

ACADEMIC REGULATIONS (R – 17)
COURSE STRUCTURE
AND
DETAILED SYLLABI
FOR
B. Tech. Regular Four Year Degree
Program

(For the Batches Admitted From 2017-2018)

&

B. Tech (Lateral Entry Scheme)

(For the Batches Admitted From 2018-2019)

CIVIL ENGINEERING



SRI VENKATESWARA COLLEGE OF ENGINEERING
& TECHNOLOGY (AUTONOMOUS)

(Affiliated to JNTUA, Ananthapuramu, Approved by AICTE, New Delhi)

R.V.S. NAGAR, CHITTOOR- 517 127 (AP), INDIA.

FOREWORD

The autonomy is conferred on Sri Venkateswara College of Engineering and technology by JNT University, Anantapur based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the affiliating University in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Sri Venkateswara College of Engineering and Technology is proud to win the confidence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, the standards and ethics for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTUA, Anantapur to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several expertise solicited from academics, industry and research, to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications needed are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the college and brighter prospects of engineering graduates.

Principal



**SRI VENKATESWARA COLLEGE OF ENGINEERING TECHNOLOGY
(AUTONOMOUS)
R.V.S. NAGAR, CHITTOOR - 517127
DEPARTMENT OF CIVIL ENGINEERING**

VISION AND MISSION OF THE INSTITUTE

INSTITUTION VISION

- Carving the youth as dynamic, competent, valued and knowledgeable professionals who shall lead the Nation to a better future and to mould the institute into a Center of Academic Excellence and advanced Research

INSTITUTION MISSION

- Providing Quality Education, student-centered teaching-learning processes and state-of-art infrastructure for professional aspirants hailing from both rural and urban areas.
- Imparting technical education that encourages independent thinking, develops strong domain of knowledge, hones contemporary skills and positive attitudes towards holistic growth of young minds.

QUALITY POLICY

- Sri Venkateswara College of Engineering and Technology strides towards excellence by adopting a system of quality policies and processes with continued improvements to enhance students' skills and talent for their exemplary contribution to the society, the nation and the world.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

(Affiliated to J.N.T. University Anantapur, Ananthapuramu).

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Program

(For the batches admitted from the academic year 2017-18)

and

B.Tech. (Lateral Entry Scheme)

(For the batches admitted from the academic year 2018-19)

- 1. Applicability** : All the rules specified herein, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2017-2018 onwards. Any reference to “College” in these rules and regulations stands for Sri Venkateswara College of Engineering and Technology (Autonomous).
- 2. Extent** : All the rules and regulations, specified herein after shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, Sri Venkateswara College of Engineering and Technology (A) shall be the Chairman of the Academic Council.
- 3. Admission** :
 - 3.1 Admission in to first year of Four Year B.Tech., Degree Program of study in Engineering :**
 - 3.1.1 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 JNTU Anantapur) 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 JNTU Anantapur) 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 in Engineering:

3.2.1 Eligibility : Candidates qualified in ECET (FDH) and / or admitted by the Convener, ECET (FDH).

In all such cases for admission, when needed, Permissions from the statutory bodies are to be obtained.

3.2.2 Admission Procedure : Lateral Entry seats are filled as per the norms prescribed 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 (Automobile Engineering)
8. B.Tech (Electronics and Telecommunication Engineering)
9. B.Tech (Electronics Engineering)
10. B.Tech (Computer Science and Systems Engineering)

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 / 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 six kinds: **Foundation, Skill, Core, Elective, Audit 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 four professional elective groups. Students can choose not more than one elective from each of the four groups. Also there are two open elective groups, students can choose not more than one elective from each of the two 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 90 working days.

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	Automobile Engineering	AT
8	Electronics and Telecommunication Engineering	ET
9	Electronics Engineering	EL
10	Computer Science and Systems Engineering	CT
11	Humanities and Basic Sciences	HS
12	MBA	MB
13	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.

Contact Periods: 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 % of Credits	Average No. of Credits
1	Humanities and Social Sciences (HS), including Management.	HS (05% to 10%)	9
2	Basic Sciences (BS) including Mathematics, Physics and Chemistry.	BS (15% to 20%)	23
3	Engineering Sciences (ES), including Workshop, Drawing, Basics of Electrical / Electronics / Mechanical / Computer Engineering.	ES (15% to 20%)	34
4	Professional Subjects-Core (PC), relevant to the chosen specialization / branch.	PC (30% to 40%)	70
5	Professional Subjects-Electives (PE), relevant to the chosen specialization / branch.	PE (10% to 15%)	12
6	Open Subjects-Electives (OE), from other technical and / or emerging subject area.	OE (05% to 10%)	6
7	Project Work or Full Semester Internship, Mini Project, Comprehensive Examination.	10% to 15%	22
8	Mandatory Courses / Audit Courses.	MC / AC	-
TOTAL			176

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 : 25 Marks

Two Quiz Examinations : 10 Marks

2 Assignments : 05 Marks

40 Marks

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 marks. In Part B, 4 questions with each carrying 5 marks may be given and the student is expected to answer any three 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 by considering 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 Two Quiz examinations, along with sessional examinations for 20 minute duration and for 10 marks shall be conducted. Each Quiz exam consists of 20 multiple choice questions and are to be answered by choosing the correct answer from a given set of 4 choices. Marks for the Quiz exams shall be awarded by considering the average of the two Quiz exams conducted.

11.3.3 Two Assignments, each one for 5 marks shall be given to the students one before the first sessional exam and the other before the second sessional exam. Internal marks for the assignments shall be awarded by considering the average of the two 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 courses are considered as theory subjects, but for all practical purposes examination will be conducted like practical.

- i. Computer Aided Engineering Drawing
- ii. Production Drawing Practice & Machine Drawing

11.7 Mandatory courses (Other than MOOCs)

Mandatory courses will not carry any credits; but, a pass in each such course afterattaining required CIE and SEE requirements during the programme shall be necessary requirement for student to qualify for the award of Degree. Its result shall be declared with “satisfactory” (Pass) or Not Satisfactory (Fail) performance.

11.8 Massive Open Online Courses (MOOCs):

The college in line with the developments in Learning Management Systems (LMS) intends to encourage the students to do online courses in MOOCs, offered internationally. The main intention to introduce MOOCs is to obtain enough exposure through online tutorials, self-learning at one’s own pace, attempt quizzes, discuss with professors from various universities and finally to obtain certificate of completion of the course from the MOOCs providers.

Regulations for MOOCs:

- 11.8.1 MOOC courses are offered as Mandatory courses. Each student has to do 3 MOOC Courses.
- 11.8.2 Institution intends to encourage the students to do one MOOC in each semester, from III year I Semester to IV year I Semester of the B.Tech. Programme
- 11.8.3 The respective departments shall give a list of standard MOOCs providers among edx, Udacity, Coursera, NPTEL or any other standard providers, whose credentials are endorsed by the HOD.
- 11.8.4 The HOD shall appoint Coordinators / Mentors and allot the students to them who shall be responsible to guide students in selecting online courses and provide guidance for the registration, progress and completion of the same.
- 11.8.5 A student shall choose an online course (relevant to his / her programme of study in the concerned semester) from the given list of MOOCs providers, as endorsed by the teacher concerned, with the approval of the HOD.
- 11.8.6 HOD & Coordinator must review the progress of the conduct of these courses once in a fortnight and advise the students accordingly.
- 11.8.7 In case a student fails to complete the MOOCs he / she shall re-register for the same with any of the providers from the list provided by the department.
- 11.8.8 In case any provider discontinues to offer the course, Institution shall allow the student to opt for any other provider from the list provided by the department, for completion of the MOOC course.
- 11.8.9 The details of MOOC(s) shall be displayed in Grade card of a student, provided he / she submits the proof of completion of it or them to the department concerned through the Coordinator / Mentor, before the end of the concerned semester. HOD has to forward the same to the Exam cell with his attestation.
- 11.8.10 The Provisional Degree Certificate and / or consolidated grade sheet shall be issued only to those students, who have submitted proof of completion of MOOC(S), for the courses they have registered with to the Examination cell through the HOD concerned.
- 11.8.11 The result of all the three MOOC courses will be reflected in the corresponding semester Grade Sheet.

11.9 EPIC Courses: EPIC (Engineering Projects in Community Development) courses are introduced and offered as Mandatory courses, one in the II B.Tech I semester and another in the II B.Tech II semester.

Guidelines for awarding CIE & SEE marks for the EPIC courses:

CIE: For awarding CIE marks (maximum 40) there shall be two assessment with each

Assessment carries 20 marks.

I Assessment: Report writing & Presentation-I which carries 20 marks conducted after completion of I & II units.

II Assessment: Report writing & Presentation-II which carries 20 marks conducted after completion of the last three units.

Marks obtained in the two assessments will be added to award CIE marks for 40.

However if any of the students is absent for both the assessments, he/she may be permitted to appear for one make up assessment conducted after second assessment on valid medical / emergency grounds.

SEE: For awarding SEE marks (maximum 60) student need to submit a detailed project and give a presentation on the date specified by the department. The work done, execution and presentation by the student will be evaluated for 60 marks by two examiners, one of them being internal examiner (subject teacher) and the other being external examiner (other than the teacher concerned) to be nominated by the Principal from the panel of experts as recommended by the chairman BOS.

One who fails to secure minimum pass marks in CIE & SEE put together has to reappear for SEE examination as and when it is conducted and to get pass marks in CIE & SEE put together so as to qualify for the award of B.Tech degree.

Attendance is mandatory for these courses.

11.10 Audit Courses

Students to be able to register for courses outside the prescribed range of Credits for audit only, when interested to supplement their knowledge / skills; any student who wishes to pursue audit course can register for the same with the concerned teacher and attend to the classes regularly. No examination will be conducted, no grade will be given for the audit courses. However such of those students who have registered and got the requisite attendance of 75% in the audit course, it will be mentioned in their grade sheet.

11.11 Comprehensive Online Examination

There shall be two comprehensive online examinations, one at the end of the III year I sem and the other at the end of III year – II sem, with 50 objective questions for 100 marks on the subjects studied in the respective semesters. A student shall acquire half credit assigned to the comprehensive online examination only when he secures 40% or more marks. In case, if a student fails in comprehensive online examination, he shall reappear/re-register by following a similar procedure adopted for the lab examinations.

