STRUCTURAL ANALYSIS-I

Course Outcomes:

At the end of the course, students will be able to:

CO1: Identify the method of analysis for indeterminate structures

CO2: Know the importance of the shape factor, deflection of beams

CO3: Analyze a member with moving loads.

CO4: Perform analysis for truss members.

CO5: Analyse the indeterminate structures using castigliano's theorem.

UNIT I

FIXED BEAMS: Introduction to static and kinematic indeterminacy- Fixed beams subjected to 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 II

SLOPE-DEFLECTION: Introduction- derivation of slope deflection equation- application to continuous beams with and without settlement of supports. Analysis of single bay, single storey, portal frame including side sway by slope deflection method.

UNIT III

MOMENT DISTRIBUTION METHOD: Introduction to moment distribution method- Stiffness and carry over factors –Distribution factors- Application to continuous beams with and without settlement of supports. Analysis of single bay, single storey portal frame including side sway by moment distribution method.

UNIT IV

KANI`S METHOD: Introduction to Kani’s method – Rotation factors- Displacement factors - Analysis of continuous beams including settlement of supports by Kani’smethod –Analysis of single bay, single storey portal frames with side sway.

UNIT V

ANALYSIS OF INDETERMINATE STRUCTURES: Analysis of trusses with up to two degrees of internal and external indeterminacies using Castigliano’s theorem.

Text Books:

1) Bhavikatti - Analysis of Structures – Vol. I &2 ,Vikaspublications,2003
2) Vazrani&Ratwani - Analysis of structures– KhannaPublications, 2009.

Reference Books:

1) Timoshenko & Young, Theory of Structures, TATA Mc. GrawHill,1965
2) B.C. Punmia, A.K Jain &A.K.Jain, SMTS–2, Theory of Structures, Twelfth Edition, 2004,LaxmiPublications.
3) C.S.Reddy, Basic Structural Analysis, Third Edition, 2010, TATA Mc. GrawHill.
4) C.K.Wang, Intermediate Structural Analysis, , First Edition, 2010, StandardPublications

:Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	--	3	--	--	3	--	--	--	--	3	3	1	3
CO2	3	3	--	2	--	--	3	--	--	--	--	3	3	3	3
CO3	3	2	--		--	2	2	--	--	--	--	2	3	3	1
CO4	3	3	--	1	--	--	3	--	--	--	--	3	2	1	1
CO5	3	3	--	1	--	--	3	--	--	--	--	3	2	1	1

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L	T	P	C
3	0	0	3

II B.Tech - II Semester

20ACE15 HYDRAULICS AND FLUID MACHINERY

Course Outcomes:

At the end of the course, students will be able to:

CO1: Analyse fluid flow concepts and problems using fundamental principles.

CO2: Analyse the different types of flows, and different equations in engineering applications.

CO3: Analyse and solve the pipe flow problems by identifying losses and application of Moody's chart.

CO4: Apply the concepts of boundary layer, drag and lift forces in the design of the objects.

CO5: Evaluate the models by performing model analysis.

UNIT I

FLUID PROPERTIES AND FLUID STATICS

Fluid – definition, distinction between solid and fluid - Units and dimensions - Properties of fluids - density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility, vapour pressure, capillarity and surface tension - Fluid statics: concept of fluid static pressure, absolute and gauge pressures - pressure measurements by manometers and pressure gauges - forces on planes – centre of pressure – buoyancy and flotation.

UNIT II

FLIUD KINEMATICS AND DYNAMICS

Fluid Kinematics - Flow visualization - lines of flow - types of flow - velocity field and acceleration - continuity equation (one and three dimensional differential forms)- Equation of streamline - stream function - velocity potential function - circulation - flow net. Fluid dynamics - equations of motion - Euler's equation along a streamline - Bernoulli's equation – applications - Venturi meter, Orifice meter and Pitot tube. Linear momentum equation and its application.

UNIT III

FLOW THROUGH PIPES

Viscous flow - Shear stress, pressure gradient relationship - laminar flow between parallel plates - Laminar flow through circular tubes (Hagen- Poiseulle's) - Hydraulic and energy gradient - flow through pipes - Darcy -Weisbach's equation - pipe roughness -friction factor- Moody's diagram - Major and minor losses of flow in pipes - Pipes in series and in parallel.

UNIT IV

TURBINES: Definition and classification Pelton turbine: Theory, Equation for work done and efficiency, Numerical problems Francis turbine: Theory, Work done and efficiency, Numerical problems, Specific speed, Unit quantities, Characteristic curves. Kaplan turbine: Working principle.

UNIT V

PUMPS: Definition and classification Centrifugal pumps: General principle, Priming, Heads, Work done and efficiency, Numerical problems, Minimum starting speed, Characteristic curve, Pumps in series and parallel.

Text Books:

1) R.K.Bansal, A Text Book of Fluid Mechanics and Hydraulic machinery, Ninth Edition 2003, Laxmi Publications.
2) P.N. Modi & S.M. Seth, Hydraulics and Fluid Mechanics including Hydraulic Machines,Twentieth Edition 2015, Standard Book House, New Delhi.
3) Jain A. K. "Fluid Mechanics", Khanna Publishers, 2010.
4) D.S. Kumar, Fluid Mechanics and Fluid Power Engineering, Katson Publishing House,Delhi.2004

Reference Books:

1) Streeter, V.L., and Wylie, E.B., “Fluid Mechanics”, McGraw-Hill, 2000.
2) F.M. White, Fluid Mechanics, seventh edition,2012, Mc Graw Hills Publications
3) Dr.R.S.Kumar, Fluid Mechanics and Fluid Power Engineering, S.Chand

Publications,2014.

4) Fox W.R. and McDonald A.T., Introduction to Fluid Mechanics John-Wiley and Sons, Singapore, 1995.

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**3**	**2**	**1**	**--**	**--**	**1**	**--**	**--**	**--**	**--**	**--**	**--**	**3**	**3**	**2**
CO2	**3**	**2**	**1**	**1**	**--**	**1**	**--**	**--**	**--**	**--**		**--**	**2**	**3**	**1**
CO3	**3**	**1**	**3**	**3**	**--**		**--**	**--**	**--**	**--**		**--**	**2**	**3**	**3**
CO4	**3**	**1**	**3**	**3**	**--**		**--**	**--**	**--**	**--**		**--**	**1**	**3**	**2**
CO5	**2**	**1**	**2**	**2**	**--**	**1**	**--**	**--**	**--**	**--**		**--**	**1**	**2**	**1**

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3	0	0	3

II B.Tech - II Semester

20AMB03 MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (Common to All Branches)

Course Outcomes:

After the completion of the course student will be able to

CO1: Gain knowledge on managerial economics

CO2: Develop an understanding of economic principles and to enhance skills in high-level problem solving and critical thinking

CO3: Evaluate the economic environment and the impact of governmental economic policies on consumers and financial institutions.

CO4: Know the application of financial accounting in the field of Engineering.

UNIT –I

INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics: Definition, Nature and Scope –Demand analysis: Law of demand, Demand determinants, Elasticity of Demand: Definition, Types, Measurement and Significance –Demand forecasting methods (Survey methods, Statistical methods, Expert opinion method, Test marketing, Controlled experiments, Judgmental approach)

UNIT –II

THEORY OF PRODUCTION AND COST ANALYSIS

Production function –Cobb Douglas Production function –Laws of Returns–Internal and External economies of scale COST ANALYSIS: Cost concepts, Fixed vs. Variable costs, Explicit vs. Implicit Costs, Out of Pocket costs Vs Imputed costs, Opportunity Cost and Sunk costs BREAK EVEN ANALYSIS: Concept of Break EvenPoint (BEP)–Break Even Chart –Assumptions underlying and Practical significance of BEP (Simple Problems).

UNIT –III

INTRODUCTION TO MARKETS AND BUSINESS ORGANIZATIONS:

Market structures –Types of Competition –Features of perfect competition, Monopoly, Monopolistic competition –Price-Output Determination under perfect competition and Monopoly –Types of Business organization –Features, Merits and demerits of Sole proprietorship, Partnership and Joint stock companies –Types of companies –Public enterprises –Types and Features –Changing business environment in post –Liberalization scenario.

UNIT –IV

CAPITAL AND CAPITAL BUDGETING:

Capital and its Significance –Types of capital –Estimation of fixed and working capital requirements –Methods and sources of raising capital –Capital Budgeting Methods: Payback Method, Accounting Rate of Return (ARR), and Net Present Value (NPV) Method (Simple Problems).

UNIT –V

FINANCIAL ACCOUNTING AND FINANCIAL ANALYSIS THROUGH RATIOS:

Double entry book keeping –Journal –Ledger –Trial Balance –Trading Account and balance sheet with simple adjustments Ratio analysis: Computation of Liquidity Ratios (Current and Quick Ratio), Activity Ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt-Equity Ratio and Interest Coverage Ratio) and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1) Aryasri A. R., Managerial Economics and Financial Analysis, 4/E, TMH, 2009.
2) Varshney R.L. and K.L. Maheswari, Managerial Economics, Sultan Chand & Sons, 19/E, 2009.
3) Siddiqui S.A. and Siddiqui A.S., Managerial Economics and Financial Analysis, New Age international, 2009.

REFERENCES:

1) Gupta R.L., Financial Accounting, Volume I, Sultan Chand & Sons, New Delhi, 2001
2) James C. Van Horne, Financial Management policy, 12/E, PHI, 2001.
3) Joel Dean, Managerial Economics, PHI, 2001.

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

II B.Tech - II Semester

20ACE16 ENGINEERING GEOLOGY LAB

Course Outcomes:

CO1: To Remember and Identify the various classifications of rocks and minerals.

CO2: To Understand the numerous properties of rocks and minerals

CO3: To apply the concepts of structural geology, ground water and landslides.

CO4: To Analyze the subsurface Characteristics in the field.

LIST OF EXPERIMENTS:

1. Introduction to Crystallography – Identification of Crystals.
2. Introduction of minerals and the study of Physical properties, Identification of Quartz and feldspars.
3. Identification of pyroxenes and Amphiboles and other silicates.
4. Identification of important economic minerals.
5. Identification of important ore deposits.
6. Identification of Igneous rocks.
7. Identification of Sedimentary rocks.
8. Identification of metamorphic rocks.
9. Structural geology- strike and dip, three and 3-point problems point problems.
10. Structural geology – Completion of out crops maps, order of superposition.
11. Subsurface analysis – Resistivity sounding.
12. Subsurface analysis – Seismic survey.

Reference Book:

1. Chennakesavulu.N.,"Textbook of Engineering Geology", Second Edition, 2013, Laxmi

Publications., New Delhi, 2009.

2. Structural Geology Manual.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3											3	3	3
CO2	3	3											3	3	3
CO3	3	3											3	2	3
CO4	3	3											3	3	3

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CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

II B.Tech - II Semester

20ACE17 TRANSPORTATION ENGINEERING LAB

Course Outcomes:

At the end of the course, students should be able to:

CO1: Conduct basic tests on pavement materials

CO2: Characterize the pavement materials

CO3: Perform quality control tests on pavements and pavement materials

CO4: Estimate quantity of pavement materials

LIST OF EXPERIMENTS

1. Specific gravity and Water absorption test of aggregates
2. Shape test
3. Aggregate impact test
4. Los angles abrasion test
5. Aggregate crushing value test
6. Deval Attrition test
7. California Bearing Ratio test
8. Specific gravity of bitumen
9. Solubility test
10. Water content test
11. Penetration test
12. Ductility test
13. Flash and fire point test
14. Softening point test

Reference Books:

1. All laboratory tests are as per IS, ASTM, AASHTO, TRL, IRC, BS procedures / specifications and guidelines.
2. S.K.Khanna-C.E.G,Justo-A.Veeraragavan, Nem, High materials and Pavement testing; Chand Publishers,2013

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3											3	3	3
CO2	3	3											3	3	3
CO3	3	3											3	2	3
CO4	3	3											3	3	3

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CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

II B.Tech - II Semester

20ACE20 HYDRAULIC AND FLUID MACHINERY LAB

Course Outcomes (CO):

By performing the various tests in this laboratory, the student will be able to

CO1: know the principles of discharge measuring devices and head loss due to sudden contraction

CO2: expansion in pipes and working principles of various pumps and motors.

List of Experiments:

1. Verification of Bernoulli's equation.
2. Calibration of Venturi meter.
3. Calibration of Orifice meter
4. Determination of Coefficient of discharge for an external mouth piece by Constant head method.
5. Determination of Coefficient of discharge for an external mouth piece by variable head method.
6. Calibration of contracted Rectangular Notch.
7. Calibration of contracted Triangular Notch. Determination of friction factor
8. Determination of loss of head in a sudden contraction.
9. Determination of loss of head in a sudden Expansion.
10. Performance test on Impulse turbines
11. Performance test on reaction turbines (Francis and Kaplan Turbines)
12. Impact of jet
13. Performance test on centrifugal pumps, determination of operating point and efficiency

References:

1. Fluid Mechanics & Hydraulic Machines A Lab Manual by Ts Desmukh (Author), Laxmi Publications (P) Ltd

2. Fluid Mechanics & Machinery Laboratory Manual by N Kumara Swamy (Author), Charotar Books Distributors.

3. Lab. Manual of Fluid Mechanics & Machines by Gupta, Chandra (Author), cbspd (Publisher).

Online Learning Resources/Virtual Labs:http://eerc03-iiith.vlabs.ac.in/

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	--	--	-	--	--	--	--	--	--	3	3	2
CO2	3	2	1	1	--	-	--	--	--	--	1	--	2	3	1

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CIVIL ENGINEERING

L	T	P	C
1	0	2	2

II B.Tech - II Semester

20ACE19 TOTAL STATION SURVEYING AND GPS LAB

Course Outcomes:

At the end of the course, students should be able to:

CO1: Use total station in the fireld of civil engineering land survey

CO2: Summarize the basic principles of GPS and GIS in civil engineering

CO3: Manage the suggested or identified constructional problems, solve in teams, in order to improve future problem solving ability and able to present it.

List of Experiments

1. Total station-general commands used- instrument preparation and setting-reading distances and angles
2. Measurement of distances and coordinates of given points, using
   a) EDM
   b) Total station
3. Measurement of altitudes of given elevated points, using total station
4. Run a closed traverse using Total station and plotting the traverse
5. Determination of areas of field (enclosed three or more points) by total station
6. Study of hand-held GPS
7. Measurement of latitude, longitude and altitude using hand held GPS
8. Selection and marking of routes using hand held GPS

Text Books:

1. N. D. Bhatt and V.M. Panchal, Machine Drawing, Charoter Publications
2. User manuals and tutorials of professional CAD software

Reference Books:

1. Ibrahim Zeid, Mastering CADCAM, McGraw-Hill.
2. ASME Y14.5 – 2009 (ME 16008)

E-links

http://nptel.ac.in/video.php?subjectId=105104101

http://media.sakshat.ac.in/NPTEL-IIT-Videos/http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.

http://nptel.iitk.ac.in/http://www.slideshare.net/Ehabtariq/surveying-by-using-digital-theodolitehttp://www.tcd.ie/civileng/Staff/Brian.Caulfield/3A1/3A1%20Lecture%206.pdfhttp://madinpoly.com/pdf/labmanual/1/surveying%20practical-ii%28317%29.pdf

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	--	--	1	--	--	--	--	--	--	3	3	2
CO2	3	2	1	1	--	1	--	--	--	--	1	--	2	3	1
CO3	3	2	1	--	--	1	--	--	--	--	1	--	3	3	2

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L	T	P	C
2	0	0	0

II B.Tech - II Semester

20AHS15 Quantitative Aptitude and Reasoning-II

Course Outcomes:

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

CO1: To evaluate various real life situations by resorting to analysis of key issues and factors.

CO2: To understand various languages structures.

CO3: To demonstrate different principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.

CO4: To explore the possibilities of utilization of concepts of reasoning.

UNIT I: QUANTITATIVE ABILITY

Profit, Loss and Discount – Cost Price – Selling Price – Retail Price – Markup Price – Ratio and Proportion Antecedent – Consequent - Mean Proportion –Direct variation – Indirect Variation – Joint Variation Partnership – Mixture and Allegation – Problems on Ages – Surds and Indices

UNIT II: QUANTITATIVE ABILITY

Time Speed and Distance – Uniform and Variable speed – Conversion - Average Speed - Relative speed – Effective speed - Problems on Trains – Stationary point and object – Moving Point and Object – Boats and Streams – Downstream and Upstream - Races and Games – Head start – Dead heat – Escalator – Number of steps

UNIT III: REASONING ABILITY

Syllogism – Statement and Conclusion - Data Sufficiency – Data Arrangement – Linear and Circular arrangement - Data Interpretation - Line Graph – Bar graph – Pie Chart

UNIT IV: VERBAL

Tense – Present Tense, Past Tense, Future Tense - Voice – Active voice, Passive voice and Active to Passive Voice Conversion Rules – Speech – Direct Speech, Indirect Speech and Direct to Indirect Speech Conversion Rules –Essay Writing – Types, Steps, Format.

UNIT V: SOFT SKILL

Time Management - Stress Management - Team Work - Accent and Voice Communication - Interview Skills

TEXT BOOKS:

1. Quantitative Aptitude, Logic Reasoning & Verbal Reasoning, R S Agarwal, S.Chand Publications.
2. Quantitative Aptitude for Competitive Examinations, R S Agarwal, S.Chand Publications

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	1	2	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-

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III B. Tech – I Semester (CE)

		L	T	P	C
20ACE22	**SOIL MECHANICS**	**3**	**0**	**0**	**3**

Course Outcomes: After successful completion of the course the students will be able to

1.Apply engineering properties for solving geotechnical operations

2.Perform soil tests using sieve analysis and hydrometer methods.

3. Evaluate seepage by using Flow nets

4.Apply the knowledge of one-dimensional consolidation theory in computing settlements of structures

5.Evaluate the factor of safety of an earth slope.

UNIT I INDEX PROPERTIES

Basic Definitions and Simple Tests: Soil formation–Three phase diagram–Volume–Weight relationships – Water content – Specific gravity – In-situ density – Relative density.

Index Properties and Soil Classification: Grain size analysis–Sieve and hydrometer methods – Consistency limits and indices – IS classification system of soils.

Unit II STRESS DISTRIBUTION TO EXTERNAL LOADS:

Soil –water-static pressure in water – effective stress concepts in soil-pore water pressure-Stress distribution in homogeneous and isotropic medium- Boussinesque theory – point load-live load- UDL-Westgaard's equation -Use of Newmark's influence chart.

UNIT III PERMEABILITY

Permeability: Soil water–Capillary rise–Permeability–factors affecting permeability– Laboratory determination of coefficient of permeability – Permeability of layered soils.

Seepage Through Soils: Seepage through soils–Flow nets–Characteristics and uses - Total, Neutral and Effective stresses – Quick sand condition.

UNIT IV COMPACTION AND CONSOLIDATION OF SOILS:

Soil moisture density relationship - Compaction-definition, zero air voids line- CBR – Standard proctor test- Consolidation: Definition,Initial, primary and secondary consolidation – Spring analogy for primary consolidation - Consolidation test – e – p and e – log p curves – Terzaghi's theory of one-dimensional consolidation – Coefficient of consolidation – Pre-consolidation pressure.

UNIT V SHEAR STRENGTH OF SOILS

Shear Strength of Soils: Mohr–Coulomb failure theories–Types of laboratory shear strength tests – Strength tests based on drainage conditions and their field applicability

Slope Stability: Infinite and finite earth slopes–Types of failures–Different factors of safety – Stability analysis of infinite as well as finite slopes (Swedish circle method and friction Circle method only) – Taylor's stability number.

TEXT BOOKS:

1. A.V. Narasimha Rao and C. Venkatramaiah, Numerical problems, Examples and Objective Questions in Geotechnical Engineering, Universities press India Limited, Hyderabad, 2000.
2. Dr. B. C. Punmia, Ashok kumar Jain and Arun kumar Jain, Soil Mechanics and Foundation engineering, Lakshmi publications (P) Ltd., New Delhi,1995

REFERENCE BOOKS:

1. A.V. Narasimha Rao, Fundamentals of Soil Mechanics, Laxmi Publications, NewDelhi,2012
2. C. Venkatramaiah, Geotechnical Engineering, New Age International (P) Ltd, Publishers, New Delhi,2007.
3. K. R. Arora, Soil Mechanics and Foundation Engineering, Standard Publishers' distributor, New Delhi,2002.

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3						2	2				3	2		
CO2	2	2					3	3					2		
CO3		3					2					3	2		
CO4	3							3				3	3		
CO5													2		

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L	T	P	C
3	0	0	3

III B.Tech – I Semester (CE)

20ACE23 DESIGN OF REINFORCED CONCRETE STRUCTURES

Course Outcomes: After successful completion of the course the students will be able to

1. Analyse, Identify, design beams of various shapes and design the shear reinforcement in beams as per IS Code.
2. Analyse, Design and draw reinforcement details of column subjected to various loads as per IS code.
3. Analyse, Design and draw reinforcement details of different types of slabs as per IS code.
4. Analyse, Design and draw the reinforcement details of footings of various shapes and stair cases as per IS code.
5. Determine the crack width in beams and design the shear wall as per IS code.

UNIT-I DESIGN OF RC ELEMENTS :

Working stress method- Design of RC elements- Introduction to Limit state method -Design of singly and doubly reinforced rectangular beams - Design of flanged beams

UNIT-II DESIGN OF COMPRESSION MEMBERS:

Short and Long columns subjected to axial loads, uni-axial and biaxial bending as per IS Code. Limit state of serviceability - Deflection (short and long term), crack width calculation as per IS code.

UNIT-III DESIGN OF SLABS:

Design of one-way slabs, two way slabs, Continuous slab Using moment Coefficients, Cantilever slab using Limit State Method.

UNIT-IV DESIGN OF FOOTINGS:

Isolated (square, rectangular), sloped and stepped footings using Limit State Method- Design of Stair cases (Dog legged stair case only).

UNIT-V SHEAR AND TORSION:

Behaviour of RC members in shear, bond and anchorage- Design requirements as per the provisions of IS codes. Behavior of Rectangular RC beams in shear and torsion – design of RC members for combined bending, shear, and torsion.

NOTE: The following plates should be prepared by the students.

1. Reinforcement particulars of beams.
2. Reinforcement particulars of columns and footings.
3. Reinforcement particulars of one way, two way and continuous slabs

FINAL EXAMINATION 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%**.**

TEXT BOOKS:

1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Limit State Design, Laxmi,PublicationsPvt. Ltd., New Delhi, 2016.

2. S.Unnikrishna Pillai & Devdas Menon - Reinforced concrete design, Tata McGraw Hill, New Delhi, 2009

REFERENCE BOOKS:

1. A. K.Jain- Limit State Design, Nemchand & Brothers, New Delhi, 7th edition, 2006.

2. P.C.Varghese,Limit state designed of reinforced concrete,Prentice Hall of India,NewDelhi, 2009.

3. N.C. Sinha and S.K Roy,Fundamentals of reinforced concrete, S. Chand publishers, New Delhi, 2013 Codes/Tables: IS 456-2000 and IS-800 code books to be permitted into the examinations Hall.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3										2	2	
CO2	3	3	3					3		3			2	3	
CO3	3	3	3					3		3				2	
CO4	3	3	3					3		3			2	3	
CO5	3	3	3					3		3			2		

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	L	T	P	C
III B.Tech – I Semester	**3**	**0**	**0**	**3**

20ACE24 **STRUCTURAL ANALYSIS – II**

Course Outcomes: After successful completion of the course the students will be able to

1. Apply the force equilibrium conditions and compatibility conditions to analyze simple structures like arches, cables and evaluate structural response.
2. Analyze the structure with moving loads using Influence line diagram method.
3. Analyze building frames by approximate methods for horizontal and vertical loads.
4. Analyze statically indeterminate structures by force method.
5. Analyze statically indeterminate structures by displacement method.

UNIT I ARCHES & CABLES

THREE HINGED ARCHES: Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust, and radial shear – effect of temperature.

TWO HINGED ARCHES: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – (No analytical question).

CABLES: Equilibrium of cable- length, anchorage of suspension cables – stiffening girders – cables with 3 hinged stiffening girders.

UNIT II

ROLLING LOADS AND INFLUENCE LINE DIAGRAMS FOR DETERMINATE STRUCTURES: Introduction-simply supported beams – single concentrated load- UDL longer than the beam span – UDL shorter than the beam span- two-wheel axles separated by a distance- multiple wheel axles (train of loads)-influence line diagram for shear force and bending moments – influence line diagrams for three hinged arches- influence line diagrams for cables with 3 hinged stiffening girders.

UNIT III ANALYSIS OF MULTISTORY FRAME BY APPROXIMATE METHODS: Analysis of multistorey frames by Portal Method, Cantilever Method and Substitute frame method.

UNIT IV FLEXIBILITY&STIFFNESS METHODS:

Flexibility method – Introduction -Application to continuous beams including support settlements.Introduction to stiffness method - Application to continuous beams including support settlements. (Limited to two span continuous beams).

UNIT V PLASTIC ANALYSIS

Introduction-idealized stress strain diagram – shear factors for various sections,moment curvature relationships – Ultimate moment – plastic hinge- lower and upper bound theorems – Ultimate strength of fixed and continuous beams.

TEXT BOOKS:

1. Bhavikatti - Analysis of Structures – Vol. I &2 ,Vikas publications,2003
2. Vazrani&Ratwani - Analysis of structures– Khanna Publications,2009.

REFERENCE BOOKS:

1. Devdasmenon - Structural analysis - 6th edition, 2007, Alpha Science International limited.
2. Pundit and Gupta - Structural Analysis (Matrix Approach)– Tata Mc.Graw Hill publishers,2006
3. B.C. Punmia, A.K Jain &A.K.Jain, SMTS–2, Theory of Structures, Twelfth Edition, 2004,Laxmi Publications.
4. C.S.Reddy, Basic Structural Analysis, Third Edition, 2010, TATA Mc. Graw Hill.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PS O1	PSO 2	PSO 3
CO1	3	3	3	--	2	--	--	--	--	2	--	--	3	2	-
CO2	3	3	3	--	--	--	2	--	--	2	--	--	3	2	-
CO3	3	3	3	--	2	--	--	--	--	2	--	--	3	2	-
CO4	3	3	3	--	--	--	--	--	--	2	--	--	3	2	-
CO5	3	3	3	--	--	--	--	--	--	2	--	--	3	2	-

III B.Tech II Semester

L	T	P	C
3	0	0	3

20AMB13 HUMAN RESOURCE DEVELOPMENT AND ORGANIZATION BEHAVIOR

(Common to All Branches)

Course Outcomes:

After completion of this course students will be able to:

1. To define and explain the basic concepts of organizational behavior.
2. To explain the essential concepts of organizational conflicts, resolution of conflicts, change management and organizational development.
3. To outline the various aspects of HR and deal with people resourcing in an organization.
4. To understand the concepts of HRD, its role and importance in an organization.
5. To develop an understanding towards emerging trends in compensation practices and HRM.

UNIT-I:
Introduction to Organisational Behaviour

Meaning and scope of organizational behavior - Challenges and Opportunities – Foundations of Individual behavior, Motivation - Theories (Maslow, ERG, Douglas McGregor two-factor theory), Group dynamics, Leaderships styles.

UNIT-II:
Organisational Conflict and Change

Organizational Conflict - causes and consequences - conflict and negotiation, Organizational change, change management process, resistance to change, flexibility and crisis management – Organizational Development – concept and significance.

UNIT-III:
Introduction to Human Resource Management

HRM: Meaning, definition and functions. Job Analysis, Job Design, Human Resource Planning - Recruitment and Selection - Sources of Recruitment - Selection process, Placement and Induction.

UNIT-IV:
Human Resource Development

Introduction to Human Resource Development: Concepts - Training and Development - methods of training, importance of Performance Appraisal, traditional and modern methods of performance appraisal, Job Evaluation - methods of Job Evaluation.

UNIT-V:

Compensation Management, Industrial Relations and Emerging HR Practices

Compensation – Concepts and Principles, Influencing Factors, Emerging Trends in Compensation – Methods of Payment – Incentives and Rewards, Managing Industrial Relations – Emerging trends and practices in Human Resource Management.

Text Books:

1. Organizational Behaviour, K. Aswathappa, (2016), 12^{th}edition, Himalaya,
2. Personnel Management, 6thedition Edwin B. Flippo, (2013)Tata Mc Graw Hill
3. Organizational Behaviour and Human Resource Management: A Guide to a Specialized MBA Course. (2017). Germany: Springer International Publishing.
4. Organisational Behaviour, 11th edition, Education Stephen P. Robins, (2008) PHI Learning / Pearson

Reference Books:

1. Personnel Management & Industrial Relations, 10thedition, Rustum S. Davar (2009) Vikas Publishers.
2. Human Resource Management, 1stedition, Venkataratnam (2011) Seven hills Book Publications.
3. Organisational Behaviour, 4thedition,Mc Shane & Von Glinov,(2007), Tata Mc Graw Hill

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO2**	**PSO3**
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	
CO2	2	2	-	-	-	-	-	-	3	-	-	-	-	-	
CO3	-	-	-	-	-	-	-	-	3	-	-	-	-	-	
CO4	2	-	2	-	-	3	3	-	3	3	-	-	-	-	
CO5	-	3	-	-	-	-	-	-	3	3	-	-	3	3	

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L	T	P	C
3	0	0	3

III B.Tech I Semester
20AHS22

HISTORY OF SCIENCE AND ENGINEERING

Course Outcomes:

After completion of the course the student will be able to

1. Acquire Knowledge of an overview of the development of modern science, with particular emphasis on science in the twentieth century
2. Gain Skills for further study of twentieth century science as a historical topic

UNIT-I

Historical Perspective: The nature of science and technology, Roots of science and technology in India, Science and society, Scientists and society, Science and Faith and the rise of applied sciences.

UNIT-II

POLICIES AND PLANS AFTER INDEPENDENCE :

Nehru's vision of science for independent India, Science and technology developments in the new era science and technology developments during the Five Year Plan Periods and science and technology policy resolutions.

UNIT-III

RESEARCH AND DEVELOPMENT (R&D) IN INDIA:

Expenditure in R&D, Science and Technology Education, Research activities and promotion of technology development, Technology mission, Programs aimed at technological self-reliance, activities of council of scientific and industrial research(CSIR).

UNIT-IV

SCIENCE AND TECHNOLOGICAL DEVELOPMENTS IN MAJOR AREAS Space - Objectives of space programs, Geostationary Satellite Services - INSAT system and INSAT services remote sensing applications, Launch Vehicle Technology Ocean Development – Objectives of ocean and development, Biological and mineral resources, Marine research and capacity building Defense Research - Spin-off technologies for civilian use, Biotechnology – Applications of biotechnology in medicine, Biocatalysts,

Agriculture, Food, Fuel and Fodder, Development of biosensors and animal husbandry Energy– Research and development in conservation of energy, India's nuclear energy program, technology spin-offs.

UNIT-V:

NEXUS BETWEEN TECHNOLOGY TRANSFER AND DEVELOPMENT:

Transfer of Technology - Types, Methods, Mechanisms, Process, Channels and Techniques, Appropriate technology, Technology assessment, Technological forecasting, Technological innovations and barriers of technological change.

TextBooks:

1. Kalpana Rajaram, Science and Technology in India, Published and Distributed by Spectrum Books (P) Ltd., NewDelhi–58.
2. Srinivasan, M., Management of Science and Technology (Problems & Prospects), East-West Press(P) Ltd., NewDelhi.

References:

1. Ramasamy, K.A., and Seshagiri Rao, K., (Eds), Science, Technology and education for Development,K.,Nayudamma Memorial Science Foundation, Chennai–8.
2. Kohili, G.R., The Role and Impact of Science and Technology in the Development of India, Surjeet Publications.
3. Government of India, Five Year Plans, Planning Commission, New Delhi.
4. Sharma K.D.,and Quresh M.A., Science, Technology and Development, Sterling Publications (P)Ltd., NewDelhi.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	-	-	-	-	-	-	1	1
CO2	3	2	1	2	-	-	-	-	-	-	1	1

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III B. Tech - I – Semester

20AME23	**RENEWABLE ENERGY TECHNOLOGY**	**L**	**T**	**P**	**C**
	(*Professional Elective - II)	3	-	-	3

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Apply the principle of Solar radiation in solving the problems related to solar radiations measurements and solar energy collectors.
2. Apply the principle of solar energy storage Photovoltaic conversion systems and solar refrigeration systems for various industrial applications
3. Apply the fundamentals of Biomass and Geothermal thermal energy conversion systems to produce useful energy for efficient utilization.
4. Apply the Principle of Wind and Direct Energy conversion systems to generate energy in efficient methods.
5. Use the principles of ocean, wave , tidal energy systems to produce useful energy for efficient utilization and applications.

UNIT: I Energy Colletors

Solar Radiation And Collection: Introduction to Energy Sources – Solar energy – Physics of the Sun– Solar Constant – Sun-Earth angles – Terrestrial and extra-terrestrial radiation – Direct and Diffuse Radiation – Solar radiation on tilted surface–Availability and limitations of solar energy, Instruments for measuring solar radiation – Sun shine recorder

Solar Thermal Collectors: Flat plate and concentrating collectors-Solar Power Plant – Central tower receiving system.

UNIT: II Solar Energy Storage and Applications

Sensible and latent heat storage , Solar heating and cooling, Solar water heating system – Solar distillation – Solar cookers – solar dryers – Solar Ponds – Photovoltaic conversion – Emerging solar cell technologies.

Solar Refrigeration: Introduction Classification, working of solar refrigeration systems.

UNIT: III Biomass and Geothermal Energy

Biomass Energy: Energy from biomass – Sources of Biomass – Conversion of biomass into fuel – Energy through fermentation – Pyrolysis – Gasification– Aerobic and Anaerobic bioconversion. – Biogas digesters – Properties and characteristics of biogas and utilization.

Geothermal Energy: Fundamental of Geophysics – Classification of Geothermal sources –Extraction techniques – Utilization of Geothermal energy.

UNIT: IV Wind and Direct Energy

Wind Energy: Basic principles of Wind energy conversion, Classification of WEC systems, Horizontal and Vertical axis windmills-Performance characteristics – Betz criteria.

Direct Energy Conversion: See beck, Peltier, Thomson, Joule, and Hall effects –Ionization–Need for DEC - Principle of DEC, Thermo Electric Generators, MHD generators.

UNIT - 5 Ocean, Wave & Tidal Energy

Ocean Thermal Energy Conversion: OTEC Principle – Open and closed cycle of OTEC –Heat exchangers Biofouling and site selection Hybrid cycle .

Wave Energy: Introduction - Advantages and disadvantages of wave energy energy and power from the waves. Wave energy conversion devices.

Tidal Energy –Introduction, Basic principle of Tidal power, Components of tidal power plants Operation methods of utilization of Tidal Energy advantages and Limitation of Tidal power.

TEXT BOOKS:

1. G.D. Rai, Non-Conventional Energy Source,4th edition, Khanna Publishers.,2000.
2. Dr. R.K. Rajput, Non-Conventional Energy Sources and Utilization, 2nd revised edition, S. Chand

REFERENCE BOOKS:

1. B.S. Magal, Frank Kreith & J.F. Kreith, Solar Power Engineering, 1st edition, Tata McGraw Hill, 1899.
2. J P Navani & Sonal Sapra, Non-Conventional Energy Resources, Revised Edition, S Chand Publishers, 2013.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3					3							3
CO2	3	3					3							3
CO3	3	3					3							3
CO4	3	3					3							3
CO5	3	3					3							3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

CIVIL ENGINEERING

III B.Tech-I Semester

L	T	P	C
3	0	0	3

20ACE33 PAVEMENT ANALYSIS AND DESIGN

Course Outcomes: After successful completion of the course the students will be able to

1. Evaluate the design parameters of pavements.
2. Analyse stresses in Rigid and Flexible pavements.
3. Design pavements using IRC and international codes
4. Establish Highway maintenance using strengthening methods
5. Use Pavement Design software proficiently.

UNIT I: TYPES OF PAVEMENTS

Types of pavement – Factors affecting design of pavements – wheel loads –ESWL Concept- tyre pressure – contact pressure, Material characteristics – Environmental and other factors.

UNIT II: STRESSES IN FLEXIBLE PAVEMENTS & RIGID PAVEMENT

Stresses in flexible pavement – layered systems concept – one layer system – Burmister Theory for Pavement Design. Stresses in rigid pavements – relative stiffness of slab, modulus of sub-grade reaction, Westergaard's stresses due to warping, stresses due to loads, stresses due to friction, Numerical Problems.

UNIT III: FLEXIBLE PAVEMENT DESIGN AND RIGID PAVEMENT DESIGN

Pavement design: CBR Method of Flexible Pavement Design- IRC method of flexible pavement design, AASHTO Method of Flexible Pavement design, IRC:58-2002, IRC:58-2015. IRC method of Rigid pavement design – Importance of Joints in Rigid Pavements- Types of Joints – Use of Tie Bars and Dowell Bars. AASHTO method of Rigid pavement design.

UNIT IV: HIGHWAY MAINTENANCE

Need for Highway Maintenance- Pavement Failures- Failures in Flexible Pavements-Types and Causes- Rigid Pavement Failures- Types and causes- Pavement Evaluation- Falling weight Deflectometer, Benkleman Beam method- Strengthening of Existing Pavements- Overlays.

UNIT V: PAVEMENT ANALYSIS AND DESIGN SOFTWARE

Overlays: Introduction, Types and suitability, OverlayDesign, Introduction to the design software such as MEPDG, KenLayer, KenPave, JULEA, & BISAR.

TEXT BOOKS:

1. Yoder, E. J., and Witczak, M. W. Principles of Pavement Design, 2nd Edition, Wiley, NY, USA, 1975.
2. Dr. L.R. Kadiyali, Traffic Engineering and Transportation Planning, Khannan Publishers, 7th Edition, 2007.

REFERENCE BOOKS

1. C. JotinKhinsty and B. Kent Lall, Transportation Engineering
2. Huang, Y. H. Pavement Analysis and Design, 2nd Edition, Pearson Prentice Hall, NJ, USA, 2010.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3					3							3
CO2	3	3					3							3
CO3	3	3					3							3
CO4	3	3					3							3
CO5	3	3					3							3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

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CIVIL ENGINEERING

III B.Tech – I Semester (CE)

L	T	P	C
3	0	0	3

20ACE34 BUILDING MATERIALS AND COMPOSITES (NPTEL)

Course Outcomes:

After successful completion of the course the students will be able to

1. Use materials for building construction.
2. Identify elements of building components.
3. Conceptualize the techniques of scaffolding and formwork of all structural elements
4. Plan construction methods and finishing works in buildings.
5. Define the building services and functionality requirements of all structures.

UNIT I

Clay products and alternatives like Fly-ash, CEB, CSEB

UNIT II

Stone, stone tiles and stone dust blocksWood and engineered wood - Glass and glazing systems,

ceramic tiles, vitrified tiles, insulation

UNIT III Fine aggregate, Coarse aggregate, Cement, Concrete

UNIT IV Precast items – flooring, roofing, walling system, HBC, AAB - Ferrous and non-ferrous metals

UNIT V Bitumen as damp proofing materials, Paints - Plastics, Composites, nanotechnology applications

TEXT BOOKS:

1. S.C.Rangwala , K.S. Rangwala and P.S. Rangwala, Engineering materials, 41st Edition:2014, charotarPublishers,Anand
2. Dr.B.C,Punmia,Buildingconstruction,TenthEdition,2012,LaxmiPublications(P)Ltd.,New Delhi.

REFERENCE BOOKS:

1. S.K. Duggal, Building materials, Fourth Edition, 2012, New Age international(P)Ltd., NewDelhi.
2. N.L.Arora and B.L. Gupta, Building construction, 2014 Edition, Satya prakshanpublications, NewDelhi.
3. Bureau of Indian Standards, National Building Code of India-2005, NewDelhi. n
4. R.N.Raikar, Diagnosis and treatment of structures in distress, Published by R&D Cetreof Structural Designers & Consultants Pvt.Ltd., Mumbai,1994.

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	--	--	--	--	--	--	--	--	--	2	2	2
CO2	3	2	2	--	--	--	--	--	--	--	--	--	2	2	2
CO3	3	2	2	1	--	--	--	--	--	--	--	--	2	2	1
CO4	3	2	2	--	--	2	1	--	--	--	--	--	2	2	1
CO5	3	2	2	-	-	-	-	-	-	-	-	-	2	2	1

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CIVIL ENGINEERING

L	T	P	C
3	0	0	3

III B.Tech, - I Semester – CE

20ACE25 ARCHITECTURE AND TOWN PLANNING

(Open Elective – I/Job oriented)

Course Outcomes:

After successful completion of the course the students will be able to

1. Know the history of Architecture and impact of environmental studies on design of building
2. Apply Techniques of planning, land scape design, and Housing.
3. To design urban built environment
4. Execute city planning.
5. Frame urban infrastructure, services, and amenities.

UNIT I HISTORY OF ARCHITECTURE:

Indian – Indus valley, Vedic age, Buddhist period, Indo Aryan, and Dravidian styles- Mughal periods: European – Egyptian, Greek, Roman, medieval and renaissance periods construction and Architectural styles; vernacular and traditional architecture. Principles of Architecture.

ENVIRONMENTAL STUDEIS IN BUILDING SCIENCE:

Components of Ecosystem; ecological principles concerning environment; energy efficient building design; thermal comfort; solar architecture; principles of lighting and styles for illumination; basic principles of architectural acoustics.

UNIT II PRINCIPLES OF PLANNING:

Principles of planning residence – site selection, site orientation – aspect, prospect, grouping, circulation, privacy, furniture requirement, services and other factors. Post classic Architecture: Introduction of post-classic architecture contribution of eminent architects to modern period – Edward Lutyens, Le Corbusier, Frank Lloyd Wrigt, Walter Groping.

UNIT-III URBAN DESIGN:

Concepts and theories of urban design; Urban design interventions for sustainable development and transportation; Historical and modern examples of urban design; Public spaces, spatial qualities and Sense of Place; Elements of urban built environment – urban form, spaces, structure, pattern, etc; Urban renewal and conservation; Site planning; Landscape design.

UNIT-IV CITY PLANNING:

Evolution of cities; principles of city planning; planning regulations, Development controls – FAR, densities and building byelaws; sustainable development.

UNIT V:URBAN INFRASTRUCTURE, SERVICES AND AMENITIES:

Basic understanding of sustainable Development, green infrastructure; urban rainwater harvesting; power supply and communication systems -- guidelines;

TEXT BOOKS:

1. Percy Brown, 'Indian Architecture (Buddhist and Hindu period)', Taraporevala and sons, Bombay, 1983
2. Satish Grover, The Architecture of India (Buddhist and Hindu period), Vikas Publishing House, New Brown Percy, Indian Architecture (Islamic Period) - Taraporevala and Sons, Bombay, 1983.
3. Michael Laurie, an Introduction to Landscape Architecture, Elsevier, 1986.
4. Text book of Town Planning, A.Bandopadhyay, Books and Allied, Calcutta 2000
5. Mohinder Singh and L.R. Kadiyali 'Crisis in road transport' 1989 Konark Publishers Pvt. Ltd., New Delhi

REFERENCE BOOKS:

1. M. Evans – Housing, Climate & Comfort, Architectural Press, London, 1980.
2. Charangoist shah, Water supply and sanitary engineering, Galgotia publishers.
3. Dr.V. Narasimhan – An introduction to Building Physics- Kabeer printing works, Chennai -5
4. L.Suri, Acoustics Design and Practice, Asia Publishing House, New York, 1963
5. John Ratcliffe, An Introduction to Town and Country Planning, Hutchinson 1981
6. Babur Mumtaz and Patweikly, Urban Housing Strategies, Pitman Publishing, London, 1976.
7. Sinha, V.C. and Acharia, E. Elements of Demography 1984 Allied Pub., Delhi
8. Luigi Fusco Girard and Peter Nijkamp (editors) Cultural Tourism and Sustainable Local

Development 2009 Ashgate, Burlington

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3										2		3		
CO2	3	2					3				2			2	
CO3	3	2												2	
CO4	3	2					3						3		
CO5	3														

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L	T	P	C
3	0	0	3

III B.Tech, - I Semester – CE

20ACE26 GROUND WATER DEVELOPMENT AND MANAGEMENT (PROFESSIONAL ELECTIVE-I)

Course Outcomes: After successful completion of the course the students will be able to

1. Identify the ground water flow & prediction
2. Implement the Methods of improving the ground water potential
3. Manage the groundwater resources
4. Do the Surface and subsurface investigation method.

UNIT I GROUND WATER FLOW

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types ofaquifers, porosity, Specific yield and Specific retention.

Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system. Ground water flow contours their applications.

UNIT II PUMPING

Analysis of Pumping Test Data – I: Steady flow ground water flow towards a well in confined and unconfined aquifers – Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests.

Analysis of Pumping Test Data – II: Unsteady flow towards a well – Non equilibrium equations – Thesis solution – Jocob and Chow's simplifications, Leak aquifers.

UNIT III EXPLORATION METHODS

Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic refraction methods. Subsurface methods – Geophysical logging and resistivity logging.Aerial Photogrammetry applications along with Case Studies in Sub-surface Investigation.

UNIT IV GROUNDWATER RECHARGE

Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNITV SEA WATER INTRUSION

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg relation, Shape of interface, control of seawater intrusion. Ground water Basin Management: Concepts of conjunction use.

TEXT BOOKS:

1. David Keith Todd, Ground water Hydrology, John Wiley & Son, New York,2000
2. H.M.Raghunath, Groundwater,1983, Wiley Eastern Ltd, 1987

REFERENCE BOOKS:

1. Bawvwr, Groundwater John Wiley & sons, 2004
2. R.Willes&W.W.G.Yeh, Groundwater Syatem Planning & Managemnet Prentice Hall.,1987
3. C.W.Fetta, Applied Hydrogeology CBS Publishers & Distributers,2000.