11.12 Comprehensive Viva-Voce

There shall be a Comprehensive Viva-Voce in IV year – II sem for 2 credits. The Comprehensive Viva-Voce will be conducted by the committee consisting of Head of the Department and two senior faculty members of the department nominated by the Principal as recommended by the chairman, BOS. The Comprehensive Viva – Voce is aimed to assess the students understanding in various subjects he studies during the B. Tech course of study. The Comprehensive Viva – Voce shall be evaluated for 100 marks by the committee. There are no internal marks for the Comprehensive Viva – Voce. A student shall acquire 2 credits assigned to the Comprehensive Viva – Voce only when he secures 40% or more marks. In case, if a student fails in Comprehensive Viva – voce, he shall reappear as and when IV/II supplementary examinations are conducted.

11.13 Mini Project

The Mini Project shall be carried out during IV year I semester with one credit along with other lab courses by having regular weekly slots. Students will take mini project batch wise and the batches will be divided as per the guidelines issued. The topic of mini project should be so selective that the students are enabled to complete the work in the stipulated time with the available resources in the respective laboratories. The scope of the mini project could be handling part of the consultancy work, maintenance of the existing equipment, development of new experiment setup or can be a prelude to the main project with a specific outcome. Mini project report will be evaluated for 100 marks in total, assessment will be done by the supervisor / guide for 40 marks based on the work and presentation / execution of the mini project. Subdivision for the remaining 60 marks is based on report, presentation, execution and viva-voce. Evaluation shall be done by a committee comprising the mini project supervisor, Head of the department and one senior faculty nominated by the Principal from the panel of experts recommended by chairman, BOS.

11.14 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.

11.15 Internship

Students shall have an option to do internship for a minimum period of 6 weeks in an Industry during summer break after III year II semester examinations. In such cases the industry shall evaluate the students performance in terms of his attendance and marks scored out of 100 in the prescribed format supplied by the department, and return the same directly to the department after the end of the internship. A student who attains required attendance and minimum 40% marks shall be awarded 3 Credits and he shall be exempted from taking one Professional elective offered in the IV year II semester by the department for 3 credits.

11.16 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.

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 70% Question Papers from the External and 30% 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.

13.5 Results Committee:

Results Committee comprising of Director, Principal, Controller of Examinations, one Senior Professor nominated 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 attendance requirements 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 44 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 66 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 176 credits and earn all the 176 credits. Marks obtained in all the 176 credits shall be considered for the award of the class based on CGPA.
- v.* A student who fails to earn 176 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.

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 44 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 132 credits and earn all the 132 credits. Marks obtained in all 132 credits shall be considered for the award of the class based on CGPA.
- iv.* A student who fails to earn 132 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.

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. Computation of SGPA and CGPA

The UGC recommends to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA). The credit points earned by a student are used for calculating the Semester Grade Point Average (SGPA) and the Cumulative Grade Point Average (CGPA), both of which are important performances indices of the student. SGPA is equal to the sum of all the total points earned by the student in a given semester divided by the number of credits registered by the student in that semester. CGPA gives the sum of all the total points earned in all the previous semesters and the current semester divided by the number of credits registered in all these semesters. Thus,

$$SGPA = \frac{\sum_{i=1}^n (C_i G_i)}{\sum_{i=1}^n C_i}$$

Where, C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course and n represent the number of courses in which a student is registered in the concerned semester.

$$CGPA = \frac{\sum_{j=1}^m (C_j S_j)}{\sum_{j=1}^m C_j}$$

Where, S_j is the SGPA of the j^{th} semester and C_j is the total number of credits upto the semester and m represent the number of semesters completed in which a student registered upto the semester.

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

16.1 In case of a specific query by students / employers regarding Semester Grade Point Average (SGPA) / Cumulative Grade Point Average (CGPA) into percentage, the following formulae will be adopted for notional conversion of SGPA / CGPA into percentage.

$$\text{SGPA to Percentage} = (\text{SGPA} - 0.5) \times 10$$

$$\text{CGPA to Percentage} = (\text{CGPA} - 0.5) \times 10$$

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:

- a. The student fails to satisfy the requirements of the program within the maximum period stipulated for the program.
- b. 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.

- i.* The students joining under R-17 Regulations from previous Regulations in II B.Tech II semester need not complete the mandatory course EPIC I offered in the II B.Tech I semester for the award of B.Tech degree.
- ii.* The students joining under R-17 Regulations from previous Regulations in III B.Tech I semester/III B.Tech II semester/ IV B.Tech I semester/ IV B.Tech II semester need not complete the mandatory EPIC course offered in the II B.Tech I semester and II B.Tech II semester 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”.

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

(AFFILIATED TO JNTUA, ANANTAPUR)

**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.
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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.
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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.
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7.	Impersonates any other candidate in connection with the examination.	<p>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.</p>
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8.	<p>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 of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.</p>	<p>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.</p>
9.	<p>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.</p>	<p>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.</p>

		Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
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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.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.



**SRI VENKATESWARA COLLEGE OF ENGINEERING TECHNOLOGY
(AUTONOMOUS)
R.V.S. NAGAR, CHITTOOR - 517127
DEPARTMENT OF CIVIL ENGINEERING**

Identification of Courses

B.Tech

Each course shall be uniquely identified by an alphanumeric code of with 7 characters as given below

No. of digits	Description
First two digits	Year of regulation Ex: 17
Next one letter	Type of program: A: B.Tech B: M.Tech C: M.B.A D: M.C.A
Next two letters	Code of department: HS/CE/CS/EE/EC/IT/ME/MB/MC
Last two digits	Indicate series numbers: ≥ 01

Ex: I Year Course:

17AHS02	17AHS01
17AHS04	17AHS09
17ACS01	17AHS03
17ACS05	17ACS03
17AEE01	17AHS07
17AHS05	17AHS08
17AHS06	
17ACS02	



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(AUTONOMOUS)
R.V.S. NAGAR, CHITTOOR - 517127
DEPARTMENT OF CIVIL ENGINEERING**

VISION AND MISSION OF THE DEPARTMENT

DEPARTMENT VISION:

- To be a Centre of Excellence in Civil Engineering Education by making Every effort continuously for improving in education and undertaking research as well as to contribute to the technology for the infrastructure development leading to sustainable development of the society

DEPARTMENT MISSION:

M1: To establish suitable forums and state-of-the art resources to enhance the faculty members creative and innovative endeavors in teaching and research in civil Engineering and allied fields

M2: To deliver knowledge among students through contemporary curriculum and modern pedagogical methods in the areas of civil engineering and interdisciplinary areas

M3: To enable students, develop skills in solving complex engineering problems of current times and also provide a framework for promoting collaborative and multidisciplinary activities



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(AUTONOMOUS)
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DEPARTMENT OF CIVIL ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Achieve a high level of technical expertise to excel in higher education / profession by obtaining knowledge in basic sciences, design and drawing and engineering principles

PEO2: Explore and apply the modern engineering tools for planning, design, execution and maintenance of works that is technically viable, economically and socially acceptable

PEO3: Develop good communication skills, team work in their responsibilities with excellence and to be ready to take up challenges in the current scenario



SRI VENKATESWARA COLLEGE OF ENGINEERING TECHNOLOGY
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DEPARTMENT OF CIVIL ENGINEERING

PROGRAM OUTCOMES (PO'S):

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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

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

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



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DEPARTMENT OF CIVIL ENGINEERING

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: To apply fundamental technical knowledge and skills to find creative technological solutions

PSO2: To function as an individual or in a team to find solutions for civil engineering problems of multi-disciplinary nature in the context of environmental and sustainable development.



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(AUTONOMOUS)
R.V.S. NAGAR, CHITTOOR-517 127, ANDHRA PRADESH
DEPARTMENT OF CIVIL ENGINEERING**

Scheme of Instruction and Examination under R17 Regulations

I B.Tech., I Semester

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
17AHS02	Differential equations and vector calculus	BS	Foundation	3	1	-	3	40	60	100
17AHS04	Engineering Chemistry	BS	Foundation	3	-	-	3	40	60	100
17ACS01	Computer Programming in C	ES	Foundation	3	-	-	3	40	60	100
17ACE01	Engineering Mechanics	ES	Foundation	3	1	-	3	40	60	100
17AEE01	Basic Electrical Engineering and Mechanical Engineering	ES	Foundation	3	1	-	3	40	60	100
17AHS05	Environmental Studies	HS	Foundation	3	-	-	3	40	60	100
17AHS06	Engineering Chemistry Lab	BS	Foundation	-	-	3	1.5	40	60	100
17AME03	Engineering Practice Lab	ES	Foundation	-	-	2	1	40	60	100
17ACS02	Computer Programming Lab	ES	Foundation	-	-	3	1.5	40	60	100
TOTAL				18	3	8	22	360	540	900

I B.Tech., II Semester

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
17AHS01	English for Communication -I	BS	Foundation	3	-	-	3	40	60	100
17AHS09	Numerical and Transform Techniques	BS	Foundation	3	1	-	3	40	60	100
17AHS03	Engineering Physics	BS	Foundation	3	1	-	3	40	60	100
17ACS03	Data Structures	ES	Foundation	3	-	-	3	40	60	100
17ACE03	Strength of Materials – I	PC	Core	3	1	-	3	40	60	100
17AME02	Computer Aided Engineering Drawing	ES	Foundation	1	-	4	3	40	60	100
17AHS07	Communication Skills Lab	BS	Foundation	-	-	2	1	40	60	100
17AHS08	Engineering Physics Lab	BS	Foundation	-	-	3	1.5	40	60	100
17ACS05	Data Structures Lab	ES	Foundation	-	-	3	1.5	40	60	100
	*** Audit Course - I	AC	Perspective	-	-	-	-	-	-	-
TOTAL				16	3	12	22	360	540	900



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Scheme of Instruction and Examination under R17 Regulations

II B.Tech., I Semester

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
17AHS15	Probability & Statistics	BS	Foundation	3	1	-	3	40	60	100
17ACE04	Strength of Materials - II	PC	Core	3	1	-	3	40	60	100
17ACE05	Building Materials and Construction	PC	Core	3	-	-	3	40	60	100
17ACE06	Fluid Mechanics	PC	Core	3	1	-	3	40	60	100
17ACE07	Surveying	PC	Core	3	1	-	3	40	60	100
17ACE08	Building Planning and Computer Drafting	PC	Core	3	-	-	3	40	60	100
17ACE12	Fluid Mechanics Lab	PC	Core	-	-	2	1	40	60	100
17ACE13	Surveying Lab	PC	Core	-	-	3	1.5	40	60	100
17ACE14	Civil Engineering Material Testing Lab	PC	Core	-	-	3	1.5	40	60	100
17AME64	Introduction to Engineering Projects - (EPIC-I)	MC	Perspective	-	-	-	-	40	60	100
	*** Audit Course - II	AC	Perspective	-	-	-	-	-	-	-
TOTAL				18	4	8	22	400	600	1000