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2											3		
CO2	3	2				3	2						3	2	
CO3	3	2				3	2						3	2	
CO4	3	2					3	2					3	2	
CO5	3	2					3	2					3	2	

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L	T	P	C
3	0	0	3

III B.Tech – I Semester (CE)

20ACE27 HYDROLOGY AND IRRIGATION ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Formulate measurements related to infiltration and runoff
2. Perform hydrograph analysis
3. Plan and design reservoirs.
4. Analyse and design Dams for power generation and irrigation systems
5. Execute the design of diversion head works and canals

UNIT I HYDROLOGY:

Engineering hydrology and its applications. Hydrologic cycle; precipitation-evaporation and transformation, infiltration and percolation and run-off, rainfall measurement, by different types of rain gauges, computation of average rainfall over a basin.Measurement of evaporation and 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.

UNIT II HYDROGRAPH ANALYSIS:

Hydrograph- Unit Hydrograph- construction and limitations of Unit hydrograph, separation of base flow, Application of the unit hydrograph to the construction of a flood hydrograph resulting from rainfall of unit duration; Resulting from two or more periods of Rainfall, S-hydrograph, Construction of Unit hydrograph of different unit duration from unit hydrograph of some given unit duration, Flow mass curve.

UNIT III IRRIGATION:

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.

RESERVOIR PLANNING:

Introduction; Investigations for reservoir planning; Selection of site for a reservoir; Zones of storage in a reservoir; Storage capacity and yield; Mass inflow curve and demand curve; Calculation of reservoir capacity for a specified yield from the mass inflow curve; Determination of safe yield from a reservoir of a given capacity; Sediment flow in streams: Reservoir sedimentation; Life of reservoir; Reservoir sediment control.

UNIT IV DAMS: GENERAL:

Introduction; Classification - advantages and disadvantages of dams; Physical factors governing selection of type of dam; selection of site for a dam.

GRAVITY DAMS: Introduction; Forces acting on a gravity dam; Combination of loading for design; Modes of failure, principal and shear stresses; Stability analysis; Elementary profile of a gravity dam; Practical profile of a gravity dam; Limiting height of a gravity dam- High and low gravity dams; Design of gravity dams–single step method; Galleries.

EARTH DAMS: Introduction; Types of earth dams; Causes of failure of earth dams; Criteria for safe design of earth dams; Section of an earth dam; Design to suit available materials; Seepage control measures; Slope protection. Seepage through earth dam – graphical method

UNIT V DIVERSION HEADWORKS:

Types of diversion head works; Diversion and Storage head works; weirs and barrages; Layouts of diversion head works; components; Causes and failure of hydraulic structures on permeable foundations; Blighs creep theory; Khoslas theory; Determination of uplift pressure, impervious floors using Blighs and Khoslas theory; Exit gradient, Check dams.

CANAL REGULATION WORKS: Canal falls: Necessity and location of falls; Types of falls; classification of falls, cistern design; roughening devices; design of sarada type fall.

CROSS DRAINAGE WORKS: Introduction; types of cross drainage works; selection of suitable type of cross drainage work

TEXT BOOKS:

1. Punmia&Lal, Irrigation and water power engineering, Sixteenth Edition, 2009, Laxmi publications Pvt. Ltd., New Delhi
2. .P.N. Modi, Irrigation Water Resources & Water Power Engineering, Seventh Edition, 2008, Standard Book House.

REFERENCE BOOKS:

1. K R Arora - Irrigation, Waterpower and Water Resources Engineering; Standard Publication, New Delhi.

2. S. K. Garg, Irrigation Engineering and Hydraulic structures, First Edition, 2006, Khanna Publishers, Delhi.

3. S. Jayarami Reddy, Engineering Hydrology, Laxmi publications, Third Edition, 2011, Pvt. Ltd., New Delhi

4. K.Subramanya, Engineering Hydrology, Fourth Edition, 2013, Tata Mcgraw Hill Company, Delhi

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	--	2	--	2	2	1	--	--	--	2	2	3	--
CO2			--	--	--	1		--	2	--	2	2		3	2
CO3	3	2	2	--	--	2	2	--	1	--	--		2	3	2
CO4	3		2	2	--	2	--	--	2	--	2	2	2		-
CO5	3	2	2	--	--	2	2	--	1	--	--	2		3	2

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CIVIL ENGINEERING

L	T	P	C
3	0	0	3

III B.Tech – I Semester (CE)

20ACE28 **CONSTRUCTION MANAGEMENT**
(PROFESSIONAL ELECTIVE-I)

COURSERA

Course Outcomes:

After successful completion of the course the students will be able to

1. Execute the initiation of the project planning and lean project delivery method
2. Perform sustainability in construction industry and safety in construction process
3. Have international view of construction projects
4. Discover key project scheduling techniques and procedures
5. Learn how to develop and manage a schedule, and understand scheduling tools such as bar charts, activity on arrow, and activity on nodes

UNIT I CONSTRUCTION PROJECT MANAGEMENT

Introduction to the Engineering and Construction Industry - Construction Projects and Industry Characteristics - Challenges and Opportunities in the Construction Industry - Program Project and Construction Management Introduction - Construction Management and Project Management - Program Management and Summary - Construction vs Manufacturing Industry Basics - Compare and Contrast the Construction and Manufacturing Industries - The Future of the Construction Industry - Introduction to the EAC Life Cycle - The Cost of Change in the EAC Lifecycle - Key EAC Lifecycle

Project Development Cycle - Contract Types - Project Delivery Methods - Contracting Strategy Assessment - CM at Risk and CM as Agency - Alliance Contracting and Public Private Partnerships - Types of Surety Bonds - Purchasing a Surety Bond - Terminating a Surety Bond - Surety Loss Data

UNIT II SUSTAINABILITY AND BIM IN CONSTRUCTION INDUSTRY

Safety in Construction Industry - Community Involvement in a Construction Project - Rating Systems for Construction Projects - The Envision Rating System

Environmental, Health and Safety Practices - Barriers to Learning and Change - Safety Performance Models - Safety, Health and Environment Management Systems - Making EHS Work for You

Technology Trends: Defining BIM - The Role of CM and Design Management - Technology and The Role of CM - Technology and The Role of Facility Management - Virtual Reality in Construction Management - International Development and Project Risk - Cost Risks: Construction Projects - Cost Risks: Operations - ESPRIT: A Framework for Understanding Risk

UNIT III CONSTRUCTION SCHEDULING

Introducing Bar (Gantt) Charts - Using Bar (Gantt) Chart - Introduction to Activity Precedence Diagrams - - Recommendations for Building AON Diagrams - Examples of Activity Precedence (AON) Diagrams Introduction to Critical Path - Critical Path in a Project Schedule – Determining the Number of Critical Paths in a Project - Imposing Lag Durations in Critical Path - Determining Critical Path in a Start to Start Relationship – Determining Critical Path in a Finish to Finish Relationship -

UNIT IV PERT & CPM

Introduction to Activity on Arrow - Drawing an Activity on Arrow Diagram - Numbering Nodes on a Diagram - Practice Drawing Activity on Arrow Diagrams - Advanced Activity Diagrams - Adding a Key to An Activity - on Arrow Diagram - Backward Pass Calculations - Determining the Duration of a Project PERT Probability – PERT Example on Completing a Project - PERT Calculations: Critical Activities – Applying PERT: Range Estimating - Linear Construction Overview and Examples - Line of Balance (LOB) MS Project Scheduling Overview - MS Project: A Deeper Dive - Primavera P6 Overview - Primavera P6 Critical Path - Primavera P6: Gantt Chart - Primavera P6 Importing Activities and Running Schedule

REFERENCES

1. Sidney M. Levy “Project Management in Construction”, The McGraw Hill Companies Inc, Newyork, 2006
2. S. D. Anderson & R. W Woodhead, “Project Manpower Management :Management Processes in Construction Practice” John Wiley & sons, 1981
3. Dennis Lock ,“Project Management in Construction”, Gower Publishing Company, Burlington 2004.
4. Saleh Mubharak ,“Construction Project Scheduling and Control”, John Wiley and Sons Inc 2010.
5. Jay.S.Newitt “Construction Scheduling Principles and Practices”, Copyright © 2009, 2005 by Pearson Education, Inc., Upper Saddle River, New Jersey 07458, 2009.
6. Andrew Baldwin & David Bordoli, “A Handbook for Construction Planning and Scheduling”, Wiley Blackwell, 2014.

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1	--	2	--		2	1	--	--	--	2	2	3	
CO2			--	--	--	1		--	2	--	2	2			
CO3	3	2	2	--	--	2	2	--	1	--	--		2	3	3
CO4	3			2	--	2	--	--	2	--	2	2	2		

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CIVIL ENGINEERING

L	T	P	C
3	0	0	3

III B.Tech – I Semester (CE)

20ACE29 **SURFACE HYDROLOGY**

(PROFESSIONAL ELECTIVE-I)

Course Outcomes:

After successful completion of the course the students will be able to

1. Define concepts of hydrologic cycle and characteristics of precipitation, infiltration, evaporation and evapotranspiration.
2. Evaluate the evapotranspiration and irrigation schedule
3. Design flood estimation using hydrographs and frequency analysis
4. Design the flood routing.
5. Apply the concepts and principles in hydrologic design.

UNIT I HYDROLOGIC CYCLE AND PRECIPITATION:

Hydrologic cycle, space and time scales, classification of hydrologic models; Precipitation: mechanisms, types, use of Intensity-Duration Frequency curves, design storm, probable maximum precipitation.

UNIT II INFILTRATION, EVAPORATION AND EVAPOTRANSPIRATION:

Infiltration: process description, measurement, Richard's equation, Green Ampt model; Evaporation: process description, modified Penman equation; Evapotranspiration: process description, measurement, irrigation scheduling.

UNIT III OVER LAND FLOW AND STREAM FLOW:

Overland flow: Hortonian and Saturation overland flow mechanisms; Stream flow: factors affecting base flow, Hydrograph analysis, unit hydrograph theory; Design flood estimation and regional flood frequency analysis.

UNIT IV FLOOD ROUTING:

Flood Routing: reservoir routing, channel routing Muskingum Cunge method, Diffusion wave routing.

UNIT V HYDROLOGIC DESIGN:

Hydrologic Design: uncertainty concepts, first order reliability method.

TEXT BOOKS:

1. Subramanya, K (2013), “Engineering Hydrology”, Fourth Edition, McGraw Hill Education (India) Private Limited, New Delhi.

2. Viessman, W., and Lewis, G.L. (2003), "Introduction to Hydrology", Fifth Edition, PHI Learning Private Limited, New Delhi.

3. Chow, V. T., Maidment, D. R., and Mays, L.W. (1988), Applied Hydrology, First Edition, McGraw-Hill International Edition, Civil Engineering Series, Singapore.

REFERENCE BOOKS:

1. S. Jayarami Reddy, Engineering Hydrology, Laxmi publications, Third Edition, 2011, Pvt. Ltd., New Delhi.

2. C.W.Fetta, Applied Hydrogeology CBS Publishers & Distributers,2000.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	--	2	--	2	2	2	--	--	--	2	2	3	
CO2			--	--	--	1		--	2	--	2	2		3	
CO3	2	2	--	2	--	2	2	3	--	--	--	2	2	3	
CO4	2	2	--	2	--	2	2	1	--	--	--	2	2		
CO5	3		--	--	--	1		--	2	--	2	2			

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(AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

III B. Tech I Semester

20ACE30 GIS LAB

Course Outcomes:

After successful completion of the course the students will be able to

1. Demonstrate Expertise in digital image processing
2. Use Global positioning system in real time data processing
3. Use the techniques of Geographical Information System
4. Perform Data integration between Satellite data, GPS and GIS in Decision Making

LIST OF EXPERIMENTS

1. Assign spatial reference or geo reference and projection to given Toposheet or map.
2. Digitize a Map/Toposheet.
3. Creation of Digital Elevation Model using Vertical Mapper.
4. Create thematic maps of given Toposheet.
5. Add attribute data to the shapfile or layer and querying on attribute data.
6. Perform vector analysis using Geoprocessing Tools.
7. Converting *.tab file to *.shp & vice versa.
8. Creation of Vorronoi / Theissan diagram for points.
9. Perform raster analysis.
10. Overlay Analysis.
11. Interpolation of point data to create Spatial Maps.
12. Compose the map by adding components, layout and exporting map.

TEXT BOOKS:

1. Lillesand, T.M. and Kiefer, R.W., 1987. Remote sensing and Image Interpretation, John Wiley.

2. Jensen, J. R. Introductory digital image processing a remote sensing perspective, Prentice Hall series in geographic information science.
3. Schowengerdt, R. A., 2007. Remote Sensing: Models and Methods for Image Processing, Academic Press.

REFERENCE BOOKS:

1. Campbell, J.B., 1996. Introduction to Remote Sensing, Taylor & Francis, London.
2. Cracknell, P. and Hayes, L. Introduction to remote sensing,
3. Jensen, J.R., 2003. Remote Sensing of the Environment an Earth Resource Perspective, Pearson Education, Delhi.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3				2	-	-	-	-	-	-			
CO2	1	2			1	2	-	-	-	-	-	-	2		
CO3	1	-			2	2	-	-	-	-	-	-	1	2	3
CO4	2	1				1	-	-	-	-	-	-	3		2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

CIVIL ENGINEERING

	L	T	P	C
III B.Tech – I Semester (CE)	0	0	3	1.5

20ACE31 STRUCTURAL ENGINEERING DESIGN LAB-I

Course Outcomes:

After successful completion of the course the students will be able to

1. Apply skills in using software.
2. Analyze and design reinforced concrete beamsand columns.
3. Analyze and designPlaneframes Plane trusses and slabs.
4. Analyze and design any structure under any loading.

LIST OF EXPERIMENTS:

1. Explanation and Practice on different tabs and options in Staad Pro.
2. Analysis and Design of Simply supported beam.
3. Analysis and Design of Fixed beam.
4. Analysis and Design of Plane frame subjected to gravity loading.
5. Analysis and Design of Plane frame subjected to gravity loads and lateral load (wind load).
6. Analysis and Design of One-way slab.
7. Analysis and Design of One way Continuous slab (for single storey).
8. Analysis and Design of Two-way slab.
9. Analysis and Design of Two way Continuous slab (for Single storey).
10. Analysis and Design of Plane roof truss.

REFERENCES

1. Reference Guide Design of R C C Buildings using Staad Pro V8i (2017) by TS Sharma
2. STAAD Pro 2007 Manual (American Examples)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3				2	-	-	-	-	-	-			
CO2	1						-	-	-	-	-	-	2		
CO3	1	-			2	2	-	-	-	-	-	-	1	2	3
CO4	2	1				1	-	-	-	-	-	-	3		2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
1	0	2	2

III B.Tech, I Semester

20ACE32 COMPUTER AIDED DRAFTING LAB

Course Outcomes: After successful completion of the course the students will be able to

1. Become familiar with the concepts and benefits of Building Information Modeling.
2. Understand the fundamental concepts and features of BIM software.
3. Use the Parametric 3D design tools to start designing projects.
4. Use the automated tools for project documentation.
5. Develop an initial level of comfort and confidence with BIM software through hands-on experience.
6. Know how to use BIM software in a typical workflow.

Exercise 1 Drawing 2D Floor Plan using BIM software

Exercise 2 Drawing 3D House Plan (3 BHK)

Exercise 3 Drawing and rendered walk through view of 3D house plan

Exercise 4 Drawing the plan and 3 D view of a residential building

Exercise 5 Drawing the plan and perspective views of Multi-Unit Residential Apartment.

Exercise 6 Drawing the plan and perspective views of Office building

Exercise 7 Drawing the plan and perspective views of School building

Exercise 8 Drawing the plan and perspective views of G +3 storey building

Exercise 9 Drawing the plan and perspective views of Cinema Hall

Exercise 10 Drawing the plan and perspective views of shopping Mall

REFERENCES

1. Dzambazova , “Mastering Revit® Architecture2009 “, Wiley Publishing Inc , 2009
2. Don Bokmiller, Whitbread, Joel Londenberg , “Mastering Autodesk® Revit®MEP2012”, John Wiley and Sons Inc, 2011

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3				2	-	-	-	-	-	-			
CO2	1	2					-	-	-	-	-	-	2		
CO3	1	3			2	2	-	-	-	-	-	-	1	2	3
CO4	2	1				1	-	-	-	-	-	-	3		2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

CIVIL ENGINEERING

III B. Tech I Semester (Common to CE, ME & ECE)	**L**	**T**	**P**	**C**
	2	**0**	**0**	**0**

20AHS21 **INDIAN CONSTITUTION**

Course Outcomes:

After successful completion of the course the students will be able to

1. Define the philosophy of constitution
2. Understand the power and functions of Parliament
3. Comprehend the role of federal structure
4. Explain about the role and function of the judiciary and public services.
5. Explain about the role of foreign policy in country's 142evelopment

UNIT 1:

PREAMBLE AND ITS PHILOSOPHY- Introduction to Indian Constitution, Evolution of Indian Constitution, preamble and its philosophy.

UNIT 2:

UNION LEGISLATURE – The Parliament, Parliamentary Structure, Process of Legislation, President of India – Powers and Functions; Prime Minister and Council of Ministers; Constitution Amendment Procedure.

UNIT 3:

FEDERALISM IN INDIA – Centre-State Administrative Relationship; Governors – Powers and Functions; State Legislature – Composition and powers; Chief Ministers – Powers and Functions; The Election Commission – Powers and Functions.

UNIT 4:

JUDICIARY AND PUBLIC SERVICES – The Union Judiciary – Supreme Court and High Court; Fundamental Rights and Duties All India Services – Central Civil Services –State Services – Loca
l Services.

UNIT 5:

INTERNATIONAL PARTICIPATION – Foreign Policy of India; International Institutions Influence: UNO, WTO, WHO, SAARC, International Summits: BRICS, NSS, UNEP – India's Role in International Negotiations; Environmentalism in India.

TEXT BOOK:

1. Briji Kishore Sharma, Introduction to the Constitution of India, Prentice Hall of India, 2005.

REFERENCE BOOKS:

1. Mahendra Pal Singh, V. N. Shukla, Constitution of India, Eastern Book Company, 2011.
2. J. N. Pandey, Constitutional Law of India – Central Law Agency, 1998

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	-	-	-		2	-	-	-	-	3			
CO2	3	3	-	-	-		3	-	-	-	-	3	3	3	2
CO3	3	3	-	-	-		3	-	-	-	-	3	3	3	1
CO4	3	3	-	-	-		2		-	-	-	3	3	3	1
CO5	3	3					3					3			

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
CIVIL ENGINEERING

III B. Tech - I Semester (Common to CE, ME & ECE)	**L**	**T**	**P**	**C**
20AHS17 QUANTITATIVE APTITUDE AND REASONING-III	**2**	**0**	**0**	**0**

Course Outcomes:

After successful completion of the course the students will be able to

1. **Develop** the thinking ability to meet the challenges in solving Logical Reasoning problems.
2. **Solve** campus placements aptitude papers covering Quantitative Ability and Verbal Ability.
3. **Apply** different placement practice techniques.

UNIT 1: QUANTITATIVE ABILITY V

Time and Work – Equal Efficiency – Different Efficiency – Combined work – Alternate work – Partial work – Negative work - Pipes and Cistern – Simple Interest – Compound Interest - Year Zero – Difference between SI and CI – Clocks – Angle of the Clock –Minutes hand Loss or Gain – Calendars – Leap Year – Non Leap year – Odd days – Days of the week

UNIT 2: QUANTITATIVE ABILITY VI

Mensuration 2D – Area and Perimeter - Mensuration 3D – Volume - Total Surface area – Lateral Surface Area – Statistics- Mean - Mean Deviation – Median – Mode - Range – Variance - – Standard Deviation - Set theory

UNIT 3: REASONING ABILITY III

Puzzles – Cubes & Dices – Algebra – Selection Decision table – Visual reasoning - Inequalities

UNIT 4: VERBAL III

Vocabulary - Synonyms, Antonyms, One Word Substitution, and Spelling - Sentence Correction – Sentence Selection, Error Identification, Sentence Improvement, Sentence completion – Cloze Test, Types, Strategies - Para jumbles- Types, Strategies.

UNIT 5: SOFT SKILLS III

Written Communication - Listening Skills - Mentoring & Coaching - Decision Making –

Competitiveness - Inspiring & Motivating.

Text Books:

1. Quantitative Aptitude, Logic Reasoning & Verbal Reasoning, R S Agarwal, S.Chand Publications.
2. Quantitative Aptitude for Competitive Examinations, R S Agarwal, S.Chand Publications

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3-**		**1**	
CO2	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**	**1**	
CO3	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**	**1**	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
CIVIL ENGINEERING

III B. Tech I Semester (Common to CE, ME & ECE)	**L**	**T**	**P**	**C**
	2	**0**	**0**	**0**

20AHS18 FRENCH LANGUAGE

COURSE OUTCOMES:

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

CO1: Demonstrate basic knowledge of French language and analyze several core competencies.

CO2: Develop and improve comprehensive capabilities and apply simple phrases & sentences in real-life conversation.

CO3: Demonstrate ability to ask and answer questions about the self, personal interest, everyday life, and the immediate environment.

CO4: Apply the knowledge of tenses in making sentences for day-to-day conversations in different time frame.

UNIT-I INTRODUCTION & PRESENTATION:

Conversation, Introduction, Alphabets & Accents Culture, Formal & Informal – Use of 'tu' and 'vous', Map of France: Geographical, Administrative Greeting, Presenting oneself & others, Asking & giving identity, Days of the week, Months of the year, Numbers, Nationality, Profession, Making a visiting card salutations Gestures &Handshakes. Grammar – Verb "appeller", 'avoir', 'etre' and Pronouns.

UNIT-II RENDEZVOUS:

Conversation, approaching someone, Tele conversation, Buying a train ticket, Numbers the formula to write a post card, Culture and Life in France.Grammar – Passe Compose, Verbs "aller", "partir", "venir", "prendre", Definite & Indefinite Articles.

UNIT-III AGENDA &INVITATION:

Conversation, Time, Fixing a meeting, Alimentation, Moments of the day (from morning to night), Punctuality, Good moments of the day, Inviting someone, Accepting & Refusing Invitations, Family tree, Describing a house interior.Grammar – Verbs "savoir", "vouloir" , "pouvoir", Future Proche, Pronom Tonique Consists of exercises and images to be used in the class by the students, Pronoun 'on', Expression of quantity with partitif article, Possessive Adjectives and Verbs "finir", "faire,".

UNIT-IV VACATION & SHOPPING:

Describing an event, Reservations at a Hotel, Describing a person, Expressing opinion, Indication of time: Depuis & pendant, Gestures: Polite & Impolite, A French vacation, Culture, Making a purchase, Choosing & Paying, Trying a dress on, Talking about weather, Understanding a Weather Bulletin, Comparison, Dress & weather, Dialogue between a client and an employee of a store and Money in everyday life in France: Parking ticket / telephone card.Grammar – Imparfait & Passe Compose and Adjectives.

UNIT-V ITINERARY, EXCURSION & WEEKEND:

Asking for & giving directions, Giving order / advice / prohibition, Reservation at a restaurant, Taking an order , Asking for bill at a Restaurant, Expression of Quantity, Alimentation: Shopping list (portions), Making Suggestion & Proposal, Going for an outing, Acceptance & Refusal of an invitation, Giving arguments: favour & against, A French Weekend.Grammar – Ordinal Verbs of Movement.

TEXT BOOKS:

1. CAMPUS 1 Methode de Francais, Jacques Pecheur et Jacky Girardet, CLE International Paris 2002.
2. La France de toujours, Nelly Mauchamp; CL Einternational. Sans frontireres - Vols. 1, 2, & 3 – Hachette.

REFERENCE BOOKS:

1. Declic 1; Jacques Balnc, Jean-Michel Cartier, Pierre Lederlion; CLE International.
2. Nouveau Sans Frontieres – Vols. 1, 2 &3. Cours de langue et de civilisation Francaise –Hachette.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	3	3	-	3	3		
CO2	2	-	-	-	-	-	-	-	3	3	-	3	3		
CO3	2	-	-	-	-	-	-	-	3	3	-	3	3		
CO4	2	-	-	-	-	-	-	-	3	3	-	-			

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
2	0	0	0

III B. Tech I Semester (Common to CE, ME & ECE)

20AHS19 GERMAN LANGUAGE

COURSE OUTCOMES:

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

CO1: Demonstrate fundamental knowledge to learn German language, sounds, pronunciations, sentence structures and the verb conjugation.

CO2: Comprehend and apply the knowledge of vocabulary and phrases in day-to-day real-life conversation.

CO3: Apply various sentence structures by examining the rules of grammar in speaking and writing.

CO4: Analyze and apply the various verb structures of English and German language effectively in professional writing.

UNIT-I GERMAN SOUNDS

Vowels, consonants, diphthongs, umlaut, the nouns, gender distinctions, cases, definite and indefinite articles, conjugation of verbs, verbs with separable and inseparable prefixes, modal verbs, personal pronouns, possessive pronouns, reflexive pronouns, cases nominative, accusative and dative. Structure of sentence and categories of sentences, subordinate clause, causative and conditional sentences; A very interesting slideshow presentation is held to enlighten the students about the culture, people, and lifestyle in Germany.

UNIT-II SENTENCE FORMATION

Infinite sentences, use of conjunctive-I and conjunctive-II, plusquam perfect, modal verb, Conjunction, temporal, subordinate clauses & complex sentences.

UNIT-III GERMAN BASIC GRAMMAR

Verbs: Different forms, past tense and present perfect tense, adjectives and their declension, degrees of comparison; Prepositions, genitive case conjunctive. Different conjunctions (coordinating and subordinating), simple, complex and compound sentences, active and passive voice, relative pronouns.

UNIT-IV PURPOSE OF LANGUAGE STUDY

Pictures and perceptions, conflicts and solutions, change and the future, the purpose of the study of the German language, listening, understanding, reacting, speaking, communicating, use of language, pronunciation and intonation, reading, reading and understanding, writing, text writing, text forming, use of language, language reflection, building up the language, language comparison, culture reflection, other cultures and cultural identity.

UNIT-V GERMAN ADVANCED COMMUNICATION LEVEL - 1

The significance of language study, Speaking and thinking, Self – discovery, Communication, Language Competence, Language and culture, Language changes, Connection with other areas of study, The mother language and the other languages.

TEXT BOOKS:

1. Korbinian, Lorenz Nieder Deutschals Fremdsprache IA. Ausländer, “German Language”, Perfect Paperback Publishers, 1st Edition, 1992.
2. Deutschals Fremdsprache, IB, Erganzungskurs, “German Language”, Front Cover. Klett, Glossar Deutsch-Spanisch Publishers, 1st Edition, 1981.

REFERENCE BOOKS:

1. Griesbach, “Moderner Gebrauch der deutschen Sprache”, Schulz Publishers, 10th Edition, 2011.
2. Anna Quick, Hermann Glaser U.A, “Intermediate German: A Grammar and workbook”, Paperback, 1st Edition, 2006.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	3	3	-	3	3		
CO2	2	-	-	-	-	-	-	-	3	3	-	3	3		
CO3	2	-	-	-	-	-	-	-	3	3	-	3	3		
CO4	2	-	-	-	-	-	-	-	3	3	-	-			

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

III B. Tech I Semester (Common to CE, ME & ECE)

L	T	P	C
2	0	0	0

20AHS20 JAPANESE LANGUAGE

Course Outcomes:

CO1: Remember and understand Japanese alphabet and demonstrate basic structures of sentences in reading and writing.

CO2: Analyze the limitations of language by examining pronouns,verbs form,adjectives and conjunctions.

CO3: Demonstrate the skills of vocabulary and apply it to learn time and dates and express the min Japanese.

CO4: Analyze the formation of simple questions and answers in Japanese to know the Japanese culture and etiquette.

UNIT – I

INTRODUCTION TO JAPANESE SYLLABLES AND GREETINGS – Introduction of Japanese language, alphabets; Hiragana, katakana, and Kanji Pronunciation, vowels and consonants. Hiragana– writing and reading; Vocabulary:50 Nouns and 20 pronouns, Greetings.

UNIT – II

DEMONSTRATIVE PRONOUNS, VERBS AND SENTENCE FORMATION - Grammar: N1waN2desu, Japanese Numerals, Demonstrative pronoun-Kore, Sore, Are and Dore (This, That, Overthere, which) Kono, sono, Ano and Dono (this, that, over there, which) Kochira, Sochira, Achira andDochira. thisway....) Koko, Soko, Asoko and Doko (Here,There,...location), Classification of verbs Beverb desu Present and Present negative Basic structure of sentence (Subject+Object+Verb) Katakana - reading and writing

UNIT - III

CONJUNCTION, ADJECTIVES, VOCABULARY AND ITS MEANING – Conjunction -Ya… ..nado Classification of Adjectives ‘I’and‘na’-ending Setphrase– Onegaishimasu–Sumimasen, wakarimasen Particle–Wa, Particle-Ni‘Gaimasu’and‘Gaarimasu’for Existence of living things and non-living things Particle- Ka,Ni,Ga, Days/Months/Year/Week (Current, Previous, Next, Next to Next); Nation, Peopleand Language Relationship of family (lookandlearn);Simple kanjirecognition.

UNIT - 4

FORMING QUESTIONS AND GIVING ANSWERS – Classification of Question words (Dare,Nani,Itsu,Doyatte,dooshite,Ikutsu,Ikura); Classification of Teforms, Polite form of verbs.

UNIT - 5

EXPRESSING TIME, POSITION AND DIRECTIONS – Classification of question words (Doko,Dore, Dono,Dochira);Time expressions (Jikan) , Number of hours, Number of months, calendar of a month; Visiting the departmental store, railway stations, Hospital (Byoki), office and University.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	3	3	-	3	3		
CO2	2	-	-	-	-	-	-	-	3	3	-	3	3		
CO3	2	-	-	-	-	-	-	-	3	3	-	3	3		
CO4	2	-	-	-	-	-	-	-	3	3	-	-			

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	0	0	3

III B.Tech II Semester (CE)

20ACE38 DESIGN OF STEEL STRUCTURES

Course Outcomes:

After successful completion of the course the students will be able to

1. Demonstrate behavior of steel as a structural member & different types of connections.
2. Design laced and battened column, Slab base and gusseted base
3. Design various sections of beams like rectangular, square, circular and purlin
4. Design beam and column, bolted and welded framed connections.
5. Design the plate girders and gantry girder.

UNIT I PROPERTIES & CONNECTIONS

Introduction: Basic properties of steel as a structural steel – stress-strain relationship, yield strength, ultimate strength. Limit state design– introduction, analysis procedure and design philosophy, comparison with working stress method. Other design requirements local buckling, fabrication and erection. Classification of sections.

Simple Connections: Bolted connections – Welded connections – Design Strength –Efficiency of joint.

UNIT II TENSION AND COMPRESSION MEMBERS:

Buckling class – slenderness ratio, design. Built-up sections – design of laced and battened columns. Column splice, column base – slab base and gusseted base.

UNIT III BEAMS

Beams: Design of Beams – Plastic moment Bending and shear strength laterally supported and unsupported beams design–Builtup sections–large plates Web buckling Crippling and Deflection of beams - Design of purlins.

UNIT IV BEAM COLUMN CONNECTIONS

Eccentric and Moment Connection: Beam-column connections- design of welded and bolted framed connections. Seated and framed connections. Moment resistant connections.

UNIT V GIRDERS

PlateGirder: Design consideration –IS Code recommendations- Plastic section modulus Calculation- Design of plate girder-Welded– Curtailment of flange plates stiffeners – splicing and connections.

Gantry Girder: Gantry girder impact factors – longitudinal forces, Design of Gantry girders.

FINAL EXAMINATION PATTERN:

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

TEXTBOOKS:

1. S.K.Duggal- Limit State Design of steel structures,Tata Mc graw Hill, New Delhi,2014
2. Subramanyam. N - Steel Structures , Oxford University press, New Delhi,2008

REFERENCE BOOKS:

1. Bhavikatti - Design of Steel Structures .IK int Publication House, New Delhi, 2010.
2. Ramchandra –Design of Steel Structures, Standard Book House, New Delhi,2010
3. K.S.Sai Ram - Design of Steel Structures, Pearson Publishers,2010

CODES/TABLES:

IS Codes:

1) IS -800 – 2007
2) STEEL Tables / SP 6 (1) Hand book for Structural Engineers
3) IS 875 Parts 1 to 5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3			-	-	-	3	-	3	3	-	3	3		
CO2	2	2		-	-	-	2	-	3	3	-	3	3		
CO3	3			-	-	-	3	-	3	3	-	3	3		
CO4	2	3		-	-	-	2	-	3	3	-	3	3		
CO5	3			-	-	-	3	-	3	3	-	3	3		

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

CIVIL ENGINERING

L	T	P	C
3	0	0	3

III B.Tech II Semester(CE)

20ACE39 FOUNDATION ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Perform Compaction using various techniques
2. Analyze the stresses in soils duo to applied loads.
3. Generate stability report on retaining walls
4. Evaluate the probable settlements of foundations and SBC of soils.
5. Estimate load carrying capacity of piles

UNIT I SOIL EXPLORATION:

Need–methods of soil exploration–Boring and sampling methods– penetration tests – planning of programme and preparation of soil investigation report.

UNIT II STRESS DISTRIBUTION IN SOILS:

Geostatic stresses–stresses due to applied loads–Boussinesq's Theory–Vertical stress due to point load, line load, strip load, uniformly loaded circular area, uniformly loaded rectangular area – Newmark's chart – westergaard's theory – pressure bulb concept – Approximate methods – Contact pressure distribution.

UNITIII SLOPE STABILITY & RETAINING WALLS:

Introduction–finite and infinite slopes, friction circle method-uses of stability number –guidelines for location of critical slope surface in cohesive and non-cohesive soils,slope protection measures - Plastic equilibrium in soils – Active and passive states–Earth pressure at rest– Rankine's theory– Coulomb's wedge theory– Culmann's and Rebhann's graphical methods for active earth pressure – stability considerations for gravity retaining walls.

UNIT IV BEARING CAPACITY: Types and choice of foundation–Depth of foundation–Types of shear failures–safe bearing capacity–Terzaghi's analysis– Meyerhof's analysis–Skempton's analysis–IS Method - Effect of water table on bearing capacity - Plate load test.

SETTLEMENT OF SHALLOW FOUNDATIONS: Types of settlement–Tolerable settlements–Allowable soil pressure for both cohesion less and cohesive soils.

UNIT V PILE FOUNDATIONS: Necessity – Classification – Load carrying capacity of piles – Static methods – Dynamic formulae – Insitu penetration tests – pile load tests – Negative skin friction – group action in piles – Settlement of pile groups.

TEXTBOOKS:

1. C.Venkatramaiah, Geotechnical Engineering, New Age International (P) , Publishers, New Delhi,2012.
2. K.R.Arora, Soil Mechanics and Foundation Engineering, Standard Publishers Delhi,2010.

REFERENCE BOOKS :

1. Joseph E. Bowles, Foundation Analysis and Design,MC Graw–Hill,Inc., NewDelhi,1991.
2. Dr.B.C.Punmia ,Ashokkumar Jain and Arun kumar Jain,Soil Mechanics and Foundation Engineering, Lakshmi Publications (P) Ltd., NewDelhi.2017.
3. A.V.Narasimha Rao and C.Venkatramaiah, Numerical problems, Examples and Objective Questions in Geotechnical Engineering, Universities Press India Limited, Hyderabad, 2000.

Course Outcome	**Program Outcomes**												**ProgramSpecificOutcomes**		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3		--	--	--	--		--	--	--	--	3		2
CO2	3	3	3	2	--	--	--		--	--	--	--			2
CO3	3	2	--	2	--	--	--		--	--	--	--		2	2
CO4	3	2	--	--	3	--	--	--	3	3	--	1	3	2	
CO5	2	2	--	2	--	--	--	--	--	--	--	--	2	2	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	0	0	3

III B.Tech II semester (CE)

20ACE40 ENVIRONMENTAL ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Describe the basic characteristics of water and to apply the appropriate treatments techniques
2. Implement advanced treatment technologies before distribution.
3. Usefundamental characteristics of sewage to apply the apt treatments practices.
4. Integrate the Sludge removal techniques and to indulgein learning the modern treatment technologies of sewage and sludge before disposal.
5. Identify the various sources and toxicity of Solid wastes, Air and Noise to summarize as a report of Environmental Impact Assessment.

UNIT I WATER SUPPLY SYSTEMS

Need for potable water supply systems–Design period, estimation methods of future population,Water supply Appurtenances - Water treatment process, sources of water, Characteristics of water- Intake structures- Types of Pumping system-Unit operations and processes in conventional water supply schemes – Aeration -Determination of optimum dose of alum for coagulation of natural surface water. Types of filters and their working and operational system. Design of slow and rapid sand filters.

UNIT II WATER TREATMENT SYSTEM

Major and Minor disinfectants used in the treatment of water. Determination of optimum chlorine dosage. Specific treatment methods used for the removal of fluorides, arsenic, hardness , iron and manganese, colour and refractory organics.

Desalination of sea water.Different methods of water distribution systems. Layout of water distribution systems. Valves and pipe joints use dinwater distribution system. Leak detection and prevention in water distribution network. Water connection to the house from municipal water main.Water quality standards for drinking purpose.

UNIT III APPURTENANCES

Basic terminologies, Separate and combined sewers. Sewer appurtenances - House drainage and plumbing systems. Stages in Waste watert reatment process - Sewage characteristics. BOD problems. Objectives of Preliminary, primary, secondary and tertiary sewage treatment processes. Design of bar screen, grit chamber and primary sedimentation tanks Biological treatment - activated sludge processes, sequential batch reactors, UASB reactors, aerated lagoons and facultative oxidation ponds. Operational and maintenance of treatment units.

UNIT IV SEWAGE DISPOSAL

Stripping of nitrogen, phosphorus ,and refractory organics, from secondary treated sewage.Standards for disposal of treated sewage into inland surface waters, marine disposal and on land.Water reuse and their prospects. Sludge stabilization by aerobic and anaerobic processes Sludgede watering practices –sludge thickening, sludge drying beds and centrifugation. Sludge disposal practices. Design of septic tank and soak – pit. Recent advancements in waste water treatment technologies- Zero liquid discharge , Advanced Oxidation process, Bio remediation.

UNIT V SOLID WASTE DISPOSAL

Sources, characteristics and generation of solid wastes. Collection and disposal. Solid waste disposal methods. Types of air pollutants, sources and effect of air pollution, Plume patterns, air pollution control filters,Carbon sequestration. Air quality standards and limits. Sources and effects of noise pollution, measurement of noise and control of noise pollution. Permissible limits of noise pollution. Principles and procedures of Environmental Impact Assessment report.

TEXTBOOKS:

1. Santosh kumar Garg“ Environmental Engineering(Vol.1). Water supply Engineering “Khanna Publishers, NewDelhi, 1996.
2. Punmia, B.C and A.K.Jain,“Waste water Engineering, Lakshmi Publications (p)Ltd.,New Delhi, 1996.
3. M.N.Rao and HVNRao,“Air Pollution”,Tata Mcgraw Hill publishing company limited, 2007.

REFERENCE BOOKS:

1. Punmia,B.C,AshokJain, and Arun Jain“ Water supply Engineering”Arihant Publications, Bombay, (1995).
2. Metcalf & Eddy“Waste water Engineering–Treatment and Reuse”,Tata Mc Graw –Hill Edition, New Delhi,2003.
3. Santoshkumar Garg“Environmental Engineering (Vol.2).“ Sewage Disposal and Air Pollution Engineering” Khanna Publishers, NewDelhi, 1996.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
CO1	3	2	2	-	-	2	3	-	-	-	-	-	3	2	2
CO2	-	2	2	-	-	2	3	-	-	-	-	-	3	2	2
CO3	3	2	2	-	-	2	3	-	-	-	-	-	3	2	2
CO4	-	2	2	-	-	2	3	-	-	-	-	-	3	2	2
CO5	3	-	-	-	-	2	3	-	-	-	-	-	3	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	0	0	3

III B.Tech–II Semester(CE)

20ACE41 FUNDAMENTALS OF GIS (COURSERA)

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain the data representation using GIS
2. Use ArcGIS software
3. Make Maps with common dataset
4. Retrieve and share GIS data

UNIT I Introduction to Geographic Information Systems(GIS)

Overview - Why GIS is Awesome -What is GIS? - A First Look at Using Desktop GIS – GIS Terminology to Know Tour of ArcMap - Data Representation in GIS - Desktop GIS Software Packages - Getting Help with GIS -Relevant Skills for the GIS Analyst - ArcGIS Desktop Licensing and Authorization - ArcGIS Desktop Installation Instructions - Summary

UNIT II Arc GIS Basics

Using Arc Mapto Explore Data-Viewing and Changing Layer Properties - Using Feature Classes and Attribute Tables - Select By Attribute and Calculate Geometry - Select by Location – AnIntroduction to Projections - Analyzing Data with Geoprocessing Tools-Setting Environment Variables- Assessing Spatial Relationships with the Spatial Join Tool.

UNIT III Making Maps With Common Datasets

Finding Common Datasets-Using Layout View to Make Maps- Core Map Elements-Symbology: Changing How Your Data Looks -Symbology Examples - Setting Up Symbology in ArcGIS -

Labeling Map Features - Making Map Books – Summary

UNIT IV Retrieving and Sharing Data

Using Metadata to Document Data Products - Sharing Data: Making and Using Map Packages - Sharing Maps: Uploading Packages to ArcGIS Online - Sharing Data: Creating Layer Files and Layer Packages – Choosing a Data Format- Joins and Relates –Trouble shooting ArcGIS

REFERENCES

1. Kang- tsung Chang(2007),' Introduction to Geographic Information Systems' Tata MC Graw Hill, New Delhi.
2. C.P.Lo and Albert K.W.Yeung(2006)"Concepts and Techniques of Geographic information Systems" Prentice Hall of India, New Delhi
3. Burrough,PeterA. and Rachael McDonnell ,(1998),'Principles of Geographical Information Systems' Oxford University press,NewYork.
4. Magwire, D.J. Good child,M.F. and Rhind,D.M., (2005),'Geographical Information Systems: Principles and Applications’, Longman Group, U.K.
5. Burrough,P.A.,1986,Geographical Information System for land Resources System, Oxford Univ. Press, UK.
6. Fotheringham,S.;Rogerson,P.(ed.),1994.Spatial analysis and GIS. Taylor and Francis, London, UK.
7. Laurini,RobertandDierkThompson,1992,FundamentalsofSpatialInformationSystems,Academics Press, ISBN 0-12-438380-7.
8. Maguire,D.J.; Goodchild, M.F.;Rhind, D.W.1991. Geographical information System, Longman, London, UK
9. Siddiqui, M.A.;2006, Introduction to Geographical Information System, Sharda Pustak Bhavan, Allahabad.
10. Siddiqui, M.A.;2011, Concepts and Techniques of Geoinformatics, Sharda Pustak Bhavan, Allahabad.

	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	PSO3
CO1	3	2	2	-	-	2	3	-	-	-	-	-	3	2	2
CO2	-	2	2	-	-	2	3	-	-	-	-	-	3	2	2
CO3	3	2	2	-	-	2	3	-	-	-	-	-	3	2	2
CO4	-	2	2	-	-	2	3	-	-	-	-	-	3	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	0	0	3

20ACE42 ADVANCED STRUCTURAL DESIGN

(PROFESSIONAL ELECTIVE-IV)

Course Outcomes:

After successful completion of the course the students will be able to

1. Apply IS codes for designing complex reinforced concrete structures
2. Analyse maximum forces and moments involved in designing cantilever and counter fort retaining walls.
3. Design complex concrete structures like flat slab, grid floor, concrete chimney etc.,
4. Prepare reinforcement detailing for reinforced concrete structures.
5. Solve practical design problems like cinema balcony.

UNIT I

Design of a flat slab (Interior panel only) and Grid floor.

UNIT II

Design of concrete bunkers of circular shape – (excluding staging) – Introduction to silos.

UNIT III

Design of concrete chimney.

UNIT IV

Design of circular and rectangular water tank resting on the ground, Design of Intz water tank (excluding staging).

UNIT V

Design of cantilever and counter fort retaining wall with horizontal back fill, Design of Cinema balcony.

TEXT BOOKS:

1. Krishna Raju. Structural Design and drawing (RCC and steel) Universities Press , NewDelhi,2009.
2. Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain. R.C.C Structures, Laxmi Publications, New Delhi,1992.

REFERENCE BOOKS:

1. Sushil kumar. R.C.C Designs, standard publishing house.2013.
2. N.C.Sinha and S.K.Roy.Fundamentals of RCC, S.Chand Publications, New Delhi,2004
3. Varghese. Advanced RCC, PHI Publications, New Delhi,2007.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
CO1	3	2	1	-	-	2	3	-	-	-	-	-	3	2	2
CO2	-	2	2	-	-	2	3	-	-	-	-	-	3	1	2
CO3	3	2	2	-	-	2	3	-	-	-	-	-	3	2	2
CO4	-	2	2	-	-	2	3	-	-	-	-	-	3	2	2
CO5	3	-	-	-	-	2	3	-	-	-	-	-	3	2	2

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L	T	P	C
3	0	0	3

III B.Tech II semester(CE)

20ACE43 GROUND IMPROVEMENT TECHNIQUES

Course Outcomes:

After successful completion of the course the students will be able to

1. Execute the dewatering methodologies
2. Explore various grouting techniques
3. Describe densification methods
4. Acquire knowledge of various soil stabilization techniques
5. Utilize geosynthetics and geogrids for improving soil stability

UNIT I DEWATERING: Methods of de-watering-sumps and inter ceptditches single, multistage well points - vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains–Electro-Osmosis.

UNIT II GROUTING: Objectives of grouting- grouts and their properties grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- post grout test.