II B.Tech., II Semester

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
17AMB01	Managerial Economics and Financial Analysis	HS	Foundation	3	-	-	3	40	60	100
17ACE16	Reinforced Concrete Structures - I	PC	Core	3	1	-	3	40	60	100
17ACE17	Engineering Geology	ES	Foundation	3	-	-	3	40	60	100
17ACE18	Concrete Technology	PC	Core	3	1	-	3	40	60	100
17ACE19	Hydraulics and Hydraulic Machinery	PC	Core	3	1	-	3	40	60	100
17ACE20	Structural Analysis - I	PC	Core	3	1	-	3	40	60	100
17ACE21	Hydraulic Machinery Lab	PC	Core	-	-	3	1.5	40	60	100
17AHS17	Technical writing and content development Lab	BS	Foundation	-	-	2	1	40	60	100
17ACE22	Engineering Geology Lab	ES	Foundation	-	-	3	1.5	40	60	100
17AHS18	English for Communication - II	MC	Perspective	-	-	-	-	40	60	100
17AME65	Engineering Projects in Community Service – (EPIC-II)	MC	Perspective	-	-	-	-	40	60	100
TOTAL				18	4	8	22	440	660	1100



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Scheme of Instruction and Examination under R17 Regulations

III B.Tech., I Semester

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
17AMB02	Management Science	HS	Foundation	3	-	-	3	40	60	100
17ACE24	Reinforced Concrete Structures-II	PC	Core	3	1	-	3	40	60	100
17ACE25	Geotechnical Engineering - I	PC	Core	3	1	-	3	40	60	100
17ACE26	Structural Analysis - II	PC	Core	3	1	-	3	40	60	100
17ACE27	Environmental Engineering-I	PC	Core	3	-	-	3	40	60	100
	* Professional Elective -I	PE	Elective	3	-	-	3	40	60	100
17ACE33	Geotechnical Engineering Lab	PC	Core	-	-	3	1.5	40	60	100
17ACE34	GIS Lab	PC	Core	-	-	3	1.5	40	60	100
17ACE35	Concrete Testing Lab-I	PC	Core	-	-	3	1.5	40	60	100
17ACE36	Comprehensive Online Examination	-	Skill	-	-	-	0.5	-	100	100
17ACE80	MOOC - I	-	-	-	-	-	-	-	-	-
TOTAL				18	3	9	23	360	640	1000

III B.Tech., II Semester

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
17ACE37	Design & Drawing of Steel Structures	PC	Core	3	1	-	3	40	60	100
17ACE38	Geotechnical Engineering - II	PC	Core	3	1	-	3	40	60	100
17ACE39	Environmental Engineering-II	PC	Core	3	1	-	3	40	60	100
17ACE40	Hydrology and Irrigation Engineering	PC	Core	3	-	-	3	40	60	100
	* Professional Elective-II	PE	Elective	3	-	-	3	40	60	100
	** Open Elective-I	OE	Elective	3	-	-	3	40	60	100
17ACE46	Environmental Engineering Lab	PC	Core	-	-	3	1.5	40	60	100
17ACE47	STAAD Lab-I	PC	Core	-	-	3	1.5	40	60	100
17ACE48	Concrete Testing Lab-II	PC	Core	-	-	3	1.5	40	60	100
17ACE49	Comprehensive Online Examination	-	Skill	-	-	-	0.5	-	100	100
17ACE81	MOOC - II	-	-	-	-	-	-	-	-	-
TOTAL				18	3	9	23	360	640	1000



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DEPARTMENT OF CIVIL ENGINEERING**

Scheme of Instruction and Examination under R17 Regulations

IV B.Tech., I Semester

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
17ACE50	Estimation, Costing and Valuation	PC	Core	3	1	-	3	40	60	100
17ACE51	Design and Drawing of Irrigation structures	PC	Core	3	1	-	3	40	60	100
17ACE52	Transportation Engineering	PC	Core	3	-	-	3	40	60	100
	* Professional Elective-III	PE	Elective	3	-	-	3	40	60	100
	* Professional Elective-IV	PE	Elective	3	-	-	3	40	60	100
	** Open Elective-II	OE	Elective	3	-	-	3	40	60	100
17ACE64	Transportation Engineering Lab	PC	Core	-	-	3	1.5	40	60	100
17ACE65	STAAD Lab-II	PC	Core	-	-	3	1.5	40	60	100
17ACE66	Mini Project	-	Skill	-	-	2	1	40	60	100
17ACE82	MOOC - III	-	-	-	-	-	-	-	-	-
TOTAL				18	2	8	22	360	540	900

IV B.Tech., II Semester

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
	Internship/ * Professional Elective-V			3			3	40	60	100
	* Professional Elective-VI			3			3	40	60	100
17ACE78	Comprehensive Viva-voce	-	Skill	-	-	-	2	-	100	100
17ACE79	Project Work	-	-	-	-	20	12	40	60	100
Total				6	-	20	20	120	280	400

* Refer to Professional Elective Courses list - Appended

** Refer to the Open Elective Courses list – Appended

*** Refer to the Audit Courses list - Appended

* PROFESSIONAL ELECTIVE-I			
S.No.	Course Code	Subject	Offering Department
1.	17ACE28	Ground water Development and Management	Civil Engineering
2.	17ACE29	Geographical Information systems	Civil Engineering
3.	17ACE30	Advanced Construction Techniques	Civil Engineering
4.	17ACE31	Air Pollution and Control	Civil Engineering
5.	17ACE32	Traffic Engineering	Civil Engineering
* PROFESSIONAL ELECTIVE-II			
S.No.	Course Code	Subject	Offering Department
1.	17ACE41	Soil Dynamics and Machine Foundations	Civil Engineering
2.	17ACE42	Health Monitoring and Retrofitting of Structures	Civil Engineering
3.	17ACE43	Environmental Impact assessment and management	Civil Engineering
4.	17ACE44	Integrated Water Resources and Planning	Civil Engineering
5.	17ACE45	Railways, Tunnels and Harbour Engineering	Civil Engineering
* PROFESSIONAL ELECTIVE-III			
S.No.	Course Code	Subject	Offering Department
1.	17ACE53	Bridge Engineering	Civil Engineering
2.	17ACE54	Rural Water Supply and Sanitation	Civil Engineering
3.	17ACE55	Disaster Mitigation and Management	Civil Engineering
4.	17ACE56	Prestressed Concrete Structures	Civil Engineering
5.	17ACE57	Earth and Earth Retaining Structures	Civil Engineering
* PROFESSIONAL ELECTIVE-IV			
S.No.	Course Code	Subject	Offering Department
1.	17ACE58	Finite Element Methods for Civil Engineering	Civil Engineering
2.	17ACE59	Elements of Earthquake Engineering	Civil Engineering
3.	17ACE60	Ground Improvement Techniques	Civil Engineering
4.	17ACE61	Solid Waste Management	Civil Engineering
5.	17ACE62	Advanced Structural Design	Civil Engineering

INTERNSHIP/ * PROFESSIONAL ELECTIVE - V			
S.No.	Course Code	Subject	Offering Department
1.	17ACE67	Internship	Civil Engineering
2.	17ACE68	Building Services Engineering	Civil Engineering
3.	17ACE69	Architecture & Town Planning	Civil Engineering
4.	17ACE70	Computational Hydraulics	Civil Engineering
5.	17ACE71	Hydro-Power Engineering	Civil Engineering
6.	17ACE72	Reliability Engineering	Civil Engineering
* PROFESSIONAL ELECTIVE - VI			
S.No.	Course Code	Subject	Offering Department
1.	17ACE73	Green Building & Sustainability	Civil Engineering
2.	17ACE74	Advanced Surveying	Civil Engineering
3.	17ACE75	Industry oriented Civil Course	Civil Engineering
4.	17ACE76	Construction Techniques, Equipment & Practices	Civil Engineering
5.	17ACE77	Modern Structural Materials and Systems Design	Civil Engineering

** OPEN ELECTIVES-I			
S.No.	Course Code	Subject	Offering Department
1.	17AME37	Renewable Energy Sources	ME
2.	17AME31	Instrumentation and Control systems	ME
3.	17AMB03	Professional Ethics	MBA
4.	17ACS06	Object Oriented Programming through Java	CSE
5.	17AME39	Operations Research	ME
** OPEN ELECTIVES-II			
S.No.	Course Code	Subject	Offering Department
1.	17ACS55	Artificial Intelligence	CSE
2.	17AME56	Optimization Techniques	ME
3.	17AEE54	Electrical Safety	EEE
4.	17AME57	Total Quality Management	ME
5.	17AME58	Entrepreneurship Development	ME

*** AUDIT COURSE-I			
S.No.	Course Code	Subject	Offering Department
1.	17AHS10	Quantitative Aptitude and Reasoning I	HAS
2.	17AHS11	Intellectual Property Rights	HAS
3.	17AHS12	Clinical Psychology	HAS
4.	17AHS13	German Language	HAS
*** AUDIT COURSE-II			
S.No.	Course Code	Subject	Offering Department
1.	17AHS19	Quantitative Aptitude and Reasoning II	HAS
2.	17AHS20	Legal Sciences	HAS
3.	17AHS21	Gender Sensitivity	HAS
4.	17AHS22	French Language	HAS

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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I B.Tech – I Semester (CE)

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17AHS02 DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

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

1. Classify and interpret the solutions of ordinary differential equations.
2. Explain concepts of maxima and minima of function of several variables.
3. Apply multiple integral techniques by evaluating areas bounded by regions.
4. Solving system of linear equations and determine the eigen values and eigen vectors.
5. Illustrate the physical interpretation of concepts of vector calculus.

UNIT-I

DIFFERENTIAL EQUATIONS: Linear and 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} , $\sin ax$, $\cos ax$, x^m , $e^{ax}V(x)$, $x^mV(x)$ and $xV(x)$. Newton's law of cooling, L-R-C circuits, bending of beams.

UNIT-II

FUNCTIONS OF SEVERAL VARIABLES: Maxima and Minima for functions of two variables –Lagrange's method of multipliers of 3 variables only. Taylor's and Maclaurin's series expansion of functions of two variables.

RADIUS OF CURVATURE: Cartesian and polar curves.

UNIT-III

APPLICATIONS OF INTEGRATION: Length of an arc and area using integral.

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

UNIT-IV

MATRICES - I: Rank of a matrix-Echelon form, Normal form -solution of linear system of homogeneous and non-homogeneous equations -Gauss elimination method. Eigen values and Eigen vectors. Cayley-Hamilton theorem - Linear Transformations - Orthogonal transformations -Diagonalization of a matrix. Quadratic forms- Reduction of Quadratic form to Canonical form and their nature.