UNIT III DENSIFICATION METHODS IN GRANULAR SOILS: In–situ densification methods in granular soils:–Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

DENSIFICATION METHODS IN COHESIVE SOILS:In–situ densification methods in Cohesive soils:– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geo drains– Stone and lime columns – thermal methods.

UNIT IV REINFORCED EARTH: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls**.**

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 V STABILISATION: Methods of stabilization-mechanical-cement- lime bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum.

GEO SYNTHETICS: Geo-textiles- Types, Functions and applications – geo-grids and geo- membranes – functions and applications.

TEXT BOOKS:

1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill Internationa Edition.
2. Dr.P.Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi / University science press, New Delhi,1990

REFERENCE BOOKS:

1. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida,USA.
2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercy,USA,1994.

Course Outcome	ProgramOutcomes												ProgramSpecificOutcomes		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO1 2	PS O1	PS O2	PS0 3
CO1	3	2	--	--	--	--	2	--	--	--	--	--	3	1	1
CO2	3	2	--	--	--	--	2	--	--	--	--	--	2	1	1
CO3	3	2	3	2	--	--	2	--	--	--	--	--	2	1	2
CO4	3	2	3	--	--	--	2	--	--	--	--	--	3	2	2
CO5	3	2	--	2	--	--	2	--	--	--	--	--	3	2	2

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(AUTONOMOUS)
CIVIL ENGINEERING

L	T	P	C
3	0	0	3

III B.Tech II Semester–CE

20ACE44 MASONRY STRUCTURES
(Professional Elective – II)

Course Outcomes: After successful completion of the course the students will be able to

1. Identify errors and defects in masonry.
2. Evaluate the strength and stability of masonry structures
3. Estimate the design parameters of all masonry units
4. Design of masonry wall for multi storey buildings
5. Explore the design concepts of reinforced masonry.

UNIT-I MASONRY UNITS, MATERIALS, TYPES& MASONRY CONSTRUCTION:

Brick, stone and block masonry units – strength, modulus of elasticity and water absorption of masonry materials –classification and properties of mortars, selection of mortars. Defects and errors in masonry construction, cracks in masonry, types, reasons for cracking, methods of avoiding cracks.

UNIT-II STRENGTH AND STABILITY:

Strength and Stability of concentrically loaded masonry walls, effect of unit strength, mortar strength, joint thickness, rate of absorption, effect of curing, effect of ageing, workmanship, strength formulae and mechanism of failure for masonry subjected to direct compression.

PERMISSIBLE STRESSES

Permissible compressive stress, stress reduction and shape reduction factors, increase in permissible stresses for eccentric vertical and lateral loads, permissible tensile and shear stresses.

UNIT-III DESIGN CONSIDERATIONS:

Effective height of walls and columns, opening in walls, effective length, effective thickness, slenderness ratio, eccentricity, load dispersion, arching action, lintels.

LOAD CONSIDERATIONS FOR MASONRY: Wall carrying axial load, eccentric load with different eccentricity ratios, walls with openings, freestanding wall.

UNIT-IV DESIGN OF MASONRY WALLS:

Design of load bearing masonry for building up to 3 storeys using IS: 1905 and SP: 20 procedures.

UNIT-V REINFORCED MASONRY:

Application, flexural and compression elements, shear walls.

MASONRY WALLS IN COMPOSITE ACTION

Composite wall-beam elements, infilled frames.

TEXT BOOKS:

1. Henry, A.W., " Structural Masonry" , Macmillan Education Ltd., 1990.
2. Dayaratnam P, "Brick and Reinforced Brick Structures", Oxford & IBH, 1987.
3. M. L. Gambhir, " Building and Construction Materials", Mc Graw Hill education Pvt. Ltd.

REFERENCE BOOKS:

1. IS 1905–1987 "Code of practice for structural use of un-reinforced masonry- (3rd revision) BIS, New Delhi.
2. SP 20 (S&T) – 1991, "Hand book on masonry design and construction (1st revision) BIS, New Delhi.

CourseOutcome	**ProgramOutcomes**												**Program SpecificOutcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	3	2	2				2					2	3		
CO2	3	2	2				2					2	3		
CO3	3	2	2				2					2	3		
CO4	3	2	2				2					2	3		
CO5	3	2	2				2					2	3		

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	L	T	P	C
III B.Tech II Semester(CE)	**3**	**0**	**0**	**3**

20ACE45 PRESTRESSED CONCRETE STRUCTURES

(PROFESSIONAL ELECTIVE-III)

Course Outcomes:

After successful completion of the course the students will be able to

1. Analyze the prestress losses and deflections
2. Design Prestressed sections for shear and flexure.
3. Design pretensioned and post tensioned structural elements.
4. Perform design of composite prestressed structures
5. Design tanks, pipes and poles

UNIT I INTRODUCTION

Historic development, pretensioning and post tensioning, Advantages and applications of prestressed concrete, Materials, High strength concrete – High Tensile Steel Prestressing systems:, Tensioning devices, anchorage devices, Pre-tensioning system, Post tensioning system – Thermo Electric Prestressing , Chemical Prestressing – Losses in Prestressing.

UNIT II LIMIT STATE DESIGN OF PRESTRESSED CONCRETE MEMBERS

Philosophy of Limit State Design – Critera for Limit States – Crack widths in Prestressed Members – Dimensioning of Prestressed Concrete Members – Design of sections for flexure – axial tension – Compression and Bending – design for shear and torsion – Design for Bond – Bearing.

UNIT III DESIGN OF PRETENSIONED AND POST TENSIONED FLEXURAL MEMBERS

Dimensioning – Self weight of Beams – Design of pretensioned beams – post tensioned beams – partially stressed members – transfer of prestress –Anchorage zone - Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons, Allowable stress, Design criteria as per I.S.Code, Elastic design of simple rectangular and I-section for flexure, Kern lines, cable profile.

UNIT IV COMPOSITE CONSTRUCTION OF PRESTRESSED AND INSITU CONCRETE

Types of Composite construction - analysis of stresses – differential shrinkage – deflection of composite members – stresses at serviceability Limit state – Flexural Strength of composite sections – shear strength of composite sections – Design of Composite Sections

UNIT V MISCELLANEOUS STRUCTURES

Design of tension and compression members – Tanks, pipes and poles – Partial prestressing – Definition, methods of achieving partial prestressing, merits and demerits of partial prestressing.

TEXT BOOKS:

1. N. Krishna Raju.Prestressed Concrete, Tata McGraw Hill Publications,2012
2. Ramamrutham. Prestressed Concrete, Dhanpatrai Publications,2006

REFERENCE BOOKS:

1. T.Y. Lin & Ned H.Burns. Design of Prestressed concrete structures (Third Edition), John a Wiley&Sons. Newyork,1996
2. Praveen Nagrajan, Prestressed Concrete design, Pearson publications, 2013 editions.

Codes/Tables:

1. Codes: IS code for pre-stressed concrete (IS- 1343-2012).

Course Outcome	**ProgramOutcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	3	3	--	--	--	2	--	--	--	--	2	1	2	
CO2	3	2	--	2	--	--	3	--	--	--	--	3	2	1	
CO3	2	2	--	--	--	--	2	--	--	--	--	2	1	2	
CO4	2	3	--	2	--	--	2	--	--	--	--	2	3	1	
CO5	1	2	3	--	--	--	1	--	--	--	--	1	1	3	

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CIVIL ENGINEERING

III B. Tech II Semester

20AME31 **Operations Research** **L T P C**

(Professional Elective – III) 3 0 0 3

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Summarize various LPP, TPP, AP, sequencing, replacement, game theory, project management, queuing models of operations Research.
2. Illustrate the application of OR models to identify solutions to industry.
3. Identify the optimum solutions with system approach to both industry and service sector.
4. Judge the advanced software tools for decision making with available sources for cost reduction and profit maximization with society concern.
5. Develop a team and play a key role in decision making with interpretation skills for all round development of organization

UNIT: I Introduction and Linear programming

Development – definition – characteristics and phases – types of Operations Research models – applications – limitations.

Linear Programming and its Applications: Linear Programming Problem – Graphical solution of LP Problems. Simplex method – artificial variables techniques - Two phase method,- Big M method

UNIT: II Transportation and Assignment problems

Transportation : Introduction – Methods of basic feasible solution, Optimality test, Degeneracy in transportation problem, unbalanced transportation Problem, -- Assignment problem – Introduction – un balanced model -- optimal solution – Hungarian method, - un-balanced assignment problems-travelling salesman problem.

UNIT: III Replacement and waiting line problems

Replacement : Introduction – replacement of items that deteriorate with time – when money value is not counted and counted – replacement of items that fail completely, group replacement, Waiting lines

: Introduction, single channel Poisson arrival, exponential service time with finite population and infinite population.

UNIT: IV Simulation and Theory of Games

Simulation Definition – types of simulation models – phases of simulation – application of simulation – inventory and queuing problems – merits and demerits -- simulation languages.

Theory of Games: Introduction – mini, max (max, mini) – criterion and optimal strategy-- to solve the rectangular two person zero sum games, solution of rectangular games in terms of mixed strategies, solution of 2x2 games without saddle point, solution of a two person zero sum 2Xn game, Graphical method for 2Xn and nX2 games.

UNIT: V Network Models and Project Management

Network models - Introduction, Rules for construction and errors. Shortest route - Dijkstra's algorithm, Minimal spanning tree - Kruskal's algorithm, Maximum flow models. Project management- CPM and PERT networks.

Text Book(s)

1. Taha, Introduction to Operations Research, New Delhi, 8th Edition, Printice Hall International Publisher, 2016.
2 A.M. Natarajan, P. Blalsubramani & A Tamilarasi, Operatiaons Research, New Delhi. 1st Edition, Pearson Piblishers, 2005.

Reference Books

1 Hiller & Liberman, Introduction to Operations Research, Noida RC, 7th Edition,Tata Mc Graw Hill publication
2 R. Panneerselvam, Operations Research, New Delhi, 2nd Edition, Prentice Hall International Publisher, 2006

	PO1	PO2	PO 3	PO4	PO5	PO 6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	3					3					3	3		
CO2	3	3					3					3	3		
CO3	3	3	3				3					3	3		
CO4	3	3		3			3					3	3		
CO5	3	3					3					3	3		

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III B.Tech II Semester

20ACS21 COMPUTER GRAPHICS

COURSE OUTCOMES:

At the end of the course the student will be able to:

1. Demonstrate different computer graphics applications and standards.
2. Design algorithms to render different geometric shapes like line, circle,and ellipse and Appreciate illumination and color models.
3. Analyze the issues in projecting graphical objects and identify solutions
4. Compare different 2D, 3D viewing and clipping techniques and Analyze the issues in projecting graphical objects and identify solutions
5. Develop solutions to problems related to computer graphics and animations by creating, rendering and projecting the Graphical objects

UNIT-I

Introduction: Basic concepts,Application are as of Computer Graphics,overview of graphics systems , Video-display devices, Raster-scan systems, Random-scan systems , Graphics monitors and work stations and input devices, graphics standards.

UNIT-II

Output primitives: Points and lines, line drawing algorithms – DDA, Bresenham's, midpoint circle Generating Algorithm-Ellipse Generating Algorithms, Filled area primitives , Scan line polygon fill algorithm, inside-outside tests, boundary-fill and flood-fill algorithms.

UNIT-III

2,D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2,Dviewing: The viewing pipeline, Window – to – View port coordinate transformation,viewing functions, Cohen – Sutherl and line clipping algorithms, Sutherland–Hodgeman polygon clipping algorithm.

UNIT-IV:

Three Dimensional Concepts: 3,D Display method, 3,D object representation: Polygon surfaces, Curved lines and surfaces, quadric surfaces, spline representation, Bezier curve and B-spline curves, Beizer and B-spline surfaces, Hermite curve.

3,D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3,DViewing: Viewing pipe line, viewing coordinates, projections, clipping.

UNIT-V:

Color Model and its Applications: RGB Color Model, YIQ Color Model, CMY Color Model ,HSV Color Model .

Computer animation: Design of animation sequence, General Computer animation Function, Raster animations, Key-Frame Systems, Morphing, motion specifications, Direct Motion specifications , Kinematics and Dynamics.

TEXT BOOKS:

1. Donal d Hearn and M.Pauline Baker,"Computer Graphics C version",2nd edition,, PearsonEducation,1997.
2. Foley,VanDam,Feinerand Hughes,"Computer Graphics Principles & practice", second edition in C, Pearson Education,1995.

REFERENCE BOOKS:

1. Steven Harrington,"Computer Graphics",TMH,1983
2. Zhig and xiang, Roy Plastock, "Computer Graphics "Second edition, Schaum's outlines, Tata Mc, Graw hill edition,2000.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	2	1	-	-	-	-	-	-	-	3	2
CO2	3	3	3	3	1	-	-	-	-	-	-	-	3	2
CO3	3	3	2	3	2	-	-	-	-	-	-	-	3	2
CO4	3	3	2	3	2	-	-	-	-	-	-	-	3	3
CO5	3	3	1	1	1	-	-	-	-	-	-	-	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

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III B.Tech II Semester (CE)

20AEE45 ELECTRICAL SAFETY

(Open Elective)

Course Outcomes:

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

1. Acquire knowledge about electrical safety and maintenance.

2. Design of electrical safety protection equipment and fire hazards.

3. Develop insulators, human safety scheme and preventive maintenance

4. Enrich hazardous zones and selection procedure

5. Classify the Hazardous zones

UNIT - I

CONCEPTS AND STATUTORY REQUIREMENTS: Introduction – electrostatics – electromagnetism – stored energy- energy radiation and electromagnetic interference- workingprinciples of electrical equipment – Indian electricity act and rules – statutory requirements fromelectrical inspectorate – international standards on electrical safety – first aid – cardio pulmonary resuscitation (CPR)

UNIT - II

ELECTRICAL HAZARDS: Primary and secondary hazards –shocks, burns, scalds, falls –human safety in the use of electricity energy leakage- clearances and insulation – classes of insulation- voltage classifications – excess energy – current surges – over current and short circuitcurrent – heating effects of current – electromagnetic forces – corona effect – static electricity –definition –

sources – hazardous conditions –control –electrical causes of fire and explosion –ionization –spark and arc- ignition energy – control –national electrical safety code ANSI C2,class ii, division 1 & 2.lighting –hazards – lighting arrestor –installation earthing – specification–earth resistance – earth pit maintenance

UNIT - III

PROTECTION SYSTEMS: Fuse – circuit breakers and overload relays – protection against over voltage and under voltage – safe limits of amperage – voltage – safe distance from lines capacity and protection of conductor – joints and connections – means of cutting of power –overload and short circuit protection – no load protection –earth fault protection- earthing standards. FRLS insulation and continuity test system grounding equipment grounding – earth leakage circuit breaker (ELCB) – cable wires – maintenance of ground-ground fault circuit interrupter-use of low voltage-electrical guards-personal protective equipment-safety in handling hand held electrical appliances and tools.

UNIT - IV

SELECTION, INSTALLATION, OPERATION AND MAINTENANCE: Role of environment in selection-safety aspects in application-(protection and interlock-self diagnostic features and fail safe concepts-Surge withstand capability test requirements-lock out and work permit system-discharge rod and earthing devices- safety in the use of portable tools-cabling and cable joints-preventive maintenance.

UNIT - V

HAZARDOUS ZONES: Classification of hazardous zones-intrinsically safe and explosion proof electrical apparatus-increase safe equipment-their selection for different zones- temperature classification -grouping of gases-use of batteries and isolators- equipment certifying agencies.

Text books:

1. Terrell Croft, Frederic P.Hartwell, American Electricians Handbook, MC Graw Hill, 16th Edition, 2011.

Reference Books:

1. Electrical safety requirement for employee work places (NFPA 70E)

2. National electrical code NEC, edition 2002

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3					3					3			3
CO2	3	3					3					3			3
CO3	3	3					3					3	3		3
CO4	3	3					3					3			3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
CIVIL ENGINEERING

L	T	P	C
3	0	0	3

III B.Tech–II Semester(CE)

20ACE49 URBAN TRANSPORT SYSTEMS PLANNING

NPTELCOURSE

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain about the Planning of Urban Transportation
2. Execute various traffic surveys to assess the travel demand
3. Develop MLR models related to Trip Distribution
4. Frame Probabilistic models of Transportation
5. Propose emerging trends in Transportation modeling

UNIT I INTRODUCTION TO URBAN TRANSPORTATION PLANNING

Urbanization,Urban Transportation: Impacts, Behavioral Changes, Urban Transportation problems & Externalities - Congestion, Safety, Emissions, etc. Introduction to Transport planning;Transport Planning Morphology: Problem definition, Solution generation, solution analysis, Evaluation and choice, Implementation Hierarchical levels of Urban Transport Planning: Conceptual Plan, Outline plan, Master plans, statutory or advisory plans, detailed development plans **Urban Transportation Planning Process**

Overview of traditional four step travel demand forecasting process: Urban Activity forecasts,Trip generation, Trip Distribution, Mode Choice, Traffic assignment Specification, Calibration,Validation and Forecasting; Information needs for Travel Demand Forecasting: Study Area,Urban Activities, Zoning, Urban Activities, Transportation System, Travel information, Types of Movements Data Collection Techniques (Home-interview survey, Commercial vehicle survey, Innovative Commercial Vehicle Tracking Methods, Intermediate Public Transport Survey,Cordon-Line Survey, Post-Card Questionnaire Survey, Registration – Number Survey, License Plate Follow-Up Survey Technique,Tag-on-Vehicle Survey).

UNIT II TRIP GENERATION

Introduction; Basic considerations in trip generation - amount of urban activity, character of urban activity, other considerations, special generators; Trip classification; Factors affecting trip generation Methods of trip Generation-Regression analysis, trip rate analysis, cross classification analysis; Multiple Linear Regression- Regression analysis concept; The step wise approach with examples. - Multiple Linear Regression- Considerations for zonal based multiple regression, Considerations for house hold based multiple regression, matching productions and attractions Category analysis- Basic approach, specifying trip generation model (trip production model structure, trip attraction model structure, Internal- External trip generation), Trip generation model calibration (developing trip production rates, developing trip attraction rates), advantages and disadvantages Stability of trip generation model- Temporal stability, geographical stability; Trip generation model application-Trip production model application,Trip attraction model application

UNIT III TRIP DISTRIBUTION

Introduction, Basic considerations in Trip Distribution,P-A Matrix to O-D Matrix, Factors affecting trip distribution: Properties of transport network, spatial separation between variouszones Growth factor methods- Uniform factor method, Average factor method, Detroit Method, Fratar method; Furness method Synthetic methods -Introduction to Gravity Model Gravity Model-Calibration, BPR Approach of Calibration Intervening opportunities model: Concept, Advantages, Limitations, Illustrative example, Competing opportunities model, Limitations Doubly restrained model: Concept, Calibration, Linear programming approach to Trip Distribution: Concept, limitations

UNIT IV MODAL SPLIT

Introduction; Influencing factors of mode choice; Types of modal split models-Trip end type and trip interchange type; Types of modal split models - Trip end type (Southern Wisconsin Model)and trip interchange type(Diversion curve model), Limitations, Aggregate and disaggregate models, advantages of disaggregate over aggregate modelling; Elements of choice decision process; Framework for the choice process of an individual Disaggregate mode choice models - Introduction, Utility theory, Probabilistic choice theory

Binary choice models- Binary logit model, discriminant analysis, Probit analysis; Logit model;Multi – nomial Logit model; Nested logit model, Estimation of logit models, Two-stage modal split models

UNIT V TRAFFIC ASSIGNMENT General, link cost function, Person-trips and vehicle Trips, diurnal patterns of demand, Trip directions Network properties: Link, nodes, characteristics of link (capacity, free flow speed, travel time, etc.), link flows, inter-zonal flows, Network connectivity, Minimum spanning tree, shortest path, etc.; Network Algorithms: Kruskal, Prims, Dijkstra, Floyd

Route Choice Behavior: User equilibrium, system equilibrium, stochastic equilibrium, Diversion Curves: California diversion curves, Detroit diversion curves, Bureau of Public roads diversion curves Deterministic traffic assignment techniques-All-or-nothing assignment, Multi-Path Traffic Assignment,; Incremental assignment, capacity restraint assignment,; Stochastic Traffic assignment techniques; Dynamic traffic assignment techniques:Basic Concepts and Approach.

Land Use and Transportation

Introduction; Urban land use planning- land use and land cover, land use classification; Land use transportation interaction; accessibility and mobility, Land use models Urban Goods Movement Introduction; Classification of urban goods movement; Factors affecting goods movement; Modelling Approaches Data collection; Strategy for goods transport facility

planning; Facilities required in good sterminals;Time series techniques for forecasting truck traffic **Urban Goods Movement**

Introduction; Classification of urban goods movement; Factors affecting goods movement; Modelling Approaches **Emerging Trends in Transportation planning** Activity based modelling; Spatial data infrastructure (SDI); Big Data analytics

REFERENCE BOOKS:

1. Hutchinson,B.G.,Principles of Urban Transport Systems Planning, Mc Graw Hill, London, 1974.

2. Khisty C. Jotin and Lall, B.Kent., Transportation Engineering and Planning, 3rd Edition, Pearson India, 2001.

3. Papacostas, C.S.,and Prevedouros, P.D., Transportation Engineering, and Planning. 3rd Edition, Prentice - Hall of India Pvt. Ltd., 2002.

4. GarberN.J., and Hoel L.A., Traffic and Highway Engineering, 4th Edition, Cengage Learning,

2009.
5. Kadiyali, L.R., Traffic Engineering, and Transport Planning, Khanna Publishers, NewDelhi,2013.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3					3					3			3
CO2	3	2		2			3					3	2		3
CO3	3	1					3					3	3		3
CO4	3	3					3					3			3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
CIVIL ENGINEERING

	L	T	P	C
III B.Tech – II Semester (CE)	**3**	**0**	**0**	**3**

20ACE50 ESTIMATION, COSTING AND VALUATION

Course Outcomes:

After successful completion of the course the students will be able to

1. Apply different types of estimates in different items of work
2. Estimate quantity of work and cost of construction
3. Estimate earthwork quantity for road & canal projects
4. Perform Rate Analysis and schedule of rates.
5. Identify types of tenders and contracts

UNIT I INTRODUCTION:

Estimating, Types of estimates and data required, Different items of work and units of measurement, Detailed and approximate estimate-advantages and disadvantages

SPECIFICATION: Importance of Specification, Types of Specification. Specification of Earthwork in excavation, Cement Concrete, Brick Masonry, R.C.C Work, Plastering Work, Painting and Flooring

UNIT II ESTIMATION OF BUILDINGS:

Methods of Detailed Estimation, Quantity Estimation of One/Two/Three roomed Buildings, Estimation of Masonry Work in Arches and Steps.

UNIT III EARTHWORK ESTIMATION:

Methods of calculating earthwork quantities for roads and canals

REINFORCEMENT ESTIMATION: Preparing Bar Bending Schedule. Estimation of quantity of reinforcement in Beams, Columns, Slabs

UNIT IV RATE ANALYSIS:

Importance of rate Analysis, Task, Outgoings, Schedule of Rates (SOR).Rate analysis for earthwork in excavation, C.C Works, Brick Masonry work, R.C.C Work, Plastering and Flooring Work.

UNIT V TENDERS AND CONTRACTS:

Types of Contracts, Types of Tenders, Conditions of Contracts, FIDIC family of Contract, Legal Requirements.

VALUATION: Cost, Price and Value; Types of Properties, Methods of valuation, Depreciation and Types, Different forms of Values, Fixing Rent for Property.

TEXT BOOKS:

1. Dutta, B.N., "Estimating and Costing in Civil Engineering: Theory and Practice, Including Specifications and Valuation', 23rd Revised edition (2006),UBS Publishers and Distributors Pvt.Ltd
2. Birdie, G.S., " Text Book of Estimating and Costing (CIVIL ENGINEERING)", 7th Edition (2015), Dhanpat Rai Publishing Company (P) Ltd-New Delhi.

REFERENCE BOOKS:

1. Kohli, R.C., Kohli, D.D., "A Textbook of Estimating, Costing & Accounts (Civil)" 12th Edition, S. Chand & Company Ltd-New Delhi.,2011.
2. Roy, M.S., "Quantity Surveying and Contract & Tenders", Vayu Education of India First edition (2015).

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3					1					3			3
CO2	3	2		2			3					2	2	2	3
CO3	3	1					2					3	3		3
CO4	3	3					3					3			3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
CIVIL ENGINEERING

	L	T	P	C
III B.Tech II Semester (CE)	**0**	**0**	**3**	**1.5**

20ACE46 SOIL MECHANICS LAB

Course Outcomes:

After successful completion of the course the students will be able to

1. Determine relative density or density index of soils
2. Evaluate permeability and seepage of soils.
3. Determine plasticity characteristics of various soils.
4. Compute Soil constants.
5. Evaluate consolidation of soils in lab

LIST OF EXPERIMENTS

1. a) Specific gravity.
   b) Differential free swell index
2. In-situ unit weight : a) Core cutter method
   b) Sand replacement method
3. Grain – size distribution by Sieve Analysis.
4. Determination of relative density or density index of sand.
5. Atterberg's limits (LL, PL & SL)
6. Coefficient of permeability: a) Constant head method
   b) Falling head method
7. I.S. Light compaction
8. California Bearing ratio (CBR) test
9. Direct shear test
10. Unconfined compression test.

Demonstration Experiments

11. Hydrometer analysis.
12. Triaxial Compression test
13. Consolidation test

LABORATORY MANUAL:

1. Appa Rao, K.V.S., And V.C.C. Rao., Soil testing Laboratory Manual, University Science Press, LaxmiPublications Private Limited, New Delhi.
2. Mittal. S., and J.P. Shukla., Soil Testing for Engineers, Khanna Publishers, New Delhi.

REFERENCE BOOKS:

Relevant IS Codes.

Course Outcome	**ProgramOutcomes**												**Program SpecificOutcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	--	--	--	--	--	3	--	--	--	--	3	--	2	-
CO2	--	3	--	--	--	--	2	--	2	--	--	2	--	2	-
CO3	--	3	--	--	--	--	2	--	2	--	--	2	--	2	-
CO4	3	3	--	--	--	--	2	--	--	--	--	2	2	2	-
CO5	3	--	--	--	--	--	3	--	--	--	--	3	--	2	-

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

CIVIL ENGINEERING

		L	T	P	C
III B.Tech	**II Semester (CE)**	**0**	**0**	**3**	**1.5**

20ACE47 STRUCTURAL ENGINEERING DESIGN LAB II

Course Outcomes:

After successful completion of the course the students will be able to

1. Design Single and Multistory buildings using STAAD Pro
2. Integrate &design residential buildings using import commands of AutoCAD in STAAD Pro
3. Execute designing different types of water tanks using STAAD Pro
4. Design trusses using STAAD Pro
5. Analyse and design of simple towers using STAAD Pro

LIST OF EXPERIMENTS

1. Analysis and Design of Single storey multi-bay structure by considering gravity loads.
2. Analysis and Design of Multi storey multi-bay structure by considering loads from IS:875-1987 and using Structure wizard in STAAD Pro.
3. Analysis and Design of Residential building by importing column positions from AutoCAD for loads from IS:875-1987 (Dead Load).
4. Analysis and Design of Residential building by importing column positions from AutoCAD for loads from IS:875-1987 for Imposed loads
5. Analysis and Design of Residential building for different load combinations from IS:875 (part 5)-1987.
6. Analysis and Design of a Water tank under gravity loading For Rectangular shape
7. Analysis and Design of a Water tank under gravity loading For Circular shape
8. Analysis and Design of a INTZE Water tank under gravity loading
9. Analysis and Design of Multi bay roof truss for factory or industrial building.
10. Analysis and Design of a Simple tower for different terrain conditions under wind loading.

CourseOutcome	**ProgramOutcomes**												**Program SpecificOutcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	--	--	--	--	-	--	2	--	--	3	1	3	-
CO2	3	2	--	--	--	--	-	--	3	--	--	2	2	3	-
CO3	3	3	--	-	--	--	-	--	2	--	--	2	2	3	-
CO4	3	2	--	-	--	--	-	--	3	--	--	2	2	3	-

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

III B.Tech – II Semester (CE)

20ACE48 ENVIRONMENTAL ENGINEERING LAB

Course Outcomes:

After successful completion of the course the students will be able to

1. Conduct experiment analysis and interpretation of data on water, waste water and solid waste to characterize the pollution potential.
2. Employ gravimetric, titrometric and colorimetric and other instrumental technologies on water, waste water and solid waste
3. Estimate the hardness of water
4. Evaluate Chlorides, sulphates and dissolved oxygen in water
5. Determine BOD and COD

LIST OF EXPERIMENTS

1. (a) Determination of pH and Electrical Conductivity of water and wastewater.

   (b) Determination of Turbidity of water.

2. Determination of

(a) Total, Suspended and Dissolved Solids in sewage.

(b) Organic and Inorganic Solids content of sewage.

(c) Volatile and Fixed Solids in sewage.

3. (a) Determination of Acidity of water.

   (b) Determination of Alkalinity of water.

4. Determination of:

(a) Hardness of water.

(b) Determination of Chlorides in Q water.

(c) Determination of Sulphates in Q water.

5. (a) Determination of Dissolved Oxygen of water.

   (b) Determination of Residual Chlorine content of municipal tap water.

6. Determination of Optimum Coagulant Dose of raw water.
7. Determination of MPN Index of natural water.
8. Determination of BOD of sewage.
9. Determination of COD of sewage.
10. Municipal Solid Waste Analysis for physical components.

LAB MANUAL:

1. Kotaiah. B. and N. Kumarswamy. Environmental Engineering Lab Manual, 2nd Ed. Charotar Publisher, Anand,2004

REFERENCE BOOKS:

1.APHA. Standard Methods for the Examination of water and wastewater 19th Ed. American Public Health Association, Washington, DC 2005,1995.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
CO1	3	1	-	2	-	2	3	-	-	-	-	3	3	3	-
CO2	3	1	-	2	-	2	3	-	-	-	-	2	3	3	-
CO3	3	1	-	2	-	2	3	-	-	-	-	2	3	3	-
CO4	3	1	-	2	-	2	3	-	-	-	-	2	3	3	-
CO5	-	-	-	-	-	2	3	-	-	-	-	3	-	-	-

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

	L	T	P	C
III B. Tech II Semester (Common to CE, ME & ECE)	**1**	**0**	**2**	**2**

20AHS16 ADVANCED ENGLISH COMMUNICATION SKILLS

Course Outcomes:

CO1:Develop language fluency through conversational practices and demonstrate appropriate body language during communication.

CO2: Interpret and apply synonyms, antonyms, one word substitutes, prefixes and suffixes to develop vocabulary to comprehend oral and written communication.

CO3: Analyze reading and writing techniques in preparing letters, resumes and technical reports by examining and applying guessing meaning, scanning, skimming and interfering meaning.

CO4: Demonstrate ability to function effectively as an individual and as a member in diverse teams examining and applying skills in Oral presentations, Interviews and Group Discussions.

UNIT – 1

INTER-PERSONAL COMMUNICATION AND BUILDING VOCABULARY – Starting a conversation, Responding appropriately and relevantly, Using appropriate Body language, Role play in Different situations, Synonyms and antonyms, One-word substitutes, Prefixes and suffixes, Idioms & Phrases and Collocations.

UNIT - 2

READING COMPREHENSION – General vs. Local Comprehension, Reading for Facts, Guessing meanings from Context, Skimming, Scanning and inferring meaning.

UNIT - 3

WRITING SKILLS – Structures and Presentation of different types of writing – Letter writing, Resume writing, e-correspondence and Technical report writing.

UNIT - 4

PRESENTATION SKILLS – Oral Presentations (individual or group) through JAM Sessions / Seminars / PPTs and Written Presentations through Posters / Projects / Reports / e-mails / Assignments, etc.

UNIT - 5

GROUP DISCUSSION AND INTERVIEW SKILLS – Dynamics of Group discussion, Intervention, Summarizing, Modulation of voice, Body Language, Relevance, Fluency and organization of ideas and rubrics of evaluation, Concept and Process of interviews, Pre-interview planning, Opening strategies, Answering Strategies, Interview through Tele-conference & Video-conference and Mock Interviews.

Suggested Software:

- Sky Pronunciation
- Pro-power 2
- Globarena Software

REFERENCE BOOKS

1. Kumar Sanjay, Pushpa Lata.English for Effective Communication, Oxford University Press,2015.
2. Konar Nira**,** English Language Laboratories– A Comprehensive Manual, PHI Learning Pvt.Ltd.,2011.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	2	-	-	-	3	-	-	3	3	-
CO2	3	3	-	-	-	-	-	-	-	3	-	-	3	3	-
CO3	2	2	-	-	-	-	-	-	-	3	-	-	3	3	-
CO4	2	-	-	-	-	-	-	-	3	3	-	-	3	3	-

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

III B. Tech II Semester (Common to CE, ME & ECE)

L	T	P	C
2	0	0	0

20AHS23 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Identify various aspects of Traditional knowledge and its importance.

CO 2: Explain briefly to understand the needs and importance of protecting traditional knowledge.

CO 3: Analyze the various systems, concepts and strategies of traditional knowledge.

CO 4: Apply the concepts of traditional knowledge in different sectors.

UNIT-1

INTRODUCTION TO TRADITIONAL KNOWLEDGE: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, Indigenous Knowledge (IK), characteristics, traditional knowledge vis-a-vis indigenous knowledge, traditional knowledge Vs western knowledge.

UNIT-2:

PROTECTION OF TRADITIONAL KNOWLEDGE: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT-3:

LEGAL FRAMEWORK AND TRADITIONAL KNOWLEDGE: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016.

UNIT-4:

TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge.

UNIT-5:

TRADITIONAL KNOWLEDGE IN DIFFERENT SECTORS: Traditional knowledge and engineering, Traditional medicine system, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Text Book:

1. Traditional Knowledge System in India, by Amit Jha, 2009.

Reference Books:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002.

2. "Knowledge Traditions and Practices of India" Kapil Kapoor1, Michel Danino2.

Web Links:

1. https://www.youtube.com/watch?v=LZP1StpYEPM
2. http://nptel.ac.in/courses/121106003/

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	3	3	-	-	-	-	-	3	3	-
CO2	2	-	-	-	-	3	3	-	-	-	-	-	3	3	-
CO3	-	-	-	-	-	3	3	-	-	-	-	-	3	3	-
CO4	3	-	-	-	-	3	3	-	-	-	-	-	3	3	-

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

IVB.Tech –I Semester

L	T	P	C
3	0	0	3

20ACE51 AIR POLLUTION AND CONTROL

(PROFESSIONAL ELECTIVE-III)

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain the Fundamentals ofAir pollution and its hazards.
2. Realizetheair pollution effects onman, material andvegetation.
3. Apply the basic attributes of Plume patterns in the atmosphere.
4. Identify the preventive measures to control the pollutants.
5. Monitor and maintain the air quality.

UNIT I

INTRODUCTION : Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non- Point, Line and ArealSources of air pollution- stationary and mobile sources.

UNIT II

EFFECTS OF AIR POLLUTION: Effects of Air pollutants on man, material and vegetation: Global effect of air pollution–Green House effect, Heat Islands, Acid Rains, Ozone Layer depletion. Applications in the removal of gases like Sox, Nox, CO, HCetc., air-fuel ratio.

UNIT III

PLUME BEHAVIOUR: Meteorology and plume Dispersion; properties of atmosphere; Heat,Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams.Air diffusion mechanism.

POLLUTANT DISPERSION MODELS: Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

UNITIV

CONTROL OF PARTICULATES: Control of particulates–control at Sources, Process Changes, Equipment modifications,Working operation of Air control Equipment.

CONTROL OF GASEOUS POLLUTANTS: Methods to Control Nox and Sox emissions–In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNITV

AIR QUALITY MANAGEMENT:Air Quality Management–Monitoring of SPM, SO; NO and CO Emission Standards. Carbon Sequestration, Decarbonization -Air Quality Standards.

TextBooks:

1. M.N.Rao and H.V.N.Rao, Air pollution,Tata Mc Graw Hill Company,2017.
2. Wark and Warner-Air pollution Harper & Row, New York,1998.

ReferenceBooks:

1. K.V.S.G.Murali Krishna,Air Pollution and Control Kousal & Co. Publications, 2016,NewDelhi.

2. R.K.Trivedy An introduction to Air pollution, 2005,B.S .Publications.

3. S.Padmanabhammurthy Environmental meteorology,I.K. Internationals Pvt Ltd, 2009 NewDelhi.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3
CO2	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3
CO3	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3
CO4	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3
CO5	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

L	T	P	C
3	0	0	3

IV B.Tech–I Semester

20ACE52 **SOLID WASTE MANAGEMENT**

(PROFESSIONAL ELECTIVE-III)

Course Outcomes:

After successful completion of the course the students will be able to

1. Understand reduction of wastes at source
2. Understand transportation of wastes
3. Understand treatment of wastes
4. Understand recovery and disposal of wastes
5. Understand reuse and recovery of materials from waste

UNITI INTRODUCTION, COLLECTION AND TRANSPORTATION:

Definition, Land Pollution – scope and importance of solid waste management, Classification and characteristics– municipal, commercial & industrial. Systems of collection, collection equipment, garbage chutes, transfer stations – bailing and compacting.

UNIT II

TREATMENT/ PROCESSING TECHNIQUES, INCINERATION: Components separation, volume reduction, size reduction, chemical reduction and biological processing problems,Process – 3 T's, factors affecting incineration process, incinerators – types, prevention of airpollution, pyrolsis, design criteria for incineration.

UNIT III COMPOSTING: Aerobic and anaerobic composting, factors affecting composting, Indore and Bangalore processes, mechanical and semi mechanical composting processes.Vermi-composting.

UNITIV

SANITARY LAND FILLING:

Different types, trench area, Ramp and pit method, site selection, basic steps involved, cell design, prevention of site pollution, leachate & gas collection and control methods, geosynthetic fabrics in sanitary land fills, biomedical wastes and disposal

UNITV

RECYCLE AND REUSE: Material and energy recovery operations, reuse in other industries, plastic wastes, environmental significance and reuse.

TextBooks:

1. Solid Waste Management, 3rd Edition, Krishana Gopi Sanoop, Sasikumar K,PHI Learning, 2000
2. Solid Waste Management, Lingaraj Patro, Sonali Publications 2012

ReferenceBooks:

1. Integrated Solid Waste Management: Engineering Principles And Management Issues, George Tchobanoglous Hilary Theisen, Samuel A Vigil, MC GRAW HILL EXCLUSIVE, Indian Edition.,1993

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3
CO2	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3
CO3	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3
CO4	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3
CO5	2	3	-	-	-	3	3	-	-	-	-	3	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

IVB.Tech I Semester (CE)

L	T	P	C
3	0	0	3

20ACE53 ADVANCED FOUNDATION DESIGN

(Professional Elective- III)

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain the theories and design principles on bearing capacity
2. Analyse the bearing capacity of Pile foundations
3. Understand the basic concepts of Sheet PileWalls
4. Design foundations on expansive soils
5. Ensure stability and safety of marine sub - structures.

UNIT-I: SHALLOW FOUNDATIONS

Theories of bearing capacity–Hansen, Vesic; Effect of tilt, eccentricity, compressibility, non–homogeneity and anisotropy of soil on bearing capacity; Bearing capacity of footings resting on stratified soils, on slope and ontop of the slopes, Settlement of foundation – 3D consolidation settlement; Bearing pressure using SPT, CPT, Dilatometer and Pressure meter,Design principles - Isolated, Combined footing and mat foundation

UNIT–II: PILE FOUNDATIONS

Bearing capacity of vertically loaded piles-Static capacity-á, â and ë Methods, IS Code; Dynamic pile capacity – Simplex and Janbu methods; Point bearing resistance with SPT and CPT results; Bearing resistance of piles on rock, Uplift resistance, Laterally loaded piles, Ultimate lateral resistance, Batter piles, Under reamed piles, Mini and micro piles; Ultimate capacity of pile groups in compression, Pullout and lateral load, Efficiency; Settlements of pile groups, Design of simple R.C.C piles.

UNIT–III: SHEET PILE WALLS

Sheet pile structures, Cantilever sheet pile walls in granular soils and cohesive soils, anchored bulk head – Free earth supported method, Fixed earth support method; Lateral earth pressure on braced sheet pile walls.

UNIT–IV: FOUNDATIONS ON EXPANSIVE SOILS

Foundations in black cotton soils – Basic foundation problems associated with black cotton soils, Lime column techniques,Useof Cohesive Non-Swelling (CNS) layer below shallow foundations; Underreamed piles –Principle of functioning of under reamed pile,Analysis and design of under reamed pile.

UNIT–V: MARINE SUBSTRUCTURES

Introduction, Types of marine structures – Breakwaters, Wharves, Piers, Sea walls, Docks, Quay walls; Design loads, Wave action, Wave pressure on vertical wall, Ship impact on piled wharf structure, Design of rubble mount break water and wall type break water.

TEXTBOOKS:

1. Donald P. Coduto, Foundation Design Principles and Practices, PHI, 3rd Edition,2008.
2. Swami Saran, Analysis and Design of Substructures– Limit State Design, Oxford & IBH Publishing Company Pvt. Ltd., 2nd Edition 2010.

REFERENCE BOOKS:

1. V. N. S. Murthy, Text Book of Soil Mechanics and Foundation Engineering, CBS Publishers & DistributorsPvt. Ltd., 3rd Edition, 2010.
2. Braja M. Das, Principles of Foundation Engineering, Cengage Learning India, 7th Edition, 2010.
3. Bowles J.E., Foundation Analysis and Design, McGraw–Hill Publishing Company, 5th Edition, 2001.
4.Shamsher Prakash,Gopal Ranjan and Swami Saran, Analysis and Design of Foundations and Retaining Structures, Sarita Publishers, 2nd Edition, 1987.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		3	1	-	3	-	-	-	-	3	2	2	-
CO2	3	3		3	2	-	3	-	-	-	-	3	2	2	-
CO3	3	2		2	1	-	3	-	-	-	-	3	2	2	-
CO4	2	2		1	3		3					3	2	1	
CO5	2	2		2	1		3					3	2	2	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

	L	T	P	C
IVB.Tech ISemester(CE)	**3**	**0**	**0**	**3**

20ACE54 **BRIDGE ENGINEERING**

(PROFESSIONALELECTIVE-III)

Course Outcomes: After successful completion of the course the students will be able to

1. Design box culvert
2. Understand the behaviour of deck slab bridge and design the same
3. Explore the design of basic components of T-Beam Bridge
4. Perform the design of composite bridges
5. Plan and design bridge bearings and abutments

UNITI

INTRODUCTION: Importance of site investigation in Bridge design, Highway Bridge loading standards, Railway Bridge loading standards(BG, MG), various loads in bridges,Impact factor.

BOX CULVERT: General aspects: Design loads, Design of Box culvert subjected to IRCclass-AA tracked vehicle only.

UNITII

DECK SLAB BRIDGE: Introduction, Effective width method of Analysis, Design of deck Slab Bridge (Simplysupported) subjected to class AA Tracked Vehicle only.

UNIT III

BEAM & SLAB BRIDGE (T-BEAM BRIDGE): General features, Design of interior panel of slab, (Pigeauds method), Design of a T-beam bridge subjected to IRC class AA tracked vehicle only.

UNITIV

COMPOSITE BRIDGES: Introduction, Advantages, Design of Composite Bridges consisting of RCC slabs over steel girders including shear connectors.

UNITV

BRIDGE BEARINGS: General features, Types of Bearings, Design principles of steel Rocker & Roller Bearings, Design of a steel Rocker Bearing, Design of Elastomeric pad Bearing.

PIERS & ABUTMENTS: General features, Bed Block,Types of piers, Forces acting on piers, Stability analysis of piers, forces acting on abutments, Stability analysis of abutments,Types of wing walls, Approaches,Types of Bridge foundations (excluding Design).

TEXT BOOKS:

1. T.R.Jagadish & M.A.Jayaram, Design of Bridges Structures, Prentice Hall of India Pvt., Delhi.
2. D.J.Victor. Essentials of Bridge Engineering, Oxford and IBH Publishers.

REFERENCE BOOKS:

1. PonnuSwamy. Bridge Engineering, TATA Mc graw Hill Company, NewDelhi.
2. N.Krishnam Raju. Design of Bridges, Oxford & IBH, Publishing Company Pvt.ltd., Delhi.
3. Ramachandra. Design of Steel structures, II Ed. Scientific publishers (INDIA),2009
4. Relevant – IRC & Railway bridge **Codes.**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	-	-	-	-	-	-	-	-	-	2	1	-
CO2	2	2	1	-	-	-	-	-	-	-	-	-	2	3	-
CO3	2	3	2	-	-	-	-	-	-	-	-	-	1	2	-
CO4	1	2	3	-	-								3	2	
CO5	1	2	2	-	-								2	3	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

IVB.Tech I Semester(CE)

	L	T	P	C
20ACE55 SEISMOLOGY TO EARTH QUAKE ENGINEERING	**3**	**0**	**0**	**3**

(COURSERA)

Course Outcomes: After successful completion of the course the students will be able to

1. Explain seismicity and faults
2. Analyse seismic waves and ground motion
3. Determine seismic response of soils and structures
4. Perform Pushover analysis and failure analysis

Unit I Seismicity and Faults

Introduction to seismology and earthquake engineering - Exploring the Earth - Fundamentals of tectonics -Fault mechanics - Fault radiation -Seismicity -Rock behaviour in the lab - Controlling seismic faults -Earthis a huge magnet - Exploring Mars structure

Unit II Seismic Waves and Ground Motion

Observation of seismic ground motion -Propagation of seismic waves - Seismic site effects - Seismic wave amplification (1D) - (2D/3D) - Soil and site characterization - Measuring and observing earthquakes – Mars Quakes

Unit III Seismic Response of Soil and Structures

Soil linear behaviour - Soil nonlinear behaviour - Seismic soil response - Simplified analysis of soil response -Application of the response spectrum - Eigen modes and modal superposition - Recombining Eigen modes and directions - Resisting seismic motion by isolation - In situ characterization of complex structures – Probabilistic Seismic Hazard Assessment

Unit IV Complex Structures and Non Linearities

Dynamic soil-structure interaction - Soil-Foundation-Structure interaction - Dynamic soil behaviour in the lab -Typical nonlinear material behaviors - Behaviour and failure of structures - Nonlinear behavior of structures –Push over analysis and capacity design -Time-history analysis of discrete systems

TEXT BOOKS

1. Earthquake Resistant Design of Structures By Pankaj Agarwal & Manish Shrikhande, PHI Publications
2. Manish Shrikhande & Pankaj Agrawal; Earthquake Resistant Design of Structures, PHI Publication, NewDelhi
3. S. K. Duggal; Earthquake Resistance Design of Structures; Oxford University Press, New Delhi
4. K. Chopra; Dynamics of Structures, Pearson, New Delhi

REFERENCE BOOKS

1. Clough& Penzin; Dynamics of Structures
2. Park& Pauly; Behavior of R.C Structures
3. John M. Biggs; Introduction to Structural Dynamics
4. SSRao;MechanicalVibration;Pearson,NewDelhi
5. IS: 1893 (Part-I) 2002, Criteria for Earthquake Resistant Design General Provision
6. IS: 13920 (1993), Code of Practice for Ductile Detailing of RC Structures
7. IS:4326(1993),Code of Practice for Earthquake Resistant Design and Construction of Buildings
8. IS: 13827 (1993), Improving Earthquake Resistance of Earthen Buildings
9. IS:13828(1993),Guidelines for Improving Earthquake Resistance.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	-	-	-	2	-	-	-	-	2	2	1	2
CO2	2	2	1	-	-	-	1	-	-	-	-	1	2	3	2
CO3	2	3	2	-	-	-	2	-	-	-	-	2	1	2	1
CO4	1	2	3	-	-		3					3	3	2	3

SRIVENKATESWARACOLLEGEOFENGINEERING& TECHNOLOGY (AUTONOMOUS)

IVB.Tech I Semester(CE)

L	T	P	C
3	0	0	3

20ACE56 HYDRO POWER ENGINEERING

(PROFESSIONAL ELECTIVE-IV)

Course Outcomes:

After successful completion of the course the students will be able to

1. Solve Problems of Open Channel Flow
2. Perform fluid flow measurements
3. Provide hydraulic design for hydropower plants
4. Solve problems of hydraulic machines
5. Explain theory of impeller design

UNIT-1

Continuity equation in cylindrical and polar coordinates energy equation in rotating system, moment of momentum equation, Kinematics of flow, Laminar and turbulent flow through pipes.Navier-Stokes equation, turbulent models, boundary layer parameters and their estimation, boundary layer separation and control, Drag and lift on submerged bodies, flow in open channel.

UNIT-2

Accuracy, error analysis, pressure measurement, velocity measurement, discharge measurement, speed measurement, force and torque measurement, temperature measurement, viscosity measurement, acoustic measurement, calibration of instruments.

UNIT-3

Types of hydropower plants and schemes, hydrology: run off studies, flood estimation studies, assessment of hydropower potential of a basin, storage and pondage, load studies, elements of hydropower plants and their hydraulic design: dams, intakes, conveyance system, types of power house.

UNIT-4

Classification and Euler's equation for hydraulic machines of hydraulic turbines and pumps, energy losses in hydraulic machines, scale effects, hydraulic similarity, non-dimensional numbers and model laws, cavitation, similarity laws in cavitating flows,Affinity laws for hydraulic machines, model testing and performance characteristics. Introduction to field testing.

UNIT-5

Theory of impeller design, design of impellers, design of pump casing, axial and radial thrust, shaft design for critical speed, special purpose pumps, bowers and compressors, Pumps characteristics curves.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	-	-	-	2	-	-	-	-	2	2	1	2
CO2	2	2	1	-	-	-	1	-	-	-	-	1	2	3	2
CO3	2	3	2	-	-	-	2	-	-	-	-	2	1	2	1
CO4	1	2	3	-	-		3					3	3	2	3
CO5	2	3	2	-	-	-	2	-	-	-	-	2	1	2	1

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L	T	P	C
3	0	0	3

IV B.Tech–I Semester(CE)

20ACE57 HEALTH MONITORING AND RETROFITTING OF STRUCTURES

(PROFESSIONAL ELECTIVE – IV)

Course Outcomes:

After successful completion of the course the students will be able to

1. Assess strength and materials deficiency in concrete structure.
2. Explain corrosion mechanism
3. Apply non-destructive testing techniques to field problems.
4. Apply cost effective repair and retrofitting strategies for buildings.
5. Assess the health condition of structures.

UNIT I

Introduction- Deterioration of Structures – Distress in Structures causes and Prevention mechanism of Damage – Types of Damage

UNIT II

Corrosion of Steel Reinforcement–Causes–Mechanism and Prevention .Damage of Structures due to Fire–Fire Rating of Structures – Phenomena of Desiccation.

UNIT III

Inspection and Testing– Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT IV

Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning. Strengthening of Structures – Strengthening Methods –Retrofitting – Jacketing.

UNIT V

Health Monitoring of Structures –Use of Sensors – Building Instrumentation.

TextBooks:

1. Diagnosis and treatment of Structures in Distress– R N Raikar, 1994
2. A.R.Santakumar. ConcreteTechnology, Oxford University press, 2006

Reference Books:

1. Bungey.Non-Destructive Evaluation of Concrete Structures Surrey University Press, Hyderbad,1982
2. EF & NSpon. Building Failures: Diagnosis and Avoidance, London, B.A. Richardson (1991), London
3. Dr.B.Vidivelli. Rehabilitation of Concrete Structures, Standard Publications, 2007
4. Handbook on repair and rehabilitation of rcc buildings – CPWD

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	-	-	-	2	-	-	-	-	2	2	1	2
CO2	2	2	1	-	-	-	1	-	-	-	-	1	2	3	2
CO3	2	3	2	-	-	-	2	-	-	-	-	2	1	2	1
CO4	1	2	3	-	-		3					3	3	2	3
CO5	2	3	2	-	-	-	2	-	-	-	-	2	1	2	1

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(AUTONOMOUS)

L	T	P	C
3	0	0	3

IVB.Tech I Semester(CE)

20ACE58 ENVIRONMENTAL IMPACT ASSESSMENT & MANAGEMENT (PROFESSIONAL ELECTIVE-IV)

Course Outcomes: After completion of the course the Students will be able to

1. Perform a critical quality review of an EIA and EIS;
2. Structure the EIA working process considering the need for interdisciplinary;
3. Perform the screening and scoping of an EIA, based on existing requirements, evaluate the impacts and draw meaningful conclusions from the results of the EIA;
4. Clarify the concept of EIA and its application in an international context to those involved in or affected by the EIA process;
5. Interpret an EIA, present its conclusions, and translate its conclusions in to all actions.

.

UNIT I INTRODUCTION:-

Basic concept 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.

UNIT II EIA METHODOLOGIES

EIA Methodologies: introduction, Criteria for the selection of EIA Methodology, EIA methods,Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods and cost / benefit Analysis.

UNIT III 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. EIA 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 IV ASSESSMENT OF IMPACT ON VEGETATION AND WILD LIFE:

Introduction- Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

ENVIROMENTAL AUDIT : Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit,Types of environmental Audit, Audit protocol, stages of Environmental Audit, on site activities, evaluation of Audit data and preparation of Audit report.

UNITV ENVIRONEMENTAL ACTS (PROTECTION AND PREVENTION)

Post Audit activities, The Environmental protection Act, The water preventation Act, The Air (Prevention & Control of pollution Act.),Wild life Act Case studies and preparation of Environmental Impact assessment statement for various Industries.

TextBooks:

1. Environmental Impact Assessment Methodologies, by Y.Anjaneyulu, B.S.Publication, SultanBazar, Hyderabad, 2010.
2. Environmental Science and Engineering, by J. Glynnand Gary W. Hein Ke–Prentice Hall Publishers, 1989

ReferenceBooks:

1. Environmental Science and Engineering ,by Suresh K.Dhaneja–S.K.,Katari& Sons Publication.,New Delhi, 2013
2. Environmental science and Engineering by AlokaDebi, Universities Press,2008
3. Environmental Impact Assessment,Canter,L.W.,1977,McGrawHills,NewYork.
4. John G.Rauand DavidC.Wooten (Ed), Environmental Impact Analysis Handbook, McGraw Hill Book Company,1979.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**3**	**1**	**2**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**2**	**1**	**2**
CO2	**2**	**2**	**1**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**1**	**2**	**3**	**2**
CO3	**2**	**3**	**2**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**1**	**2**	**1**
CO4	**1**	**2**	**3**	**-**	**-**		**3**					**3**	**3**	**2**	**3**
CO5	**2**	**3**	**2**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**1**	**2**	**1**

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3	0	0	3

IV B.Tech I Semester (CE)

20ACE59 TRAFFIC ENGINEERING

(PROFESSIONALELECTIVE-IV)

Course Outcomes:

After successful completion of the course the students will be able to

1. Conduct traffic studies
2. Estimate the congestion in an area and to design parking facility
3. Design intersections and prepare traffic management plans.
4. Identify the various type of traffic signs and road indicators.
5. Evaluate traffic impacts on the environment and safety.

UNIT I TRAFFIC CHARACTERISTICS

TRAFFIC CHARACTERISTICS: Basic characteristics of Traffic – Volume, Speed and Density – Relationship among Traffic parameters.

TRAFFIC MEASUREMENT: Traffic Volume studies – objectives – types of Volume studies – concepts of PCU – data collection and presentation – Speed studies – Types of Speed studies - Objectives of Speed studies – methods of conducting Speed studies – data collection and presentation – Statistical methods for analysis of Speed data.

UNIT II CAPACITY STUDIES

HIGHWAY CAPACITY: Definition of Capacity – importance of capacity – factors affecting capacity- concept of level of service – different levels of service – concept of service volume – Peak Hour factor.

PARKING STUDIES: Types of parking facilities – On-street and Off-street parking facilities – Parking studies – Parking Inventory Study – Parking survey by Patrolling method – analysis of parking data and parking characteristics – Multi story car parking facility – Design standards.

UNIT III TRAFFIC CONTROL & REGULATIONS

TRAFFIC CONTROL & REGULATION: Traffic problems in urban areas – importance of traffic control and regulation – Traffic regulatory measures – Channelization – Traffic signals – Saturation flow – Signal design by Webster method – Signal phasing and Timing diagrams.

UNIT IV TRAFFIC ENVIRONMENT

TRAFFIC & ENVIRONMENT: Detrimental effect of traffic on Environment – Air Pollution – Pollution – Pollutants due to traffic – Measures to reduce Air Pollution due to traffic – Noise Pollution – Measures to reduce Noise Pollution.

TRAFFIC SIGNS AND ROAD MARGINS: Types of traffic signs – cautionary, regulatory, and informative signs – Specifications – Pavement markings – Types of Markings – Lane markings and object markings – Standard and Specifications for Road markings.

UNIT V HIGHWAY SAFETY

HIGHWAY SAFETY: Problem of Highway Safety – Types of Road accidents – Causes – Engineering Measures to reduce accidents – Enforcement measures – Educational measures – Road safety Audit – Principles of Road Safety Audit.

Text Books:

1. Nicholas J.Garber, Lester A.Hoel. Principles of Traffic & Highway Engineering. 1st Edition, Cengage Learning, 2020.
2. Dr. L.R Kadiyali. Traffic Engineering & Transportation Engineering. 6th Edition, Khanna Publishers, 2019.

Reference Books:

1. S.K.Khanna, C.E.G Justo. Highway Engineering. 9th Edition, Nemchand& Bros, 2020.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1		-	2	-	2	-	-	-	-	2	2	1	2
CO2	2	2		-	1	-	1	-	-	-	-	1	2	3	2
CO3	2	3		-	2	-	2	-	-	-	-	2	1	2	1
CO4	1	2		-	3		3					3	3	2	3
CO5	2	3		-	2	-	2	-	-	-	-	2	1	2	1

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IV B.Tech I Semester (CE)

L	T	P	C
3	0	0	3

20ACE60 DISASTER MITIGATION AND MANAGEMENT (PROFESSIONALELECTIVE-IV)

Course Outcomes: After successful completion of the course the students will be able to

1. Enumerate environmental hazards and disasters
2. Explain various types of environmental hazards and disasters
3. Indentify causes for volcanoes and earthquakes
4. Describe exogenous hazards and disasters
5. Explain the causes of soil erosion and related disasters

UNIT I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

UNIT II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards

UNIT III

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

UNIT IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters infrequent events: Cyclones – Lightning – Hailstorms Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception& mitigation) Cumulative atmospheric hazards/ disasters: - Floods- Droughts- Cold waves- Heat waves. Floods:- Causes of floods- Flood hazards India- Flood control measures .Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Planetary Hazards/ Disasters- Man induced Hazards /Disasters Physical hazards/ Disasters-Soil Erosion

UNIT V

Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion Conservation measures of Soil Erosion. Chemical hazards/ disasters: -- Release of toxic chemicals, nuclear explosion- Sedimentation processes. Sedimentation processes: - Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation. Biological hazards/ disasters: - Population Explosion.

Emerging approaches in Disaster Management- Three Stages 1.Pre- disaster stage (preparedness) 2. Emergency Stage 3. Post Disaster stage-Rehabilitation

Text books:

1. Rajib Shah, Disaster Management, Universities Press, India, 2003
2. Tushar Bhattacharya, Disaster Science and Management, TMH Publications. 2013
3. Pardeep Sahni, Disaster Mitigation: Experiences And Reflections,2001
4. Donald Hyndman & David Hyndman, Natural Hazards & Disasters, Cengage Learning,2010

References:

1. Kates, B.I & White The Environment as Hazards, G.F, Oxford Publishers, New York, 1978
2. R.B. Singh (Ed), Disaster Management Rawat Publication, New Delhi, 2000
3. H.K. Gupta (Ed), Disaster Management Universities Press, India, 2003
4. R.B. Singh Space Technology for Disaster Mitigation in India (INCED), University of Tokyo,1994.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**3**	**1**		**-**	**2**	**-**	**2**	**2**	**-**	**-**	**-**	**2**	**2**	**1**	**2**
CO2	**2**	**2**		**-**	**1**	**-**	**1**	**1**	**-**	**-**	**-**	**1**	**2**	**3**	**2**
CO3	**2**	**3**		**-**	**2**	**-**	**2**	**2**	**-**	**-**	**-**	**2**	**1**	**2**	**1**
CO4	**1**	**2**		**-**	**3**		**3**	**3**				**3**	**3**	**2**	**3**
CO5	**2**	**3**		**-**	**2**	**-**	**2**	**2**	**-**	**-**	**-**	**2**	**1**	**2**	**1**

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IV B.Tech I Semester (CE)

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3	0	0	3

20ACE61 DESIGN AND DRAWING OF IRRIGATION STRUCTURES (PROFESSIONAL ELECTIVE-V)

Course Outcomes:

After successful completion of the course the students will be able to

1. Design various irrigation structures like head and cross regulator structures
2. Draw different types of weirs, aqueducts and canals.
3. Identify various types of reservoirs and their design aspects

Design and drawing of the following irrigation structures:

1. Sloping glacis weir.
2. Tank sluice with tower head
3. Type III Syphon aqueduct.
4. Surplus weir.
5. Trapezoidal notch fall.
6. Canal regulator.

Final Examination pattern:

Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

Text Books:

1. Satyanarayana Murthy, C. Design of minor irrigation and canal structures. Wiley eastern Ltd, New Delhi.1990
2. Garg, S.K. Irrigation engineering and Hydraulic structures. Standard Book House.1987.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1		-	2	-	2	2	-	-	-	2	2	1	2
CO2	2	2		-	1	-	1	1	-	-	-	1	2	3	2
CO3	2	3		-	2	-	2	2	-	-	-	2	1	2	1

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3	0	0	3

IVB.Tech I Sem

20ACE62 INTEGRATED WATER RESOURCES AND PLANNING

(PROFESSIONAL ELECTIVE V)

Course Outcomes:

After successful completion of the course the students will be able to

1. Apply system analysis to problems in water resources engineering
2. Perform economic analysis of water resources system
3. Evaluate and apply water management techniques
4. Plan irrigation management systems
5. Perform water quality management

UNIT I

Introduction: General Principles Of Systems Analysis To Problems In Water Resources engineering, Objectives of water resources planning and development, Nature of water resources Systems, Socio Economic Characteristics.

UNIT II

Economic Analysis of Water Resources System: Principles of Engineering Economy, Capital, Interest and Interest Rates. Time Value of Money, Depreciation, Benefit Cost Evaluation, Discounting Techniques, Economic and Financial Evaluation, Socio -Economic Analysis

UNIT III

Methods of Systems Analysis: Linear Programming Models, Simplex Method, Sensitivity Analysis, Dual Programming, Dynamic Programming Models, Classical Optimization Techniques, Non-linear Programming, Gradient Techniques, Genetic Algorithm, Stochastic Programming, Simulation, SearchTechniques, Multi Objective Optimization.

UNIT IV

Surface Water Storage Requirements, Storage Capacity and Yield, Reservoir Design, Water Allocations for Water Supply, Irrigation, Hydropower and Flood Control, Reservoir Operations, Planning of an Irrigation System, Irrigation Scheduling, Groundwater management, Conjunctive Use of Surface and Subsurface Water Resources, Design of Water Conveyance and Distribution Systems.

UNIT V

Water Quality Management: Water Quality Objectives and Standards, Water Quality Control Models, Flow Augmentation, Wastewater Transport Systems, River Water Quality Models andLake Quality models. Legal Aspects of Water & Environment Systems: Principles of Law applied to Water Rights and Water Allocation, Water Laws, Environmental Protection Law, Environmental Constraints on water Resources Development.

TEXT BOOKS

1. Loucks,D.P.,Stedinger, J.R. and Haith, D.A. (1982) "Water Resources System Planning and Analysis" , Prentice Hall Inc. NYork
2. Chaturvedi, M.C.(1987),"Water Resources Systems Planning and Management", Tata Mc Graw Hill Pub. Co., N Delhi

REFERENCE BOOKS

1. Hall.W.A.and Dracup,J.A.(1975)," Water Resources Systems",Tata Mc Graw Hill Pub. NDelhi
2. James,L.D. and Lee (1975), "Economics of Water Resources Planning",Mc Graw Hill Inc. N York
3. Kuiper,E.(1973)"Water Resources Development, Planning, Engineering and Economics", Buttersworth, London

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1		-	2	-	2	2	-	-	-	2	2	1	2
CO2	2	2		-	1	-	1	1	-	-	-	1	2	3	2
CO3	2	3		-	2	-	2	2	-	-	-	2	1	2	1
CO4	1	2		-	3		3	3				3	3	2	3
CO5	2	3		-	2	-	2	2	-	-	-	2	1	2	1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

	L	T	P	C
IV B.Tech I Semester (CE)	**3**	**0**	**0**	**3**

20ACE63 FINITE ELEMENT METHODS FOR CIVIL ENGINEERING

(PROFESSIONAL ELECTIVE –V)

Course Outcomes: After successful completion of the course the students will be able to

1. Conceptualize FEM using Elasticity
2. Explain 1D and 2D elements of FEM
3. Generate Element stiffness matrices
4. Solve Axisymmetric problems and isoparametric problems
5. Perform numerical techniques of FEM

UNIT I

INTRODUCTION: Concepts of FEM – Steps involved – merits & demerits –energy principles –Discretization – Rayleigh –Ritz method of functional approximation.

PRINCIPLES OF ELASTICITY: Equilibrium equations – strain displacement relationships inmatrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNITII

ONE DIMENSIONAL & TWO DIMENSIONAL ELEMENTS: Stiffness matrix for bar element– shape functions for one dimensional elements – one dimensional problems.Two Dimensional Elements - Different types of elements for plane stress and plane strain analysis –Displacement models–generalized coordinates – shape functions – convergent and compatibility requirements– Geometric invariance – Natural coordinate system area and volume coordinates

UNIT III GENERATION OF ELEMENT:

Generation of element stiffness and nodal load matrices for3-node triangular element and four node rectangular elements.

UNIT IV ISOPARAMETRIC FORMULATION:

Concepts of, isoparametric elements for 2 D analysis–formulation of CST element, 4– Noded and 8-noded iso-parametric quadrilateral elements–Lagrangian and Serendipity elements.

AXI-SYMMETRIC ANALYSIS: Basic principles–Formulation of 4-noded iso-parametric axisymmetric element

UNITV

SOLUTION TECHNIQUES: Numerical Integration ,Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS:

1. R.Chandranpatla and Ashok D.Belegundu.Tirupati. Finite Elements Methods in Engineering Pearson Education Publications.1990

2. C.S.Krishna Murthy. Finite Element analysis– Theory & Programming-Tata Mc. Graw Hill Publishers, 1994

REFERENCE BOOKS:

1. H.V.Lakshminaryana. Finite element analysis and procedures in engineering, 3rd edition, universities press, Hyderabad,2005

2. S.Rajasekharan. Finite element analysis in Engineering Design, S.Chand Publications, NewDelhi.,1999

3. S.S. Bhavakatti. Finite element analysis , New age international publishers.,2005

4.Desai, Finite element method and its application,2012, Pearson Publications.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	--	--	--	--	--	--	--	--	--	--	2	2	-
CO2	3	3	--	--	--	--	--	--	--	--	--	--	2	2	-
CO3	3	3	--	--	--	--	--	--	--	--	--	--	2	2	-
CO4	3	3	--	--	--	--	--	--	--	--	--	--	2	2	-
CO5	3	3	--	--	--	--	--	--	--	--	--	--	2	2	-

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

20ACE64 EARTH AND EARTH RETAINING STRUCTURES

(PROFESSIONAL ELECTIVE –V)

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain lateral earth pressure theories and pressure theories and design retaining walls.
2. Design anchored bulk heads by different methods.
3. Develop pressure envelops and design of various components in braced cuts and cofferdams.
4. Explain stability of earth dams and its protection and construction.
5. Identify protection methodologies for Dams

UNIT I

Lateral Pressure: Basic concepts, Rankine and Coulomb earth pressure theories, graphical methods. Determining active and passive pressures: Culmanns, Rebhan's, logarithmic spiral methods, friction circle method. Consideration of surcharge, seepage, earth quake, wave effect, stratification, type of backfill, wall friction and adhesion.

Retaining walls: Uses, types, stability and design principles of retaining walls, backfill drainage, settlement and tilting.

UNIT II

Anchored bulk heads: Classification of anchored bulk heads, free and fixed earth support methods. Rowe's theory for free earth supports and equivalent beam methods for fixed earth supports. Design of anchored rods and dead man**.**

UNIT III

Braced cuts and Cofferdams: Braced excavations and stability of vertical cuts, lateral pressuresin sand and clay, Braced and cellular cofferdams: uses, types, components, stability, piping and heaving. Stability of cellular coffer dams, cellular cofferdams in rock and in deep soils.

UNIT IV

Earth dams- Stability analysis : Classification, seepage control in embankments and foundations, seepage analysis, stability analysis: upstream and down stream for steady seepage, rapid draw down, end of construction, method of slices and Bishop's method.

UNIT V

Earth dams -Protection & Construction: Slope protection, filters, embankment construction materials and construction, quality control, grouting techniques. Instrumentation and performance observations in earth dams**.**

TextBooks:

1. Basic & Applied soil mechanics –Gopal Ranjan & ASR Rao ,New Age International Publishers, 2011.
2. Embankment Dams by Sharma Hd, Publisher: India Book House(IBH) Limited,1991
3. Engineering for Embankment Dams By B.Singh &R.S.Varshney, AA Balkema Publishers, 1995

ReferenceBooks:

1. Foundation Design By W.C.Teng, PrenticeHall,1962
2. Analysis And Design Of Foundations By Bowles. J. W Mcgraw Hill, 4th Edition, 1955.
3. Earth And Rock- Fill Dams: General Design And Construction Considerations By United States Army Corps Of Engineers, University Press Of The Pacific,2004
4. Soil Mechanics In Engineering And Practice By Karl Terzaghi, Ralph B.Peck, Gholamreza Mesri, 3rd Edition.Wiley India Pvtltd,2010.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	--	--	--	--	3	--	--	--	--	3	3	2	3
CO2	3	3	--	--	--	--	2	--	--	--	--	2	2	1	1
CO3	3	2	3	2	2	--	3	--	--	--	--	3	1	3	2
CO4	2	3	2	1	--	--	2	--	--	--	--	2	2	3	2
CO5	3	2	3	2	2	--	1	--	--	--	--	1	1	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY

(AUTONOMOUS)

	L	T	P	C
IVB.Tech I Semester	3	0	0	3

20ACE65 RURAL WATER SUPPLY AND SANITATION

(PROFESSIONAL ELECTIVE –V)

Course Outcomes:

After successful completion of the course the students will be able to

1.Plan water supply systems and execute water treatment process

2.Eradicate water supply issues in rural areas and promote water resources.

3.Plan and execute water distribution systems.

4.Endorse onsite sanitation systems and community latrines

5.Implement solid waste disposal and setup bio gas plants

UNIT I

Concept of environmental and scope of sanitation in rural areas. Magnitude of problem of water supply and sanitation–population to be covered and difficulties National policy. Various approaches for planning of water supply systems in rural areas. Selection and development of preferred sources of water, springs, wells and infiltration galleries, collection of raw water from surface source.

UNIT II

Specific problem in rural water supply and treatment e.g. iron, manganese, fluorides etc. Low cost treatment , appropriate technology for water supply and sanitation. Improvised method and compact system of treatment of surface and ground waters such as MB settlers, slow and sand filter, chlorine diffusion cartridge etc. Water supply through spot sources, hand pumps, open dug –well.

UNIT III

Planning of distribution system in rural areas.Water supply during fairs, festivals and emergencies. Treatment and disposal of waste water / sewage. various method of collection and disposal of night soil.

UNIT IV

On site sanitation system and community latrines. Simple waste water treatment system for rural areas and small communities such as stabilization ponds, septic tanks, soakage pits etc.

UNIT V

Disposal of solids waste : composting, land filling. Biogas plants.

TextBooks:

1. Low cost on site sanitation option, Hoffman & Heijno Occasional Nov.1981

ReferenceBooks:

1. Wagner, E.G. and Lanoik, J.N. water supply for rural areas and small communities, Geneva:W.H.O.1959.
2. Manual of water supply and treatment, 3rd edition, CPHEEO, GOI, New delhi.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	--	--	--	--	3	--	--	--	--	3	3	2	3
CO2	3	3	--	--	--	--	2	--	--	--	--	2	2	1	1
CO3	3	2	3	2	2	--	3	--	--	--	--	3	1	3	2
CO4	2	3	2	1	--	--	2	--	--	--	--	2	2	3	2
CO5	3	2	3	2	2	--	1	--	--	--	--	1	1	3	2

SRIVENKATESWARACOLLEGEOFENGINEERING&TECHNOLOGY

(AUTONOMOUS)

L	T	P	C
3	0	0	3

IV B.Tech I Semester

20AMB14 ECONOMIC POLICIES IN INDIA (Common to All Branches)

(OPEN ELECTIVE - III)

Course Outcomes:

After completion of this course students will be able to:

1. Explain the basic characteristics of Indian economy, its potential in terms of natural resources.
2. Explain the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.
3. Outline the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.
4. Analyze the progress and changing nature of agricultural sector and its contribution to the economy as a whole.
5. Explain the basic features of Indian economy, sources of revenue, how the state governments finance its programmes and projects.

Unit –I Basic features and problems of Indian Economy: - Nature of Indian Economy, demographic features and Human Resource Development, Problems of Poverty, Unemployment, Inflation, income inequality, Black money in India.

Unit-II Sectoral composition of Indian Economy: - Issues in Agriculture sector in India ,land reforms Green Revolution and agriculture policies of India , Industrial development , small scale and cottage industries, industrial Policy, Public sector in India, service sector in India.

Unit-III Economic Policies :- Economic Planning in India , Planning commission v/s NITI Aayog, monetary policy in India, Fiscal Policy in India, Centre state Finance Relations, Finance commission in India. LPG policy in India.

UNIT - IV: Indian Planning Objectives &strategy of Planning in India: Regional Planning Policy in India - regional imbalances in India and policy measures to remove regional imbalances, critical review of Regional Planning in India; Economic Growth and Social Attainment - the role of Development Strategy; Gender Responsive Budgeting and Gender Equity.

Unit-V External sector in India: - India's foreign trade value composition and direction, India Balance of payment since 1991, FDI in India, Impact of Globalization on Indian Economy, WTO and India.

Text Books:

1. Dutt Rudder and K.P.M Sunderam (2001): Indian Economy, S Chand & Co. Ltd. New Delhi.
2. Mishra S.K & V.K Puri (2001) "Indian Economy and –Its development experience", Himalaya Publishing House.
3. Kapila Uma: Indian Economy: Policies and Performances, Academic Foundation

Reference Books:

1. Bardhan, P.K. (9th Edition) (1999), The Political Economy of Development in India, Oxford University Press, New Delhi.
2. Jalan, B. (1996), India's Economic Policy- Preparing for the Twenty First Century, Viking, New Delhi.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	-	-	-	3	3	-	-	3	3		3	3
CO2	3	3	-	-	-	-	-	-	-	-	3	-	3	3	
CO3	3	2	-	-	-	-	-	-	-	-	3	-		3	
CO4	2	3	3	-	-	-	3	3	-	-	3	3	3	3	3
CO5	3	2	3	-	-	-	3	3	-	-	3	3	3	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

	L	T	P	C
IV B.Tech I Semester	**3**	**0**	**0**	**3**

20ACS38 CRYPTO CURRENCIES AND BLOCK CHAIN TECHNOLOGIES

(OPEN ELECTIVE-III)

Course Outcomes:

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

1. Define the Fundamental concepts of Crypto currencies and Block chain Technologies

2. Demonstrate the application of hashing and public key cryptography in protecting the block chain.

3. Explain the elements of trust in block chain: Verification Validation and consensus.

4. Interpret crypto currency Regulation and for Block chain Applications

UNIT- I

Introduction to Cryptography &Crypto currencies: Cryptographic Hash Functions - Hash Pointers and Data Structures - Digital Signatures - Public Keys as Identities - A Simple Crypto currency - How Bitcoin Achieves Decentralization - Centralization vs. Decentralization - Distributed consensus - Consensus with out identity using a block chain

UNIT- II

Mechanics of Bitcoin: Bitcoin transactions - Bitcoin Scripts - Applications of Bitcoin scripts - Bitcoin blocks - The Bitcoin network - Limitations and improvements

How to Store and Use Bitcoins - Hot and Cold Storage - Splitting and Sharing Keys - Online Wallets and Exchanges - Payment Services - Transaction Fees - Currency Exchange Markets

UNIT- III

Bitcoin Mining: The task of Bitcoin miners - Mining Hardware- Energy consumption and ecology - Mining pools - Mining incentives and strategies

Bitcoin and Anonymity: Anonymity Basics - How to De-anonymizeBitcoin – Mixing - Decentralized Mixing - Zerocoin and Zero cash

UNIT- IV

Community, Politics, and Regulation: Consensus in Bitcoin - Bitcoin Core Software - Roots of Bitcoin - Governments Notice Bitcoin - Anti Money- Laundering - Regulation

UNIT- V

Bitcoin as a Platform: Bitcoin as an Append-Only Log - Bitcoins as "Smart Property" - Secure Multi-Party Lotteries in Bitcoin - Bitcoin as Public Randomness Source - Prediction Markets and Real World Data Feeds

Altcoins and the crypto currency Ecosystem: Altcoins: A Few Altcoins in Detail - Relationship Between Bitcoin and Altcoins - Merge Mining

Text Books

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

Reference Books

1. Wattenhofer, The Science of the Blockchain
2. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies
3. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
4. DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014.
5. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	3	-	-	-	-	-	-	-	-	3	3	3
CO2	2	3	-	2	-	-	-	-	-	-	-	-	3	2	2
CO3	3	2	3	1	-	-	-	-	-	-	1	-	2	2	2
CO4	3	2	2	-	-	-	-	-	-	1	-	-	2	3	3
CO5	2	2	3	-	1	-	-	-	-	-	-	-	3	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

IV B. Tech - I - Semester

20AME54	**OPTIMIZATION TECHNIQUES**	**L T P C**
	(OPEN ELECTIVE – III)	3 0 0 3

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Formulate unconstrained optimization techniques in the engineering application.
2. Formulate constrained optimization techniques for various application.
3. Implement neural network technique and swarm optimization to real world design problems.
4. Apply genetic algorithms and multi objective optimization to the complex engineering problems.
5. Evaluate solutions by various optimization approaches for structural and dynamic problem.

UNIT: I Unconstrained Optimization Techniques

Introduction to optimum design - General principles of optimization – Problem formulation & their classifications - Single variable and multivariable optimization, Techniques of unconstrained minimization – Golden section, Random, pattern and gradient search methods – Interpolation methods.

UNIT: II Constrained optimization techniques

Optimization with equality and inequality constraints - Direct methods – Indirect methods using penalty functions, Lagrange multipliers - Geometric programming.

UNIT: III Artificial Neural Networks and Swarm intelligence

Introduction – Activation functions, types of activation functions, neural network architectures, Single layer feed forward network, multilayer feed forward network, Neural netwok applications. Swarm intelligence - Various animal behaviors, Ant Colony optimization, Particle Swarm optimization.

UNIT: IV Advanced Optimization Techniques

Multi stage optimization – dynamic programming; stochastic programming; Multi objective optimization, Genetic algorithms and Simulated Annealing technique.

UNIT: V Static and Dynamic Applications

Structural applications – Design of simple truss members – Design of simple axial, transverse loaded members for minimum cost, weight – Design of shafts and torsionally loaded members – Design of springs.

Dynamic Applications – Optimum design of single, two degree of freedom systems, vibration absorbers. Application in Mechanisms – Optimum design of simple linkage mechanisms.

Text Book(s)

1. Kalyanmoy Deb, “Optimization for Engineering Design: Algorithms and Examples”, PHI Learning Private Limited, 2nd Edition, 2012.
2 Rao Singiresu S., “Engineering Optimization – Theory and Practice”, New Age International Limited, New Delhi, 3rd Edition, 2013.

3 Rajasekaran S and VijayalakshmiPai, G.A, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2011

Reference Books

1. Goldberg, David .E, “Genetic Algorithms in Search, Optimization and Machine Learning”, Pearson, 2009.
2. Srinivasan G, “Operations Research Principles and Applications”, PHI, 2017.

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	3	3			3					3	3	2	3
CO-2	3	3	3	2			2					3	3	2	2
CO-3	3	3	3	3			3					3	3	2	2
CO-4	3	3	3	3			3					3	3	2	3
CO-5	3	3	2	2			2					1	3	2	2

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(AUTONOMOUS)

L	T	P	C
3	0	0	3

IV B. Tech - I - Semester

20ACE68 AEROSOL AND GAS MEASUREMENT DEVICES

(OPEN ELECTIVE – III)

Course Outcomes: After successful completion of the course the students will be able to

1. MeasureAerosol properties using various methodologies.
2. Access trace gases using chemical and instrumentation processes.
3. Conduct measurement of solar radiation.
4. Evaluate meteorological variables using instruments and measurement systems.
5. Estimate aerosol depth using satellites and remote sensing techniques.

UNIT-I - Measurement of aerosol optical properties: aerosol optical depth, scattering coefficient,absorption coefficient, angular scattering measurements, Measurement of aerosol physical and chemical properties: aerosol sampling, Sampling Inlet types and Sampling Efficiency, Sampling and Measurement using Inertial, Gravitational, Centrifugal, and Thermal Techniques, Thermal and Optical Transmittance (TOT) Techniques, Incandescence Methods, Methods for Chemical Analysis of Atmospheric Aerosols, Principles of Ion Chromatography, Mass Spectrometry,Optical and Electrical Mobility Methods for Particle Characterization, Principles of Airborne sampling of Aerosols.

UNIT-II - Trace Gases: Chemiluminescence, Photochemical reaction, Chemical Conversion Techniques, Spectroscopic techniques, Satellite Instrumentation for Monitoring Trace Gases.Clouds: Optical Techniques for the Measurement of Cloud Water Content, Cloud Probes and Imager, Cloud Particle Sampling, Cloud Particle Spectrometer with Depolarization.

UNIT-III- Radiation: Measurement of solar radiation, radiance and irradiance, spectral radiance, measurement of shortwave and longwave fluxes, Meaurement of global and diffuse radiative fluxes, principle for converion of satellite measured radiances to fluxes using ADMs.Oceanic Research Vessels, Expendable Bathythermograph (XBT), Optical and Infrared Imaging and altimeter system, Interferometry Techniques, CTD sonde, Acoustic Doppler Current Profiler (ADCP), Moored and Drifting Buoys and Satellite Instrumentation.

UNIT-IV - Instruments and Measurement Systems: Instrument Response, Measurement Quality, Signal to Noise ratio, Measurement Artifacts, Instrument Response Time, Instrumental Time Resolution, Detection Limit and Sensivity, Sources of Uncertainties, Calibration procedures.Basic statistics, concept of error and uncertainty analysis, Error analysis, probability distribution functions, regression analysis, least square fit, goodness of fit, uncertainties in the fit,

propagation of error for a simple linear system. Measurement of meteorological variables: wind, pressure, temperature, humidity, dew point temperature and rain fall, Snow and Rain Sampling Techniques. Radar Principles, Radar equation, Various types of Radar, Estimation of rainfall from weather radar measurements Lidars: Basic lidar principles, Various types of Lidar, Lidarprobing of aerosols and clouds, Principles of Microwave Radiometers for atmospheric probing of temperature and water vapour.

UNIT-V –Principles of Visible, IR and Microwave Remote Sensing techniques, satellite orbits and their characteristics, Spectral bands used in satellite remote sensing for aerosols, clouds and water vapour, Satellite observation geometries, determination of solar and satellite zenith angles and relative azimuth, Spectral variation of surface reflectance for different surface types and vegetation, Basic concepts of satellite remote sensing: Instantaneous field of view, pixel resolution, swath, panoramic corrections, ground track, revisit period, orbital precession, Basics of satellite data structure and formats, Levels of data processing, Basic principles for retrieval of geophysical parameters from satellite observations in different spectral bands: estimation of surface reflectance, brightness temperature, detection of clouds, estimation of aerosol optical depth, estimation of cloud top temperature, Principle of GPS technique for measurement of water vapour

TextBooks:

1. Atmospheric Chemistry and Global Change”,G.P.Brasseur, J.J. Orlando, and G.S. Tyndall (eds.), Oxford University Press,1999.
2. Chemistry of the Lower and Upper Atmosphere” Finlayson- Pitts and Pitts, Academic Press, 1999.
3. Chemistry of the Natural Atmosphere” P.Warneck, Academic Press, 1999.

ReferenceBooks:

1. Atmospheric Change" T.E. Graedel & P.J. Crutzen Freeman, 1992.
2. Chemistry of Atmospheres :An Introduction to the Chemistry of the Atmospheres of Earth, the Planets, and their Satellites" R.P.Wayne, Oxford University Press,2000

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3					3					3	3	2	3
CO-2	3	3	3	2			2					3	3	2	2
CO-3		3													
CO-4	3	3	3	3			3					3	3	2	3
CO-5	3	3	2	2			2					1	3	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

L	T	P	C
3	0	0	3

IVB.Tech I Semester(CE)

20ACE69 ATMOSPHERIC CHEMISTRY
(OPEN ELECTIVE – III)

Course Outcomes:

After successful completion of the course the students will be able to

1.Define basics of atmospheric structure and circulation

2.Enumerate Stratospheric Chemistry

3.Explain dominant processes and chemical reactions in the stratosphere.

4.Analyse stratospheric ozone loss problem.

5.Relate air quality and climate change.

UNIT-I- Introduction and Fundamentals. Photochemistry; Theory of gas –phase reaction rates; Multiphase chemistry; Analysis of reaction mechanisms; Timescales; Box models.

UNIT-II- Stratospheric chemistry. Stratospheric ozone and the Chapman mechanism; Catalytic loss cycles (HOx, NOy and halogen chemistry); Polar and mid-latitude ozone depletion; Role of aerosol chemistry in the stratosphere.

UNIT-III- Tropospheric Chemistry. Oxidizing capacity of the atmosphere; Tropospheric ozone; Tropospheric NOx and hydrocarbons; Air pollution and ozone smog; Tropospheric Sulfur and tropospheric aerosols.

UNIT-IV - Atmospheric Chemistry and Climate. Global warming and atmospheric chemistry:direct and indirect effects. Chemistry-climate feedbacks.

UNIT-V – Air Pollution: Photochemical Smog,Acid and Nutrient Deposition, Heavy Metals and Persistents, Particulate Matter, Effects of Meteorology on Air Pollution.

TextBooks:

1. Atmospheric Chemistry and Global Change",G.P.Brasseur,J.J. Orlando, and G.S. Tyndall (eds.), Oxford University Press,1999.
2. Chemistry of the Lower and Upper Atmosphere" Finlayson- Pitts and Pitts, Academic Press, 1999.
3. Chemistry of the Natural Atmosphere " P.Warneck, Academic Press, 1999.

ReferenceBooks:

1. Atmospheric Change"T.E. Graedel & P.J.Crutzen, Freeman,1992.
2. Chemistry of Atmospheres: An Introduction to the Chemistry of the Atmospheres of Earth the Planets, and their Satellites " R.P.Wayne, Oxford University Press,2000

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3					3					3	3	2	3
CO-2	3	3	3	2			2					3	3	2	2
CO-3		3													
CO-4															
CO-5	3	3	2	2			2					1	3	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

IV B.Tech I Semester Civil Engineering

L	T	P	C
3	0	0	3

20AEC67 INDUSTRIAL ELECTRONICS
(OPEN ELECTIVE –IV)

Outcomes:

After completion of the course, student should be able to

CO1. Analyze the semiconductor controlled ac and DC drive system

CO2. Develop an illumination system for domestic, industry and commercial sites.

CO3. Design an electric heating system for industrial purposes.

CO4. Equip the skill to design and develop a regulated power supply, Power factor Control and motor control

UNIT I CONVENTIONAL DC AND AC TRACTION

Conventional DC and AC Traction: Electric traction services, Nature of traction load, Coefficient of adhesion, Load sharing between traction motors, Main line and sub urban train configurations, Calculation of traction drive rating and energy consumption. Important features of traction drives, Conventional DC and AC traction drives, Diesel electric traction.

Static converters for Traction: Semi-conductor converter controlled drive for AC traction, Semiconductor chopper controlled DC traction.

UNIT II ILLUMINATION

Illumination : Nature of light, Basic laws of illumination, Light sources and their characteristics, Light production by excitation and ionization, Incandescence and fluorescence, Different types of lamps, Their construction, Operation and characteristics, Applications, Latest light sources, Design of illumination systems.

UNIT III ELECTRIC HEATING

Introduction to electric heating, Advantages of electric heating, Resistance heating, Temperature control of furnaces , Induction and dielectric heating.

Power Supplies: Performance parameters of power supplies, Comparison of rectifier circuits, Filters, Regulated power supplies, Switching regulators, Switch mode converter.

UNIT IV POWER FACTOR CONTROL

Static reactive power compensation, Shunt reactive power compensator, Application of static SCR controlled shunt compensators for load compensation, Power factor improvement and harmonic control of converter fed systems, Methods employing natural and forced commutation schemes, Methods of implementation of forced commutation.

UNIT V MOTOR CONTROL

Voltage control at constant frequency, PWM control, Synchronous tap changer, Phase control of DC motor, Servo mechanism, PLL control of a DC motor.

TextBooks:

1. Dubey, G.K., Power Semiconductor Controlled Drives, Prentice Hall inc. (1989).
2. Paul, B., Industrial Electronic and Control, Prentice Hall of India Private Limited (2004)..

ReferenceBooks:

1. Sen, P.C., Thyristor DC Drives, John Wiley and Sons (1981).
2. J.M.D. Murphy, F.G. Turnbull, Power Electronic Control of Ac Motors, Pergamon (1990).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3									2	2	2
CO2	3	3	2	3									2	3	3
CO3	3	3	3	3									3	3	2
CO4	3	3	3	2									3	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

20AMB09 INTELLECTUAL PROPERTY RIGHTS

(Common to All Branches)

(OPEN ELECTIVE –IV)

COURSE OUTCOMES:

After completion of the course, the students will be able to

1. Outline different types of intellectual properties.
2. Distinguish the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.
3. Formulate designs, patent and copyright for their innovative research works.
4. Apply intellectual property law principles of Trademarks to real problems.
5. Examine ethical and professional issues which arise in the intellectual property law context.

UNIT - I: UNDERSTANDING AND OVERVIEW OF IPR: Introduction- meaning- nature- forms of intellectual property- types of intellectual property-industry property-International conventions.

UNIT-II: COPYRIGHT ACT, 1957: Meaning –Nature and object of copyright-origin and development of copyright law in India-salient features of copyright act,1957-Definitons- originality material-rights of reproduction.

UNIT-III: TRADEMARKS ACT, 1999: Salient features of Trademarks Act, 1999-Meaning-objectives and functions of trademark-Definition of Trademark- trademark protection- -acquisition of Trademark rights-protectable matter-trademark registration process.

UNIT-IV: PATENT ACT, 1970: Meaning –definition of patent-history and concept of patent law-salient features of the patent act- Definition-kinds of patents and advantages-rights and obligations of patentee- Process of obtaining a patent.

UNIT-V: DESIGNS ACT, 2000: Meaning –definition- Salient features of Designs-Registration of Designs-Rights granted to design holders -Infringement of Design.