UNIT-V

VECTOR CALCULUS: Gradient, Divergence, Curl and their properties (without identities).

VECTOR INTEGRATION:Line Integrals – Potential functions - Area, Surface and Volume integrals -Green's theorem- Stokes theorem & Gauss Divergence theorems (without proof) – problems on Green's, Stokes and Gauss's Theorem.

Text books:

1. Dr.B.S.Grewal, Higher Engineering Mathematics. Kanna Publications, 40th edition.
2. B.V.Ramana, A Text book of Engineering Mathematics-I, Tata Mc Grawhill.
3. T.K.V.Iyengar, B.Krishna Gandhi and others, A Text book of Engineering Mathematics –I, S.Chand and company.

Reference books:

1. Erwin Kreyszig, Advanced Engineering Mathematics. John Wiley & Sons.2016
2. Thomson, A Text book of Engineering Mathematics, Book Collection
3. N.Bail, M.Goyal&C.Walking, A Text book of Advanced Engineering Mathematics-A computer Approach.
4. E.Rukmangadachari and Keshava Reddy, A Text book of Engineering Mathematics-I, Pearson Education.

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 of corrosion - 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 - 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 – 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.

Textbooks:

1. Jain & Jain, A text book of Engineering Chemistry, Dhanpat Rai Publishing Company, 15th edition, New Delhi, 2008.
2. Prof. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C. Ramachandraiah, Chemistry for Engineers, McGraw Hill Higher Education Hyd., 3rd edition, 2009.
3. Dr. K. RaviKrishnan, A text book of Engineering Chemistry, Sri Krishna Publications, Secunderabad, Telengana, New edition. July, 2015.

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I B.Tech – I Semester (CE)

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3 0 0 3**

17ACS01 COMPUTER PROGRAMMING IN C

Outcomes: Upon completion of this course, students will be able to:

1. Apply the paradigms of structured programming to solve different problems.
2. List out the salient features and applications of C programming language.
3. Demonstrate the techniques for implementing applications using C programming.
4. Know how to use basic data structure like array in simple data processing applications.

UNIT – I

INTRODUCTION TO COMPUTERS AND PROBLEM SOLVING: What is computer, Block diagram of a Computer, Hardware Vs Software, Types of Programming Languages, The Problem-Solving aspect, Top-Down design.

C FUNDAMENTALS: The C character set, Variables, Identifiers and keywords, Data types, Constants, Input-Output statements, Structure of a C program, Simple C programs to exchange the values of two variables, Counting the number of factors of a given integer.

ALGORITHM, FLOWCHART: Fundamental algorithms- Factorial computation, Greatest Common Divisor computation, Sine function computation, Reversing the digits of an integer, Generating prime numbers.

UNIT – II

C STATEMENTS: Conditional and Unconditional Statements, Iterative Statements: Concept of a loop, Pre-test and Post-test loops, Event and Counter Controller loops, Operators- Classification of operators, Expressions- Precedence and Associativity, Evaluation of Expressions, Standard library functions.

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).

UNIT – III

ARRAYS: Declaration and Definition of an array, Processing an Array, Passing arrays to functions, Two-dimensional and Multi-dimensional arrays, Array techniques-Array order reversal, Removal of duplicates from an ordered array.

STRINGS: Defining and Initialization of Strings, NULL character, Reading and Writing a string, Processing the string, String handling functions.

UNIT – IV

POINTERS: Fundamentals, Pointer declarations, Pointers and One-dimensional array, Dynamic memory allocation, Operations on pointers, Arrays of pointers, Pointers for Inter function communications.

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 – V

FILES: Significance of files, Opening and Closing a data file, Reading and Writing a data file, Processing a data file, Concept of text files and binary files, File handling functions, Additional features – Command line parameters, Preprocessor directives.

Text books:

1. Behrouz A. Forouzan, Richard F. Gilberg, “C Programming & Data Structures”, India Edition, Course Technology, 2010.
2. R.G. Dromey, “How to Solve it by Computer”, Low Price Edition, Pearson Education India, 2008.

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3 1 0 3**

17ACE01 ENGINEERING MECHANICS

Outcome: Student will be able to

- 1 Construct free body diagrams and develop appropriate equilibrium equations.
- 2 describe the concepts of friction and apply in real life problems.
3. Determine the centroid and Moment of Inertia for composite sections.
4. Apply the dynamic analysis of rigid body motion in engineering applications
5. Demonstrate the work and energy relations.

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

FORCE SYSTEMS AND EQUILIBRIUM: Types of force systems – Resultant of coplanar, concurrent and non-concurrent force systems – Concept of moment – Varignon’s theorem - Equilibrium of coplanar force systems – Lami’s Theorem – Types of members and supports – Support reactions.

UNIT – II

FRICITION: Introduction to friction - Classification of friction- Laws of Friction – Limiting Friction – Cone of limiting friction – Angle of friction – Coefficient of friction - Motion of Bodies – Wedges.

UNIT– III

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 - IV

KINEMATICS: Introduction to Dynamics - Motion of a Rigid Body

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 - V

ANALYSIS OF SIMPLE PIN JOINTED FRAMES:Definition – Perfect, Deficient and Redundant frames – Methods of Analysis - Analysis of simple trusses by method of joints and method of sections.

Text books:

1. Bhavikatti and Rajasekharappa Engineering Mechanics, by New Age Intl. Publications, New Delhi.
2. R.K. Bansal, A text book of Engineering Mechanics, Laxmi Publications, New Delhi.
3. A Nelson, Engineering Mechanics (Statics and Dynamics), Tata McGraw Hill Education Private Limited, New Delhi.

Reference books:

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

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IB.Tech – I Semester (CE)

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**17AEE01 BASIC ELECTRICAL ENGINEERING AND MECHANICAL
ENGINEERING
PART - A
(Electrical Engineering)**

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

1. Apply joining process and various types of welding used in the infrastructure developments.
2. Identify the suitable material handling system and service for the infrastructure development.
3. Describe the working of IC Engines and Compressors and apply for the modern development of constructional equipment.
4. Associate to a team for executing projects in Refrigeration & Air Conditioning.

UNIT - I:

CIRCUITS AND ELECTROMAGNETISM-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:

TRANSFORMERS & INDUCTION MACHINE-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

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. 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.

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IB.Tech – I Semester (CE)

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17AHS05 ENVIRONMENTALSTUDIES

Outcomes: After completion of the course the student

1. will be able to understand what constitutes the environment, how to conserve the precious resources and maintain the ecological balance. They will be aware of maintain the ecological balance based on the cultural and biological diversity
2. can realize the importance of ecosystem, biodiversity and its conservation.
3. will be able to identify the major pollutants and abatement devices in order to protect the environment from pollution for effective environmental management.
4. will be Capable of managing social issues related to the environment and be aware of the enforcement of environment acts in our constitution.
5. will be able to analyse of the population growth and its effect on environment and human health.

UNIT-I

ENVIRONMENT AND NATURAL RESOURCES: Definition, Scope and Importance, Need for Public Awareness - Components of Environment(Atmosphere, Hydrosphere, Lithosphere and Biosphere) –Natural resources and associated problems- **Forest resources:** Use and over-exploitation, deforestation, case studies– Timber extraction, Mining, Dams and other effects on forest and tribal people- **Water resources:** Use and over utilization of surface and ground water, Floods, Drought, conflicts over water, dams-benefits and problems- **Food resources:** World food problems, Sources, changes caused by agriculture and overgrazing, impacts of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. **Energy resources:** Renewable and Non-renewable energy resources

UNIT-II

ECOSYSTEMS AND BIODIVERSITY : Concept of an ecosystem, Structure and function of an ecosystem – Producers, Consumers and decomposers – Energy flow in the ecosystem – Food chains, food webs and ecological pyramids – Ecological Succession - Introduction, types,

characteristic features, structure and function of the following ecosystems: Forest- Grassland- Desert-Aquatic (ponds, streams, lakes, rivers, oceans, estuaries)- Introduction to biodiversity: Definition, types(genetic, species and ecosystem diversity)-Bio-geographical classification of India-Value of biodiversity(Consumptive use, Productive use, Social use, Ethical use, Aesthetic and Option values)- India as a mega diversity nation-Hot spots of India-Threats to biodiversity(habitat loss, Poaching of wildlife, man-wildlife conflicts)- Conservation of biodiversity(In-situ and Ex-situ conservation of biodiversity).

UNIT-III

ENVIRONMENTAL POLLUTION: Definition, causes, effects and control measures of: a. Air Pollution b. Water Pollution c. Soil Pollution d. Noise Pollution e. Thermal Pollution f. Nuclear hazards, Solid Waste Management: Causes, effects and control measures of urban and industrial wastes- Role of an individual in prevention of pollution- Pollution case Studies- Environmental Impact Assessment- Disaster management: Floods, Earthquake, Cyclone, Landslides and Tsunamis - Field Trip- Visit to a local polluted site- Urban/Industrial etc.

UNIT-IV

SOCIAL ISSUES AND THE ENVIRONMENT: From unsustainable to sustainable development- Water conservation(rainwater harvesting, watershed management), Cloud seeding- 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-Act's: Environment Protection Act-Air (Prevention and Control of Pollution) Act-Water (Prevention and control of Pollution) Act-Wildlife Protection Act-Forest Conservation Act.

UNIT-V

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nation, Population explosion-Family Welfare Programme-Environment and human health-Human Rights-Value Education-HIV/AIDS-Women and Child Welfare-Role of Information Technology in Environment and human health.

Text books:

1. Benny Joseph, Environmental Studies, Mc Graw Hill Publications, 2nd Edition, 2016.
2. Kaushik, Anubha&Kauhsik, C.P., Environmental Science (As per the latest syllabus JNTU, Anantpur), New Age International Publishers, 5th Edition, 2016.
3. Dr. A. Ravikrishnan, Environmental Sciences (JNTU Anantapur), Sri Krishna Hitech Publishing company Pvt Ltd, 2016.

References:

1. G. Tyler Miller and ScotttSpoolman, Environmental Science, Cengage Learning Publishers, 15th Edition, 2015.
2. Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, Prentice Hall, 3rd Edition, 2007.
3. Cunningham, W. P. Cooper, T. H. Gorhani, Environmental Encyclopedia, Jaico publications, Mumbai, 2001.
4. ErachBharucha, Textbook of Environmental Studies for UGC, University Press, 2005.
5. B.K.Sharma Environmental Chemistry, Krishna Prakashan Media (p) Ltd, 2011.
6. V.P. Kudesia Environmental Chemistry, Pragati Prakashan Publications, 2nd edition, Meerut, 2003.