TEXT BOOKS:

1. Narayanan, P.(Revised 2017, Reprint 2018).Patent Law. Eastern Law House.
2. Acharya, N.K. (2021). Intellectual Property Rights: Scandinavian Languages Edition.
3. Chowdhary, R., S.K. & Other. Law of Trademark, Copyrights, Patents and Designs.
4. Reddy, G.B., Intellectual Property Rights and the Law, Gogia Law Agency.
5. Holyoak, J. &Torremans, P. Intellectual Property Law.

REFERENCES:

1. Bouchoux, E.B. Intellectual Property Rights, Cengage Learning.
2. Ganguli, P. Intellectual Property Rights– Unleash my Knowledge Economy. Tata McGraw Hill Publishing Company Ltd.
3. Wadhera, B.L. Intellectual Property Law, Universal Publishers.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	3	-	-	-	-	-
CO3	-		3	3	3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-

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IV B.Tech I Semester

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20ACM02 - ARTIFICIAL INTELLIGENCE FOR ENGINEERS

(OPEN ELECTIVE –IV)

Course Outcomes:

After Completion of the course the student will be able to

1. Summarize and formulate appropriate logics and AI methods for problem solving.
2. Apply various searching, game playing, and knowledge representation techniques to solve the real-world problems.
3. Analyze different expert systems and its applications.
4. Explain the concepts of probability theory.

UNIT I:

Introduction to artificial intelligence: Introduction, history, intelligent systems, foundations of AI, applications, tic-tac-toe game playing, development of AI languages, current trends in AI.

Problem solving: state – space search and control strategies: Introduction, general problem-solving characteristics of problem.

UNIT II:

Search Strategies: exhaustive searches, heuristic search techniques: A* Algorithm and Hill Climbing, constraint satisfaction.

Problem reduction and game playing: Introduction, problem reduction, game playing, alpha -beta p runing.

UNIT III:

Logic concepts: Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic.

UNIT IV:

Knowledge representation: Introduction, approaches to knowledge representation, knowledge

Representation using semantic network, extended semantic networks for KR, knowledge representation using frames.

Advanced knowledge representation techniques: Introduction, conceptual dependency theory,

script structure, cyc theory.

UNIT V:

Expert system and applications: Introduction phases in building expert systems, expert system versus traditional systems, rule- based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools.

Uncertainty measure: probability theory: Introduction, probability theory, Bayesian belief networks, certainty factor theory, dempster- shafer theory, Case Study.

Text Books:

1. Artificial Intelligence by Saroj Kaushik, CENGAGELearning.
2. Artificial intelligence, A modern Approach, by Stuart Russel and Peter Norvig Second Edition,PEA.
3. Artificial Intelligence by Rich, Kevin Knight, Shiv Shankar B Nair, 3rd edition,TMH.
4. Introduction to Artificial Intelligence by Patterson,PHI.

Reference Books:

1.Artificial intelligence, structures and Strategies for Complex problem solving, -George F Lugar, 5th ed,PEA.

2. Introduction to Artificial Intelligence, Ertel, Wolf Gang,Springer.

3. Artificial Intelligence, A new Synthesis, Nils J Nilsson,Elsevier.

Online Courses:

1. NPTEL Course: Fundamentals of Artificial Intelligence

https://nptel.ac.in/courses/112/103/112103280/

2. NPTEL Course: Introduction to Artificial Intelligence

https://nptel.ac.in/courses/106/102/106102220/

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	3	-	-	-	-	-	-	3	3	2
CO2	3	2	-	-	3	-	-	-	-	-	-	2	3	2
CO3	3	2	-	3	-	-	-	-	-	-	-	3	3	2
CO4	3	3	-	-	3	-	-	-	-	-	-	3	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

L	T	P	C
3	0	0	3

IV B. Tech I Semester (CE)

20ACE70 METRO RAIL TRANSPORT – DESIGN & CONSTRUCTION

(OPEN ELECTIVE IV)

Course Outcomes:

After successful completion of the course, the students will be able to

1. Identify the various components of Metro & its Planning for various disciplines
2. Overview the Elevated and Underground Metro
3. Analyse and Design Elevated and Underground Metro
4. Understand Contract systems and quality systems in Metro

Unit I

Introduction – History and evolution of Metro Rail System – Overview of World Metro Systems Metro Operations – Metro Depots – Maintenance

Unit II

Metro Planning and Selection – Metro Construction – Metro Track – Various Functions – Architecture – MEP – HVAC – Contracts and Quality in Metros

UNIT III Overview of Elevated Metros – Construction Technology – Elevated Metros – Metro Electrification Systems – Metro Rolling Stock – Metro Signaling – Overview of Underground Metros

Unit IV

Analysis and Design of Stations and Viaduct – Analysis and Design – Temporary and Permanent Structures

Unit V

Construction Methodology – Top Down and Bottom Up – Future Technology – High Speed – Maglev etc., - Metro Act

References :

1. Metro Act _ Government of India – 2002
2. Rolling Stock – Report of Ministry of Urban Development – GOI -2013
3. Radio communication for Communications-Based Train Control (CBTC): A tutorial and survey – 2017
4. Technical Details of Metro Rolling Stock _ Ansaldo Manual – 2016
5. Technical Details of Metro Rolling Stock – Bombardier – 2015
6. Technical Standards of Track Structure for Metro Railways/MRTS – RDSO
7. Detailed Project Reports of Various Metro Projects in India – By Delhi Metro Rail Corporation
8. Manual Of Specifications And Standards – Hyderabad Metro Government of Andhra Pradesh - 2008

COPOMAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	-	-	-	-	-	-	-	-	2	2	
CO2	3	3	2	2	-	-	-	-	-	-	-	-	2	2	
CO3	3	2	1	2	-	-	-	-	-	-	-	-	2	2	
CO4	2	1	1												
CO5	1	1	2										2	2	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

IVB.Tech I Semester(CE)

L	T	P	C
3	0	0	3

20ACE71 CONCRETE ENGINEERING AND TECHNOLOGY (NPTEL)

Course Outcomes:

After successful completion of the course the students will be able to

1. Understand the Fundamental of concrete - constituents,
2. Apply the concepts of proportioning, mixing, transportation, placing and curing of concrete
3. Evaluate the Properties of fresh and hardened concrete.
4. Investigate the Quality of concrete used in the construction;

UNIT I

Fundamental of concrete- constituents, proportioning, mixing, transportation, placing and curing. - Properties of fresh and hardened concrete.

UNIT II Quality control in concrete construction. - Durability of concrete – alkali aggregate reaction, reinforcement corrosion, freezing and thawing, etc.

UNIT III

Special concretes –high strength, low heat of hydration, high early strength, self-compacting, etc.

UNIT IV

Construction methods- shot crete, roller compacted concrete,etc. **-** Reinforcing materials – epoxy coated bars, fibre- reinforced plastics.

UNIT V Introduction to maintenance of concrete structures – use of non destructive testing, evaluation criteria.

References:

1. P.K.Meht and Paulo J.M.Monteiro,"Concrete: microstructure, properties and materials", The Mc Graw Hill Companies
2. AM Neville, Properties of concrete,Pearson
3. ML Gambhir, Concrete Technology,Tata Mc Graw Hill Companies
4. AR Santakumar, Concrete Technology, Oxford University Press

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	-	-	-	-	-	-	-	-	2	2	
CO2	3	3	2	2	-	-	-	-	-	-	-	-	2	2	
CO3	3	2	1	2	-	-	-	-	-	-	-	-	2	2	
CO4	3	2	1	2	-	-	-	-	-	-	-	-	2	2	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

20AMB04 CREATIVITY AND INNOVATION

(Common to All Branches)

Course Outcomes:

After the completion of the course student will be able to

1. Explain innovation and creativity management from the perspective of obtaining a sustainable competitive advantage and integrating innovation into the business strategy.
2. Explain the attributes of successful innovation strategies including an in-depth understanding of the dynamics of innovation
3. Identify the role that innovation plays in the competitive dynamics of industries and how these innovations affect society.
4. Explain the factors and drivers that predict creativity and innovation of individuals, groups, and organizations
5. Design a creative business concept and develop a business plan.

Unit I: Creativity: Concept - Convergent and Divergent Thinking -Creative Intelligence - Enhancing Creativity Intelligence -Determinants of Creativity - Creativity Process - Roots of Human Creativity - Biological, Mental, Spiritual and Social -Forms of Creativity - Essence, Elaborative and Expressive - Existential, Entrepreneurial and Empowerment.

Unit II: Creative Personality: Creative Personality Traits Congenial to Creativity - Motivation and Creativity - Strategies for changing Motivation - Creativogenic Environment - Formative Environment and Creativity - Adult Environment - Environmental Stimulants - Blocks to Creativity- Strategies for unblocking Creativity.

Unit III: Organizational Creativity: Creative Manager - Techniques of Creative Problem Solving - Creative Encounters and Creative Teams - Perpetual Creative Organizations - Creative Management Practices – Human Resource Management, Marketing Management, Management of Operations, Management of Product Design and Growth Strategies-Issues and Approaches to the Design of Creative Organizations Policy frameworks - Organizational Design for Sustained Creativity - Mechanism for Stimulating Organizational Creativity - Creative Diagnosing - Creative Societies - Necessity Model of a Creative Society

Unit IV: Management of Innovation: Nature of Innovation- Concept of Innovation- Historic Retrospective-Typology of Innovations-Innovation Process- Macroeconomic View of Innovation Approaches to Innovations-Assumptions and Barriers to Innovations-Innovation Sources, -Technological Innovations and their Management-Training for Innovation - Management of Innovation-Agents of Innovation -Skills for Sponsoring Innovation.

Unit V: Innovation & Entrepreneurship: Concept of Entrepreneurship- Entrepreneurial opportunities, attitude, traits and tendencies-Design of a Successful Innovative Entrepreneurship-Idea generation & Prototype Development- Social Innovation and Entrepreneurship-Intellectual Property Right (IPR)-Commercialization of Innovations-Startup and Venture development-Pre-incubation and Incubation Stages-Govt. Schemes and funding support to ideas, innovations, and startup-Current trends, development and general awareness on Innovation and startup.

Text Books:

1. Kandwalla, P. N. (2004). Lifelong creativity : an unending quest. Tata Mcgraw-Hill..
2. Khandwalla, P. N. (2022). Corporate Creativity: The Winning Edge (1st ed.). Mc Graw Hill India.
3. Dr. C.S.G. Krishnamacharyulu & Dr. Lalitha Ramakrishnan (2010) - Innovation Management, Himalaya Publishing House, Edition: 2, 2010

Reference Books:

1. Rastogi, P. N. (2009). Management of technology and innovation: Competing through technological excellence. SAGE Publishing India.
2. Plucker, J. A. (2021). Creativity and innovation: Theory, research, and Practice. Routledge.

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

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L	T	P	C
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IV B.Tech I Semester

20AMB05 LEADERSHIP ESSENTIALS

Course Outcomes:

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

1.Identify the concepts and theories of leadership and analyse its relevance to the organizations.

2.Analyze various sources of power, politics and conflict management.

3.Adapt theories of leadership to cases and contexts in organisation.

4.Interpret change, sustainable development and implications of cultural factors in organizations.

5.Develop leadership potential and practices in organizations.

Unit I- Overview and Introduction of Leadership: concepts and functions of leadership; Leadership, Role and Functions of a Leader, Leadership Motives Characteristics of an Effective Leader, Leadership as a Process - the Complexities of Leadership - Effective Leadership Behaviours and Attitudes –Emerging Approaches of leadership.

Unit II- Leadership and Power: Sources of Power, The link between Politics, Power and Conflict, Power and Conflict; Coercion, Trait Approach, Ohio State Leadership Study, The University of Michigan Study, Blake and Mouton's Managerial Grid.

Unit III- Leadership theories and styles: Contingency Theories of Leadership -, The Path-Goal Theory, Transactional Leadership Style Charismatic Leadership. Servant Leadership, Leadership Ethics.

Unit IV- Fostering Organizational Culture and Climate: Vision Building; Developing Strategic Thinking; strategies in developing a culture conducive to change; handling change; Cultural Factors Influencing Leadership Practice.

Unit V- Developing Future Leaders: Strategic Leadership Competencies; 360º Leadership Assessment; The Myers–Briggs Type Indicator (MBTI); developing global leaders in organization.

Textbooks:

1. Peter Guy Northouse. (2021). Introduction to leadership : concepts and practice (5th ed.). Sage.
2. Humphrey, R. H. (2014). Effective leadership : theory, cases, and applications. Sage.

References Books:

1. Bratton, J., Grint, K., & Nelson, D. L. (2005). Organizational leadership. Thomson/South-Western.

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

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	L	T	P	C
IV B.Tech I Semester	**3**	**0**	**0**	**3**

20AMB06 LAW FOR ENGINEERS (Common to All Branches)

Course Outcomes:

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

1. Explain the essential principles of the law relevant to engineering practice
2. Apply the relevant provisions of contract law
3. Use effective contract laws for decision making and problem-solving techniques in different scenarios
4. Recognize and explore key legal requirements for engineering including health & safety, privacy, and professional indemnity.
5. Discuss about the industrial dispute settlement mechanism

UNIT- I: THE NATURE AND SOURCES OF LAW: Definition and nature of law, definition law and morality, classification of law, Overview of Business laws in India – Sources of business law.

UNIT- II: LAW OF CONTRACT: Contract- Essential features of a valid contract – Performance of a contract – Breach of contract and its remedies.

UNIT- III: SPECIAL CONTRACTS: Quasi Contracts – Contingent Contracts – Indemnity and Guarantee – Contract of Agency – Bailment and Pledge.

UNIT- IV: LAW OF TORT: Definition of Tort, Fundamental Purpose Development of Law of Torts-Specific Torts, Negligence, Nervous Shock, Nuisance, Trespass, Defamation False Imprisonment and Malicious Prosecution Purpose.

UNIT- V INDUSTRIAL DISPUTE & SETTLEMENT MECHANISM: Employee Grievances - Collective Bargaining- Industrial Disputes and Resolution Mechanism; **Overview on IPR.**

Text Books:

1. Kapoor, N. D. (1983). Elements of mercantile law: including company law and industrial law. Sultan Chand & Sons.
2. Kunwar Arora, Vibha Arora. (2017). Law for Engineers. Central Law Publications.

Reference Books:

1. Gulshan, S. S. (2009). Business law. Excel Books.
2. Mulheron, R. (2020). Principles of Tort Law. Cambridge University Press.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO1	-	3	3	-	-	-	-	-	-	-	-	-
CO2	-	3	3	-	-	-	-	-	-	-	-	-
CO3	-	3	3	-	-	-	-	-	-	-	-	-
CO4	-	3	3	-	-	-	-	-	-	-	-	-
CO5	-	3	3	-	-	-	-	-	-	-	-	-

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20AMB07 ENTREPRENEURSHIP ESSENTIALS

(Common to All Branches)

COURSE OUTCOMES

After completion of the course, the students will be able to

1. Explain the Fundamentals and specifics of Entrepreneurship.
2. Apply theoretical concepts in developing an idea and startup a new technology-based company.
3. Prepare marketing and financial plans that are viable in nature.
4 Apply marketing research methods and tools to forecast and to analyze the trend.
5. Develop innovative business solutions with a holistic perspective from concept to reality.

UNIT-I: BASIC ENTREPRENEURSHIP: Entrepreneurial traits, true motivation & leadership, understanding of Entrepreneurial process, understanding of personal aspirations, Entrepreneurial personality development, Entrepreneurial communication, Entrepreneurship in Indian Scenario, Future prospects in India and emerging economies.

UNIT-II: MARKETING AND MARKET RESEARCH: Market dynamics, Market segmentations and creation of derivatives, Marketing Research methodologies, trend, assessment, analysis and forecasting, structural aspects of market. Identification of overall market, addressable market and serviceable market for product and services.

UNIT-III: ENGINEERING DESIGN PROCESS: Introduction to Engineering Design Process; Design Approaches - Forward and Reverse Engineering; Reverse Engineering Process – Definition and goal of Reverse engineering (RE); Theory of inventive problem solving (TRIZ): Fundamentals, methods and techniques, inventive design strategies and Simulation in Engineering Design - Computer Aided Engineering and Simulation; Engineering Manufacturing and Materials; Sustainability and Design: Recyclability; Reliability and Lean Design Engineering; Interface with Industrial design; Economic considerations in design; Eco Design and Green Engineering Product Development

UNIT – IV: FINANCIAL AND LEGAL ASPECTS OF BUSINESS: Process for effective financial planning, types of budgets preparation, overview of specific ratios to measure financial performance, liquidity, asset management, profitability, leverage and comparative analysis, business laws enshrined in the Indian constitution, the policies of the state, Income tax structure, the labor laws.

UNIT –V: MANAGEMENT OF GROWTH VENTURE: Importance of Innovation as a differentiator in growth venture, Underlying opportunities, Strategic management for Launching process of growth ventures, understanding organizational & institutional aspects of growth ventures, Exit strategies of Growth ventures, Future prospects of venture financing of growth venture firms.

TEXT BOOKS:

1. Allen, K. R. (2018). Launching New Ventures: An Entrepreneurial Approach. United States: Cengage Learning.
2. Khanka, S. S. (2006). Entrepreneurial Development. India: S. Chand Limited.
3. Nelson, A. J., Byers, T. H., Dorf, R. C. (2018). Technology Ventures: From Idea to Enterprise. United Kingdom: McGraw-Hill Education.

REFERENCES:

1. Harrington, H. J. (2018). Creativity, Innovation, and Entrepreneurship: The Only Way to Renew Your Organization. United States: Taylor & Francis.
2. Smith, A., Pigneur, Y., Papadakos, T., Osterwalder, A., Bernarda, G. (2015). Value Proposition Design: How to Create Products and Services Customers Want. Germany: Wiley.
3. Allen, K. R. (2010). Entrepreneurship for Scientists and Engineers. United Kingdom: Pearson Prentice Hall.

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

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20AMB08 ESSENTIALS OF MANAGEMENT SCIENCE

(Common to All Branches)

Course Outcomes:

After completion of the course student will be able to

1. Apply various areas of functional management for the prospects of business organization.
2. Apply management principles for decision making.
3. Apply various functions of Hr manager.
4. Use tools and techniques to become an effective manager.
5. Apply production tools and techniques in every area of business

UNIT-I INTRODUCTION TO MANAGEMENT: Nature, importance and Functions of Management, Approaches to Management - Taylor's Scientific Management - Henry Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Leadership Styles .

UNIT-II INTRODUCTION TO ORANISATION: Types of Mechanistic and organic structures. Delegation, Decentralization - Formal and Informal Organization

UNIT III OPERATIONS MANAGEMENT: Principles and Types of Plant Layout - Methods of production (Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement

UNIT IV MATERIALS MANAGEMENT: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records, Marketing: Functions of Marketing, Marketing Mix, Product Life Cycle and Channels of Distribution.

UNIT V HUMAN RESOURCES MANAGEMENT (HRM): Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Wage and Salary Administration, Job Evaluation and Merit Rating, Performance Appraisal

Text Books:

1. Aryasri, Management Science, TMH, 4 th Edition, 2009.
2. Stoner, Freeman, Gilbert, Management, Pearson Education, New Delhi, 6 th Edition, 2004.
3. PannerSelvem, Production and Operations Management, Prentice Hall of India, 3 rd Edition, 2012

Reference Books:

1. Kotler Philip & Keller Kevin Lane, Marketing Management, PHI, 12th Edition, 2005.
2. Koontz &Weihrich, Essentials of Management, TMH, 6 th Edition, 2005.
3. SubbaRao. P, Personnel and Human Resource Management, Himalaya Publishing House, 2000

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	3	-	3	-
CO2	-	-	-	-	-	-	-	-	3	-	3	-
CO3	-	-	-	-	-	-	-	-	3	-	-	-
CO4	-	-	-	-	-	-	-	-	3	-	3	-
CO5	-	-	-	-	-	-	-	-	-	-	3	-

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IV B.Tech I Semester

20ACE66 PROJECT MANAGEMENT SOFTWARE LAB

Course Outcomes:

After successful completion of the course the students will be able to

1. Develop skills to handle projects using project management software
2. Select the right strategic mix of projects and balance resource capacity
3. Design, develop and maintain detailed resource loaded schedules
4. Provide necessary administrative support to project management teams
5. Conceptualize Organizational Breakdown Structure (OBS) and Enterprise Project Structure (EPS) that are useful in organizing projects, people and work.

Exercise 1 Creating Portfolio, Program, and Project assigning responsible managers

Exercise 2 Creating Project Codes and performing it grouping option

Exercise 3 Creating all three types of Calendar– Work Week, Exception and Holiday setup

Exercise 4 Working with Budget log, spending plan and summary

Exercise 5 Comparison of budgeted cost and actual cost of all activities during execution

Exercise 6 Creating WBS, Work Package and activities for G+3 storied building

Exercise 7 Estimating Budgeted and Actual cost for Activities for construction of residential building

Exercise 8 Establishing budgets for Work Packages, Project cash flow, cost monitoring and revisions for commercial building loaded with 50 + activities

Exercise 9 Budgets, cash flowcost monitoring and revisions for bridge construction

Exercise 10 Establishing budgets, project cashflow, cost monitoring and revisions for Power plant construction

References

1. Paul East Wood Harris,“ Planning and Scheduling using Primavera 5.0, for Engineering and Construction ”, East wood Harris Pty Ltd., 2005
2. Jong pil Nam, “ Construction Scheduling with Primavera P6 ” , Author House, 2016

CourseOutcome	**ProgramOutcomes**												**Program SpecificOutcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	-	3	-	1	-	-	-	3	-	2	2	3
CO2	-	2	3	-	3	-	-	-	-	-	3	-	-	2	3
CO3	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	2	3	-	-	-	-	-	-	-	-	-	-	2	3
CO5	2	-	3	-	-	-	-	-	1	-	3	-	2	-	3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

IV B.Tech I Semester

L	T	P	C
2	0	0	0

20AMB12 PROFESSIONAL ETHICS (Common to All Branches)

Course Outcomes:

After completion of this course students will be able to:

1. Identify and analyze an ethical issue in the relevant field.
2. Apply specific ethical theories to current social issues.
3. Identify significant problems in contemporary professional ethics.
4. Explain the ethical roles of engineers in industry and society.
5. Explain moral and ethical obligations toward the environment.

UNIT I INTRODUCTION:

Professionalism-models of professionalism-Ethics-Types of ethics and morality-Engineering ethics-Positive and negative faces of ethics- Responsibility for safety-Technology pessimism and perils of technological optimism.

UNIT II ETHICAL CONCEPTS:

Human Values – morals-integrity-work ethics-Respect for others-respect for authority-conflicts of interests-moral dilemmas-honesty- courage-cooperation-valuing time-commitment-collegiality-loyalty-self -interest-Professional accountability-royalty-Problem of bribery, extortion and grease payments-problem of nepotism, excessive gifts-confidentiality-uses of ethical theories-Kohlberg's Theory- Gilligan`s Theory-Ethical codes of IEEE and Institution of Engineers.

UNIT III ENGINEERS ROLE IN SAFETY:

Safety and risks-risk and costs-risk benefit analysis-Testing methods for safety-The promise of technology - Computer Technology Privacy-Social policy-Engineering standards-the standards care-Social and value dimensions of technology-communicating risk and public policy-occupational crime-professional rights and employee rights-whistle blowing.

UNIT IV ROLES OF ENGINEERS:

Engineers as managers, Advisors, Consultants, Experts and witnesses- Engineers role in industry and society- models of professional roles-Theories about right action – paternalism - different business practices - Moral leadership- Cases - Bhopal gas tragedy, Nuclear power plant disasters.

UNIT V ENVIRONMENTAL ETHICS:

Global Issues - Multinational corporations-Living in harmony with NATURE - Holistic technology-Eco friendly production system-sustainable technology and development - weapon development-Four orders of living, their interconnectedness - Eco system - Ozone depletion - pollution

Text Books:

1. Subramanian R, Professional Ethics,1st Edition, Oxford University Press. 2013.
2. Naagarazan , R.S., A Textbook on Professional Ethics and Human Values,1st edition, New Age International (P) Limited, Publishers New Delhi.,2014
3. R. R. Gaur, R. Sangal and G. P. Bagaria, Human Values and Professional Ethics:,EecelBooks,New Delhi.2010.

Reference Books:

1. Fundamentals of Ethics for scientists and Engineers, Edmond G Seebauer and Robert L. Barry, 1st edition Oxford University Press, 2008.
2. Professional Ethics and Human Values – M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi.
3. Professional Ethics and Human Values: Prof. D.R. Kiran, TATA McGraw Hill Education, 2007.
4. Charles D Fleddermann, “Engineering Ethics”, Prentice Hall.
5. Charles E Harris, Micheal J Rabins, “Engineering Ethics, Cengage Learning.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											2
CO2	3	2		1	1		1				3	2
CO3	3	2	1	1	1		1				3	
CO4			1	3		1		3			3	2
CO5			1	3	1	1	1	3			3	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
CIVIL ENGINEERING

L	T	P	C
3	1	0	4

II B.Tech - II Semester

20ACE73 INDUSTRIAL STRUCTURES (HONORS)

Course Outcomes:

CO1: Demonstrate the knowledge concepts, techniques and applications of design of steel industrial building, stiffened elements, bunkers, silos, chimneys.

CO2: Analyze different steel industrial building structures and RC structures.

CO3: Design different structural members like steel buildings, transmission line towers, RC bunkers, silos, chimneys and cylindrical shells.

CO4: Recommend suitable structural elements for reinforced concrete structures

CO5: Use appropriate method to design RC and steel structures

UNIT I

Planning of Industrial Structures – types of industrial structures – different components of industrial structures – Bracings of Industrial Buildings – Design of Steel Industrial Buildings.

UNIT II

Thin Walled / Cold Formed Steel Members: Definitions – Local Bucking of Thin-Elements Post Buckling of Thin-Elements – Light Guage Steel Columns and Compression Members – Form-Factor for Columns and Compression Members – Behaviour of Stiffened Elements Under Uniform Compression – Multiple Stiffened Compression Elements –Effective Length of Light Gauge Steel Compression Members – Light Gauge Steel Tension Members.

UNIT III

RC Bunkers &Silos: Introduction – Janssen's Theory – Airy's Theory – Design of Square, Rectangular and Circular Bunkers; Design of Silos. Pre-engineered and Mill buildings – Transmission Lines Towers – plate girders. Bunkers and Silos – pipe/cable racks- Chimney.

UNIT IV

RC Chimneys: Introduction – Wind Pressure – Stresses in Chimney Shaft Due to Self-Weight and Wind – Stresses in Horizontal Reinforcement Due to Wind Shear – Stresses Due to Temperature Difference – Combined Effect of Self Load, Wind and Temperature – Temperature Stresses in Horizontal Reinforcement Problems.

UNIT V

Design Principles of Cylindrical Shells & Design Problems.

Text Books:

1. Ramamrutham.S., Design of Reinforced Concrete Structures, Dhanpat Rai Publishing Company, 2007.
2. Varghese.P.C., Advanced Reinforced Concrete Design, PHI, Eastern Economy Editions, Second Edition, 2005.
3. Subramanian, N., Design of Steel Structures, Oxford University Press, 2008.
4. Ramachandra and Virendra Gehlot, Design of steel structures -Vol. 2, Scientific Publishers, 2012.

References:

1. Henn W. Buildings for Industry, Vol.I and II, London Hill Books, 1995
2. Handbook on Functional Requirements of Industrial buildings, SP32-1986, Bureau of Indian Standards, 1990.
3. Handbook of Industrial Lighting, Stanley L.Lyons, Butterworths, London.1981
4. Koncz, J., Manual of Precast Construction Vol. I and II, Bauverlay GMBH, 1971.
5. Handbook on Precast Construction, An Indian Concrete Institute Publication, 2016

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	--	--	--	--	--	--	--	--	--	--	2	3	2
CO2	3	2	3	--	--	--	--	--	--	--	--	--	3	1	1
CO3	3	3	2	1	2	--	--	--	--	--	--	--	3	2	1
CO4	3	3	--	1	--	1	--	--	--	--	--	--	3	2	1
CO5	3	2	2	1	--	2	2	--	--	--	--	--	2	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	1	0	4

II B.Tech - II Semester

(20ACE74) PAVEMENT MATERIALS AND CONSTRUCTION

(HONORS)

Course Outcome(S): At the end of the course students are able to

CO1: Develop an understanding of the fundamentals of pavement sub grade behavior as they pertain to design and performance.

CO2: Absorbs the Key design Characteristics of pavement component materials which are discussed in terms their dynamic behavioral performance.

CO3: Acquire a basic understanding of the Material factors that are considered in pavement design including Bituminous Emulsion, Cutback, their features etc.

CO4: Decide the kind of Equipment needed for the Construction of road and its operation etc.

CO5: Specify the method of pavement construction.

UNIT: 1

Aggregates: Origin, classification, requirements, properties and tests on road aggregates, concepts of size and gradation - design gradation, maximum aggregate size, aggregate blending to meet specification

Bitumen and Tar: Origin, preparation, properties and chemical constitution of bituminous road binders; requirements.

Bituminous Emulsions and Cutbacks: Preparation, characteristics, uses and tests, Adhesion failure, mechanism of stripping, tests and methods of improving adhesion

UNIT: 2

Bituminous Mixes: Mechanical properties, dense and open textured mixes, flexibility and brittleness, No Hveem Stabilometer & Hubbard-Field Tests) bituminous mix, design methods using Rothfuchs Method only and specification using different criteria - voids in mineral aggregates, voids in total mix, density, flow, stability, percentage voids filled with bitumen.

UNIT: 3

Equipment in Highway Construction: Various types of equipment for excavation, grading and compaction - their working principle, advantages and limitations. Special equipment for bituminous and cement concrete pavement and stabilized soil road construction.

UNIT: 4

Sub-grade: Earthwork grading and construction of embankments and cuts for roads, preparation of subgrade, quality control tests.

Flexible Pavements: Specifications of materials, construction method and field control checks for various types of flexible pavement layers.

UNIT: 5

Cement Concrete Pavements: Specifications and method of cement concrete pavement construction; Quality control tests; Construction of various types of joints

Text Books:

1. Khanna, S.K., and Justo, C.E.G., `Highway Engineering', Nem Chand and Bros. Roorkee.
2. Sharma, S.C., `Construction Equipment and its Management', Khanna Publishers.

Reference Books:

1. RRL, DSIR, `Bituminous Materials in Road Construction', HMSO Publication.
2. RRL, DSIR, `Soil Mechanics for Road Engineers', HMSO Publication.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	--	--	--	--	--	--	--	--	--	--	3	3	
CO2	3	3	--	--	--	--	--	--	--	--	--	--	3	1	
CO3	3	2	3	2	2	2	--	--	--	--	--	--	3	3	
CO4	3	3	--	--	3	3	3	--	--	--	--	--	3	3	
CO4	2	3	-	3	2	2	3	--	--	--	--	--	2	2	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	1	0	4

II B.Tech - II Semester

(20ACE75) ALTERNATIVE BUILDING MATERIALS (HONORS)

Course Outcomes:

After studying this course, students will be able to:

CO1: Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;

CO2: Suggest appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression.

CO3: Analyze different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner. Also capable of suggesting suitable agro and industrial wastes as a building material.

CO4: Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material.

CO5: Identify equipment for production of alternative materials

UNIT-I

Introduction: Energy in building materials, Environmental issues concerned to building materials, Embodied energy and life-cycle energy, Global warming and construction industry, Green concepts in buildings, Green building ratings – IGBC and LEED manuals – mandatory requirements, Rainwater harvesting & solar passive architecture. Environmental friendly and cost effective building technologies, Requirements for buildings of different climatic regions

UNIT- II

Elements of Structural Masonry: Elements of Structural Masonry, Masonry materials, requirements of masonry units' characteristics of bricks, stones, clay blocks, concrete blocks, stone boulders, laterite Blocks, Fal- G blocks and Stabilized mud block. Manufacture of stabilized blocks.

Structural Masonry Mortars: Mortars, cementations materials, sand, natural & manufactured, types of mortars, classification of mortars as per BIS, characteristics and requirements of mortar, selection of mortar. Uses of masonry, masonry bonding, Compressive strength of masonry elements, Factors affecting compressive strength, Strength of Prisms / wallets and walls, Effect of brick bond on strength, Bond strength of masonry: Flexure and shear, Elastic properties of masonry materials and masonry, Design of masonry compression elements subjected to axial load.

UNIT- III

Alternative Building Materials: Lime, Pozzolana cements, Raw materials, Manufacturing process, Properties and uses. Fibers- metal and synthetic, Properties and applications. Fiber reinforced plastics, Matrix materials, Fibers organic and synthetic, Properties and applications. Building materials from agro and industrial wastes,Types of agro wastes, Types of industrial and mine wastes, Properties and applications. Masonry blocks using industrial wastes. Construction and demolition wastes

UNIT- IV

Alternative Building Technologies: Use of arches in foundation, alternatives for wall constructions, composite masonry, confined masonry, cavity walls, rammed earth, Ferro cement and ferroconcrete building components, Materials and specifications, Properties, Construction methods, Applications. Top down construction, Mivan Construction Technique. Alternative Roofing Systems: Concepts, Filler slabs, Composite beam panel roofs, Masonry vaults and domes

UNIT- V

Equipment for Production of Alternative Materials: Machines for manufacture of concrete, Equipments for production of stabilized blocks, Moulds and methods of production of precast elements, Cost concepts in buildings, Cost saving techniques in planning, design and construction, Cost analysis: Case studies using alternatives.

Text Books:

1. KS Jagadish, BV Venkatarama Reddy and KS Nanjunda Rao, “Alternative Building Materials and Technologies”, New Age International pub.

2. Arnold W Hendry, “Structural Masonry”, Macmillan Publishers

Reference Books:

1. RJS Spence and DJ Cook, “Building Materials in Developing Countries”, Wiley pub.

2. LEED India, Green Building Rating System, IGBC pub.

3. IGBC Green Homes Rating System, CII pub. 4. Relevant IS Codes.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	--	--	--	--	--	--	--	--	--	--	3	3	3
CO2	3	3	--	--	--	--	--	--	--	--	--	--	3	1	1
CO3	3	2	3	2	2	2	--	--	--	--	--	--	3	3	2
CO4	3	3	--	--	3	3	3	--	--	--	--	--	3	3	3
CO5	3	3	2	--	--	--	--	--	--	--	--	--	3	1	1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	1	0	4

II B.Tech - II Semester

20ACE76 WATER TREATMENT TECHNOLOGY

(HONORS)

Course outcomes: After successful completion of the course the students will be able to

CO1: Understand the fundamental importance and properties of water by identifying the appropriate treatment techniques.

CO2: Remember the principles of aeration, sedimentation and Coagulation process by analyzing its design parameters.

CO3: Analyze the mechanism of Filtration and Disinfection process in water.

CO4: Apply the removal techniques of hardness, Fluorides and to relate the necessity of rain water harvesting.

CO5: Design Rain water Harvesting Processes.

Unit-1

Introduction – Sources of water, Importance of water quality and standards. Objectives of Water treatment. Flow chart on overall water supply project, Unit diagrams on water treatment systems. Suitability of Intake Structures.

Unit -2

Treatment Operations – Gas transfer two film theories- Water in air system and Air in water system. Types of Aeration and limitations. Principles of Sedimentation. Design criteria and design of Sedimentation tanks.

Unit-3

Coagulation and Flocculation- Theory of Coagulation. Types of Coagulants, reactions, Coagulant Aids, Determination of Optimum dose of Coagulants. Design Criteria and numerical problems on estimation of coagulants.

Unit -4

Filtration – Theory of Filtration, types of filters used in treatment plant, Hydraulics of Filter bed. Design criteria and Design of Filters, Filter Back wash, Operational troubles and trouble shooting. Water disinfection, methodologies. theory of disinfection, Chemistry of Chlorination and Break Point Chlorination.

Unit 5

Water Softening - Ions causing Hardness, Degree of Hardness, Removal techniques, Problems associated with hardness. Fluoridation and De-fluoridation techniques. Special requirements of Industrial water supply. Rural water supply systems. Rain water Harvesting processes and utilization.

Text Books:

1. Fair, G.M., Geyer J.C and Okun, (1969) “Water and Waste water Engineering” Vol II, John Wiley Publications.
2. Weber W.J., (1975) “Physico - Chemical Processes for Water Quality Control”.
3. AWWA, (1971), “Water Quality and Treatment “McGraw Hill.
4. CPHEEO Manual, (1991), “Water Supply and Treatment”, GO Publications.

Reference Books:

1. Peavy, H.S., Rowe and Tchobonoglous,G., (1985), “Environmental Engineering”, McGraw Hill
2. Viessman Jr, Hammer J. M, Perez, E.M, and Chadik, P. A, Water Supply and Pollution Control, PHI Learning, New Delhi, 2009
3. Howard S. Peavy, Donald R. Rowe and George Tchobanoglous, Environmental Engineering, McGraw Hill., 1984

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	--	--	--	--	--	--	--	--	--	--	3	3	3
CO2	3	3	2	--	--	2	--	--	--	--	3	--	3	1	1
CO3	3	3	--	--	--	--	--	--	--	--	--	--	3	1	1
CO4	3	3	--	--	3	3	3	--	--	--	--	--	3	3	3
CO5	3	2	3	2	2	2	--	--	--	--	--	--	3	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

	L	T	P	C
III B.Tech I Semester	**3**	**1**	**0**	**4**

20ACE77 NANOTECHNOLOGY AND ITS APPLICATION IN CIVIL ENGINEERING (HONOR)

Course Outcomes:

1. To learn the basic concepts of Nanotechnology.
2. To understand nanomaterial properties useful in construction materials
3. Able to understand nanotechnology application in civil engineering
4. Use nanomaterials in Environmental engineering
5. Comprehend the environmental risks due to the Nano technology

Unit – I

INTRODUCTION: Introduction to Nanoscience and Technology, basic principles and important Concept of Nanotechnology, Nanomaterial, Nano size effect, Surface area, Surface to volume ratio, Property of Nanomaterials- Mechanical, Electrical, optical, Thermal, Magnetic and Catalytic. Awareness and Existing activities of nanotechnology relevant to construction - desk study. Understanding phenomena of traditional construction materials at nanoscale.

Unit -II

NANOTECHNOLOGY IN CONSTRUCTION MATERIALS: Nanomaterials in Concrete and Cement, Introduction, different nanomaterials used in concrete, Development of nano concrete, Application of nanomaterials in UHPC, Nano silica, densification of cement using Nanosilica, Nano alumina, Carbon nanotube (CNT), the Effect of single-welled CNT and Other Nanomaterials on Cement Hydration and Reinforcement, Polycarboxylates, Titanium oxide, Nano kaolin, Nano clay. Nanomaterials-Enabled Multifunctional Concrete and Structures, Next-Generation Nano-based Concrete Construction Products

Unit-III

NANO TECHNOLOGY IN STRUCTURAL MATERIAL:

Nanotechnology and Steel, Applications in Steel structures, for strength, corrosion resistance Improving strength of steel with nanomaterials, effect of copper nanoparticles of strength of Steel. MMFX steel and application. Applications in welds and joints, weld ability, delayed fracture, strengthening of steel bolts, vanadium and molybdenum nanoparticles to improve delayed fracture. Wood as structural material, nanomaterials to improve structural performance and serviceability of wood, nanocomposites, polymer – nanocomposite.

Unit-IV

NANO TECHNOLOGY AND COATINGS AND COATINGS: Nanomaterials based paints, insulating Properties nanomaterials, Smart nanomaterials for building and Glass, Nanomaterials for Thermal or Fire Retarding, Functional coatings and thin films. Environment and performance monitoring sensors and devices. Nano sensors for structural health monitoring. Advances in instrumentation, atomic force microscopy, Nanoindentation techniques, Neutron and X-ray scattering techniques for construction materials

Unit V

NANO TECHNOLOGY IN ENVIRONMENTAL ENGINEERING: Introduction, nanomaterials for clean water, waste water treatment, Nanomaterials as adsorbent for removal of pollutant, microorganisms, heavy metals. Removal of pesticides and fungicides with Nanomaterials. Nanomaterials for water disinfection, Nanofiltration. Nanomaterials as photo catalyst, catalyst. Nanomaterials for capturing carbon dioxide. Nanomaterials for Air pollution remediation, Air purification and Emission mitigation using Nanomaterials. Nanotechnology for detection of pollutant in air and water, Nano sensors and application. Environmental risk due to Nanomaterials, Nanotoxicology.

Text Books:

1. Khitab Anwar, Advanced Research on Nanotechnology for Civil Engineering Applications, IGI Global, May 16, 2016 - Technology & Engineering

2. Zdenek Bittnar, Peter J. M. Bartos, Jiri Nemecek, V. Smilauer, J. Zeman, Nanotechnology in Construction: Proceedings of the NICOM3, Springer Science & Business Media, Apr 21, 2009 - Technology & Engineering
3. M.S. Ramachandra Rao, Shubra Singh, Nanoscience and Nanotechnology: fundamentals to Frontiers, Wiley 2013
4. G Cao, Nanostructures and Nanomaterials synthesis, properties and applications, Imperial College press 2004.

Reference Books:

1. W. Zhu, P.J.M. Bartos and A. Porro, Materials and Structures / Matriaux et Constructions, RILEM TC 197-NCM: 'Nanotechnology in construction materials' Application of nanotechnology in construction Summary of a state-of-the-art report Prepared 2 Vol. 37, November 2004, pp 649-658
2. Florence Sanchez, Konstantin Sobolev, Nanotechnology in concrete – A review, Construction and Building Materials 24 (2010) 2060–2071
3. G.A. Mansoori, T. Rohani. Bastami, A. Ahmadpour, Z. and Eshaghi, Chapter 2 Environmental Application Of Nanotechnology, Annual Review of Nano Research, Vol.2, Chap.2, 2008
4. Ian SofianYunus, Harwin, AdiKurniawan, DendyAdityawarman and Antonius Indarto, Nanotechnologies in water and air pollution treatment, Environmental Technology Reviews Vol. 1, No. 1, November 2012, 136–148
5. JieZhuang and Randall W. Gentry, Environmental Application and Risks of Nanotechnology: A Balanced View, In Biotechnology and Nanotechnology Risk Assessment: Minding and Managing the Potential Threats around Us; Ripp, S., et al.; ACS Symposium Series; American Chemical Society: Washington, DC, 2011.

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	--	--	--	--	--	2	--	--	--	--	--	1	3	-
CO2	3	--	--	--	--	--	3	--	--	--	--	--	2	3	-
CO3	3	--	--	2	--	--	3	--	--	--	--	--	2	3	-
CO4	3	--	--	3	--	--	3	--	--	--	--	--	2	3	-
CO5	3	--	--	2	--	--	3	--	--	--	--	--	2	3	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

L	T	P	C
3	1	0	4

III B.Tech-I Semester

20ACE78 RAILWAY INFRASTRUCTURE PLANNING AND DESIGN

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain the significance of importance of railway infrastructure.
2. Design the geometry of the track system.
3. Develop skills to signaling and interlocking of the railway track system.
4. Manage railway track system.
5. Locate sites for railway line construction

UNIT I PLANNING OF RAILWAY LINES

Network Railways operational system, historical background of Indian railways, plans and developments, policy and standards, traffic forecast and surveys, railway alignment, project appraisal and organization setup.

COMPONENT OF RAILWAY TRACK AND ROLLING STOCK

Permanent way, forces acting, rails, function of rails, rail fixtures and fastenings, sleepers and ballast, rail joints, elements of junctions and layouts, types of traction, locomotives and other rolling stock, brake systems, resistance due to friction, wave action, wind, gradient, curvature, starting, tractive effort of a locomotive, hauling power of a locomotive.

UNIT II GEOMETRIC DESIGN OF RAILWAY TRACK

Right of way and formation, field investigation, geometric design elements, safe speed on curves, speeds computation, string lining of curves, gradients, grade compensation, railway can’t and can’t deficiency, traction, safety measures.

UNIT III TRACK CONSTRUCTION AND MAINTENANCE

Special considerations and construction practices, track laying, inspection and maintenance problems, maintenance tools, maintenance of rail surface, track drainage, track circuited lengths, track tolerances, mechanized method, off-track tampers, shovel packing, ballast confinement and directed track maintenance, bridge maintenance, renewal, classification of renewal works, through sleeper renewals, mechanized relaying, track renewal trains.

UNIT IV SIGNALLING AND INTERLOCKING

Objectives, classification, fixed signals, stop signals, signaling systems, mechanical signaling system, electrical signaling system, systems for controlling train movement, interlocking, modern signaling installations.

UNIT V RAILWAY STATION AND YARDS

Site selection, facilities, classification, platforms, building areas, types of yards, catch sidings, ship sidings, foot over bridges, subways, cranes, weigh bridge, loading gauge, end loading ramps, locomotive sheds, ash-pits, water columns, turntable, triangles, traverse, carriage washing platforms, buffer stop, scotch block, derailing switch, sand hump, fouling mark.

HIGH SPEED RAILWAYS

Modernization of railways, effect of high-speed track, vehicle performance on track, high speed ground transportation system, ballast less track, elevated railways, underground and tube railways.

TEXT BOOKS:

1. J.S. Mundrey, “Railway Track Engineering”, Fourth Edition, Tata McGraw-Hill Education Private Limites, New Delhi, 2010.