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

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IB.Tech – I Semester (CE)

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17AHS06 ENGINEERING CHEMISTRY LAB

Outcomes: After completion of practical student will be able to

1. Use volumetric analysis for the estimation of metal ions, hardness of water, and chlorides in water.
2. Demonstrate importance of viscosity index, flash point and fire point of lubricants.
3. Use of pH meter, conductivity meter and potentiometer.

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.
4. Estimation of Copper by EDTA method.
5. Estimation of Ferrous Ion by Potassium Dichromate method.
6. Determination of viscosity of oils through Redwood viscometer No.1.
7. Estimation of Ferrous Ion by potentiometry using standard Potassium Dichromate.
8. Determination of rate of corrosion by weight loss method.
9. Acid- Base titration by Conductometric method.
10. Determination of Alkalinity of water sample.
11. Determination of Flash and Fire point by using Pensky Marten's apparatus.
12. Preparation of Phenol-Formaldehyde resin.
13. Determination of Acidity of water sample .

Text books:

1. Vogel's Textbook of Quantitative Inorganic Analysis, ELBS Edition, 1994.
2. Dr K. N. Jayaveera and K.B. Chandra Sekhar "Chemistry Pre-lab manual", S.M. Enterprises Ltd., 2007

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I B.Tech – I Semester (Common to Civil Engineering, ME & AE) /

II Semester (Common to ECE, ETE, EE, EEE, CSE, IT & CSSE)

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17AME03 ENGINEERING PRACTICE LAB

OUTCOMES:

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

1. produce different prototypes in the carpentry trade such as Mortise and tenon joint, and Table stand using woodturning lathe.
2. Assess time in a Fitting trade such as Dove tail joint and Half Round joint.
3. Design basic prototypes in the trade of Tin smithy such as rectangular tray, and funnel.
4. Complete various basic House Wiring techniques such Stair case wiring (i.e. control of one lamp by two switches fixed at two different places), and wiring for tube light (Fluorescent Lamp)/Focus light.
5. Design different models in a foundry shop such as single- and two-pieces patterns.
6. Construct various basic prototypes in the trade of Welding such as T-Joint and H-Joint.

1. TRADES FOR EXERCISES:

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 given 100 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:

- a. Plumbing
- b. Machine Shop
- c. 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.

REFERENCE BOOKS:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
2. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas
3. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.
4. Engineering Workshop by Vishnu Universal Learning.
5. Engineering Workshop by GRIE institute.
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17ACS02

COMPUTER PROGRAMMING LAB

OUTCOMES:

After performing this laboratory, the students will be able to:

1. Confidently work n any C programming development environment.
2. Predict the behavior of variables using different types of storage classes.
3. Use files concept to read / write data in secondary storage area.
4. Develop programs by applying the derived data types such as structures, unions and pointers.

WEEK 1

- a) Write a C Program to exchange the values of two variables with a temporary variable and without using a temporary variable.
- b) Write a C program to generate the prime factors of a given positive integer.
- c) Write a C program to find the cosine value of a given integer by using mathematical function.

WEEK 2

- a) Sum of the individual digits means adding all the digits of a number. Ex: 123, sum of the digits is $1+2+3 = 6$. Write a C program to find the sum of individual digits of a positive integer.
- b) A Fibonacci sequence is defined as follows: the first and second terms of the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate first n terms of the sequence.

- c) Prime number is a number in which is exactly divisible by one and itself only.

Ex: 2, 3, 5, 7,

Write a c program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

WEEK 3

- a) Write a C program to convert the Celsius temperature into Fahrenheit temperature or vice versa by using a standard formula.
- b) Write a C program to construct a pyramid of numbers.
- c) Write a C program to generate Pascal's triangle.

WEEK 4

- a) Write a C program to calculate the following: $\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
- b) Write a C program, which takes two integer operands and one operator from user, performs the operation and then prints the result.(consider the operators +, -, *, /, % and use the **switch** Statement).

WEEK 5

- a) Write a C program that uses both recursive and non-recursive functions
- To find the factorial of a given integer. Factorial of a number is nothing but the multiplication of numbers from a given number to 1.
 - To find the GCD (Greatest Common Divisor) of two integers. GCD means Greatest Common Divisor. i.e. the highest number which divides the given numbers.

Ex: GCD (12,24) is 12.

Formula: $\text{GCD} = \text{product of numbers} / \text{LCM of numbers}$.

- b) Towers of Hanoi problem means we have three towers here source, intermediate and destination. We have to transfer all the disks from source to destination towers. Here the restriction is not to place a big disk on the smaller one and for this we use the intermediate tower. Finally the arrangements in the destination tower must be same as the disks in the source tower at first.

Write a C program that use recursive function to solve the Towers of Hanoi problem.

WEEK 6

- a) Write a C Program to find the largest and smallest number in a list of integers using arrays.
- b) Write a C program that uses functions to perform the following using arrays:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices

WEEK 7

- a) 2's Compliment of a number is obtained by scanning it from right to left and complimenting all the bits after the first appearance of a 1. Thus 2's Compliment of 11100 is 00100.

Write a C program to find 2's Compliment of a binary number.

- b) In converting the Roman numeral to its equivalent decimal number, we have to take ROMAN value as input and this value is converted into its equivalent decimal number.

Write a C program to convert the given Roman numeral to its decimal equivalent.

WEEK 8

- a) Write a C program that uses functions to perform the following operations:
 - i. To insert a substring into a given main string from a given position.
 - ii. To delete n characters from a given position in a given string.
- b) Write a C program to determine whether the given string is Palindrome or not.

WEEK 9

- a) Write a C program that displays the position or index in the string S where the string T begins, or 1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

WEEK 10

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

- i) Reading a complex number
- ii) writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: Represent complex number using a structure)

WEEK 11

- a) Write a C program to display the contents of a file.
- b) Write a C program which copies the contents of one file to another.

WEEK 12

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

I B.Tech – I Semester (Common to ECE, ETE, EE, EEE, CSE, IT & CSSE) /

II Semester (Common to Civil Engineering, ME & AE)

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17AHS01 ENGLISH FOR COMMUNICATION - I

OUTCOMES:

1. Communicate ideas effectively to the target audience.
2. Develop LSRW skills.
3. Apply the acquired technology in their communication.
4. Develop skills to meet the demands of Industry and corporative world.
5. Apply grammatical concepts in regular communication.

In order to improve the skills in LSRW the following course content are prescribed and divided into five units.

UNIT-I

**ENVIRONMENTAL CONSCIOUSNESS: CLIMATE CHANGE- GREEN COVER-
POLLUTION**

REMEDIAL GRAMMAR:

1. Articles
2. Prepositions
3. Tenses
4. Sentence Construction-Strategies (avoiding Repetition and ambiguity)

UNIT-II

EMERGING TECHNOLOGIES: SOLAR THERMAL POWER-CLOUD COMPUTING-NANOTECHNOLOGY

REMEDIAL GRAMMAR

1. Sentence Transformation (Degrees, Voice, Speech & synthesis)
2. Common Errors in English
3. Subject + Verb Agreement
4. Modal Verbs, Question Tags

UNIT-III

ENERGY: RENEWABLE AND NON-RENEWABLE SOURCES-ALTERNATIVE SOURCES-CONSERVATION- NUCLEAR ENERGY

VOCABULARY:

1. Roots-Prefixes-Suffixes (RPS Method)
2. Synonyms
3. Antonyms

UNIT-IV

ENGINEERING ETHICS: CHALLENGER DISASTER-BIOTECHNOLOGY-GENETIC ENGINEERING-PROTECTION FROM NATURAL CALAMITIES

Vocabulary:

1. Phrasal Verbs
2. Idioms
3. One-word substitutes
4. Words often confused

UNIT-V

TRAVEL AND TOURISM: ADVANTAGES AND DISADVANTAGES OF TRAVEL-TOURISM- ATITHI DEVO BHAVA- TOURISM IN INDIA.

Writing Practice (Composition):

1. Paragraph-Writing (Descriptive & Narrative)
2. Precise-Writing
3. Essay Writing, Expansion of Proverbs
4. Note-Making
5. Letter-Writing (Formal & Informal)

TEXT BOOKS Prescribed:

MINDSCAPES, ORIENT BLACKSWAN.

REFERENCE BOOKS:

1. M. Ashraf Rizwi, "Technical English Communication", Tata Mc Graw Hill, Latest Edition.
2. Basic communication skills for Technology, Andrea J Rutherford, Pearson Education, Asia.
3. Technical communication by Meenakshi Raman Sangeetha Sharma, Oxford
4. Oxford Practice Grammar by John Eastwood , Oxford.
5. English Pronouncing Dictionary by Daniel Jones Oxford.

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

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

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17AHS09 NUMERICAL AND TRANSFORM TECHNIQUES

Course Outcomes:

After completion of the course the student will be able to

1. Apply interpolation to solve engineering problems
2. Apply numerical solutions to solve ordinary differential equations.
3. Apply Laplace transform techniques to solve engineering problems.
4. Analyse periodic functions using Fourier Transform.
5. Solve one dimensional and two-dimensional problems using partial differential equations.

UNIT-I

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction - The Bisection method- The method of false position - Newton - Raphson method. **Interpolation:** Forward Differences - backward differences-Newton's forward and backward differences formulae for interpolation - Lagrange's interpolation formula - Inverse interpolation .Cubic Spline interpolation.

UNIT-II

NUMERICAL DIFFERENTIATION-First and second order derivatives- **Numerical integration**-Trapezoidal rule - Simpson's 1/3 rule and 3/8 th Rule- **Numerical solutions of ordinary differential equations** by Taylor's series-Picard's method of successive Approximations - Euler's and Modified Euler's Method – Runge-Kutta Methods – Predictor - corrector method - Milne's method.

UNIT-III

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-IV

FOURIER SERIES: Fourier series- Even and odd functions-Fourier series in an arbitrary interval -Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement) - Fourier sine and cosine integrals. Fourier Transforms - Fourier sine and cosine Transforms.

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 onedimensional wave equation, heat equation and two – dimensional Laplace's equation.

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

TEXT BOOKS:

1. Dr.B.S.Grewal, Higher Engineering Mathematics. Kanna Publications, 40th Edition.
2. B.V.Ramana, A Text Book Of Engineering Mathematics-I, TATA MC Grawhill
3. E. Rukmangadachari and Keshava Reddy, A Text Book Of Engineering Mathematics-I, Pearson Education.
4. T.K.V.IYENGAR, B.Krishna Gandhi And Others, A Text Book Of Engineering Mathematics –I, S.ChandAnd Company.

REFERENCES:

1. Erwin Kreyszig, Advanced Engineering Mathematics. JOHN WILEY & SONS-2016.

2. Jain.M.K, Iyengart.K.V,,Jain.R.K. Numerical Methods For Scientific And Engineering Computation. Newage International Publishers.
3. N.Bail, M.Goyal&C.Walking, A Text Book Of Advanced Engineering Mathematics- A Computer Approach.
4. Pal, Mathematical Methods, Oxford University Press, 2009.
5. S.S. Sastry, Introductory Methods of Numerical Analysis, Printice Hall of India publications, 2012.

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CO1	3	2	-	-	-	2	-	-	-	3	-	-	2	2
CO2	3	2	-	-	-	3	-	-	-	3	-	-	2	2
CO3	3	3	-	-	-	3	-	-	-	3	-	-	2	2

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17AHS03 ENGINEERING PHYSICS

OUTCOMES:

1. Apply concepts of optics, lasers and fibre optics, and their application in both scientific and technological systems
2. Determine crystal properties, Crystal defects , periodicity and structures using X-rays and various ultrasonic techniques
3. Define quantum structure of sub-atomic particles
4. Apply superconducting and magnetic materials and their applications to understand electronic devices.
5. Apply semiconductors and nanomaterials to design equipment.

UNIT - I

OPTICS:

INTERFERENCE: Introduction - Interference in thin films by reflection – Newton Rings.

DIFFRACTION: Introduction - Fraunhofer diffraction due to single slit- Diffraction spectra using Grating.

LASERS: Introduction – Laser Characteristics – Spontaneous and stimulated emission of radiation – Einstein’s coefficients – population inversion –Ruby laser - He-Ne laser- Semiconductor Laser - Applications of laser.

FIBER OPTICS: Introduction – Principle of optical fiber – Acceptance angle and acceptance cone – Numerical aperture – Classification of Optical Fibers- Attenuation in optical fibers – Optical fiber communication system- Applications of optical fibers.

UNIT - II

CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction – Space lattice – Basis – Unit cell – Lattice parameters – Crystal systems – Bravais lattices – Structure and packing fractions of Simple cubic, body centered cubic, face centered cubic crystals-Directions and planes in crystals – Miller Indices – Bragg's law – X-ray diffraction by powder method

ULTRASONICS: Introduction – Production of ultrasonic by piezoelectric method – Properties and detection of Ultrasonic waves – Applications of Ultrasonics.

UNIT - III

PRINCIPLES OF QUANTUM MECHANICS: Wave and particles – de Broglie hypotheses – Properties of Matter waves –Heisenberg uncertainty principle- Schrödinger time independent wave equation – Physical significance of wave function – Particle in one dimensional Infinite potential box

FREE ELECTRON THEORY: Classical free electron theory – Electrical conductivity – merits and demerits – Quantum free electron theory –merits and demerits - Fermi Dirac distribution - Kronig penny model qualitative only.

UNIT - IV

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

SUPERCONDUCTORS: General properties of superconductors – Meissner effect – Penetration depth – Type I and Type II superconductors – Flux quantization – Josephson effect – Application of superconductors.

UNIT - V

SEMICONDUCTORS: Introduction – Intrinsic and extrinsic Semiconductors–Fermi level- Equation of conductivity - Drift and diffusion – Einstein’s equation – Hall Effect - Solar Cell.

NANOMATERIALS: Introduction – Significance of Nano scale - Types of nanomaterials- Dimensionality – Growth of nanomaterials: Ball milling method - Sol-Gel method - Chemical vapor deposition – Properties of nanomaterials: Optical, Electrical, Mechanical and Magnetic - application of nano materials.

TEXT BOOKS:

1. Avadhanulu and Kshirasagar “A Text book of Engineering Physics” Revised Edition, S.Chand, New Delhi 2014
2. Gaur and Gupta “Engineering Physics” New Delhi, DhanpatRai Publishers, 2010
3. Thyagarajan K “Engineering Physics” Delhi, Tata Mcgraw Hill Publishers, 2013.

REFERENCE BOOKS:

1. Pillai.S.O: Solid State Physics, 6thedition, New Delhi: New Age International, 2005.
2. Chattopadhyay, K. K; Banerjee, A.N “Introduction to Nano Science and Technology” New Delhi: PHI, 2009 .
3. Resnick, Halliday and Walker “Fundamentals of Physics” 9th Edition, New Delhi: Wiley Publishers, 2010.

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

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17ACS03

DATA STRUCTURES

OUTCOMES:

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

1. Understand different types of advanced abstract data types (ADT), Data structures and their implementation.
2. Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
3. Apply various techniques for representation and manipulation of the data in the real world.
4. Choose appropriate sorting and searching mechanism based on the problem being solved.

UNIT – I

INTRODUCTION TO DATA STRUCTURES: Definition of Data Structures, Abstract Data Type, Classification of Data Structures- Linear and Non-Linear, Applications.

UNIT – II

STACKS AND QUEUES

STACKS: Basic Operations, Array representation of stacks, Stack applications-Reversing Data, Infix to Postfix Transformation, Postfix expression evaluation, Other applications of Stacks.

QUEUES: Basic Operations, Array representation of Queues, Circular Queues, Priority Queue, Dequeue, Applications of Queues.

DYNAMIC MEMORY ALLOCATION

UNIT – III

LINEAR LIST: Concepts of Linked Lists, Types of Linked Lists, Basic List Operations, Concatenating two lists, Singly Linked List implementation, Linked representations of Stacks & Queues, Doubly Linked List and its Operations, Circularly Linked List, Application of LinkedLists.

UNIT – IV

SEARCHING AND SORTING

SEARCHING: Linear and Binary search methods.

SORTING: Bubble sort, Selection sort, Insertion sort, Quick sort, Merge Sort.

UNIT – V

TREES AND GRAPHS

TREES: Basic Tree Concepts, Binary Trees, Binary Tree Traversals, Applications of Binary Trees, Binary Search Trees, Spanning Trees.

GRAPHS: Introduction, Graph Representation in C, Graph Storage Structures- Adjacency Matrix, Adjacency List, Graph Traversals, Applications.

TEXT BOOKS:

1. Richard Gilberg, Behrouz Forouzan, “Data Structures: A Pseudocode Approach with C (Data Structures Series)”, Second Edition, Cengage Learning, 2004.
2. Gav Pai, “Data Structures and Algorithms – Concepts, Techniques and Applications”, Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1. A.A.Puntambekar, “Data Structures Using C”, First Edition, Technical Publications, 2009.
2. E Balagurusamy, “Data Structures Using C”, Tata McGraw-Hill Education, 2013.

3. Ashok N. Kamthane, "Introduction to Data Structures in C", Pearson Education India,2007.
4. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan (2008), "Fundamentals of DataStructurein C", Second Edition, University Press, India.
5. <http://nptel.ac.in/courses/106105085/>(NPTEL videolectures).

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

I B.Tech, II-Semester (Civil Engineering)

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17ACE03 STRENGTH OF MATERIALS – I

OUTCOMES: After Completion of the course student will be able to

1. interpret the concept of stress and strain relationships.
2. Determine the internal forces in the beam.
3. Analyze expressions for deflection, and to identify the behavior of columns.
4. Analyze the stress state of members in tension, shear torsion and bending
5. Construct SFD, BMD, TMD Diagrams and to draw their stress diagrams

UNIT-I

SIMPLE STRESSES AND STRAINS: Elasticity and plasticity – Types of stresses and strains – Hooke's law– Factor of safety- 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 and beams – Shear force and bending moment diagrams for cantilever, simply supported and over hanging beams with point loads, uniformly distributed load, uniformly varying loads and couples – Relationship between bending moment, shear force and loading

UNIT-III

THEORY OF SIMPLE BENDING: Assumptions 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), I, T, Angle and Channel sections – 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: Differential equation of deflected beam – Slope and Deflection at a point - Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L and uniformly varying load- Mohr's theorems – Moment area method – application to simple cases.

UNIT-V

COLUMNS AND STRUTS: Introduction - slenderness ratio – Equivalent Length - Euler's formulae for long columns with different end conditions – Rankine's and I.S. Code formulae- Combined direct and bending stresses – Eccentric loading – Limit of eccentricity and core of section.

TEXT BOOKS:

1. B.C. Punmia, Ashok Kumar Jain & Arun Kumar Jain, Mechanics of Materials, Laxmi Publications.
2. R.K.Bansal, Strength of Materials, Laxmi Publications.
3. R.K.Bansal, Introduction to text book of Strength of Material, Laxmi publications Pvt.Ltd., New Delhi.
4. A.R.Basu, Strength of Materials, Dhanpat Rai & Co., Nai Sarah, New Delhi.

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II Semester (Common to Civil Engineering, ME & AE)

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17AME02 COMPUTER AIDED ENGINEERING DRAWING

(First Angle Projection)

OUTCOMES:

After completion of this course, the student will be capable to:

1. Communicate his/her ideas effectively by using orthographic projections in computer software.
2. Develop engineering drawing shapes in AutoCAD.
3. Compile the projection of points, lines, planes and solids then create virtual drawings by using computer.
4. Analyze the various sectional views and develop the surfaces of engineering objects.
5. Use the BIS and create drawings.
6. Elaborate the Conversion of 2D to 3D and vice-versa.

INTRODUCTION:

1. Information about sketch book and allotment of marks for both sketching and computer execution work.
2. AutoCAD commands and use of limits, units and dimensioning the views on computer.
3. Orthographic projections - Principles of projection – both first and third angle and symbols.
4. Practicing on computer (first classes).
5. All the problems are to be solved on the sketch book and after it is checked by the instructor, it should be executed on the computer.

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:

- a) Sketching of polygons - Triangles, Square, Rectangle, Pentagon, Hexagon, Circle at different positions.
- b) Sketching of Tangents to the circles.

2. CONICS:

Constructions of Ellipse, Parabola, Hyperbola

3. POINTS:

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

4. LINES:

- a) Sketching of lines when they are
 - i. Parallel to both H.P & V.P
 - ii. Parallel to V.P/H.P and perpendicular to H.P /V.P
 - iii. Parallel to V.P/H.P and inclined to H.P /V.P
 - iv. Inclined to both the planes
- b) Sketching of the line to measure true length & true inclinations
- c) Sketching of the line to determine the traces

5. PLANES:

Sketching of the planes when they are

- a) Perpendicular to V.P/H.P and parallel to H.P /V.P
- b) Inclined to V.P/H.P and perpendicular to H.P /V.P
- c) Perpendicular to both V.P and H.P.
- d) Inclined to both V.P and H.P.