2. Rangwala, S.C. “Railway Engineering”, Charotar Publishing House, Anand, India, 2008.

3. S.C. Saxena and S.P. Arora, “A textbook of Railway engineering”, Sixth Edition, Dhanpat Rai Publications, 2001.

REFERENCES

1. Satish Chandra and M. Agrawal, "Railway Engineering", Second Edition, Oxford University Press, 2013.

2. Clifford F. Bonnett, "Practical Railway Engineering", 2nd Edition, Imperial College Press, London, 2005.

3. Gupta, B.L. and Amit Gupta, "Railway Engineering", Third Edition, Standard Publishers, New Delhi, India, 2005.

4. William W. Hay, "Railroad Engineering", Second Edition, John Wiley & Sons, New York, 1982.

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	--	--	--	--	2	--	--	--	--	2	1	3	-
CO2	3	3	--	--	--	--	3	--	--	--	--	3	2	3	-
CO3	3	3	--	2	--	--	3	--	--	--	--	3	2	3	-
CO4	3	3	--	3	--	--	3	--	--	--	--	3	2	3	-
CO5	3	3	--	2	--	--	3	--	--	--	--	3	2	3	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

L	T	P	C
3	1	0	4

III B.Tech I Semester

20ACE79 WATER POWER ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Describe the different concepts relevant to hydro power engineering
2. Select layouts for hydropower plant
3. Choose sites for dam construction by reconnaissance
4. Solve problems related to all kinds of turbines
5. Conduct economic and environmental assessment of hydropower plants

UNIT I BASIC HYDRO POWER CONCEPTS:

Hydrological cycle, Selection of site-Run off, Factors affecting runoff, Hydrograph and flow duration curve. Mass curve, Storage and pondage, Advantages and disadvantages of water power, Potential of hydropower in India- Its development and future prospect.

UNIT II LAYOUT:

Operation and selection of hydro plant, Layout, Essential elements, Catchment area-Reservoir.

UNIT III DAMS:

Selection of site, Gravity dams, Earth dams, Rock fill dams, Spillways, Types, Conduits Surge tanks, Types, Water hammer, Draft tubes.

UNIT IV HYDRAULIC TURBINES:

Types, Selection factors, Turbine size, Pelton wheel, Francis turbine, Propeller turbine-Kaplan turbine, Bulb turbine, Scale ratio, Comparison of turbines, Governing of hydraulic turbines.

UNIT V POWER STATION DESIGN:

Surface power stations power house structure, dimensions, lighting and ventilation, variations in design of power house, Underground power stations. Location of underground power stations, types of underground power stations, components of under-ground power house, types of layout, advantages and limitations of underground of underground power house**.**

TEXT BOOKS:

1. Nag P.K., "Power Plant Engineering" Tata McGraw Hill, 2nd Edition, 4 th Fourth reprint 2003.
2. Rai-Khanna. G.D., "An introduction to power plant technology" Publishers, Delhi, 2013

REFERENCE BOOKS:

1. Dr.Sharma P.C, Kataria S. K. & Sons, "Power Plant Engineering" 2009
2. Small and mini Hydropower system by Tata McGraw Hill, 1984

Mapping of COs with POs & PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	--	--	--	--	3	--	--	--	--	3	3	2	3
CO2	3	3	--	--	--	--	2	--	--	--	--	2	2	1	1
CO3	3	2	3	2	2	--	1	--	--	--	--	1	1	3	2
CO4	3	1	--	--	--	--	3	--	--	--	--	3	3	2	3
CO5	3	3	--	--	--	--	2	--	--	--	--	2	2	1	1

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

	L	T	P	C
III B.Tech I Semester	**3**	**1**	**0**	**4**

20ACE 80 PLANNING AND MANAGEMENT OF ENVIRONMENTAL PROJECTS

Course Outcomes:

After successful completion of the course the students will be able to

1. Describe the basic planning and layout of water system facilities.
2. Implement equipment practices in the field of construction.
3. Illustrate operation and maintenance of waterworks.
4. Integrate applications and techniques to complete the project on time
5. Draft detailed estimate and schedule of the construction projects

UNIT I PLANNING AND LAYOUT OF CIVIC FACILITIES

Planning and Layout of Civic facilities such as water supply and treatment system, waste water collection treatment, common effluent treatment plant (CETP) and disposal system, solid waste management including engineered landfill sites, functions including regulation by local authorities like water and sanitation Boards, Municipal authority etc., dealing with above mentioned civic facilities.

UNIT II PROJECT PLANNING

Project planning, identification, pre-feasibility studies and feasibility report, administration, legal and financial aspects of management of civic facilities. Schedules of Labour, materials and equipments, Graphical presentation of earthwork. Construction Equipments: Equipment for execution and transportation of earth, hauling equipment, hoisting equipment, pile driving equipment, Equipment for pumping water, Dozers and cranes, Scraper, Batching plants, RMC equipment etc.

UNIT III OPERATION AND MAINTENANCE

Operation and maintenance of water work, waste water treatment facilities and landfill sites, cleaning equipments, precautions, safety equipments, safety practices, emergency maintenance, inspections. record keeping of key activities of O and M. Monitored data at various stages of treatment facilities, check list, recording of data, reporting and review of performance of various equipments/unit operations of the treatment facilities, sampling requirement, selection of sampling point, test performed in the Laboratory for samples to be taken from various units operations and their effluents, organisation and computerization of data for decision making and planning interventions. Instrumentation and controls in water works, waste treatment and solid waste management facilities.

UNIT IV NETWORK ANALYSIS:

Network and Network Analysis: CPM, Activity time estimate, earliest event time, Latest allowable occurrence time, Start and finish time of activity, Float, Critical activities and critical path, updating crashing. Development of PERT network, Network rules, Graphical guidelines for networks, Work breakdown structure, Time estimates and computations using PERT. Project monitoring using PRIMAVERA or MS Project.

UNIT V CONTRACT MANAGEMENT

Contract Management: scope of work, detailed estimate (Approved Plan), Administrative approval/Estimate sanction, notice inviting tenders and its types, tender, earnest money deposit, security deposit, types of contracts, essentials of legally valid contract between engineer and employers, appointment and authority of engineer for execution of works, public works administration: system of accounts, estimates, Delhi Schedule rates (CPWD), cost adjustment indices sub head, sub works, administrative approval, technical sanction, possession of funds, expenditure sanction, various methods of executing works.

TEXT BOOKS:

1. Punmia and Khandelwal, “PERT and CPM”, Laxmi Publications, New Delhi.
2. Peurifoy R.L., Schexnayder C.J, Shapira A., “Construction Planning, equipment and methods”, Tata Mc Graw Hill (P) Ltd., New Delhi

REFERENCE BOOKS:

1. Dutta B.N., “Estimation and Costing in Civil Engineering”, UBS Publication Distribution (P) Ltd.,
2. Hinze J., “Construction Contracts”, Tata McGraw Hill Education (P) Ltd., New Delhi. (For Unit-IV)
3. CPHEEO, “Manual on Water and Wastewater Treatment”, Ministry of Urban Development, New Delhi.
4. CPWD, “Delhi Schedule of Rates”, New Delhi.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	-	-	2	2	-	-	-	-	2	3	2	2
CO2	3	-	2	-	-	2	2	-	-	-	-	2	3	2	2
CO3	3	-	2	-	-	2	2	-	-	-	-	2	3	2	2
CO4	3	-	2	-	-	2	2	-	-	-	-	2	3	2	2
CO5	3	-	2	-	-	2	2	-	-	-	-	2	3	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

III B.Tech – II Semester (CE)

	L	T	P	C
20ACE81 ADVANCED DESIGN OF METAL STRUCTURES	**3**	**1**	**0**	**4**

Course Outcomes:

After successful completion of the course the students will be able to

1. Apply plasticity concepts to steel members.
2. Perform Limit state design of trusses and frames.
3. Perform Minimum weight design of steel structures.
4. Prepare detailed structural drawings of steel structures.
5. Use Codal provisions for designing industrial sheds

UNIT I PLASTICITY

Introduction - Nature of plasticity- Assumptions - Stress-strain curve - Bauschinger effect.Plastic Stress-Strain relations - Necessary Elasticity-Plane stress and plane strain – Yield criteria and flow rules - Tresca Theory-Vonmises Theory-Geometrical representation - St. Venant's theory of plastic flow - Prandtl Reuss theory - Concept of slip line field theory.

UNIT II FLEXIBILITY IN FRAMES

Semi rigid design of steel structures - Connection flexibility in steel frames - Analysis of continuous beams with flexible connections - Semi rigid design of steel frames.

UNIT III VIRTUAL WORK

Limit analysis of steel structures - Development of Moment –Curvature relations for steel sections - Moment redistribution – Plastic hinge - Principle of Virtual work - Mechanism condition – Statical and Mechanism methods of analysis.

UNIT IV PLASTIC ANALYSIS

Limit state design – Trusses - Portal frames - Gable frames. Factors affecting plastic moments - Secondary design aspects - Influence of axial force, shear on plastic moment – Buckling - Column stability - Brittle fracture – repeated loading. Minimum weight design – Assumptions - Minimum weight theorems – Heyman and Prager method.

UNIT V STEEL SYSTEM DESIGN

Design guides - Use of SP – 6 - Single span, two span frames flat roof – gable roofs. Light gauge – cold form structures Plate girders in bending and shear – steel systems for seismic design.

TEXT BOOKS:

1. L.S. Beedle, "Plastic Design of Steel Frames", John Wiley & Sons, 1958.

2. G.C.Spencer, "An Introduction to Plasticity", Chapman and Hall, 1968.

REFERENCE BOOKS:

1. Hill Rodney, "Mathematical Theory of Plasticity", Ox.U.Press, 1950.

2. B.G. Neal, "Plastic Methods of Structural Analysis", 3rd Edition, Chapman and Hall, 1977.

3. R. Narayanan et al, "Teaching Resource for Structural steel design" Institute for Steel Development and Growth, 2003.

4. SP: 6(6) - 1972, "ISI Handbook for Structural Engineers – Application of Plastic Theory in Design of Steel Structures", Indian Standards Institution, 1972.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	-	-	2	-	-	-	-	-	2	3	2	
CO2	3	-	2	-	-	2	-	-	-	-	-	2	3	2	
CO3	3	-	2	-	-	2	-	-	-	-	-	2	3	2	
CO4	3	-	2	-	-	2	-	-	-	-	-	2	3	2	
CO5	3	-	2	-	-	2	-	-	-	-	-	2	3	2	

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L	T	P	C
3	1	0	4

III B.Tech – II Semester (CE)

20ACE82 GEOTECHNICAL EARTH QUAKE ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain causes and effects of earthquake
2. Explain tests on dynamic soil properties
3. Calculate liquefaction resistance and settlement
4. Analyse seismic slope stability
5. Perform seismic design of retaining walls

UNIT I INTRODUCTION

Seismology and earth quakes – Seismic waves – Size of earth quake – Ground motion parameters – Wave propagation – one dimensional and multi-dimensional.

UNIT II DYNAMIC SOIL PROPERTIES

Seismic refraction – Continuous surface wave test – Spectral analysis of surface waves – Multi channel analysis of surface waves – Seismic downhole test – Seismic cross hole test.

UNIT III LIQUEFACTION

Liquefaction case histories – process and factors – Cyclic stress and strain approach – Liquefaction resistance and settlement – Lateral spreading – Foundation options.

UNIT IV SEISMIC SLOPE STABILITY

Introduction – Limit equilibrium analysis – Stress deformation analysis – Analysis of inertial instability – Pseudo static approach – Homogeneous wedge approach – Newmark sliding block analysis – Analysis of weakening instability – Analysis of stability – Analysis of deformations.

UNIT V SEISMIC DESIGN OF RETAINING WALLS

Dynamic response of retaining walls – Effect of water on wall pressure – Seismic pressures on basement walls – Richard – Elms deterministic method – Whitman – Liao statistical method – Design based on seismic pressures – Performance based design.

TEXT BOOKS

1. Geotechnical Earthquake Engineering by Steven L. Kramer, Pearson Education, 2003.
2. Geotechnical Earthquake Engineering Handbook, Robert W. Day, McGraw-Hill, 2002

REFERENCE BOOKS

1. Elements of Mechanical Vibration by R.N.lyengar, I.K.International Publishing House Pvt. Ltd,2010
2. Earthquake Tips — Learning Earthquake Design and Construction C.V.R. Murthy,2002
3. A.K. Chopra, Dynamics of Structures, Theory and Applications to Earthquake Engineering, Pearson Education, 2004.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	-	-	2	-	-	-	-	-		3	2	2
CO2	3	-	2	-	-	2	-	-	-	-	-		3		2
CO3	3	-	2	-	-		-	-	-	-	-		3		3
CO4	3	-	2	-	-	2	-	-	-	-	-	2	3	2	3
CO5	3	-	2	-	-	2	-	-	-	-	-	2	3	2	3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
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	L	T	P	C
III B.Tech I Semester	**3**	**1**	**0**	**4**

20ACE83 **STOCHASTIC HYDROLOGY**

Course Outcomes:

After successful completion of the course the students will be able to

1. Describe hydrologic cycle and analyse the rainfall data.
2. Compute the losses from precipitation and estimate the runoff from a watershed.
3. Explain methods for measurement of stream flow.
4. Identify the various systems and methods of irrigation.
5. Estimate the water requirements of a crop.

UNIT1 INTRODUCTION:

Hydrologic Principles: Introduction, Hydrologic cycle, Importance of Hydrology, Global water availability, India's water availability, Practical applications of Hydrology, Hydrologic cycle (Horton's qualitative and engineering representations).

PRECIPITATION:

Forms and types of precipitation, Measurement of rainfall, Optimum number of rain gauge stations, Consistency of rainfall data (double mass curve method), Computation of mean rainfall arithmetic average, Thiessen polygon and Isohyet methods, Estimation of missing rainfall data (Arithmetic average, normal ratio), Rainfall hyetographs

UNIT 2 LOSSES FROM PRECIPITATION:

Evaporation: Process, factors affecting evaporation, Measurement using IS Class A Pan, Estimation using empirical formulae. Infiltration: Factors affecting infiltration capacity, Measurement (double ring infiltrometer), Horton's infiltration equation, Infiltration indices.

RUN OFF: Concept of catchment/ watershed, Water budget equation, Components, Factors affecting runoff, Rainfall-runoff relationship using simple regression analysis, Hydrographs, Unit Hydrograph method.

UNIT 3 STREAM FLOW MEASUREMENT:

Measurement of stage, Measurement of discharge by area– velocity method and slope area method, Simple stage-discharge relation

UNIT 4 IRRIGATION- INTRODUCTION:

Definition, Need, Purpose, Benefits, Ill effects and Scope of irrigation, Seasons across the country, Sources of water for irrigation – surface and ground water, Systems of flow irrigation and lift irrigation, Methods of application of irrigation water.

RESERVOIRS: Definitions, Investigation for reservoir site, Storage zones.

UNIT 5 IRRIGATION AND WATER REQUIREMENT OF CROPS:

Definition of consumptive use, Duty, Delta and Base period, KOR depth, Factor affecting duty of water, Definition of gross command area, Culturable command area, Intensity of irrigation, Time factor, Crop factor, Irrigation efficiencies, Irrigation required, Frequency of irrigation.

TEXT BOOKS:

1. A Text Book of Hydrology- K Subramanya, Tata McGraw- Hill Publications.
2. Irrigation, Water Resources and Water Power Engg- Modi P.N., Standard book house New Delhi

REFERENCE BOOKS:

1. Hand Book of Hydrology- Ven Te Chow , Mc Graw Hill Publications.
2. Hydrology and Water Resources Engineering- R.K. Sharma and Sharma. Oxford and IBH, New Delhi.
3. Applied Hydrology- Linsley, Kohler and Paulhus, Wiley Eastern Publication, New Delhi.
4. Irrigation Engg. And Hydraulic. Structures - S.K. Garg, Khanna publications, New Delhi
5. Irrigation and Water power Engg. – Punmia and Pandey Lal Lakshmi Publications, New Delhi.

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	--	3	--	3	--	--	--	--	3	2	1
CO2	3	3	--	--	3	--	3	--	--	--	--	3	3	3
CO3	3	2	--	--	2	--	2	--	--	--	--	2	2	3
CO4	3	3	--	--	3	--	3	--	--	--	--	3	3	3
CO5	2	2	2	--	2	--	2	--	--	--	--	2	2	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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III B.Tech II Semester (CE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**4**

20ACE84 ROAD TRANSPORT MANAGEMENT AND ECONOMICS

Course Outcomes:

After successful completion of the course the students will be able to

1. Classify transportation and functions of traffic administration
2. Recognize and execute the Motor Vehicle Act
3. Execute traffic management systems
4. Evaluate the scheduling and fare management of road transport
5. Estimate the economic aspects of road transportation system

UNIT I INTRODUCTION

System Classification – History of Transportation – modes – types –. Advantages of motor transport. Principal function of administrative, traffic, secretarial and engineering divisions. chain of responsibility, forms of ownership by state, municipality, public body and private undertakings.

UNIT II MOTOR VEHICLE ACT

Laws governing use of motor vehicle - Licensing of drivers and conductors -Registration of vehicles - State and inter-state permits - Traffic rules and controls - Accident causes, analysis and prevention - RTO and regulations -Offences, penalties and procedures - Rules and regulations, testing and passing of vehicle

UNIT III TAXATION AND INSURANCE

Introduction, objectives and structure - Method of laying taxation - Goods vehicle taxation -Passenger vehicle taxation - Mode of tax payment - Tax exemption - Service life of vehicles - Toll tax reasons and operational management - Build operate transfer arrangement - Types of insurance - Accident claims and settlements - Duty of driver in case of accident - Surveyor and loss accessor

UNIT IV SCHEDULING AND FARE STRUCTURE

Principal features of operating costs for transport vehicles with examples of estimating the costs. Fare structure and method of drawing up of a fare table. Various types of fare collecting methods. Basic factors of bus scheduling. Problems on bus scheduling.

UNIT V ECONOMY OF ROAD TRANSPORT

Road Transport Road Transport- Roads – Vehicles – Significance Characteristics- Competition – Monopoly – Nationalisation- Road Development during Plans- Road Finance – Regulation – Taxation - Current Problems of motor transport

TEXT BOOKS:

1. John Duke, "Fleet Management", McGraw-Hill Co, USA, 1984.
2. Kitchin.L.D., "Bus Operation", III edition, Illiffee and Sons Co., London, 1992.

REFERENCES

1. Motor Vehicles Acts, Law Publishers
2. Schumer, Economics of transport, TMH
3. Fair and Williams, Economics of transportation, East West Press.
4. Hudson, Motor transportation, TMH.
5. M.V. Act 1988-RTO rules and regulation manual
6. Fuel Economy of Motor Vehicle, Allied Publishers.
7. National Research Council, Automotive Fuel Economy, National Academic Press.
8. CIRT Journal of Transport Management.
9. Government Motor Vehicle Act, Publication on latest act to be used as on date

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	2	--	--	--	--	--	--	--	3	2	3	
CO2	3	2	2	2	--	--	--	--	--	--	--	3	2	2	
CO3	2	2	3	--	--	--	--	--	--	--	--	2	3	1	
CO4	3	3	2	2	--	--	--	--	--	--	--	3	2	2	
CO5	2	2	2	2	--	--	--	--	--	--	--	2	1	2	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

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III B.Tech – II Semester (CE)

L	T	P	C
3	1	0	4

20ACE85 SUSTAINABILITY CONCEPTS IN CIVIL ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain sustainable environment and frame environmental legislations.
2. Offer solutions to global environmental issues.
3. Create sustainable designs
4. Formulate technologies complying with environmental standards
5. Practice Green engineering and urbanization

UNIT I SUSTAINABILITY

Introduction, Need and concept of sustainability, Social-environmental and economic sustainability concepts - Sustainable development, Nexus between Technology and Sustainable development, Challenges for Sustainable Development - Multilateral environmental agreements and Protocols - Clean Development Mechanism (CDM), Environmental legislations in India - Water Act, Air Act.

UNIT II GLOBAL ENVIRONMENTAL ISSUE

Resource degradation, Climate change, Regional and Local Environmental Issues. Carbon credits and carbon trading, carbon foot print Carbon sequestration – Carbon capture and storage (CCS). Environmental management standards, ISO 14000 series, Life Cycle Analysis (LCA) - Scope and Goal, Bio-mimicking.

UNIT III SUSTAINABLE DESIGN

Basic concepts of sustainable habitat, Green buildings, green materials for building construction, material selection for sustainable design, green building certification- GRIHA & IGBC Certification for buildings, Energy efficient building design- Passive solar design technique, Thermal storage, Cooling strategies, high performance insulation. Sustainable cities, Sustainable transport.

UNIT IV CLEAN TECHNOLOGY AND ENERGY

Energy sources: Basic concepts-Conventional and non-conventional, solar energy, Fuel cells, Wind energy, Small hydro plants, bio-fuels, Energy derived from oceans, Geothermal energy. Rainwater harvesting.

UNIT V GREEN ENGINEERING

Green Engineering concepts, Sustainable Urbanization, industrialization, and poverty-reduction; Social and technological change, Industrial Processes: Material selection, Pollution Prevention, Industrial Ecology, Industrial symbiosis.

TEXTBOOKS:

1. Allen, D.T. and S Honnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice-Hall.

2. Bradley. A.S; Adebayo, A. O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.

REFERENCE BOOKS:

1. Mackenthun, K. M.,Basic Concepts in Environmental Management, Lewis Publication.

2. ECBC Code 2007, Bureau of Energy Efficiency, New Delhi Bureau of Energy Efficiency Publications- Rating System, TERI Publications - GRIHA Rating System.

3. Ni bin Chang, Systems Analysis for Sustainable Engineering: Theory and Applications, McGraw-Hill Professional.

4. Twidell, J. W. and Weir, A. D., Renewable Energy Resources, English Language Book Society (ELBS).

5. Malcolm Dowden, Climate Change and Sustainable Development: Law, Policy and Practice.

6. Daniel A. Vallero and Chris Brasier, "Sustainable Design: The Science of Sustainability and Green Engineering", Wiley-Blackwell.

CourseOutcome	**ProgramOutcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	--	--	--	--	--	--	--	3	2	2	
CO2	2	3	1	1	--	--	--	--	--	--	--	3	1	2	
CO3	2	2	2	1	--	--	--	--	--	--	--	2	2	1	
CO4	2	2	3	1	--	--	--	--	--	--	--	3	3	3	
CO5	2	2	2	1	--	--	--	--	--	--	--	2	1	1	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

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III B.Tech – II Semester (CE)

L	T	P	C
3	1	0	4

20ACE86 OPTIMIZATION TECHNIQUES IN GEOTECHNCAL ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Adopt various numerical methods and mathematical tools for analysis of research data
2. Apply numerical methods in applied soil mechanics
3. Use bivariate data and Lagrangae's equation for the problems
4. Explore GA in geotechnical engineering.
5. Apply queuing theory for solving AI problems

UNIT I RECURRENCE RELATION AND GENERATING FUNCTIONS

Recurrence Relation and Generating Functions: Formation of recurrence relation, Solution of linear and nonlinear recurrence relation, Properties of generating function and solve the recurrence relation using the generating function and related problems. Scatter Diagram; Karl Pearson's coefficient of linear correlation, Linear regression, Properties of regression and related problem. Queue.

UNIT II NUMERICAL ANALYSIS

Numerical analysis: Introduction to interpolation, Newton's Forward and Backward interpolation (Statement only), Lagrange and Divided interpolation (Statement only), Simple problems. Numerical differentiation for equal and unequal interval. Matrix Eigen value and eigen vector by power methods, simple problems. Curve fitting and problems. Statistics: Analysis of Bivariate data. Correlation Analysis – Meaning of correlation.

UNIT III OPTIMIZATION TECHNIQUES:

Optimization Techniques: Linear programming problem (LPP) Formation of LPP, Graphical Method and related problems. Transportation Problems, assignment problem., Queuing Theory- Basic Structure, Exponential distribution, Birth-and Death Model.

UNIT IV EVOLUTIONARY ALGORITHMS

Tucker condition, Penalty function method, Augmented Lagrangian method, sequential unconstrained minimization, cutting plane method; Introduction to Evolutionary algorithms: Need for evolutionary algorithms, Type of evolutionary methods, Introduction to Genetic algorithm (GA), Difference and similarities between GA and traditional methods. Basic operations of GA: reproduction, crossover, mutation and elitism. Binary coded and real coded GA

UNIT V ARTIFICIAL INTELLIGENCE:

Artificial Intelligence: Introduction- Classification of artificial intelligence - expert systems-artificial neural networks basic concepts-uses in functional approximation and optimization applications in the design and analysis, building construction. Fuzzy logic-basic concepts-problem formulation using fuzzy logic-applications

Text Books:

1. Introduction to Optimum Design J.S. Arora (2004), Elsevier, 2nd Edition.

2. Optimization for Engineering. Design: Algorithms and Examples K. Deb (2006), Prentice Hall India, ,

3. Engineering Optimization: Theory & Practice, S.S. Rao (2008) New Age International (P) Ltd, 3rd Edition

Reference Books:

1. Multi - Objective Optimization Using Evolutionary Algorithms, K. Deb(2003) John Wiley

2. Applied Statistics & Probability for Engineers: Montgomery, Douglas C. & Runger, George C. (2007), 3/e,Wiley India.

3. Parallel distributed processing Vol.1 (1986) Rumelhart, D.E and McClelland, J.L.,, M I T Press, 1986. 4. Fuzzy logic implementation and applications (1996), Patyra, M.J. and Mlynek Wiley.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	--	--	--	1	--	--	--	--	1	3	2	3
CO2	3	2	--	3	--	--	2	--	--	--	--	2	2	3	1
CO3	1	2		1								1	2	2	
CO4	3	2	--	3	--	--	2	--	--	--	--	2	2	3	1
CO5	2	2	3	1	--	--	2	--	--	--	--	2	2	1	2

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III B.Tech II Semester

		L	T	P	C
20ACE87	**RIVER MORPHOLOGY**	**3**	**1**	**0**	**4**

Course Outcomes:

After successful completion of the course the students will be able to

1. Describe theoretical concepts of water and sediment movements in rivers
2. Analyse Steady flow and Unsteady flow
3. Solve River Dynamics Problems
4. Provide protection to river banks
5. Simulate models for flood control

UNIT I PHYSICAL PROPERTIES AND EQUATIONS:

Dimensions and units, Properties of water and sediment, River flow kinematics, Conservation of mass, Equations of motion, Hydraulic and energy grade lines.

UNIT – II STEADY FLOW AND UNSTEADY IN RIVERS:

Steady river flow, Steady-nonuniform river flow, Sediment transport in rivers, River continuity equation, River momentum equations, River flood waves, Loop-rating curves, River flood routing, River flow and sediment-duration curves.

UNIT – III RIVER EQUILIBRIUM AND RIVER DYNAMICS:

Particle stability, Channel stability, Regime relationships, Equilibrium in river bends, Downsteam hydraulic geometry, Bars in alluvial rivers, River meandering, Lateral river migration, River dynamics, Riverbed degradation, Riverbed aggradation, River confluences and branches, River databases.

UNIT – IV RIVER STABILIZATION AND RIVER TRAINING WORK:

Riverbank stability, Riverbank riprap revetment, Riverbank protection, River flow-control structures, River training along braided rivers.

UNIT – V RIVER ENGINEERING AND RIVER MODELLING:

River flood control, River closure, Canal headworks, Bridge scour, Navigation waterways, Rigid-bed model, Mobile-bed river models, Finite-difference approximations, One-dimensional river models, Multidimensional river models**.**

Text Books:

1. River Mechanics, Pierre Y. Julien, Cambridge University Press, 2002
2. River Engineering, Margaret S Peterson, Prentice Hall, 1986
3. River Morphology, R J Garde, New Age International Ltd, 2015

Reference Books:

1. River Morphology: A Guide for Geoscientists and Engineers Dr. Joachim Mangelsdorf, Professor Dr.-Ing. Karl Scheurmann, Dipl.-Ing. Fritz-Heinz Weiß (auth.) , Springer Series in Physical Environment

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	--	--	--	1	--	--	--	--	1	3	2	3
CO2	3	2	--	3	--	--	2	--	--	--	--	2	2	3	1
CO3	3	1	2	--	--	--	1	--	--	--	--	1	3	2	3
CO4	3	2	--	3	--	--	2	--	--	--	--	2	2	3	1
CO5	2	2	3	1	--	--	2	--	--	--	--	2	2	1	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

III B.Tech – II Semester (CE)

L	T	P	C
3	**1**	**0**	**4**

20ACE88 SOIL MECHANICS FOR HIGHWAY ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Describe soil classification systems, various soil exploration methods
2. Test the soil to know the shear strength of soil
3. Apply strategies for maintenance and rehabilitation of highways
4. Identify different drains depending on soil condition
5. Design road embankments using soil nailing principles and grouting Techniques

.

UNIT I: INTRODUCTION

Soil Mechanics applications to Highway Engg. Soil formations, Types, Regional Soil deposits of India, Index properties, their determination, importance, various soils Classification systems, HRB classification, problems on these. Soil compaction: - Factors contributing to shear strength affecting, Structure &Engg behavior of compacted cohesive soil, Field compaction specifications Filed compaction control, Different types of Equipments used for compaction, their choice. Permeability of soil: Darcy's Law, Validity, Soil-water system, Types, Determination of Permeability, problems..

UNIT II SITE INVESTIGATION:

Introduction, Planning exploration programmes, Methods, Samplers, SPT, Subsoil investigation Report, Geophysical methods. . Shear strength: - Importance, Measurements, shear strength of clay, Sand, elastic properties of soil – Tangent, Secant modulus, Stress – Strain curves, Poisson's ratio, Shear Modulus. Stability of slopes: Introduction, Types, Different methods of analysis of slopes for Øu+0 & C-Ø soil, Location of most critical circle, Earth dam slopes stability, Taylor's stability number. Effect of Earthquake Force, problems on above.

UNIT III INVESTIGATION

Geometrics, Pavement, Condition, Recommended. Levels of Investigation Traffic, Thickness, Design, Constraints, Maintenance, Routine, Maintenance, Preventive Maintenance, Rehabilitation, Economic Analysis, Selection of Alternatives.

UNIT IV HIGHWAY DRAINAGE

Highway Drainage: Introduction, Importance, Surface drainage, Sub-surface drainage, methods, design of subsurface drainage system, Road construction in water logged areas, Landslides – Definition, classifies, factors affecting the landslides.

UNIT V REINFORCED EARTH STRUCTURES:

Reinforced Earth Structures: Introduction, Components, Advantages, Types of stability – External, Internal, (No problems), Geotextiles – types, Functions, their uses in road Embankments and railway works, other uses**.**

TEXT BOOKS :

1. C. Venkatramaiah, Geotechnical Engineering, New Age International (P) Ltd, Publishers,New Delhi,2012
2. K. R. Arora, Soil Mechanics and Foundation Engineering, Standard Publishers Distributor,Delhi,2010
3. S K Khanna and C E G Justo, "Highway Engineering", Nem Chand Bros, Roorkee.
4. L R Kadiyali, "Highway Engineering", Khanna Publishers, New Delhi.
5. R Srinivasa Kumar, "Highway Engineering", University Press

REFERENCE BOOKS:

1. Joseph E. Bowles, Foundation Analysis and Design, MC Graw – Hill, Inc., New Delhi,1991
2. Dr. B. C. Punmia, Ashok kumar Jain and Arunkumar Jain, Soil Mechanics and FoundationEngineering, Lakshmi Publications (P) Ltd., New Delhi.2017
3. A.V. Narasimha Rao and C. Venkatramaiah, Numerical problems, Examples and ObjectiveQuestions in Geotechnical Engineering, Universities Press India Limited, Hyderabad,2000
4. Relevant IRC Codes.
5. Specifications for Roads and Bridges-MoR T&H, IRC, New Delhi.
6. C. JotinKhisty, B. Kentlal, "Transportation Engineering", PHI Learning Pvt. Ltd. New Delhi

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	--	--	--	1	--	--	--	--	1	3	2	3
CO2	3	2	--	3	--	--	2	--	--	--	--	2	2	3	1
CO3	1	1	2	--	--	--	1	--	--	--	--	1	1	2	3
CO4	3	2	--	3	--	--	2	--	--	--	--	2	--	2	1
CO5	2	2	3	1	--	--	2	--	--	--	--	2	2	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

IV B.Tech – I Semester

		L	T	P	C
20ACE89	**DESIGN OF HIGH-RISE BUILDINGS**	**3**	**1**	**0**	**4**

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain behavior of tall buildings due to various types of loads.
2. Understand the behaviour of various structural systems
3. Perform building analysis using approximate and accurate methodologies
4. Evaluate creep, shrinkage and temperature effects.
5. Identify stability issues of high rise buildings.

UNIT I LOADING AND DESIGN PRINCIPLES

Loading- sequential loading, Gravity loading, Wind loading, Earthquake loading, - Equivalent lateral force, modal analysis - combination of loading, – Static and Dynamic approach – Analytical and wind tunnel experimental methods - Design philosophy - working stress method, limit state method and plastic design.

UNIT II BEHAVIOUR OF VARIOUS STRUCTURAL SYSTEMS

Factors affecting growth, height and structural form. High rise behaviour, Rigid frames, braced frames, In filled frames, shear walls, coupled shear walls, wall-frames, tubulars, cores, outrigger - braced and hybrid mega systems.

UNIT III ANALYSIS AND DESIGN

Modeling for approximate analysis, Accurate analysis and reduction techniques, Analysis of buildings as total structural system considering overall integrity and major subsystem interaction, Analysis for member forces, drift and twist - Computerized three-dimensional analysis – Assumptions in 3D analysis – Simplified 2D analysis.

UNIT IV STRUCTURAL ELEMENTS

Sectional shapes, properties and resisting capacity, design, deflection, cracking, prestressing, shear flow, Design for differential movement, creep and shrinkage effects, temperature effects and fire resistance.

UNIT V STABILITY ISSUES

Overall buckling analysis of frames, wall-frames, Approximate methods, second order effects of gravity of loading, P-Delta analysis, simultaneous first-order and P-Delta analysis, Translational, Torsional instability, out of plumb effects, stiffness of member in stability, effect of foundation rotation.

REFERENCES:

1. Taranath B.S., “Structural Analysis and Design of Tall Buildings”, McGraw Hill, 1988.
2. Beedle.L.S., “Advances in Tall Buildings”, CBS Publishers and Distributors, Delhi, 1986.
3. Bryan Stafford Smith and Alexcoull, “Tall Building Structures - Analysis and Design”, John Wiley and Sons, Inc., 2005.
4. Gupta.Y.P.,(Editor), Proceedings of National Seminar on High Rise Structures – Design and Construction Practices for Middle Level Cities, New Age International Limited, NewDelhi,1995.
5. Lin T.Y and Stotes Burry D, “Structural Concepts and systems for Architects and Engineers”, John Wiley, 1988.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	--	--	--	--	2	--	--	--	--	2	2	3	
CO2	1	3	--	--	--	--	2	--	--	--	--	2	2	2	
CO3	2	1	--	--	--	--	2	--	--	--	--	2	3	1	
CO4	2	2	--	3	--	--	2	--	--	--	--	2	--	2	3
CO5	2	1	--	2	--	--	2	--	--	--	--	2	--	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

IV B.Tech – I Semester (CE)

		L	T	P	C
20ACE90	**SOIL DYNAMICS**	**3**	**1**	**0**	**4**

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain SHM, vibration analysis and frequency response
2. Determine Viscous damping and vibration measurements
3. Analyse the stress strain behavior of cyclically loaded soils
4. Evaluate Dynamic Soil Properties
5. Use appropriate techniques for dynamic soil characterization, design of machine foundations and vibration isolation.

UNIT I

Fundamentals of Vibration: Definitions, Simple harmonic motion, Free and forced vibrations with and without viscous damping, Frequency dependent excitation, System s under transient loads, Rayleigh's method of fundamental frequency, Logarithmic decrement.

UNIT II

Frequency of Soil Systems: Determination of viscous damping, Transmissibility, Systems with two and multiple degrees of freedom, Vibration measuring instruments.

UNIT III

Wave Propagation: Propagation of seismic waves in soil deposits, Attenuation of stress waves, Stress-strain behavior of cyclically loaded soils, Strength of cyclically loaded soils.

UNIT IV

Dynamic Soil Properties: Dynamic soil properties, Laboratory and field testing techniques, Elastic constants of soils, Correlations for shear modulus and damping ratio in sands, gravels, clays and lightly cemented sand; Liquefaction of soils.

UNIT V

Vibration Analysis - Types, General requirements, Permissible amplitude, Allowable soil pressure, Modes of vibration of a rigid foundation block, Methods of analysis, Lumped mass models, Elastic half space method, Elastodynamics, Effect of footing shape on vibratory response, Dynamic response of embedded block foundation.

TEXT BOOKS :s:

1. Das, Braja M. and Ramana, G. V., Principles of Soil Dynamics, Cengage Learning Inc., 2nd Edition, 2011.

2. Srinivasulu, P. and Vaidyanathan, C., Hand Book of Machine Foundations, Tata McGraw–Hill, 2007.

Reference Books:

1.Arya, S. D, O'Neil, M. and Pincus, G., Design of Structures and Foundations for Vibrating Machines, G. Gulf Publishing Co., 1979.

2. Prakash, S., Soil Dynamics, McGraw-Hill, 1981.

3. Swami Saran, Soil Dynamics and Ma chine Foundations, Galgotia Publications Pvt. Ltd., 2nd Edition, 2010.

4. Kameswara Rao, N. S. V., Vibration Analysis and Foundation Dynamics, Wheeler Publishing, 1998.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	-	-	-	-	-	-	2	2	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	2	2	-
CO3	3	2	3	2	-	-	-	-	-	-	-	-	2	2	-
CO4	2	2	3	3	-	-	-	-	-	-	-	-	2	2	-
CO5	2	3	3	2	-	-	-	-	-	-	-	-	2	2	-

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

IV B.Tech – I Semester

L	T	P	C
3	**1**	**0**	**4**

20ACE91 URBAN FLOOD PLANNING AND MANAGEMENT

Course Outcomes:

After successful completion of the course the students will be able to

1. Establish water system for urban development
2. Explain river flood management.
3. Provide insights pertaining to management in urban drainage
4. Identify comprehensive management techniques in an urban environment, along with its interrelations and interfaces.
5. Analyse case studies on storm water management

UNIT I

URBAN WATER

Urban Development:-Urbanization Process, Impact on Urban Infrastructure, Urban Infra Structure Planning, Urban water system, Water availability, Assessment of underwater components:-Contamination of water sources-water supply and sanitation-Solid waste-Strom water Runoff and water Borne Diseases.

UNIT II

RIVER FLOOD MANAGEMENT

Characteristics of river flooding, Settlement of urban areas and impact of flooding, Evauation of flood events:-Real time flood forecasting-Probability or risk of flooding, River Flood control measures, Structural measures:-Extensive measures-Intensive measures, Non Structural Measures:-Forecasting and early warning system-Zoning of areas liable to flooding-Flood Proof Construction-Flood Insurance, Evaluating Flood Damage:-Level Damage Curve-Historical damage curve Method-Aggregate Damage Equation

UNIT III

MANAGEMENT OF FLOODS IN URBAN DRAINAGE

Impact of urban development on water cycle, environmental impact on aquatic eco system, management of macro drainage:-management of urban drainage-mismanagement of riverside areas in combination with urban drainage, Principles of sustainable management, Types of control measures:-Distributed control measures-control measures in micro drainage and macro drainage-compatibility of systems sewage effluent-Planning macro drainage control.

UNIT IV

INTEGRATED URBAN WATER MANAGEMENT:

Management Phases, Integrated and sustainable approach to urban development:-Integrated approach to urban environment-Institutional aspects, Urban and water shed management.

UNIT V

STORM WATER PLAN & CASE STUDIES:

Interfaces between plans:-Management-Sanitation and urban drainage-Urban drainage, erosion & solid waste-environmental restoration, Structure:-Principles-Objectives of the plan-Strategies-Scenarios, Measures:-Nonstructural measures-Structural measures, Outcomes, Programmes:-Monitoring programme-Further studies, Case studies:-Urban flooding in Brazil, Argentina and Central America.

TEXT BOOKS

1. Carlos E.M Tucci, Urban Flood Management. CAP-NET, APFM, WMO/TD-NO 1372, 2006.

REFERENCE BOOKS

1. Chris Zevenbergen, Adrian Cashman, Niki Evelpidou, Erik Pasche, Stephen Garvin, Richard Ashley,Urban Flood Management, CRC Press, 2010

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	-	-	-	-	-	-	2	2	-
CO2	1	3											1	3	-
CO3	3	2	3	2	-	-	-	-	-	-	-	-	2	2	-
CO4	2	2	1	1	2	-	-	-	-	-	-	-	2	2	-
CO5	2	3	3	2	-	-	-	-	-	-	-	-	2	2	-

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

IV B.Tech – I Semester (CE)

L	T	P	C
3	1	0	4

20ACE92 ENVIRONMENTAL IMPACT ASSESSMENT OF TRANSPORT PROJECTS

Course Outcomes:

After successful completion of the course the students will be able to

1. Describe the quality review of an EIA and EIS.
2. Apply the EIA methodologies.
3. Conduct EIA evaluation for various impacts.
4. Perform EIA assessment on deforestation impacts.
5. Perform Environmental audit protection and prevention acts

UNIT- I : Basic concept of EIA and Methodologies: Initial environmental Examination, Elements of EIA, – factors affecting EIA Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters. EIA Methodologies: Introduction, Criteria for the selection of EIA Methodology, EIA methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost / Benefit Analysis.

UNIT- II : Impact of Developmental Activities and Land use. Introduction, Methodology for the assessment of soil and ground water, Delineation of study area, Identification of activities.

UNIT- III : Procurement of relevant soil: Quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. EIA 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- IV : Assessment of Impact of development Activities: on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT – V : Environmental Audit & Environmental legislation: objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, on-site activities, evaluation of Audit data and preparation of Audit report. Post Audit activities : The Environmental pollution Act, The water ;Act, The Air (Prevention & Control of pollution Act.), Mota Act. Wild life Act.Case studies and preparation: of Environmental Impact assessment statement for various Industries.

TEXT BOOKS :

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCE BOOKS:

1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K., Katania&. Sons Publication., New Delhi
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	3	2	-	-	-	-	-	3	3	2
CO2	3	-	-	-	-	3	2	-	-	-	-	-	3	3	2
CO3	3	-	-	-	-	3	2	-	-	-	-	-	3	3	2
CO4	3	-	-	-	-	3	2	-	-	-	-	-	3	3	2
CO5	3	-	-	-	-	3	2	-	-	-	-	-	3	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	0	2	4

II B.Tech - II Semester

(20ACE93) FUNDAMENTALS OF STRENGTH OF MATERIALS (MINOR)

Pre-request: Nil

Course Outcomes:

At the end of the course, students should be able to:

CO1: be in a position to explain stress and strain at a point and their relations in a deformable material.

CO2: be able to understand transformation of stresses and be an expert of construction of Bending Moment and shear force diagram

CO3: be able to understand bending and shear stresses in beams.

CO4: be able to understand and apply Eulers theory on elastic stability of columns

CO5: be able to understand torsion of shafts and be able to apply for thick and thin cylinders.

UNIT I

SIMPLE STRESSES AND STRAINS: Introduction, Properties of Materials, Stress, Strain, Hooke's law, St. Venant's principle, Stress–Strain Diagram for structural steel and nonferrous materials, Principles of superposition, Deformation of uniform bars, bars of varying cross sections, tapering bars of circular and rectangular cross-sections, temperature stresses. Deformation due to self–weight.

ELASTIC CONSTANTS: Relationship among elastic constants,volumetric strain, Stresses in composite sections Thermal stresses (including thermal stresses in compound bars).

UNIT II

TRANSFORMATION OF STRESSES: Introduction,Resolution of stresses on inclined planes, General two dimensional stress system, Principal planes and Principle stresses, Plane stress and plane strain conditions, Mohr's circle of stresses

BENDING MOMENT AND SHEAR FORCE IN BEAMS: Introduction, Definitions-Bending moment and Shearing force in beam, Sign convention, Relationship between loading, shear force and bending moment, SFD and BMD with salient values for statically determinate beams(cantilever Beams, simply supported beams and overhanging beams) subjected to point loads, UDL, UVL and Couple

UNIT III

BENDING STRESS IN BEAMS: Introduction – Bending stress in beam, Assumptions in simple bending theory, Pure bending derivation of Bernoulli's equation, Modulus of rupture, section modulus, flexural rigidity, Variation of bending stresses across the cross section of the beams

SHEAR STRESS IN BEAMS: Expression for horizontal shear stress in beam,Shear stress diagram for rectangular, symmetrical 'I' and 'T' sections

UNIT IV

ELASTIC STABILITY OF COLUMNS: Introduction–Short and long columns, Assumptions, Euler's theory on columns, Derivation of Euler's buckling load for a column with both ends hingedEffective length slenderness ratio, radius of gyration., Limitations of Euler's theory, Rankine's formula and problems.

UNIT V

TORSION OF CIRCULAR SHAFTS: Pure torsion, torsion equation of circular shafts,Strength and stiffness, Torsional Rigidity and polar modulus, Power transmitted by shaft of solid and hollow circular sections.

THIN AND THICK CYLINDERS: Stresses in thin cylinder subjected to pressure, hoop, longitudinal and volumetric strains, Thick cylinders-Lame's theory

TEXT BOOKS:

1. Mechanics of Materials by Ferdinand P. Beer and E. RusselJohnston (jr) Publisher, 6th Edition, 2013
2. Strength of materials by L.S.Srinath, Prakash Desai and AnanthRamu Publisher, 2nd Edition, 2009

REFERENCE BOOKS:

1. Elements of Strength of Materials, Timoshenko and Young, Affiliated East-West Press.
2. Mechanics of Materials, James M. Gere (5thEdition), Thomson Learning.
3. Strength of materials By I.B.Prasad, Khanna Publisher E LEARNING: NPTEL

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	--	--	1	--	--	--	--	--	--	3	3	2
CO2	3	2	1	1	--	1	--	--	--	--	1	--	2	3	1
CO3	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3
CO4	3	1	3	3	--	3	--	--	--	--	1	--	1	3	2
CO5	2	1	2	2	--	1	--	--	--	--	3	--	1	2	1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

III B.Tech I Semester (CE)

L	T	P	C
3	0	2	4

20ACE94 INTRODUCTION TO FLUID MECHANICS

Course Outcomes:

After successful completion of the course the students will be able to

1. Evaluate fluidlow parameters under static and dynamic conditions using fundamental principles.
2. Analyse different types of flows, momentum applications.
3. Solve the boundary layer problems.
4. Estimate losses in pipe flows using Moody's Charts
5. Explain working principles of different flow measuring devices

UNIT I

Fluid Properties: Dimensions and units - Definition of a fluid – Physical properties of fluids Density, Specific weight, Specific volume, Specific gravity, Compressibility, Vapour pressure, Surface tension and capillarity and Viscosity. Fluid Statics: Pascal's law, Pressure variation in a static fluid – Atmospheric, gauge and absolute pressures, Measurement of pressure – Piezometer – U–tube and inverted U–Tube Manometers and Bourdon's pressure gauge.