6. SOLIDS:

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

7. SECTIONS OF SOLIDS:

- a) Different types of hatching on the polygons.
- b) Sketching of sections of solids when the section/cutting plane is
 - i. Parallel to V.P/H.P and perpendicular to H.P /V.P.
 - ii. Inclined to V.P/H.P and perpendicular to H.P /V.P.
 - iii. Perpendicular to both principal planes.

- c) Sketching of sections when the cutting plane passing through different positions- base, axis, corner, apex/vertex, generator, lateral edge.

8. DEVELOPMENT OF SURFACES:

Sketching of developed surfaces of

- a) cylinder, prisms using parallel line method
- b) cone, pyramids using radial line method
- c) truncated solids and frustum

9. ORTHOGRAPHIC PROJECTIONS:

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

10. ISOMETRIC PROJECTIONS:

- a) Setting of isometric grid
- b) 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 2e

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.

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II Semester (Civil Engineering, ME & AE)

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17AHS07

COMMUNICATION SKILLS LAB

OUTCOMES:

1. *Recognize English sounds- Monophthongs, Diphthongs and consonantal sounds.*
2. *Use correct Pronunciation in English.*
3. *Differentiate between Received Pronunciation and varieties of English.*
4. *Apply proper stress pattern in speaking English language.*
5. *Demonstrate skills to meet the demands of the industry.*

I PHONETICS: Organs of speech, speech mechanism, vowels, consonants, diphthongs, syllable division, word stress, intonation, phonetic transcription with support of speech solutions,

II TENSES: Speaking of past, present & Future, Role play.

III INFORMAL CONVERSATIONS:

Situational conversation

0. Greeting/Self-introduction
 - Expressing the cause of something
 - Describe a current situation
 - Speaking traditions/customs/public issues
 - Making plans for vacation
 - Expressing of emotions
 - Shopping –bargaining price and making purchases

IV FORMAL CONVERSATIONS:

Situational conversation

- Making an appointment
- Naming foods and describing tastes
- Reporting other person's messages
- Requesting
- Asking for directions and describing
- Making suggestions, agreements and refusals

V GROUP DISCUSSIONS:

Do's and Don'ts of a G.D. speaking on Knowledge based, controversial or abstract topics.

Prescribed software for Practice:

Sky Pronunciation, Pro-power 2 & Globarena

REFERENCE BOOKS:

1. A Text Book of English Phonetics for Indian students by T. Balasubramaniam, Macmillan Ltd., 2000.
2. Sasikumar.V and P.V. Dhamija, Spoken English: A Self-Learning Guide to Conversation Practice. 34th Reprint. Tata MCGraw Hill. New Delhi, 1993.
3. Spoken English, R.K. Bansal and J.B. Harrison, Orient Longman 2006 Edn.
4. Speaking English Effectively, Krishna Mohan & NP Singh (Macmillan)
5. Body language- Your success Mantra, Dr Shalini Verma, S. Chand & Co, 2008.

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

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17AHS08

ENGINEERING PHYSICSLAB

OBJECTIVES:

1. To understand the phenomenon of light like interference, diffraction and dispersion.
2. To understand the role of optical fiber parameters and signal losses in communication
3. To learn the diffraction studies related to application of laser.
4. To understand the application of B-H curve.

OUTCOMES:

1. The importance of optical phenomenon like interference and diffraction of light is recognized.
2. The practical knowledge of optical fiber, semiconductor, magnetic materials, lasers and their
3. relative parameters are obtained.
4. The importance of optical fibers is recognized in the field of communication.

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

1. Determine the wavelengths of given light source - Spectrometer.
2. Dispersive power of prism
3. Determine the thickness of thin wire by Interference.
4. Determine the wavelength of given laser source – Diffraction grating.
5. Determine the radius of curvature of given plano convex lens by forming Newton Rings.
6. Magnetic field along the axis of a current carrying coil – Stewart and Gee’s method.
7. Numerical Aperture of an optical fiber.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
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17ACS05 DATA STRUCTURES LAB

OUTCOMES:

After Completing this lab, the student must demonstrate the Knowledge and ability to:

1. Demonstrate the application of software engineering principles in design, coding, and testing of large programs.
2. Emphasizethespecificationofeachdatastructureasanabstractdatatypebefore discussing implementations and application of the structure.
3. Aware of the importance of structured programming methods in developing the software.
4. Know the systematic approach to study algorithms, by focuses first on understanding the action of the algorithm then analyzing it

WEEK 1

Write a C program that implements Stack & Queue operations using arrays

WEEK 2

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

- Converting Infix expression to Post fix expression.
- Evaluating the Post fix expression.

WEEK 3

Write a C program that implements Circular Queue operations using Arrays.

WEEK 4

Write a C program that implements Dequeue operations using Arrays.

WEEK 5

Write a C program that implements Stack & Queue operations using Pointers

WEEK 6

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

i)Creation ii)Insertion iii) Deletion iv)Traversal

WEEK 7

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

i)Creation ii)Insertion iii) Deletion iv)Traversal

WEEK 8

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

i)Creation ii)Insertion iii)Deletion iv)Traversal

WEEK 9

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:

i)Linearsearch ii) Binarysearch

WEEK 10

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

i)Bubble sort ii)Selectionsort iii) Insertionsort

WEEK 11

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

i) Mergesort ii) Quicksort

WEEK 12

Write a C program that uses functions to perform the following Binary Tree Traversals

a)Inorder b)Preorder c) Postorder

WEEK 13

Write a C program to implement the following graph traversals

a) Depth-FirstSearch

b) Breadth- FirstSearch

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

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17AHS10 Quantitative Aptitude and Reasoning –I

OUTCOMES:

After completion of the course the student will be able to

1. Solve Time and distance problems.
2. Apply Data interpretation to solve the problems on Line, Bar, Pie graphs.
3. Develop the thinking ability and apply Venn diagram and binary logic.
4. Apply the number series and letter analogies in problems on verbal analogy.

SYLLABUS FOR QUANTITATIVE APTITUDE

COMPETENCY 1:

1.1 Numbers

Classification of numbers - Divisibility rules - Finding the units digit - Finding remainders in divisions involving higher powers -LCM and HCF Models.

1.2 Decimal Fractions

1.3 Simplification

1.4 Square Roots & Cube Roots

1.5 **Average**

Definition of Average - Rules of Average - Problems on Average - Problems on Weighted Average - Finding Average using assumed mean method.

1.6 Problems on Numbers

1.7 Problems on Ages

1.8 Surds & Indices

1.9 **Percentage**

Introduction - Converting a percentage into decimals - Converting a Decimal into a percentage - Percentage equivalent of fractions - Problems on Percentages

1.10 **Profit And Loss & True Discount**

Problems on Profit and Loss percentage - Relation between Cost Price and Selling price - Discount and Marked Price –Two different articles sold at same Cost Price - Two different articles sold at same Selling Price - Gain% / Loss% on Selling.

1.11 **Ratio and proportion**

Definition of Ratio - Properties of Ratios - Comparison of Ratios - Problems on Ratios - Compound Ratio - Problems on Proportion, Mean proportional and Continued Proportion.

COMPETENCY 2:

2.1 **Partnership**

Introduction-Relation between capitals, Period of Investments and Shares .

2.2 **Chain Rule**

2.3 **Time & work**

Problems on Unitary method - Relation between Men, Days, Hours and Work - Problems on Man-Day-Hours method – Problems on alternate days - Problems on Pipes and Cisterns .

2.4 **Time & Distance**

Relation between speed, distance and time – Converting kmph into m/s and vice versa - Problems on average speed -Problems on relative speed –

Problems on trains -Problems on boats and streams - Problems on circular tracks – Problems on races .

2.5 **Mixtures and Allegations**

Problems on mixtures - Allegation rule - Problems on Allegation

2.6 **Simple Interest**

Definitions - Problems on interest and amount – Problems when rate of interest and time period are numerically equal.

2.7 **Compound Interest**

Definition and formula for amount in compound interest - Difference between simple interest and compound interest for 2 years on the same principle and time period.

2.8 **Logarithms**

SYLLABUS FOR REASONING

COMPETENCY 3:

3.1 Cubes

Basics of a cube - Formulae for finding volume and surface area of a cube - Finding the minimum number of cuts when the number of identical pieces are given - Finding the maximum number of pieces when cuts are given - Problems on painted cubes of same and different colors - Problems on cuboids - Problems on painted cuboids - Problems on diagonal cuts

3.2 Venn diagrams

Representing the given data in the form of a Venn diagram –Problems on Venn diagrams with two sets - Problems on Venn diagrams with three sets –

Problems on Venn diagrams with four sets

3.3 Binary Logic

Definition of a truth-teller - Definition of a liar - Definition of an alternator –

Solving problems using method of assumptions - Solving analytical puzzles using binary logic .

COMPETENCY 4:

4.1 Number and letter series

Difference series - Product series - Squares series - Cubes series - Alternate series
- Combination series - Miscellaneous series - Place values of letters.

4.2 Number and Letter Analogies

Definition of Analogy -Problems on number analogy -Problems on letter analogy
- Problems on verbal analogy.

Odd man out

Problems on number Odd man out -Problems on letter Odd man out –
Problems on verbal Odd man out .

COMPETENCY 5:

5.1 Coding and decoding

Coding using same set of letters - Coding using different set of letters –
Coding into a number - Problems on R-model .

5.2 Direction sense

Solving problems by drawing the paths-Finding the net distance travelled –
Finding the direction - Problems on clocks - Problems on shadows - Problems
on damaged compass - Problems on direction sense using symbols and notations

5.3 Critical Reasoning

Problems on assumption - Problems on conclusions –Problems on inferences –
Problems on strengthening and weakening of arguments - Problems on principle
-Problems on paradox

5.4 Lateral reasoning puzzle

Problems on common balance -Problems on digital balance -Problems on coins -
Problems on lockers -Problems on heights -Digit puzzles using basic arithmetic
operations .

TEXT BOOKS:

1. GL Barrons, Tata Mc Graw Hills, 'Thorpe's Verbal reasoning', LSAT Materials.2015.
2. R S Agarwal, 'A Modern approach to Logical reasoning' , S chand Company Ltd 2002.