UNIT II

Fluid Kinematics: Types of flow – Streamline – Streak line – Path line – Stream tube –Control volume and control surface– Continuity equation in one and three-dimensional flow – Stream function and velocity potential function – Flow net – Acceleration of a fluid particle – Local and convective accelerations –Tangential and normal accelerations.

Fluid Dynamics: Euler's equation of motion along a streamline – Bernoulli's energy equation– Applications; Energy correction factor – Impulse–momentum equation – Momentum correction factor –Force on a bend – Energy gradient line – Hydraulic gradient line.

UNIT III

Laminar Flow: Reynolds' experiment – Regimes of flow - laminar flow, turbulent flow, transitional flow – Reynolds' number – Laminar flow through circular pipes – Hagen Poiseuille equation – Laminar flow through parallel plates.

Boundary Layer Theory: Introduction to Boundary layer theory - Flow around submerged objects-Drag and lift.

UNIT IV

Analysis of pipe Flow: Forces acting on open pipe and buried pipe, Minor losses in pipe flow–Darcy–Weisbach equation – Variation of Friction Factor – Moody's chart; Pipes in series and parallel – Pipe networks.

UNIT V

Flow Measurement: Velocity measurement by Pitot tube and Pitot static tube –Discharge measurement by Venturimeter and orifice meter – Orifices and mouthpieces – Flow over Rectangular, Triangular and Trapezoidal and Stepped Notches and Broad Crested Weirs.

TEXT BOOKS:

1. P.N. Modi & S.M. Seth, Hydraulics and Fluid Mechanics including Hydraulic Machines,Twentieth Edition 2015,
Standard Book House, New Delhi.
2. D.S. Kumar, Fluid Mechanics and Fluid Power Engineering, Katson Publishing House,Delhi.2004

REFERENCE BOOKS:

1. Streeter & Wylie, Fluid Mechanics, Mc Graw Hills Publications,1997.
2. F.M. White, Fluid Mechanics, seventh edition,2012, Mc Graw Hills Publications
3. DrR.S.Kumar, Fluid Mechanics and Fluid Power Engineering, S.Chand Publications,2014
4. R.K.Bansal, A Text Book of Fluid Mechanics and Hydraulic machinery, Ninth Edition 2003, Laxmi Publications

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	--	--	1	--	--	--	--	--	--	3	3	2
CO2	2	1	1										1	2	
CO3	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3
CO4	1	2	2											2	2
CO5	2	1	2	2	--	1	--	--	--	--	3	--	1	2	1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

L	T	P	C
3	0	2	4

III B.Tech – II Semester (CE)

20ACE95 BASIC SURVEYING

Course Outcomes:

After successful completion of the course the students will be able to:

1. Explain fundamental principles of surveying
2. Perform linear and angular measurements and traversing
3. Demonstrate various types of 328eveling
4. Compute area using Plane Table Surveying
5. Determine areas and volumes using various methods of surveying.

UNIT I

Introduction:

Definition of surveying, Objectives and importance of surveying. Classification of surveys. Principles of surveying. Units of measurements, Surveying measurements and errors, types of errors, precision and accuracy. Classification of maps, map scale, conventional symbols, topographic maps, map layout, Survey of India Map numbering systems.

Measurement of Horizontal Distances:

Measuring tape and types. Measurement using tapes, Taping on level ground and sloping ground. Errors and corrections in tape measurements, ranging of lines, direct and indirect methods of ranging, Electronic distance measurement, basic principle.Booking of tape survey work, Field book, entries, Conventional symbols, Obstacles in tape survey, Numerical problems.

UNIT II

Measurement of Directions and Angles: Compass survey: Basic definitions; meridians, bearings, magnetic and True bearings. Prismatic and surveyor's compasses, temporary adjustments, declination. Quadrantal bearings, whole circle bearings, local attraction and related problems

Traversing: Traverse Survey and Computations: Latitudes and departures, rectangular coordinates, Traverse adjustments, Bowditch rule and transit rule, Numerical Problems.

UNIT-III

Leveling:

Basic terms and definitions, Methods of leveling, Dumpy level, auto level, digital and laser levels. Curvature and refraction corrections. Booking and reduction of levels. Differential leveling, profile leveling, fly leveling, check leveling, reciprocal leveling.

UNIT IV

Plane Table Surveying:

Plane table and accessories, Advantages and limitations of plane table survey, Orientation and methods of orientation, Methods of plotting – Radiation, Intersection, Traversing, Resection method, Two point and three point problems, Solution to two point problem by graphical method, Solution to three point problem Bessel's graphical method, Errors in plane table survey.

UNIT V

Areas and Volumes:

Measurement of area by dividing the area into geometrical figures, area from offsets, mid ordinate rule, trapezoidal and Simpson's one third rule, area from co-ordinates, introduction to planimeter, digital planimeter. Measurement of volumes- trapezoidal and prismoidal formula.

Contouring:

Contours, Methods of contouring, Interpolation of contours, contour gradient, characteristics of contours and uses.

Text Books:

1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Surveying (Vol-1, 2 &3), sixteenth 2005, LaxmiPublications (P) Ltd., New Delhi.
2. R.Subramanian, Surveying and leveling, Second Edition, 2005, Oxford university press, New Delhi.

Reference Books:

1. Chandra AM, Plane Surveying, New age International PVT. Ltd., Publishers, New Delhi, 2002.
2. Chandra AM, Higher Surveying, New age International PVT. Ltd., Publishers, New Delhi, 2002.
3. C.Venkatramaiah, Text book of surveying, First Edition, Universities Press, New Delhi, 1996.
4. Duggal S.K., Surveying (Vol-1&2), Tata MC.Graw Hill Publishing Co. Ltd. Fourth Edition, New Delhi, 2005.

Course Outcome	**Program Outcomes**												**Program Specific Outcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	--	--	1	--	--	--	--	--	--	3	3	2
CO2	2	1	1										1	2	
CO3	3	1	3	--	--	--	--	--	--	--	1	--	2	2	3
CO4	1	2	2											2	2
CO5	3	1	3	2	--	3	--	--	--	--	3	--			1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

III B.Tech – II Semester (CE)

L	T	P	C
3	0	2	4

20ACE96 ESSENTIALS OF ENGINEERING GEOLOGY

Course Outcomes:

After successful completion of the course the students will be able to

1. Identify different types of Rocks and minerals
2. Define concepts of structural mineralogy
3. Identify rocks using Petrology
4. Explain the basics of earthquakes and landslides.
5. Enumerate the purpose of Dams, Tunnels and Reservoirs

UNIT I

INTRODUCTION: Importance of geology from Civil Engineering point of view. Brief study on case histories of Civil Engineering failures due to geological factors. Geological action of rivers, wind and glaciers.

WEATHERING OF ROCKS: Causes of weathering, importance of weathering in civil engineering operations. In situ and drift soils, common types of soil, their origin and occurrence n India. Formation of soils. Classification of soils and their origin. Distribution of Indian soils and their importance.

UNIT II

MINERALOGY: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Study of physical properties of following common rock forming minerals: Feldspar , Quartz , Olivine , Augite , Hornblende , Muscovite ,Biotite , Asbestos, Chlorite , Kyanite , Garnet, Talc , Calcite, Pyrite, Hematite, Magnetite, Galena, and Bauxite.

UNIT III

PETROLOGY: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of Igneous. Sedimentary and Metamorphic rocks. Their distinguishing features, Megascopic study of Granite, Dolerite, Basalt, Laterite, Breccia, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

STRUCTURAL GEOLOGY: Out crop, strike and dip. Study of common geological structures such as folds, faults unconformities, and joints – their importance.

UNIT IV

EARTH QUAKE &LAND SLIDES: Ground water, Water table, types of aquifers, springs, cone of depression, geological controls of ground water movement, ground water exploration/ Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas/ Landslides, their causes and effect; measures to be taken to prevent their occurrence.

UNIT V

GEOLOGY OF DAMS, RESERVOIRS AND TUNNELS: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs. Purposes of tunneling, Geological Considerations (i.e. Lithological, structural and ground water) in tunneling. Over break and lining in tunnels.

Text Books:

1. N.Chennkesavulu, Engineering Geology, Second Edition, 2013, Laxmi Publications.

2. Parbinsingh, Engineering geology, 2012, Katson Publications

Reference Books:

1. Vasudevkanthi, Engineering geology, First Edition, 2012, Universities press, Hyderabad.

2. SubinoyGangopadhyay, Engineering Geology, 2012, Oxford University press.

3. K.V.G.K. Gokhale, Principals of Engineering Geology, First Edition, 2013, B.S publications

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3										2	1	3
CO2	2	1	1										1	1	1
CO3	3	1	3	--	--	--	--	--	--	--	1	--	2	2	3
CO4	1	2	2										1	2	2
CO5	3	1	3	2	--	3	--	--	--	--	3	--	1	2	1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

IV B.Tech I Semester (CE)

L	T	P	C
3	0	2	4

20ACE97 A SIMPLIFIED APPROACH TO CONCRETE TECHNOLOGY

Course Outcomes:

After successful completion of the course the students will be able to

1. Understand various ingredients of concrete and their role.
2. Examine knowledge on the admixtures and fresh properties of concrete.
3. Examine knowledge on the hardened properties of concrete.
4. Design concrete mixes using various methods
5. Explain various types of special concretes

UNIT I

CEMENT: Portland cement – Chemical composition – Hydration – Setting and fineness ofcement – Tests on cements – Different grades of cement -Types of cements.

AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength &other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption& moisture content of aggregate – Bulking of sand –Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Maximum aggregate size.

UNIT II

TYPES OF ADMIXTURES: Mineral admixtures – Chemical admixtures – Plasticizers – Super plasticizers – Retarding plasticizers – Accelerating plasticizers – Pozzolonic or mineral admixtures

FRESH CONCRETE: Workability – Factors affecting workability – Measurement of workability– Slump test, Compaction factor test, flow test, Vee–Bee test – Setting times of concrete –Segregation &bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT III

HARDENED CONCRETE: Water / Cement ratio – Abram's Law – Gel space ratio – Effective water in the mix - Effect of age and temperature on strength of concrete – Maturity concept– Strength in tension & compression – Factors affecting strength – Relation between compressive & tensile strength - Curing of concrete – Methods – Quality of mixing water.

TESTING OF HARDENED CONCRETE: Compression test – Tension test – Factors affecting strength – Flexure test – Splitting test – Non-destructive testing methods

UNIT IV

MIX DESIGN: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Proportioning of concrete mix by IS 10262 method

UNIT V

SPECIAL CONCRETES: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Different types of fibres – Polymer concrete - Self consolidating concrete – High strength concrete.

Text Books:

1. Neville, A.M. Properties of Concrete.4^{th} edition, 2012, Pearson publication.
2. Shetty, M.S. Concrete Technology. S.Chand& Co, 2004

References:

1. Gambhir, M.L. Concrete Technology. New Delhi. Tata Mc. Graw Hill Publishers, 2004.
2. Santha Kumar, A.R. Concrete Technology. New Delhi. Oxford University Press,2006.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3										2	1	3
CO2	2	2	1												
CO3	3	3	3	--	--	--	--	--	--	--	1	--	2		3
CO4	1	2	2										1		2
CO5	1	1	2	2	--	3	--	--	--	--	3	--	1		1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	1	0	4

II B.Tech - II Semester MINORS(Industry Relevant Track)

20ACE98 FUNDAMENTALS OF BUILDING DESIGN (MINOR)

Course Outcomes: At the end of the course, students should be able to:

CO1:. Analyze and make effective decisions in use of principles of functional planning of the buildings with respect to Acoustics and Lighting and Thermal design of buildings in various climatic zones that the student may encounter in his/her professional career.

CO2: Select different building materials and explain the manner in which they can be used in different types of buildings with respect to various functional requirements like acoustics, lighting and thermal comfort.

CO3: Apply the techniques learned to the estimate solar radiation falling on different surfaces of the buildings, design shading devices to protect from direct sunlight, design of energy efficient, functionally comfortable buildings, low energy buildings and green buildings.

CO4: Explain the thermal comforts due to radiation from sun

CO5: Identify the requirements of buildings in tropical zones.

UNIT-1

Acoustics, fundamentals: Physics of sound-Frequency, period amplitude. Intensity of sound-Watts/m2- Bel- Decibel scales- dBA- Phon. Addition of sound levels. Human Audibility range. Behaviorof sound in free and reverberant fields. Noise- allowable limits-effect of noise on human-Air and structure born noises-equivalent noise levels-day and night equivalent.

UNIT-2

Acoustics, applications: Measures of noise control- Source-path and receiving end. TL value and computation of TL value, Flanking paths. Sound absorption-materials and fixings. Reverberation-Sabines formula-Eyrings modification. Acoustical defects- acoustical design of auditoriums and small lecture halls. Acoustical considerations of offices, hospitals and Industrial buildings.

UNIT-3

Lighting, Natural: Visual tasks – Natural lighting- illumination requirements for various buildings – principles of day lighting – day light factor and its components- Design of side-lit windows-BIS and CBRI methods-skylightsLighting.

Artificial: Artificial lighting- illumination requirements-lux meter – lamps and luminaries – polar distribution curves– Colour temperature and colourrendering index- glare -Design of artificial lighting – lumen method – point by point method. Basic idea of street lighting and outside lighting

UNIT-4

Thermal comfort: Factors affecting thermal comfort Effective temperature –Thermal comfort indices-ET-CET Charts- Bioclimatic chart- Psychrometry and Psycrometric chart. Earth-Sun relationship: Sun's apparent movement with respect to the earth. Solar angles-Computation of solar radiation on different surfaces-solar path diagram-shadow-throw concept and design of shading devices

UNIT-5

Heat flow through building envelope: Thermo physical properties of building materials: Thermal quantities – heat flow – thermal conductivity – resistance and transmittance and surface coefficient -Sol- air temperature concept- solar gain factor. Thermal transmittance of structural elements – thermal gradients – heat gain/loss calculation. Periodic heat flow – time lag and decrement factor. Design approaches: Climate conscious designs- Climatic zones in India- orientation and shape of buildings in different climatic zones-Passive solar-Active solar and Active approaches. Requirements of buildings in tropical areas-Thermal insulation-Introduction to the concept of green-building

Text book(s):

1. Koenigsberger O H, Ingersoll T G, Mathew A and Szokolay S V, Manual of Tropical Housing and Building: Climate Design, Universities Press (1975).
2. Szokolay S V, Introduction to architectural science, Taylor & Francis group(2008).

Reference(s):

1. AjithaSimha.D, Building Environment, Tata McGraw Hill Publishing Co., New Delhi, 1985
2. Bureau of Indian standards, Handbook on Functional Requirement of Buildings – SP:41(S and T) – 1987

3. Givoni. B Man,. Climate and Architecture, Applied Science Publication, 1976 Knudsen V.O. and Harris C.M., Acoustical Design in Architecture, John Wiley, 1980 Koenigseberger, Manual of tropical Housing and Building Part I – Climatic design, Orient Longman, 2011
4. Krishnan, Climate responsive architecture, Tata McGraw Hill, 1999 M David Egan , Architectural Acoustics, J.Ross Publishing, 2007Olgay Victor, Design with climate-A bioclimatic approach to architectural regionalism- Princeton University press-1963

Correlation levels of 1, 2 or 3 for PO's and PSO's are defined below:

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**3**	**2**	--	--	--	--	--	--	--	--	--	--	**2**	**3**	**2**
CO2	**3**	**2**	**3**	--	--	--	--	--	--	--	--	--	**3**	**1**	**1**
CO3	**3**	**3**	**2**	**1**	**2**	--	--	--	--	--	--	--	**3**	**2**	**1**
CO4	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3
CO5	3	1	3	3	--	3	--	--	--	--	1	--	1	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

III B.Tech I Semester (CE)

L	T	P	C
3	1	0	4

20ACE99 GEOMETRIC DESIGN OF TRANSPORTATION INFRASTRUCTURE

Course Outcomes:

After successful completion of the course the students will be able to

1. Recognize transportation design elements.
2. Design Super elevation, Gradient and Vertical Curves
3. Design intersections.
4. Identify the type of provisions for various traffic and road indicators.
5. Design guidelines for pedestrian layouts

UNIT I

HIGHWAY CROSS SECTION ELEMENTS AND GEOMETRIC DESIGN OF HIGHWAYS

Functional Classification of Highway system, Design controls-Topography, Driver Characteristics, Vehicle characteristics, Traffic, Capacity and level of service, Design Speed, Objectives of Geometric Design, Carraigeway, Shoulders, Formation, Right of way, Kerbs, Foot paths, Medians-Design specifications, Pavement Surface characteristics-Skid Resistance, factors affecting skid resistance, Measurement of skid Resistance, Road Roughness, measurement of Road roughness, Camber, Objectives of Camber, design standards.

UNIT II

HORIZONTAL AND VERTICAL ALIGNMENT

Objective of horizontal curves; Super elevation-Need for Super elevation-Methods of computing Super elevation, Minimum Radius of curve, Methods of attainment of super elevation, Extra widening on curves; Transition Curves-Objectives and Design Gradients-Types of Gradients, Design Standards; Vertical Curves-Summit Curves, Valley Curves and Design criteria for vertical Curves; Combination of Vertical and Horizontal Curves-Grade Compensation; Sight Distance-Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance, Importance of Sight Distances for Horizontal and Vertical Curves.

UNIT III

INTERSECTION DESIGN

Types of Intersections, Design Principles of Intersections, Design of At-grade Intersections-Channelization, Objective; Traffic Islands and Design standards, Rotary Intersection-Concept and Design, Advantages and Disadvantages; Grade separated Interchanges-Types, warrants and Design standards.

UNIT IV

TRAFFIC SIGNS AND ROAD MARKINGS:

Types of traffic signs – cautionary, regulatory and informative signs – Guidelines for the provision of Road Signs-Specifications – Pavement markings – Types of Markings – Lane markings and object markings – Standard and Specifications for Road markings. Highway Appurtenances-Delineators, Traffic impact Attenuators, Safety Barriers

UNIT V

MISCELLANEOUS ELEMENTS:

Requirements of Pedestrians: Pedestrian facilities on Urban roads; Cycle tracks-Guidelines and Design standards; Bus bays-Types and Guidelines; Design on On-street and Off street Parking facilities-Guidelines for lay out Design.

Text Books:

1. Nicholas J.Garber, Lester A.Hoel. Principles of Traffic & Highway Engineering. 1st Edition, Cengage Learning, 2010.
2. Dr. L.R Kadiyali. Traffic Engineering & Transportation Engineering. 6th Edition, Khanna Publishers, 1997.
3. Principles and Practice of Highway Engineering, L.R. Kadiyali and N.B.Lal, Khanna Publications.
4. IRC Codes for Signs, Markings and Mixed Traffic Control in Urban Areas.

Reference Books:

a. S.K.Khanna, C.E.G Justo. Highway Engineering. 9th Edition, Nemchand& Bros, 2011

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		--	--	--	--	--	--	--	--	--	--	2	3	2
CO2	2	2	3	--	--	--	--	--	--	--	--	--		1	1
CO3	3	2	2	1	2	--	--	--	--	--	--	--	3	2	1
CO4	2	3	3	3	--	2	--	--	--	--	1	--	2		
CO5	1	1	3	3	--	3	--	--	--	--	1	--	1	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

III B.Tech II Semester (CE)

L	T	P	C
3	1	0	4

20ACEA0 NON DESTRUCTIVE TESTING AND HEALTH MONITORING OF CIVIL STRUCTURES

Course Outcomes:

After successful completion of the course the students will be able to

1. Assess strength and materials deficiency in concrete structures.
2. Explain inspection methods using NDT
3. Apply Health Monitoring Systems
4. Use imaging tools for scanning damaged structures
5. Explore vibration control using SHM

UNIT I

Introduction – necessity of NDE and SHM; Fundamental differences between NDE and SHM philosophies; Causes of degradation in concrete and steel structures; General methods of NDT of civil engineering structures according to Indian Standards; Sensor based SHM of civil structures – optical, piezoelectric and non-contact approaches; Imaging as a tool for NDT – A scan, Bscan, C-scan, time of flight based reconstruction, synthetic aperture focusing technique;

UNIT II

Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT III

Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

UNIT IV

Imaging as a tool for NDT – A scan, Bscan, C-scan, time of flight based reconstruction, synthetic aperture focusing technique; Electromagnetic imaging – fundamentals, ground penetrating radar; Thermography – fundamentals, Infrared thermography; Elastic wave based methods – impact echo; Ultrasonics – fundamentals, instrumentation, imaging methodologies; Future directions.

UNIT V

Vibration Control using SHM – introduction to FE formulation Constitutive Relationship Element Stiffness Matrix for High Precision Finite Element Element Mass Matrix for High Precision Finite Element Developing Actuator and Sensor Influence Matrix Estimating Sensor Voltage Active Control of Damping A Case study of Performance Estimation for Different Patches SHM of Ribbon Reinforced Composite Laminate

Text Books:

1. Diagnosis and treatment of Structures in Distress – R N Raikar,1994
2. A.R. Santakumar. Concrete Technology, Oxford University press,2006
3. Smart Materials and Structures, Gandhi and Thompson
4. Structural Health Monitoring: Current Status and Perspectives, Fu Ko Chang

Reference Books:

1. Bungey. Non-Destructive Evaluation of Concrete Structures– Surrey University Press, Hyderbad,1982
2. EF & N Spon. Building Failures: Diagnosis and Avoidance, London, B.A.Richardson (1991), London
3. Dr. B. Vidivelli. Rehabilitation of Concrete Structures, Standard Publications,2007
4. Handbook on repair and rehabilitation of rcc buildings - CPWD

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**1**		--	--	--	--	--	--	--	--	--	--	**2**	**1**	**2**
CO2	**2**	**2**	**3**	--	--	--	--	--	--	--	--	--		**1**	**1**
CO3	**3**	**2**	**2**	**1**	**2**	--	--	--	--	--	--	--	**2**	**2**	**1**
CO4	2	3	3	3	--	2	--	--	--	--	1	--	2	1	
CO5	1	2	1										1		1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

III B.Tech – II Semester (CE)

L	T	P	C
3	1	0	4

20ACEA1 FERRO CEMENT TECHNOLOGY

Course Outcomes:

After successful completion of the course the students will be able to

1. Project the applications of Ferro cement Technology
2. Design Ferro cement Beams
3. Execute the analysis and design of Ferro cement slabs for housing construction
4. Fabricate Ferro cement pre cast panels
5. Offer rehabilitation solutions for structures using Ferro cement

UNIT 1 Introduction

Ferrocement : Definition of ferrocement, applications of ferrocement, materials used in ferrocement, parameters and properties of materials used in ferrocement, cement mortar mix, skeletal steel, steel mesh reinforcement, fibre reinforced polymeric meshes, advantages of FRP, disadvantages of FRP, behavior of ferrocement in tension, advantages of ferrocement, difference between ferrocement and reinforced cement concrete: Physical and Mechanical properties, Concrete and other cementitious composite materials

UNIT II Ferrocement Beams

Analysis and Design of RC ferrocement composite beams – Maximum Deflection – Flexure – Shear and provisions - Performance evaluation of RC ferrocement composite beams

UNIT III Ferrocement Slabs

Creep – Fatigue, Analysis and Design of Ferrocement Slabs - Analysis of a double-skin ferrocement wall panel for housing construction

UNIT IV Prefabricated Structural Elements

Ultimate moment capacity and crack width of weldmesh ferrocement - ferrocement as permanent formwork to reinforced concrete - manufacturing process of industrial concrete elements, precast construction, erection and assembly techniques. Inelastic buckling of ferrocement encased columns

UNIT V Repair and Rehabilitation using Ferrocement

repair of short square columns using ferrocement retrofit material for masonry columns Rehabilitation of RC beams using precast ferrocement bonded plates Tensile, flexural and impact behaviour of ferrocement with chicken wire mesh reinforcement

Text Books

1. Government Of Maharashtra WRD Handbook Chapter No. 1 Ferrocement Technology
2. P.J.Nedwel & R.N.Swamy, “ Ferrocement : Proceedings of the Fifth International Symposium on Ferrocement” UMIST, Manchester, 6–9 September 1994, Taylor and Francis
3. ACI 549 – R 97 Report on Ferrocement

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	--	--	--	--	--	--	--	--	--	--	2	1	2
CO2	2	2	3	--	--	--	--	--	--	--	--	--		1	1
CO3	3	2	2	1	2	--	--	--	--	--	--	--	2	2	1
CO4	1	2			2								1	1	2
CO5	1	2	1		2								1	1	1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

IV B.Tech – I Semester (CE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**4**

20ACEA2 PREFABRICATED STRUCTIRES

Course Outcomes:

After successful completion of the course the students will be able to

1. Analyze the prefabricated load carrying members
2. Apply production technology of prefabrication
3. Design roof and floor slabs
4. Design precast structural elements
5. Design Factory Structures

UNIT – I

Need for prefabrication – General Principles of Prefabrication - Comparison with monolithic construction, types of prefabrication, site and plant prefabrication, economy of prefabrication, modular coordination, standardization – Materials – Modular coordination – Systems – Production – Transportation – Erection

UNIT-II

Prefabricated Load Carrying Members-Planning for components of prefabricated structures disuniting of structures, design of simple rectangular beams and I-beams, handling and erection stresses, elimination of erection stresses, beams, columns, symmetric frames.

UNIT - III

Behaviour of structural components – Large panel constructions – Construction of roof and floor slabs – Wall panels – Columns – Shear walls

Joints - Joints for different structural connections, effective sealing of joints for water proofing, provisions for non-structural fastenings, expansion joints in precast construction.

UNIT – IV

Production Technology - Choice of production setup, manufacturing methods, stationary and mobile production, planning of production setup, storage of precast elements, dimensional tolerances, acceleration of concrete hardening. Hoisting Technology - Equipment for hoisting and erection, techniques for erection of different types of members like beams, slabs, wall panels and columns, vacuum lifting pads.

UNIT – V

Applications - Designing and detailing of precast unit for factory structures, purlins, principal rafters, roof trusses, lattice girders, gable frames, singe span single storied simple frames, single storied buildings, slabs, beams and columns.Progressive collapse – Code provisions – Equivalent design loads for considering abnormal effects such as earthquakes, cyclones, etc., - Importance of avoidance of progressive collapse.

Text Books:

1. CBRI, Building materials and components, India, 1990

2. Mokk. L, (1964), Prefabricated Concrete for Industrial and Public Structures, Publishing House of the Hungarian Academy of Sciences, Budapest

References:

1. Structural design manual, Precast concrete connection details, Society for the studies in the use of precast concrete, Netherland Betor Verlag, 1978.

2. Koncz T., Manual of precast concrete construction, Vols. I, II and III, Bauverlag, GMBH, 1971.

CourseOutcome	ProgramOutcomes												**Program SpecificOutcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	--	--	--	2	2	--	--	--	--	1	1	3	1
CO2	3	3	--	--	--	2	3	--	--	--	--	3	2	3	3
CO3	3	3	--	2	--	3	3	--	--	--	--	3	2	3	3
CO4	3	3	--	3	--	3	3	--	--	--	--	2	2	3	2
CO5	3	3	--	2	--	3	3	--	--	--	--	3	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	1	0	4

II B.Tech - II Semester MINORS(Industry Relevant Track)

20ACEA3 CONSTRUCTION MATERIALS AND BUILDING DESIGN (MINOR)

Course Outcomes: At the end of the course, students should be able to:

CO1: Select suitable qualities of stone and bricks for use as building materials.

CO2: Select suitable qualities of doors and windows for use in buildings.

CO3: Select suitable qualities of flooring and roofing materials for use in buildings.

CO4: Demonstrate properties of different materials and apply various principles of building planning, Plan ventilation and lighting requirements of a building.

CO5: Design the building planning

UNIT 1

Building materials: Stones : Stones Requirements of good building stones, IS specification and tests on stones; stone masonry, Brick masonry, Characteristics of good building bricks, IS specifications and test; Classification of bricks

UNIT 2

Materials for Doors and windows: Functional requirements, materials of doors and windows, glazing, method of fixing doors windows, fixtures and fastenings. Timber Types and properties, seasoning, testing; Glass – Types and properties.

UNIT 3

Flooring and Roof material: Flooring materials, tests and IS specifications: Ground and upper floors; functional requirements of flooring material, varieties of floor finishes and their suitability. Roofing materials: GI, AC, fibre sheets, Mangalore tiles; Roof construction – types and their suitability.

UNIT 4 Miscellaneous materials: Properties, types and uses of following materials, Lime, Ferrous metals, Polymers, Plastics types, Mastic, Gypsum, Ferro Crete, Clay Tiles and glazed ware, Plaster of Paris. Artificial stone; Aluminium and alloys – Properties.

UNIT 5

Building planning and Design: Principle of Building planning, Integrated approach in Built Environment, Building Rules and Byelaws, Necessity of laws, plot sizes, road width, open spaces, floor area ratio (F.A.R.), marginal distance, building line control line, height regulation, Built-up area, floor area, carpet area, Landscape elements and elements of interior decoration.

Building Design: Introduction, Types of load, thermal insulation of roofs and walls. Ventilation: Necessity of ventilation, stack effect, wind effect, Mechanical ventilation, objectives, selection of ventilation system, ventilation rate, Lighting: Principles, Day lighting, design of windows, sky component, E.R.C, Orientation, artificial illumination, supplementary illumination

Textbooks:

1. Shah M. G., Kale C. M. and Patki S. Y., "Building drawing an Integrated approach to Built environment", Tata McGraw Hill (Fifth edition).
2. Mentt, "Building Design and Constructions", Tata McGraw Hill (Second edition)

Reference Book:

1. National Building Code of India 2016, Bureau of Indian Standard, New Delhi
2. Ghosh, "Materials of Construction" Tata McGraw Hill
3. M. S. Mamlouk and J. P. Zaniewski, Materials for Civil and Construction Engineers, 3rd Ed., Prentice Hall, USA, 2010.
4. P. C. Varghese, Building Materials, PHI Learning Pvt. Ltd., India, 2005. 5. TTTI Chandigrah, "Civil Engineering Materials", Tata McGraw Publication

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	--	--	--	--	--	--	--	--	--	--	3	3	3
CO2	3	3	--	--	--	--	--	--	--	--	--	--	3	1	1
CO3	3	2	--	--	--	--	--	--	--	--	--	--	3	3	2
CO4	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3
CO5	3	1	3	3	--	3	--	--	--	--	1	--	1	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

III B.Tech – I Semester (CE)

L	T	P	C
3	1	0	4

20ACEA4 TESTING METHODS FOR CNS SOIL

Course Outcomes:

After successful completion of the course the students will be able to

1. Conduct tests on CNS soil
2. Analyse the Bearing Capacity of CNS Soil
3. Perform tests on CNS soil in Pile Foundation
4. Test the shallow foundation
5. Perform Subsurface Investigation

UNIT I INTRODUCTION

CNS soil – Introduction – Causes of Swelling – Optimum Thickness of CNS soil – CNS Material – Construction Procedure - Tests on CNS Soil – CNS layer diagram – CNS Layer – Effect of CNS Soil on underlying soil media – Inhibition mechanism of expansive soil by CNS layer

UNIT II BEARING CAPACITY OF CNS SOIL

Tests on Bearing Capacity of CNS and MSM; Soil Improvement, Mechanics of Saturated Expansive Soil Media; Experiments to find the thickness of CNS soil in Canal Lining – Guide lines for lining of Canals

UNIT III PILE FOUNDATION

Piles in CNS Soil – Tests on Piles – Procedure for manufacture, placement and quality assurance of CNS for foundations – case history of application of CNS technology – Tests on Piles in CNS **soil**

UNIT IV SHALLOW FOUNDATIONS

Procedure for design and construction of shallow foundations in expansive clayey soils with CNS and MSM technology; An approach to settlement analysis of a raft founded on a subsurface having expansive soil horizon overlain by a CNS horizon; Assessment of equilibrium depth Hd of under reamed piles based on passive resistance development in expansive soils

UNIT V SUB SURFACE INVESTIGATION

Guidelines for subsurface investigation in expansive clayey soils; Transmitted swelling pressure in retaining structures; Coulombian-cohesion approach to engineering of expansive soil deposits -- field performance; Statement of soil mechanics by Terzaghi -- need for incorporating other factors to minimize variance; Approach to design of thickness of CNS intercepting layer using conventional / small scale test data simulating field behaviour for the construction of stable civil engineering structure on deep seated expansive soil deposits and development of simplified procedure

Text Books:

1. Ramanath Keshavarao Katti ,Behaviour of saturated expansive soil and control methods, 1994
2. Amer Ali Al – rawas & Matheus F A Goosen , Expansive Soils , CRC Press, 2006

CourseOutcome	ProgramOutcomes												**Program SpecificOutcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	--	--	--	2	2	--	--	--	--	1	1	3	1
CO2	3	3	--	--	--	2	3	--	--	--	--	3	2	3	3
CO3	3	3	--	2	--	3	3	--	--	--	--	3	2	3	3
CO4	3	3	--	3	--	3	3	--	--	--	--	2	2	3	2
CO5	3	3	--	2	--	3	3	--	--	--	--	3	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

III B.Tech – II Semester (CE)

L	T	P	C
3	1	0	4

20ACEA5 GROUND WATER DEVELOPMENT AND MANAGEMENT

Course Outcomes:

After successful completion of the course the students will be able to

1. Assess the different aquifer properties
2. Apply mathematical model for assessing groundwater
3. Evaluate and apply groundwater management techniques
4. Generate modeling techniques for accessing quality of ground water
5. Manage ground water basins.

UNIT - I

Zones of Aeration and Saturation: Zone of aeration, Zone of saturation, Storage efficient of aquifers, Fluctuations of the water table, Fluctuations of the piezometric surface, Recharge and discharge areas.

Ground Water Flow: Properties of water in relation to flow, Head distribution, Laminar and turbulent flow, Darcy's law. Formation constants, Flow through aquifers.

UNIT - II

Evaluation of Aquifer Properties: Aquifer tests, Confined aquifers, Semiconfined aquifers, Unconfined and semi unconfined aquifers, Transition for artesian to water table conditions, Bounded aquifers, Partially penetrated aquifers, Sloping piezometric and phreatic surfaces, Areal methods. Sea Water Intrusion: Sea Water Intrusion in Coastal Aquifers, Modelling of Pollutant Transport in the Unsaturated Zone. Prevention and Control of Seawater Intrusion.

UNIT - III

Ground Water Recharge, Discharge and Balance: Parameters of Ground Water Balance, Estimation of Recharge Components, Nuclear Methods, Estimation of Ground Water Discharge, Ground Water Resources Evaluation In India, Case History.

UNIT - IV

Ground Water Development and Management: Ground-Water Development, Water logging, Conjunctive use, Desalination, Modelling Techniques in Ground-Water Management, Ground Water Legislation.

Management of Groundwater: Pollution in Relation to water use, Municipal sources and causes, Industrial sources and causes, Agricultural sources and causes, Miscellaneous sources And causes, Attenuation of Pollution, Monitoring Groundwater Quality

UNIT – V

Groundwater Basin Management and Conjunctive Use: Groundwater Basin Management, Conjunctive Use, Mathematical modelling of a dual aquifer system.

Text Books:

1. K. R. Karanth, Ground Water Assessment Development and Management, Tata McGraw- Hill Publishing Company Limited, New Delhi.

Reference Books:

1. David Keith Todd, Groundwater Hydrology, Gopsons Paper Ltd., Noida, Second Edition.
2. H. M. Raghunath, Ground Water, New Age International (P) Ltd., New Delhi, Third Edition.

	PO1	PO2	PO3	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PSO1	PSO2	PSO3
CO1	3	3	--	--	--	2	2	--	--	--	--	1	1	3	1
CO2	3	3	--	--	--	2	3	--	--	--	--	3	2	3	3
CO3	3	3	--	2	--	3	3	--	--	--	--	3	2	3	3
CO4	3	3	--	3	--	3	3	--	--	--	--	2	2	3	2
CO5	3	3	--	2	--	3	3	--	--	--	--	3	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

III B.Tech – II Semester (CE)

L	T	P	C
3	**1**	**0**	**4**

20ACEA6 DESIGN OF EARTH RETAINING STRUCTURES

Course Outcomes:

After successful completion of the course the students will be able to

1. Evaluate earth pressure acting on retaining walls
2. Narrate rigid retaining walls
3. Explain distribution of earth pressure acting on Sheet Piles
4. Perform Pseudo static analysis
5. Recognize functions and Mechanics of Braced cuts

UNIT I

Earth pressures – Different types and their coefficients- Classical Theories of Earth pressure – Rankine's and Coulomb's Theories for Active and Passive earth pressure- Computation of Lateral Earth Pressure in Homogeneous and Layered soils- Graphical solutions for Coulomb's Theory in active and passive conditions.

UNIT II

Retaining walls – different types - Type of Failures of Retaining Walls – Stability requirements – Drainage behind Retaining walls – Provision of Joints – Relief Shells.

UNIT III

Sheet Pile Structures – Types of Sheet piles – Cantilever sheet piles in sands and clays – Anchored sheet piles – Free earth and Fixed earth support methods – Row's moment reduction method – Location of anchors, Forces in anchors.

UNIT IV

Pseudo static analysis of Earth Retaining Structures using Mononobe & Okabe Solution

UNIT V

Braced cuts and Cofferdams: Lateral Pressure in Braced cuts – Design of Various Components of a Braced cut – Stability of Braced cuts – Bottom Heave in cuts. – types of cofferdams, suitability, merits and demerits – Design of single – wall cofferdams and their stability aspects – TVA method and Cummins' methods.

Text Books:

1. Muni Buddu, Foundation and earth retaining Structures,1st edition, John Wiley& Sons Inc,2007.
2. Chris R. L. Clayton, Rick I. Woods, Andrews J. Bond and Jarbas Milititsky, Earth Pressure and Earth-Retaining Structures, 3rd edition, CRC Press, 2014

Reference Books:

1. Principles of Foundation Engineering by Braja M. Das.
2. Foundation analysis and design – Bowles, JE – McGraw Hill
3. Soil Mechanics in Engineering Practice – Terzaghi, K and Rolph, B. peck 2nd Edn. – John Wiley & Co.,
4. 4Analysis and Design of Foundations and Retaining Structures, Prakash, S – Saritha Prakashan, Mearut.

	PO1	PO2	PO3	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PSO1	PSO2	PSO3
CO1	3	3	--	--	--	2	2	--	--	--	--		1	3	1
CO2	3	3	--	--	--	2	3	--	--	--	--		2	3	3
CO3	2	2	--	2	--	3	3	--	--	--	--		2	3	1
CO4	1	1	--	3	--	3	3	--	--	--	--		2	3	2
CO5	3	2	--	2	--	3	3	--	--	--	--		2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

IV B. Tech I Semester (CE)

L	T	P	C
3	1	0	4

20ACEA7 DEEP EXCAVATIONS AND TUNNELS

Course Outcomes:

After successful completion of the course the students will be able to

1.Understand underground tunneling

2.Explain modern tunnel construction techniques

3.Perform design of tunnels

4.Narrate preliminary details of deep excavations

5.Foresee the requirements of caverns shafts and under ground stations

Unit I Introduction to Underground Tunneling

Terminology – site investigation - Short Term and long term tunnel stability – surface and sub-surface settlement trough – multi tunnel interaction – soil nails to stabilize open face of tunnel – Immersed Tube tunnels – Lined tunnels – types – unlined tunnels – submerged floating tunnels

Unit II Modern Tunnel Construction Techniques

Open face tunneling – closed face tunneling – Ground techniques – pre - lining techniques – principle of slurry shield machine – Earth Pressure balance machine (EPB)– Tunnel Boring Machine (TBM)

Unit III Design and Construction Requirements of Tunnels

Stability – short term undrained stability – long term drained stability - ground movements – shield tunneling - performance of linings – transverse side settlement – horizontal movements – volume loss – Design of tunnels in soft ground – SCL tunneling

Unit IV Preliminary design for Deep Excavations

General Design aims – Preliminary design for ultimate limit states – design against base heave in clays – design against piping in sands - Preliminary design for serviceability limit states – Estimation of ground settlements outside excavations and maximum lateral wall deformations – estimation of soil swelling inside excavation in both the short term and long term

Unit V Caverns , Shafts and Underground Stations

Caverns – NATM (New Austrian Tunneling Method) - Geological input – Solid Geology – structure – Hydrogeology – Site investigation – Aerial Photo Interpretation – Tunnel Boring Machine (TBM) – cavern Design – cavern location and orientation – Cavern layout – Rock mass quality and design – Cavern Construction and Excavation - Tunnel shafts – Types – inclined, vertical, circular – hard soil , rock , drilling mucking timbering, Raising – Shaft sinking in soft ground – Design of shaft supports - and Excavation of Hydraulic Power Station – underground stations – Metro Tunneling group (MTG)

Text Books:

1. Lunniss, R. and Baber, J. (2013) Richard Lunniss and Jonathan Baber, “Immersed Tunnels “, CRC Press, 2013
2. Ponnuswamy and Victor.J “Transportation Tunnel” CRC Press, 2016

Reference Books:

1. Geotechnical Engineering Office (HK). (1998). “Geoguide 4 - Cavern Engineering

	PO1	PO2	PO3	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PSO1	PSO2	PSO3
CO1	1	3	--	--	--	3	3	--	--	--	--		1	3	1
CO2	3	3	--	--	--	2	3	--	--	--	--		2		
CO3	2	2	--	1	--	1	2	--	--	--	--		2		1
CO4	1	1	--	3	--	2	3	--	--	--	--		3	3	1
CO5	3	2	--	2	--	3	3	--	--	--	--		2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

	L	T	P	C
	3	1	0	4

II B.Tech - II Semester **MINORS(Industry Relevant Track)**

20ACEA8 **ADVANCED SURVEYING**

Course Outcomes: This course will enable students to:

CO1: Apply geometric principles to arrive at solutions to surveying problems.

CO2: Analyze spatial data using appropriate computational and analytical techniques.

CO3: Design proper types of curves for deviating type of alignments.

CO4: Use the concepts of advanced data capturing methods necessary for engineering practice.

CO5: Perform Modern Surveying

UNIT-1

Curve Surveying Curves: Necessity – Types, Simple curves, Elements , Designation of curves, Setting out simple curves by linear methods (numerical problems on offsets from long chord & chord produced method), Setting out curves by Rankines deflection angle method (numerical problems). Compound curves, Elements, Design of compound curves, Setting out of compound curves (numerical problems). Reverse curve between two parallel straights (numerical problems on Equal radius and unequal radius). Transition curves Characteristics , numerical problems on Length of Transition curve, Vertical curves –Types – (theory).

UNIT-2

Geodetic Surveying and Theory of Errors: Geodetic Surveying: Principle and Classification of triangulation system, Selection of base line and stations, Orders of triangulation, Triangulation figures, Reduction to Centre, Selection and marking of stations Theory of Errors: Introduction, types of errors, definitions, laws of accidental errors, laws of weights, theory of least squares, rules for giving weights and distribution of errors to the field observations, determination of the most probable values of quantities.

UNIT-3

Introduction to Field Astronomy: Earth, celestial sphere, earth and celestial coordinate systems, spherical triangle, astronomical triangle, Napier's rule

UNIT-4

Aerial Photogrammetry: Introduction, Uses, Aerial photographs, Definitions, Scale of vertical and tilted photograph (simple problems), Ground Co-ordinates (simple problems), Relief Displacements (Derivation), Ground control, Procedure of aerial survey, overlaps and mosaics, Stereoscopes, Derivation Parallax

UNIT-5

Modern Surveying Instruments: Introduction, Electromagnetic spectrum, Electromagnetic distance measurement, Total station, Lidar scanners for topographical survey. Remote Sensing: Introduction, Principles of energy interaction in atmosphere and earth surface features, Image interpretation techniques, visual interpretation. Digital image processing, Global Positioning system Geographical Information System: Definition of GIS, Key Components of GIS, Functions of GIS, Spatial data, spatial information system Geospatial analysis, Integration of Remote sensing and GIS and Applications in Civil Engineering(transportation, town planning).

Text Books:

1. B.C. Punmia, “Surveying Vol.2”, Laxmi Publications pvt. Ltd., New Delhi.
2. Kanetkar T P and S V Kulkarni , Surveying and Levelling Part 2, Pune Vidyarthi GrihaPrakashan.
3. K.R. Arora, “Surveying Vol. 1” Standard Book House, New Delhi.
4. Sateesh Gopi, Global Positioning System, Tata McGraw Hill Publishing Co. Ltd. New Delhi

Reference Books:

1. S.K. Duggal, “Surveying Vol.I& II”, Tata McGraw Hi ll Publishing Co. Ltd. New Delhi.
2. R Subramanian, Surveying and Leveling, Second edition, Oxford University Press, New Delhi.
3. David Clerk, Plane and Geodetic Surveying Vol1 and Vol2, CBS publishers
4. B Bhatia, Remote Sensing and GIS , Oxford University Press, New Delhi.
5. T.M Lillesand,. R.W Kiefer,. and J.W Chipman, Remote sensing and Image interpretation , 5th edition, John Wiley and Sons India
6. James M Anderson and Adward M Mikhail, Surveying theory and practice, 7th Edition, Tata McGraw Hill Publication.

7. Kang-tsung Chang, Introduction to geographic information systems, McGraw Hill Higher Education

ourse Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	3	3	--	--	--	--	--	--	--	--	--	--	3	3	3
CO2	3	3	--	--	--	--	--	--	--	--	--	--	3	3	1
CO3	3	2						--	--	--	--	--	3	3	2
CO4	3	2						--	--	--	--	--	3	3	3
CO5	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

III B.Tech I Semester

20ACEA9 ENVIRONMENTAL BIOTECHNOLOGY

L	T	P	C
3	1	0	4

Course Outcomes: After successful completion of the course the students will be able to

1. Explain the role of bio technology in environmental protection
2. Identify water treatment using biofiltration and bio infiltration
3. Narrate the role of biotechnology in bio remediation
4. Explain the bio processes of waste treatment
5. Perform Environmental monitoring

UNIT I

CONCEPT OF ENVIRONMENTAL BIOTECHNOLOGY

Definition – concept and scope – Application of biotechnology – Role of microbial systems – Principles – Characteristics - Genetically engineered organisms – Merits and demerits – Bio tools for environmental monitoring – Role of biotechnology in environmental protection.

UNIT II

BIOTECHNOLOGY AND POLLUTION ABATEMENT

Biotechnology of wastewater treatment - Bioreactors - Microbial system in waste water stabilization – Biofilms - immobilization technology in waste water treatment – Microbial metabolism and growth kinetics – oil degradation – biodecolourization – Reed bed technology – Rhizosphere engineering - Biofiltration and Bioindicators.

UNIT III

ROLE OF BIOTECHNOLOGY IN BIOREMEDIATION

Soil pollution - Bioremediation – Principles - Biodegradation of agro chemicals and other organic compounds – Biotransformation of xenobiotic compound - Role of GEMS in degradation of xenobiotics; Bioscrubbers – Biomining of metals - Biopulping.

UNIT IV

BIOTECHNOLOGY AND VALUE ADDITION

Bio processes in waste treatment - Production of value added products from waste – single Cell Protein (SCP), ethanol, methane and hydrogen, amino acids, vitamins -Enzyme production from wastes – Biodegradable plastics - Environmental implications - .Biotechnology of Microbial composting - Biofertilizers- Biopesticides.

UNIT V

ENVIRONMENTAL MONITORING

Bioindicators –Biomarkers –Biosensors –Biomonitoring –Polluted environment – Short and long term monitoring of remediated sites.

Text Books:

1. Chatterji. A.K., 2003. Introduction to Environmental Biotechnology. Prentice Hall of India Pvt. Ltd., New Delhi.

2. Miller Jr. G. T., 2004. Environmental Science. Tenth Edition. Thompson Brooks/Cole. Unite d States

3. Kumar H.D, 1998. A text book on biotechnology. II Edition, Affiliated east west press Pvt. Ltd., New Delhi.

Reference Books:

1. Environmental Biotechnology, Principles and Applications by Bruce E Rittman and Perry L McCarty, Mc Grawhill Higher education.
2. Environmental Biotechnology Edited by Hans-Joachim Jördening and J Winter, WILEY-VCH Verlag Gmbh & Co.
3. Bioremediation and Natural Attenuation by Pedro J J Alvarage and Walter A Illman, Wiley Interscience.
4. Environmental Biotechnology, Vol 10 Handbook of Environmental Engineering, Edited by L K Wang et al, Humana Press.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	--	--	--	2	2	--	--	--	--	1	1	3	1
CO2	3	3	--	--	--	2	3	--	--	--	--	3	2	3	3
CO3	3	3	--	2	--	3	3	--	--	--	--	3	2	3	3
CO4	3	3	--	3	--	3	3	--	--	--	--	2	2	3	2
CO5	3	3	--	2	--	3	3	--	--	--	--	3	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

III B.Tech II Semester

L	T	P	C
3	1	0	4

20ACEB0 GROUND WATER HYDROLOGY

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain the characteristics of aquifers.
2. Narrate the fundamentals and technicality of ground water flow
3. Perform well hydraulics
4. Explore Groundwater using geophysical methods
5. Identify ground water recharge methods

Unit 1

Introduction: Importance, vertical distribution of subsurface water, occurrence in different types of rocks and soils, definitions-aquifers, aquifuge, aquitard, aquiclude, confined and Unconfined aquifers.

Unit 2

Fundamentals of Ground Water Flow: Aquifer parameters, specific yield and specific retention, porosity, storage coefficient, derivation of the expression, Darcy's law, hydraulic conductivity, coefficient of permeability and intrinsic permeability, transmissibility, permeability in isotropic, unisotropic layered soils, steady one dimensional flow: cases with recharge.

Unit 3

Well Hydraulics: Steady Flow, Radial flow in confined and unconfined aquifers, pumping test Unsteady Flow, General equation, derivation; thesis method, Cooper and Jacob method, Chow's method, solution of unsteady flow equations, leaky aquifers (only introduction), interference of well, image well theory.

Unit 4

Ground Water Exploration: Seismic method, electrical resistively method, Geophysical techniques, electrical logging, radioactive logging, induction logging, sonic, and fluid logging.

Unit 5

Ground Water Development: Types of wells, methods of construction, tube well design, dug wells, pumps for lifting water, working principles, power requirement, Conjunctive use, necessity, techniques and economics.

Ground Water Recharge: Artificial recharge, groundwater runoff.

Text Books:

1. Agarwal VC, Ground water Hydrology, PHI Learning, 2010

2. Todd D.K., Ground water Hydrology, John Wiley, 2011

3. Chahar Bhagu R, Ground Water Hydrology, Tata Mc Grawhill, 2017

Reference Books:

1. A.K.Rastogi, Numerical Ground Water Hydrology, Penram International Publishers, 2007

ourse Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	--	--	--	--	--	--	--	--	--	--	3	3	3
CO2	3	3	--	--	--	--	--	--	--	--	--	--	3	3	1
CO3	3	2						--	--	--	--	--	3	3	2
CO4	3	2						--	--	--	--	--	3	3	3
CO5	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

	L	T	P	C
III B.Tech II Semester	**3**	**1**	**0**	**4**

20ACEB1 WATER QUALITY MODELING

Course Outcomes:

After successful completion of the course the students will be able to

1. Describe the modelling concepts.
2. Explain the importance of Diagnostic Models.
3. Use mass balance equation for the water quality models.
4. Apply the linear programming models and experimental design.
5. Use software in water quality modelling

UNIT I MODELING CONCEPTS

Casual and statistical models-Characteristics- Steps in model development - Importance of model building- conservation of mass and mass balance –calibration and verification of models.

UNIT- II WATER QUALITY MONITORING

Water Pollution, Sources of Pollution, Nature of pollutants, Existing Approaches for Control/ – Abatement of Water Quality Degradation, Water Quality Monitoring in River Basins

UNIT III WATER QUALITY MODELS

Mass balance equation -Mathematics of Pollutant Transport – Advection- dispersion-In-Water Transformation- Waste load allocations – Basic mechanisms of river self-purification, Dissolved Oxygen dynamics Streeter-Phelps and Dobbins models, Pollutant and nutrient dynamics, Temperature dependence and transport, Dissolved oxygen in Rivers and estuaries; Lake Water Quality Models; Models for Nitrogen, Bacteria, Phosphate and toxicants – Ground Water Quality Modelling – Contaminant solute transport equation, Numerical methods.

UNIT IV COMPUTER BASED SIMULATION

Formulation of linear optimization models. Linear programming. Sensitivity testing and duality. Solution techniques and computer programming; Formulation of linear optimization models. Finite difference and finite element method of pollutant dispersion – Optimization river pollutant and management models -Application of models- simulation, parameter estimation and experimental design. Model Uncertainty and reliability.

UNIT V SOFTWARES

Surface water quality models -HSPF, QUAL2K

References:

1. Deaton, M.L and Winebrake, J.J., Dynamic Modelling of Environmental Systems, Verlag, 2000.
2. Chapra, S.C. Surface Water-Quality Modelling, McGraw-Hill, 2008.
3. Dykes, A.P., Mulligan, M., and Wainwright, J, Monitoring and Modelling dynamic environment, Wiley – Blackwell 2015.
4. PaoloZannetti ., Air Pollution Modelling – Theories, computation Methods and available Software Springer. New York , 1990
5. M.Benedini., G.Tsakiris Water Quality Modelling for Rivers and streams Springer , New York , 2013

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	--	--	--	--	--	--	--	--	--	2	2	3
CO2	2	3	--	--	--	--	--	--	--	--	--	--	1	1	1
CO3	3	1	2					--	--	--	--	--	2	2	2
CO4	2	1	3	3				--	--	--	--	--	3	2	3
CO5	3	1	2	3	--	2	--	--	--	--	1	--	2	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

IV B.Tech I Semester

L	T	P	C
3	1	0	4

20ACEB2 SURFACE WATER HYDROLOGY

Course Outcomes: After successful completion of the course the students will be able to

1. Develop water shed concept and the relevant model
2. Estimate the runoff by various methodologies.
3. Perform statistical analysis of evapotranspiration and infiltration.
4. Perform Hydrograph related calculations and conclusions.
5. Evaluate Design flood by rational methods.

UNIT-I

Introduction: Scope and importance of hydrology, Hydrologic cycle, Global and India's Water resources, Applications of hydrology, Formation of precipitation, Climate and Weather seasons in India. Watershed concept and modeling: Catchment-topographic and ground water divide, Description of the catchment, catchment processes, demarking a catchment, stream patterns, water budgeting. Classification of models, model formulation, Lumped parameter conceptual models, Physically based models, Model performance testing.

UNIT-II

Location of rain-gauges and optimum number of rain-gauges, Analysis of rainfall data, Rainfall mass curve and hyetograph, Intensity-Duration analysis, Intensity-Frequency-Duration analysis, Depth-Area-Duration analysis, Double mass curve. Abstractions from precipitation: Evaporation-Process, measurement, empirical equations and Estimation by water budget method and Energy budget method.

UNIT-III

Evapo-transpiration-AET & PET, Estimation by Penman's equation, Reference Crop Evapo-transpiration by Blaney Criddle formula, Infiltration-Process, Factor affecting infiltration, Measurement, Horton's equation and Philip's equation. Infiltration indices, Probability and Statistics-Introduction, Probability and Random variables, PDF and CDF, Distribution functions, Selection of distribution function and its parameter estimation. Correlation, Regression analysis-Simple linear and multiple linear regression, curvilinear regression. Runoff:-Process, Factors affecting runoff, API, Basin yield, Curve number method.

UNIT-IV

Hydrograph and its features, Methods of hydrograph separation, Unit hydrograph and its derivation, Unit hydrographs from complex storms and for various durations, S-curve hydrograph and its uses, Synthetic unit hydrograph.

UNIT-V

Flood: Design flood and its estimation- Rational method, Frequency analysis Gumbel's and Log-Pearson's type III distribution, Selection of design return period. Flood routing- Reservoir routing: Modified Pul's method, Goodrich method, Channel routing- Prism and Wedge storage, Muskingum method. Flood control: Structural and Non-structural measures.

Text book(s):

1. Chow V T, Maidment D R and Mays L W, Applied hydrology, McGraw Hill (1988).

2. McCuen R H, , Hydrologic Analysis and Design, Pearson (2012).

Reference(s):

1. Singh V P, Elementary Hydrology, Pearson (1992).

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**1**	**1**	**3**	--	--	--	--	--	--	--	--	--	**3**	**2**	**3**
CO2	**2**	**3**	--	--	--	--	--	--	--	--	--	--	**2**	**1**	**1**
CO3	**3**	**1**						--	--	--	--	--	**2**	**2**	**2**
CO4	**3**	**3**	**2**	**3**				--	--	--	--	--	**3**	**2**	**3**
CO5	3	1	2	3	--	2	--	--	--	--	1	--	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
CIVIL ENGINEERING

L	T	P	C
3	1	0	4

II B.Tech - II Semester MINORS(Industry Relevant Track)
20ACEB3 RAILWAYS& AIRPORTS

Course Outcomes: After studying this course, students will be able to:

CO1: Acquires capability of choosing alignment and also design geometric aspects of railway system, runway and taxiway.
CO2: Suggest and estimate the material quantity required for laying a railway track and also will be able to determine the hauling capacity of a locomotive.
CO3: Develop layout plan of airport, harbor, dock and will be able relate the gained knowledge
CO4: Apply the knowledge gained to conduct surveying, understand the tunneling activities.
CO5 : Perform Taxiway Design in Airport zones

UNIT-1
Railway Planning: Significance of Road, Rail, Air and Water transports – Coordination of all modes to achieve sustainability – Elements of permanent way – Rails, Sleepers, Ballast, rail fixtures and fastenings, – Track Stress, coning of wheels, creep in rails, defects in rails – Route alignment surveys, conventional and modern methods- – Soil suitability analysis – Geometric design of railways, gradient, super elevation, widening of gauge on curves- Points and Crossings.
UNIT-2
Railway Construction and Maintenance: Earthwork – Stabilization of track on poor soil, Calculation of Materials required for track laying – Construction and maintenance of tracks – Modern methods of construct ion & maintenance – Railway stations and yards and passenger amenities- Urban rail – Infrastructure for Metro, Mono and underground railways.
UNIT-3
Airport Planning: Air transport characteristics, airport classification, air port planning: objectives, components, layout characteristics, and socioeconomic characteristics of

the catchment area, criteria for airport site selection and ICAO stipulations, typical airport layouts, Parking and circulation area.

UNIT-4

Airport Design: Runway Design: Orientation, Wind Rose Diagram, Runway length, Problems on basic and Actual Length, Geometric design of runways, Configuration and Pavement Design Principles.

Unit 5

Elements of Taxiway Design, Airport Zones, Passenger Facilities and Services, Runway and Taxiway Markings and lighting- case studies of Indian Airports.

Text Books:

1. Saxena Subhash C and Satyapal Arora, "A Course in Railway Engineering", Dhanpat Rai and Sons, Delhi.
2. Satish Chandra and Agarwal M.M, "Railway Engineering", 2nd Edition, Oxford University Press, New Delhi.
3. Khanna S K, Arora M G and Jain S S, "Airport Planni ng and Design", Nemchand and Brothers, Roorkee,
4. C Venkatramaiah, " Transportation Engineering", Volume II: Railways, Airports, Docks and Harbours, Bridges and Tunnels, Universities Press
5. Bindra S P, "A Course in Docks and Harbour Engineering", Dhanpat Rai and Sons, New Delhi

Reference Books:

1. Oza.H.P. and Oza.G.H., "A course in Docks &Harbour Engineering". Charotar Publishing Co.,
2. Mundrey J.S. "A course in Railway Track Engineering". Tata McGraw Hill
3. Srinivasan R. Harbour, "Dock and Tunnel Engineering ", 26th Edition 2013

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	--	--	--	--	--	--	--	--	--	--	3	3	3
CO2	3	3	--	--	--	--	--	--	--	--	--	--	3	1	1
CO3	3	1						--	--	--	--	--	3	3	2
CO4	3	2		3				--	--	--	--	--	3	2	3
CO5	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

	L	T	P	C
III B.Tech I Semester	**3**	**1**	**0**	**4**

20ACEB4 HOUSING PLANNING AND MANAGEMENT

Course Outcomes: After successful completion of the course, students will be able to

CO1 Explain the concept behind the selection of appropriate construction materials for construction
CO2 Apply the standards prescribed by National Housing policy while designing the houses for rural poor
CO3 Design the various housing projects for the benefit of urban poor category (EWS,LIG)
CO4 Evaluate the various cost effective modern construction materials using in the field.
CO5 Design Housing Project with cash flow for appraisal of their financial performance.'

UNIT 1. INTRODUCTION TO HOUSING

Definition of Basic Terms – House, Home, Household, Apartments, Multi storeyed Buildings, Special Buildings, Objectives and Strategies of National Housing Policies, Principle of Sustainable Housing, Housing Laws at State level, Bye-laws at Urban and Rural Local Bodies – levels - Development Control Regulations, Institutions for Housing at National, State and Local levels.

UNIT 2. HOUSING PROGRAMMES

Basic Concepts, Contents and Standards for Housing Programmes - Sites and Services, Neighborhoods, Open Development Plots, Apartments, Rental Housing, Co-operative Housing, Slum Housing Programmes, Role of Public, Private and Non-Government Organisations.

UNIT 3. PLANNING AND DESIGN OF HOUSING PROJECTS

Formulation of Housing Projects – Site Analysis, Layout Design, Design of Housing Units (Design Problems)

UNIT 4. CONSTRUCTION TECHNIQUES AND COST-EFFECTIVE MATERIALS

New Construction Techniques – Cost Effective Modern Construction Materials, Building centers – Concept, Functions, and Performance Evaluation.

UNIT 5. HOUSING FINANCE AND PROJECT APPRAISAL

Appraisal of Housing Projects – Housing Finance, Cost Recovery – Cash Flow Analysis, Subsidy and Cross Subsidy, Pricing of Housing Units, Rents, Recovery Pattern (Problems)

TEXT BOOKS:

1. Meera Mehta and Dinesh Mehta, Metropolitan Housing Markets, Sage Publications Pvt. Ltd., New Delhi, 1999.
2. Francis Cherunilam and Odeyar D Heggade, Housing in India, Himalaya Publishing House, Bombay, 1997.

REFERENCES

1. Development Control Rules for Chennai Metropolitan Area, CMA, Chennai, 2002.
2. UNCHS, National Experiences with Shelter Delivery for the Poorest Groups, UNCHS (Habitat), Nairobi, 1994.
3. National Housing Policy, 1994, Government of India.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	--	--	--	--	--	--	--	--	--	3	3	3
CO2	2	1													
CO3	3	2	3										3	2	2
CO4	1	3													
CO5	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3

SRI VENKATESWARACOLLEGEOFENGINEERING&TECHNOLOGY

(AUTONOMOUS)

III B.Tech II Semester (CE)

L	T	P	C
3	1	0	4

20ACEB5 DESIGN AND CONSTRUCTION OF HIGH WAY PAVEMENTS

Course Outcomes:

After successful completion of the course the students will be able to

1. Identify highway pavement materials
2. Perform tests on bituminous materials
3. Design the highway geometrics
4. Design the thickness of the pavement
5. Explain pavement construction processes

Unit I Highway Pavement Materials

Materials used for flexible pavements - Granular materials in highway pavements - Cement-stabilized Cutback –Binders used for bituminous high way materials –Road tars and tar-bitumens-Modified bitumens- Bitumen emulsions- Binder viscosity- Cement concrete- Conventional aggregates- IRCstandards.

Unit II Production and Testing of Bituminous Materials

Mixing plants for bituminous highway materials Coated-macadam Mixing Plants –Asphalt Mixing Plants–Drum Mixing Plants–Determination of watercontent–Binder content–Aggregate Grading–the sampling and examination of bituminous materials

Unit III Geometric Design of Highways

Introduction and standards – Highway Design criteria– Design of Vertical Curves–Design of Horizontal Curves – Super elevation – Design of other facilities

Unit IV Design of Pavements

Introduction - Failure criteria - Applied loading - Subgrade strength and condition - Thickness designmethods-Method of Bituminous Pavement Design - Pavement design for bitumen-surfaced roads intropical and subtropical countries - Structural design of flexible highway pavement - The mix design ofpavement concrete - Pavement slab reinforcement - Joints in concrete roads - Joint spacing - Effect of subgrade strength –Water proof orseparation membrane

Unit V Pavement Construction

Base and Sub base construction – Kerbs and Foot paths – Bituminous Paving Machines – Compaction of Bituminous Materials – Concrete Paving with Fixed – form plant – Slip Form Paving – Texturing and Curing – Safety Fences

TextBooks

1. Highway Design and Construction R.J.Salter, Mcmillan Education, 19882.Highway Planning, Survey, andDesign, GhaziG.Al-Khateeb CRCPress,2021

References

1.Principles of Highways Engineering and Traffic Analysis-Fred Mannering & Walter Kilareski, John Wiley & Sons Publication

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1											2		1
CO2	2	3											2	3	
CO3	2	1											3		2
CO4	3	3											2	2	2
CO5	2	2											3	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

III B.Tech II Semester(CE)

L	T	P	C
3	1	0	4

20ACEB6 AIRPORT & SEAPORT ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Plan commercial airport and related buildings
2. Design runways and taxiways
3. Explain the operation and components of ports
4. Report operation, shore protection and reclamation
5. Design the permanent and enabling structures

Unit I

Master Planning Process of Commercial Airport–Planning Airside, landslide and terminal buildings– Execution of navigational aids and meteorological stations

Unit II

Design and Execution of runways and taxiways – Maintenance, Evaluation, and Rehabilitation of existing runways and taxiways

Unit III

Overview of marine structures – Operation and components of ports

Unit IV

Shore Protection and Reclamation

UnitV

Design Considerations and functional requirements of marine structures – Design and Construction ofpermanent and enabling structures

References

1. Airport Planning and Designing by S.K. Khanna, M.G.Arora.
2. Harbour&AirportEngineering,Dr.R.P.Rethaliya,AtulPrakashan Publishers

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	2										1	2	2
CO2	1	2	2										3	3	2
CO3	2	1	3										1	2	2
CO4	3	2	2										2	2	2
CO5	2	2	1										3	3	2

SRI VEKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

IV B.Tech – I Semester(CE)

L	T	P	C
3	1	0	4

20ACEB7 DOCKS & HARBOR ENGINEERING

Course Outcomes:

After successful completion of the course the students will be able to

1. Explain methods of route alignment and design elements in Railway Planning and Constructions.
2. Define Construction techniques and Maintenance of Track laying and Railway stations.
3. Perform planning and site selection ofAirport Planning and design.
4. Analyze and design the elements for orientation of runways and passenger facility systems.
5. Explain various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.

UNIT I

General History, Advantages and disadvantages of water transportation, Modern trends in water transportation, Elements of water transportation, Historical development in India, Classification of harbours, Ports development in India, Port authorities ,Bodies and association

UNIT II

Harbour Planning Selection of site and planning of harbours, Ship characteristics, Characteristics of good harbour, Size of harbour, Natural Phenomena Tides, Wind, Water waves, Currents phenomena, Characteristics and effects on marine structures, Littoral drift.

Unit III

Marine Structure -General design aspects, Breakwaters - function, types general design principles, Wharves, Quays, Jetties, Piers, Pier heads, Dolphin, Fenders, Mooring Accessories Navigation Aids Necessity, Types of navigation aids, Requirement of signals, Fixed and floating navigation aid

Unit IV

Docks and Repair Facilities Harbor docks, Wet docks, Repair docks, Lift docks, Floating docks, Slipways, Port Facilities Port building facilities, Transit sheds, Warehouses, Cargo handling facility,

UNIT V

Coastal Structures: Landing Stage – Inland Water Transport –Services forshipping terminals ,Inland port facilities planning 8 Dredging General ,Classification of dredging works, Types of dredgers, Uses of dredged material ,Execution of dredging work Coastal Protection Sea wall, Revetment , Wave action on Coastal Structures and Coastal ProtectionWorks –Coastal Regulation Zone,2011:

Text Books:

1.Subramanian K.P.,Highways, Railways, Airport and Harbour Engineering,V Scitech Publications (India),Chennai, 2010.
2.S. P. Bindra, A Course in Docks and Harbour Engineering, 1992, Dhanpat Rai & Sons, New Delhi
3.Srinivasan and S. C. Rangwala, Harbour, Dock and Tunnel Engineering, 1995, Charotar Pub House, Anand

Reference Books:

1.Venkatramaiah.C.,Transportation Engineering Vol.2 Railways, Airports, Docks and Harbours, Bridges and Tunnels,Universities Press (India) Private Limited, Hyderabad,2015.

2. Alonzo Def. Quinn, Design and Construction of Ports and Marine Structure, McGraw - Hill Book Company, New York

Course Outcomes	ProgramOutcomes												**Progrm SpecificOutcomes**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	--	--	2		2	--	--	--	--	1	1	3	1
CO2	3	3	--	--	3		3	--	--	--	--	3	2	2	3
CO3	3	3	--		3		3	--	--	--	--	3	2	2	3
CO4	3	3	--	-	3		3	--	--	--	--	2	2	2	2
CO5	3	3	--		3		3	--	--	--	--	3	2	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

I B.Tech II Semester (ME)

L	T	P	C
3	1	0	3

20ACE02 **Applied Mechanics**

Course Outcomes:

After Completion of the course the student will be able to

1. Apply the various methods to determine resultant forces and equilibrium equations.
2. Analyze the dynamic analysis of rigid body motion
3. Analyze the work energy relations
4. Apply the concept of centroid and Moment of Inertia for composite sections.
5. Identify and formulate various methods for solving simple frames and Trusses

UNIT I

Basic Concepts of Engineering Mechanics

Basics: Fundamental Principles - Resolution and Composition of forces and equilibrium of particles - Principle of transmissibility - Free body diagram - Equilibrium of rigid bodies **Forces and Force Systems:** Types of force systems Resultant of coplanar, concurrent and non- concurrent force systemsConcept of moment – Varignon's theorem

Equilibrium of Systems of Forces: Equilibrium concept in mechanics Free body diagram - Equilibrium of coplanar force systems, Types of embers and supports, Support reactions

UNIT II

Kinematics: Introduction to Dynamics - Rectilinear and Curvilinear motion Displacement, Velocity and Acceleration Motion of a Rigid BodyTypes of their Analysis in Planar Motion

UNIT III

Kinetics: Bodies in rectilinear translation Curvilinear translation Bodies rotating about fixed axis – D'Alemberts Principle - Principle of work energy Principle of impulse and momentum virtual work – Langrange's Equation.

UNIT IV

Centroid and Centre of Gravity: Introduction to centre of gravity and centroid Centroids of symmetrical and unsymmetrical shapes Theorems of Pappus and Guldinus (simple problems)

Area and Mass moments of Inertia: Definition– Parallel axis and perpendicular theorems Polar Moment of Inertia-Radius of gyration - Moments of Inertia of Basic Shapes and composites, Moment of inertia of mass (Simple problems only).

UNIT V

Simple Stresses and Strains:

Introduction Elasticity Stress Strain - Types of stresses and strains Elastic limit – Hooke's Law – Young'sModulus – Lateral Strain, Poisson's ratio and Volumetric Strain-Relationship between Elastic constants

Analysis of Simple Pin Jointed Frames (**Trusses**): Definition Perfect, Deficient and Redundant **Frames** Methods of Analysis - Analysis of simple trusses by method of joints and method of sections

Text Books:

1. Engineering Mechanics 2nd Edition, Bhavikatti and Rajasekharappa, New Age Intl. Publications,New Delhi, 2016.
2. A text book of Engineering Mechanics 6th Edition, R.K. Bansal, Laxmi Publications, New Delhi,2017
3. Engineering Mechanics (Statics and Dynamics) 4th Edition, A Nelson-Tata McGraw Hill Education Private Limited, New Delhi, 2014.

Reference Books:

1. Engineering Mechanics, Strength of Materials and Elements of Structural Analysis 1st Edition,
2. C.Venkatramaiah & A.V.Narasimha Rao- CBS Publishers & Distributors, New Delhi. 2018
3. Engineering Mechanics by Timoshenko & Young
4. A Text Book of Engineering Mechanics by R.S.Khurmi- S.Chand & Company Limited, NewDelhi.
5. Engineering Mechanics by Irving H. Shames Prentice Hall, New Delhi.
6. Engineering Mechanics by Ferdinand L. Singer Published by Row Publishers, New York.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**1**		**3**	**2**									**1**		
CO2	**1**	**3**												**2**	
CO3	**1**			**3**	**1**										**1**
CO4		**3**		**3**									**1**		
CO5					**1**	**2**	**3**							**3**	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

I B.Tech I Semester (EEE)	L	T	P	C
	3	0	0	3

20ACE03 BASIC CIVIL AND MECHANICAL ENGINEERING

COURSE OUTCOMES:

After successful completion of the course, students will be able to

CO1. Apply the basic principles of civil engineering, Techniques and tools for analyzing civil structures and solve related problems.

CO2. Describe the working of principles of basic mechanical engineering and solve problems related to it

Part – A: CIVIL ENGINEERING

UNIT-I:

SURVEYING AND CIVIL ENGINEERING MATERIALS

Overview of Civil Engineering: Civil Engineering contributions to the welfare of society,specialized sub disciplines in Civil Engineering.

Surveying: Objectives, Classification and principles; Measurements – distances, angles, levels. Areas and volumes; contouring; Illustrative examples.

Civil Engineering Materials: Bricks, stones, concrete, steel, glass, timber, composite Materials.

Mechanics of Materials: Forces, system of forces, Laws of mechanics, moment of a force,equilibrium,

resultant, Internal and External forces, Stress, Strain, Hooke's law and Elasticity.

UNIT-II:

BUILDING COMPONENTS AND CIVIL ENGINEERING INFRASTRUCTURE BUILDING COMPONENTS:

Sub structure – Types of foundations, Bearing capacity and settlement, Requirement of goodfoundations.

Superstructure – Civil engineering construction – Brick masonry, Stone masonry, Beams, Columns, Lintels, Roofs,
Floors, Stairs, Building bye-laws – bye-laws floor area, carpet area and floor space index, basics of interior design and
landscaping.

Civil Engineering Infrastructure – Types of Bridges and Dams, water supply and Sanitary systems, Rainwater
harvesting, Types of Highways and Railways, Ports and Harbours.

Part – B: MECHANICAL ENGINEERING

UNIT-III:

INTERNAL COMBUSTION ENGINES, TURBINES AND PUMPS

Overview of Mechanical Engineering: Introduction to Mechanical Engineering, specialized sub disciplines in Mechanical Engineering.

Internal Combustion Engines – Classification- Working principle of petrol and Diesel Engines – stroke engines – Comparision of four stroke and two stroke engines.

Turbines and Pumps – Classifications of Steam turbines – Impulse turbine, Reaction turbines; working principle of Reciprocating Pumps (single acting and double acting) and Centrifugal Pumps.

UNIT-IV

MECHANICAL POWER TRANSMISSION SYSTEMS

Power Transmission Systems: Belt, rope and chain drives, Gears and Transmission screw

Power Transmission by belts: Classification of belts, Length of the Belt (Open and Crossed-Belt Drives), Power Transmitted by Belt Drive, Tension due to Centrifugal Forces, Initial Tension, Maximum Power Transmitted.

Power transmission by Gear train: Gear terminology, classification of gears, Gear train-Simple Gear Train and Compound Gear Train, Power Transmitted by Simple Gear Train.

UNIT-V: MANUFACTURING PROCESSES

Manufacturing Processes: Elementary ideas of Casting, Forging, Rolling, welding, Soldering and Brazing.

Machining processes: Lathe-Turning, Taper Turning, Thread cutting, Shapping, Drilling, Grindingand Milling (simple sketches and short notes).

TEXTBOOKS:

1. Shanmugam G and Palanichamy MS, Basic Civil and Mechanical Engineering, Tata McGraw Hill PublishingCo. NewDelhi, 1 stedition 2018.
2. R. Vaishnavi, Prof. M. Prabhakaran & Prof. V. Vijayan, Basic Civil and Mechanical Engineering, S. CHAND Publications, 2nd edition, 2013.
3. B.C Punmia, Ashok Kumar Jain, Arun Kumar Jain, Surveying (vol-I), Laxmi publications, 16th edition, 2005.
4. B.C Punmia, Ashok Kumar Jain, Arun Kumar Jain, Building Construction, Laxmi publications, 10th edition, 2005.

REFERENCES:

1. V. Ganesan, I.C. Engines, Noida, 4th Edition, Tata McGraw Hill, 2014.
2. Kalpakjain, Manufacturing Technology, Chennai, 4th Edition, Pearson Edition, 2002.
3. S.C. Arora &Domkudwar, A Corse in Refrigeration and Air Conditioning, Dhanapat RaiPublications, New Delhi, 2016.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		3	2									1		
CO2	1	3												2	

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
CIVIL ENGINEERING

L	T	P	C
3	0	0	3

II B.Tech - II Semester (ME)
20ACE11 MECHANICS OF SOLIDS

Course Outcomes: At the end of the course, students should be able to:

CO1: Understand the concepts and applications of stresses and strains

CO2: Determine the internal forces in the beams

CO3: Formulate the expressions for deflection for different loading conditions

CO4: Formulate the expressions for shear stress distribution across the various members

CO5: Formulate the expressions for longitudinal and circumferential stresses in thin and thick cylinders

UNIT I

SIMPLE STRESSES AND STRAINS: Elasticity and Plasticity – Types of stresses and strains – Hooke's law – Stress –Strain curve - Working stress – Factor of safety – Lateral strain, Poisson's ratio and Volumetric strain – Elastic moduli and the relationship between them – Bars of varying Section – composite bars – Temperature stresses. STRAIN ENERGY: Resilience – Gradual – sudden - impact and shock loadings-Simple applications.

UNIT II

SHEAR FORCE AND BENDING MOMENTS: Types of supports – Types of beams – Shear force and bending moment diagrams for simply supported - cantilever and over hanging beams with point loads - uniformly distributed load - uniformly varying loads and couples.

UNIT III

THEORY OF SIMPLE BENDING: Assumptions made in the theory of simple bending – Derivation of bending equation: $M/I = f/y = E/R$ – Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), Design of simple beam

SHEAR STRESS DISTRIBUTION: Derivation of formula – Shear stress distribution in rectangular – triangular – circular - I and T sections.

UNIT IV

DEFLECTIONS OF BEAMS: Bending into a circular arc – slope - deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads - U.D.L uniformly varying load. TORSION OF CIRCULAR SHAFTS AND SPRINGS: Theory of pure torsion - Torsional theory applied to circular shafts – Power transmission - Close and open coiled helical springs under axial loads and axial twist.

UNIT V

THIN CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop - longitudinal and volumetric strains – changes in diameter and volume of thin cylinders – Riveted boiler Shells - Thin spherical shells. THICK CYLINDERS: Thick cylinders – Lame's equation – Design of thick cylindrical shells – Compound cylinders – Shrink fit allowance – Initial difference of radii at the junction.

Text Books:

1. B.C. Punmia, Ashok Kumar Jain & Arun Kumar Jain, Mechanics of Materials, Mumbai, 1st Edition, Laxmi Publications, 2002.
2. R. Subramaniyan, Strength of Materials, Oxford University Press, New Delhi, 2008.

References:

1. Bhavikatti, Strength of materials, New Delhi, 4th Edition, S. Chand & Co., 2009
2. Timoshenko & Young, Elements of Strength of materials, New Delhi, 2nd Edition, Eastern Wiley Publications, 2011.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	--	--	1	--	--	--	--	--	--	3	3	2
CO2	3	2	1	1	--	1	--	--	--	--	1	--	2	3	1
CO3	3	1	3	3	--	2	--	--	--	--	1	--	2	3	3
CO4	3	1	3	3	--	3	--	--	--	--	1	--	1	3	2
CO5	2	1	2	2	--	1	--	--	--	--	3	--	1	2	1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	0	0	3

II B.Tech - II Semester (ME)

20ACE12 FLUID MECHANICS AND HYDRAULIC MACHINERY

Course Outcomes:

At the end of the course, students should be able to:

CO1: Apply how to find pressure on surfaces and in pipes

CO2: Apply how to find frictional losses in a pipe when there is a flow between two places

CO3: Able to know types of flow and its measurements and applications

CO4: Able to classify the turbines and design criteria based on water availability

CO5: Able to identify the suitable pump required for different purposes.

UNIT I

FLUID PROPERTIES AND STATICS: Dimensions and units - Definition of a fluid – Physical properties of fluids – Density, Specific weight, Specific volume, Specific gravity, Compressibility, Vapor pressure, Surface tension, Capillarity and Viscosity. Pascal's law – Pressure variation in a static fluid – Atmospheric, gauge and absolute pressures – Measurement of pressure – Piezometer – U–tube and inverted U–tube manometers – Bourdon's pressure gauge – Hydrostatic forces on plane surfaces– Buoyancy-Buoyant Force and Centre of BuoyancyMetacentre and Metacentric Height- Stability of Submerged and Floating Bodies.

UNIT II

FLUID KINEMATICS AND FLUID DYNAMICS: Types of flow, velocity field, one and two-dimensional flow analysis, circulation and vorticity, stream function and velocity potential function, potential flow, standard flow patterns, combination of flow patterns, flow net. Continuity equation, Euler's equation of motion, Bernoulli's equation, Impulse momentum equation and applications (pipe bend).

UNIT III

Reynolds's experiment – Reynolds's number - Minor losses in pipe flow - Darcy– Weisbach equation – Variation of friction Factor – Moody's chart – Pipes in series –Pipes in parallel.

Flow Measurement: Velocity measurement by Pitot tube and Pitot static tube – Discharge measurement by Venturimeter and orifice meter – Turbine Flow meter.

UNIT IV

BOUNDARY LAYER THEORY: Dimensional Analysis as a tool in design of experiments, identification of non dimensional numbers and their significance, dimensional analysis methods. Boundary Layer Theory – Formation, growth and separation – Mathematical models for boundary layer flows.

UNIT V

HYDRAULIC TURBINES: Elements of hydroelectric power plants- Heads and efficiencies of turbines – Classification of turbines –Pelton wheel-Modern Francis turbine – Kaplan turbineMain components and working principle- Expressions for work done and efficiency – Working proportions and design of each.

CENTRIFUGAL PUMPS: Classification and types of pumps – Components and working of a centrifugal pump – Work done by the impeller– Heads and efficiencies – NPSH- Priming – Priming devices – Minimum starting speed – Multistage pumps – Pumps in series and parallel – Submersible pumps – Limiting suction head – Cavitation – Expression for specific speed

Text Books:

1. P.N. Modi & S.M. Seth, Hydraulics and Fluid Mechanics including Hydraulic Machines, New Delhi, Standard Book House,14th Edition 2002.
2. R.K. Bansal, A Text book of Fluid Mechanics and Hydraulic machinery, 9th Edition, Laxmi Publications (P) Ltd, 2010.

References:

1. Nachleba, Hydraulic Turbines, New Delhi, 1st Edition, Tata McGraw Hill Publishing Co.Ltd, 2012.
2. Streeter & Wylie, Fluid Mechanics, 10th Edition, T M H Publications, 1997.

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	--	--	--	--	--	--	--	--	--	3	3	3
CO2	3	3	3	--	--	--	--	--	--	--	--	--	3	3	3
CO3	3	1	1	--	--	--	--	--	--	--	--	--	3	1	1
CO4	1	3	2	--	--	--	--	--	--	--	--	--	1	3	2
CO5	2	3	1	--	--	--	--	--	--	--	--	--	2	3	1

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
CIVIL ENGINEERING

L	T	P	C
0	0	3	1.5

II B.Tech - II Semester (ME)
20ACE21 FLUID MECHANICS AND HYDRAULIC MACHINES LAB

Course Outcomes (CO):

By performing the various tests in this laboratory, the student will be

CO1: able to know the principles of discharge measuring devices and head loss due to sudden contraction

CO2: expansion in pipes and working principles of various pumps and motors.

List of Experiments:

1. Verification of Bernoulli's equation.
2. Calibration of Venturi meter.
3. Calibration of Orifice meter
4. Determination of Coefficient of discharge for an external mouth piece by Constant head method.
5. Determination of Coefficient of discharge for an external mouth piece by variable head method.
6. Calibration of contracted Rectangular Notch.
7. Calibration of contracted Triangular Notch. Determination of friction factor
8. Determination of loss of head in a sudden contraction.
9. Determination of loss of head in a sudden Expansion.
10. Performance test on Impulse turbines
11. Performance test on reaction turbines (Francis and Kaplan Turbines)
12. Impact of jet
13. Performance test on centrifugal pumps, determination of operating point and efficiency

References:

1. Fluid Mechanics & Hydraulic Machines A Lab Manual by Ts Desmukh (Author), Laxmi Publications (P) Ltd

2. Fluid Mechanics & Machinery Laboratory Manual by N Kumara Swamy (Author), Charotar Books Distributors.

3. Lab. Manual of Fluid Mechanics & Machines by Gupta, Chandra (Author), cbspd (Publisher).

Online Learning Resources/Virtual Labs: http://eerc03-iiith.vlabs.ac.in/

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	--	--	--	--	--	--	--	--	--	3	3	3
CO2	3	3	3	--	--	--	--	--	--	--	--	--	3	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

CIVIL ENGINEERING

III B.Tech –I Semester

L	T	P	C
3	0	0	3

20ACE35 INTEGRATED WASTE MANAGEMENT FOR A SMART CITY

Course Outcomes:

At the end of the course, the student will be able to:

1. Understand the current issues and management in solid waste.
2. Apply basics of municipal solid waste management.
3. Apply various disposal methods of solid waste
4. Understand the construction and demolition waste management processes.
5. Explain management of electronic waste

UNIT-I

INTRODUCTION TO SOLID WASTE MANAGEMENT:

Municipal Solid Waste Sources; composition; generation rates Swachh Bharat Mission andSmart Cities Program, Current Issues in Solid Waste Management and Review of MSW Management Status in First List of 20 Smart Cities in the Country.

UNIT-II

MUNICIPAL SOLID WASTE MANAGEMENT:

Municipal Solid Waste, Characteristics and Quantities, Collection, Transportation, Segregation and Processing.

UNIT-III

DISPOSAL OF MUNICIPAL SOLID WASTE:

Landfill, Biochemical Processes and Composting, Energy Recovery from Municipal Solid Waste. Municipal Solid Waste (MSW) Rules 2016.

UNIT-IV

CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT:

Overview of C&D Waste – Sources, Effects, and Regulations, Beneficial Reuse of C&D Waste

Materials.

UNIT-V

ELECTRONIC WASTE (E-WASTE) MANAGEMENT:

Sources, Effects, Issues and Status in India and globally,controlling measures, E-Waste Management Rules 2016 and Management Challenges.

TEXTBOOKS

1. William A Worrell and P. AarneVeslind, “Solid Waste Engineering”, 2nd Edition Cengage Learning,2012(ISBN-13:978-1-4390-6217-3)
2. George Tchobanoglous, Hilary Theisen and Samuel A Vigil, “Integrated Solid Waste Management”,Tata Mc GrawHill, 1993.
3. The Central Public Health and Environmental Engineering Organization (CPHEEO),“Manualon Solid Waste Management”, India, 2016.

REFERENCES

1. “MunicipalSolidWasteManagementRules2016”,CentralPollutionControlBoard,Govt.of India, 2016.
2. “Electronic Waste Management Rules 2016”, Central Pollution Control Board, Govt. ofIndia,2016.
3. “Construction and Demolition Waste Management Rules 2016”, Ministry of EnvironmentandForest and Climate Change, Govt. ofIndia, 2016.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3
CO2	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3
CO3	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3
CO4	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3
CO5	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

CIVIL ENGINEERING

L	T	P	C
3	0	0	3

III B.Tech I – Semester (ME)
20ACE36 DISASTER MANAGEMENT

CourseOutcomes:

After completing this Unit,students will be able to

1. Understand about the natural hazards and its management
2. Explain the effect of the fire hazards and solid waste management
3. Interpret the regulations of building codes and land use planning related to risk and vulnerability
4. Involve in the process of disaster management
5. Plan the strategies for risk reduction in schools and communities

UNIT - I

Natural Hazards And Disaster Management: Introduction of DM–Inter disciplinary-nature of the subject–Disaster Management cycle–Five priorities for action.Case study methods of the following: floods, draughts – Earth quakes – global warming, cyclones & Tsunamis – Post Tsunamihazards along the Indian coast– land slides.

UNIT-II

Man Made DisasterAnd Their Management Along With Case Study Methods Of The Following: Firehazards–transport hazard dynamics–solid waste management–post disaster – bio terrorism -threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases &Aids and their management

UNIT-III

Risk and Vulnerability:Building codes and land use planning–social vulnerability–environmental vulnerability – Macroeconomic management and sustainable development,climate change risk rendition– financial management of disaster – related losses.

UNIT-IV

Role of Technology In Disaster Managements: Disaster management for infra structures,taxonomy of infra structure – treatment plants and process facilities-electrical substations-roads and bridges- mitigation programme for earth quakes –flowchart, geospatial informationin agriculture drought assessment-multimedia technology in disaster risk management and training transformable indigenous knowledgein disaster reduction.

UNIT-V

Education and Community Preparedness: Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery -Community based disaster management and social capital-Designing resilience building community capacity for action.

TEXT BOOKS

1. Rajib shah & R R Krishnamurthy "Disaster Management"–Global Challenges and Local Solutions' Universities press.(2009),
2. Tushar Bhattacharya,"Disaster Science & Management" Tata Mc Graw Hill Education Pvt. Ltd., New Delhi.
3. Jagbir Singh"Disaster Management"–Future Challenges and Opportunities' IK International Publishing House Pvt.Ltd. (2007),

REFERENCE BOOKS

1. Harsh.K.Gupta " Disaster Management edited ", Universities press, 2003.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	3	-	3	3	-	3	3		
CO2	2	2	-	-	-	-	2	-	3	3	-	3	3		
CO3	2	2	-	-	-	-	2	-	3	3	-	3	3		
CO4	2	2	-	-	-	-	2	-	3	3	-	3	3		
CO5	2	2	-	-	-	-	2	-	3	3	-	3	3		

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

CIVIL ENGINEERING

IV B.Tech –I Semester (ME)

L	T	P	C
3	0	0	3

20ACE35 INTEGRATED WASTE MANAGEMENT FOR A SMART CITY

Course Outcomes:

At the end of the course, the student will be able to:

1. Understand the current issues and management in solid waste.
2. Applybasics of municipal solid waste management.
3. Apply various disposal methods of solid waste
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UNIT-I

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2. "Electronic Waste Management Rules 2016", Central Pollution Control Board, Govt. ofIndia,2016.
3. "Construction and Demolition Waste Management Rules 2016", Ministry of Environment and Forest and Climate Change, Govt. of India, 2016.

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CO1	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3
CO2	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3
CO3	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3
CO4	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3
CO5	3	-	-	-	-	3	3	-	-	-	-	3	3	3	3