REFERENCE BOOKS:

1. Abhjit Guha 'Quantitative Aptitude' Tata Mc Graw Hills, 4th Edition, 2011.
2. R S Agarwal, 'Quantitative Aptitude' S. Chand Company Ltd 2008.
3. G.L BARRONS 'Quantitative Aptitude'. Tata Mc Graw Hills,2014

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

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17AHS11

INTELLECTUAL PROPERTY RIGHTS

Outcomes:

The course should enable the students to:

1. Explore the knowledge in determination of trade secrets status.
2. Relate new developments in trade law.
3. Infer complexities involved in the process of attributing intellectual property rights
4. Infer the legalities of intellectual property to avoid plagiarism and other IPR relates crimes like copyright, infringements, etc.
5. interpret the fundamental principles and the application of those principles to factual, real-world disputes.

UNIT-I INTRODUCTION TO INTELLECTUAL PROPERTY

Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT-II TRADE MARKS

Purpose and function of trademarks, acquisition of trademarks rights, protectable matter, selecting and evaluating trademark, trademark registration processes.

UNIT-III LAW OF COPYRIGHTS AND LAW OF PATENTS

Fundamentals of copyrights law, originality of material, rights to reproduction, rights to perform the work publicly, copyright ownership issues.

Copyright registration, notice of copyright, international copyright law, foundation of patent law, patent searching process, ownership rights and transfer.

UNIT-IV TRADE SECRETS AND UNFAIR COMPETITION:

Trade secrets law, determination of trade secrets status, liability for misappropriations of trade secrets, protection for submission, trade secrets litigation, misappropriation of right of publicity and false advertising.

UNIT-V NEW DEVELOPMENTS OF INTELLECTUAL PROPERTY

New developments in trade law, copyright law, patent law, intellectual property audits international overview of intellectual property, international-trademark law, copyright law, international patent law, international development in trade secrets law.

TEXT BOOKS:

1. Deborah. E. Bouchoux, “Intellectual Property Right”, Cengage Learning, 4th Edition, 2013.
2. Prabuddha Ganguli, “Intellectual Property Right: Unleashing the Knowledge Economy”, Tata McGraw Hill Publishing Company Ltd., 3rd Edition, 2005.

REFERENCE BOOKS:

- 1.Catherine J.Holland, “Intellectual Property: Patents, Trademarks, Copyrights, Trade Secrets”, Entrepreneur Press, CDR Edition, 2007.
- 2.Stephen Elias, “Patent, Copyright & Trademark: A Desk Reference to Intellectual Property Law”, LisaGoldoftas Publishers, Nolo Press, 1996.

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

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17AHS12

CLINICAL PSYCHOLOGY

OUTCOMES:

The course should enable the students to:

1. Develop the knowledge pertinent to the organism, developmental, social and situational factors those are relevant to the initiation and maintenance of human behavior.
2. Understand the present and implement effective strategies to deal with these issues during work with patients.
3. Interpret professional identity and practice as clinical psychologists through fundamental knowledge of psychology, commitment to professional ethics.
4. Use the concepts of multiculturalism, diversity and participation for life-long learning.

UNIT-I BASIC PSYCHOLOGY

Introduction: Psychology, definition, psychology as a science, early schools of psychology, modern perspectives, methods of psychology, experimental method, systematic observation, case study method, survey method, fields of psychology.

UNIT-II BIOLOGY OF BEHAVIOR AND SENSORY PROCESS

Neurons and synapses: Nervous system, peripheral and central nervous system: brain and sleep: importance of fore brain, association cortex, left and right hemisphere functions; Some general properties of senses, subliminal stimuli, the visual sense, auditory sense, the other senses; Consciousness, meaning, functions, divided consciousness, stages of sleep, dreams, meditation, hypnosis.

UNIT-III ATTENTION AND PERCEPTION

Selective attention; physiological correlates of attention, internal influences on perception, learning set, motivation and emotion, cognitive styles. External influences on perception, figure

ground, movement, illusions, perceptual organization, constancy, depth perception, binocular and monocular cues.

UNIT-IV MOTIVATION AND EMOTION MOTIVES

Definitions, motivation cycle, theories of motivation, biological motivation, social motives, frustration and conflicts of motives, defense mechanism, emotion, expression and judgment of emotion, the physiology of emotion, theories of emotion.

UNIT-V CLINICAL PSYCHOLOGY & MENTAL HEALTH

History of clinical psychology and its role in understanding and alleviation of mental illness, promotion of mental health and rehabilitation of the mentally ill, role and functions of clinical psychologists in DMHP, professional code of conduct and ethical issues.

TEXT BOOKS:

1. M. S. Bhatia, “Clinical Psychology”, B J Publishers,1st Edition, 2008.
2. Paul Bennett, “Abnormal and Clinical Psychology: An Introductory Textbook”, Pearson Publishers,2nd Edition, 2006.

REFERENCE BOOKS:

1. Robert A. Baron, GirishwarMisra, “Psychology: Indian Subcontinent Edition”, Pearson Education, 5th Edition, 2009.
2. HillGard, E. R., C.A. Richard, L.A.Rita, “Introduction to Psychology”, Oxford and IBH, New Delhi, 6th Edition, 1976.

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

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17AHS13

GERMAN LANGUAGE

Outcomes:

The course should enable the students to:

1. Complete reading, writing, speaking, and listening assignments with ever increasing proficiency and accuracy.

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 SENTENCES FORMATION

Infinite sentences, use of conjunctive and conjunctive ii (contd.) plusquam perfect, modal verb (contd.) 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 (co-ordinating and subordinating), simple, complex and compound sentences, active and passive voice, relative pronouns.

UNIT-IV PURPOSE OF LANGUAGE STUDY

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17AHS15 PROBABILITY AND STATISTICS

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

1. sample the data and analyze it.
2. optimize a function with two or more variables.
3. apply suitable tests and evaluate the acceptance of the hypothesis.
4. evaluate different estimations and hypothesis to make inferences.
5. forecast data using correlation and Regression Techniques.

UNIT I

RANDOM VARIABLES & THEORITICAL DISTRIBUTIONS: Discrete and Continuous random variables – Distribution Functions – Moment generating functions. Binomial Distribution – Poisson Distribution – Normal Distribution – related properties.

UNIT II

CORRELATION AND REGRESSION: Karl pearson coefficient of correlation – Spearman Rank correlation – Regression lines – x on y and y on x – Angle between Regression lines
SAMPLING DISTRIBUTIONS Populations and Samples – Sampling distributions of means.

UNIT III

ESTIMATION: Point Estimation – Interval estimation – Bayesian estimation.

TESTING OF HYPOTHESIS: Type I error and Type II errors, One tail, two tail tests - Hypothesis concerning one and two means – Hypothesis concerning one and two proportions.

UNIT IV

TESTING OF SIGNIFICANCE: Student- t-test, F-test, Chi-square [χ^2] test: χ^2 test goodness of fit – the analysis of RxC tables

ANALYSIS OF VARIANCE - One way and Two way classifications.

UNIT V

STATISTICAL QUALITY CONTROL: Introduction to Quality Control, Construction of \bar{X} , Range chart, C - chart and P charts.

QUEUING THEORY: Introduction - Pure Birth and Death process- M/M/1 Model – Problems on M/M/1 Model.

Text Books:

1. Iyengar. T.K.V., Krishna Gandhi B., Probability & Statistics, New Delhi, S.Chand & Company, 2012.
2. Miller and John Freund. E, Probability & Statistics for Engineers, New Delhi, Pearson Education, 2004.

References:

1. Shahnaz Bathul, A text book of Probability & Statistics, Vijayawada, V.G.S. Books links, 2010.
2. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan chand publications, 2007
3. Arnold O Allen, Probability & Statistics, , Academic Press, 2010
4. Ahmed Waheedullah, Ahmed Mohiuddin. M, Sulthan Ali, Probability & Statistics, Hyd, Hitech Publishers, 2006.

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

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17ACE04

STRENGTH OF MATERIALS –II

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

1. Evaluate principal stresses and strains for axial loading, Inclined plane for biaxial stresses.
2. Analyse the close and open coiled helical springs and torsion of circular shafts.
3. interpret the principles of thin and thick cylinders and apply the same for unsymmetrical bending problems.
4. Analyse the beams

UNIT I

PRINCIPAL STRESSES AND STRAINS: Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – 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 – Principal stresses and strains – Analytical and graphical solutions.

THEORIES OF FAILURES: Various Theories of failures like Maximum Principal stress theory –Maximum Principal Strain theory – Maximum shear stress theory – Maximum strain energy theory –Maximum shear strain energy theory.

UNIT II

THIN CYLINDERS & THICK CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – Changes in dia. and volume of thin cylinders – Thin spherical shells. Introduction Lamé’s theory for thick cylinders – Derivation of lamé’s formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – necessary difference of radii for shrinkage – Thick spherical shells.

UNIT III

TORSION OF CIRCULAR SHAFTS: Theory of pure torsion – Derivation of Torsion equations: – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

SPRINGS: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple –springs in series and parallel – Carriage or leaf springs.

UNIT IV

PROPPED CANTILEVERS: Analysis of propped cantilevers 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

CONTINUOUS BEAMS: Analysis of two span continuous beams using Clapeyron's Theorem(Theorem of three moments).

UNIT V

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

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.

Reference Books:

1. Subramanian, 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, Charotar 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
CO1	3	2	--	2	--	--	--	--	--	--	--	--	2	--
CO2	3	2	--	2	--	--	--	--	--	--	--	--	2	--
CO3	3	2	--	2	--	--	--	--	--	--	--	--	2	--
CO4	3	2	--	-	--			--	--	--	--	--	2	--

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17ACE05 BUILDING MATERIALS AND CONSTRUCTION

Outcomes: After completion of the course the Students will be able to

1. Identify the relevant physical and mechanical properties pertaining to the construction industry.
2. Demonstrate the relevant BIS testing procedure to be carried out to ascertain the quality of building materials.
3. Select modern construction material appropriate to the climate and functional aspects of the buildings and know about the causes of deterioration, crack pattern and damages.
4. Select construction technique to be followed in brick, stone and hollow block masonry, Concreting, flooring, roofing, plastering and painting etc.

UNIT I

INTRODUCTION: Importance – Classification of construction materials – Properties of materials. IS Standards for Building materials and construction.

STONES: Properties of building stones – Relation to their structural requirements –Classification of stones – Dressing of stones – Natural bed – Testing of stones.

BRICKS: Composition of good brick earth – Methods of manufacturing of bricks –Comparison between clamp burning and kiln burning –Qualities of a good brick-Testing of bricks.

TILES: Characteristics of good tile- Manufacturing methods-Types of tiles – Testing of tiles.

UNIT II

STEEL: Importance – Types of steels- Properties of steels and usage-Testing procedures of steels.

CEMENT: Functions of ingredients of cement – Properties of cement – Types of cements – Testing of cements – Hydration of cement and hydration products.

CONCRETE: Importance of W/C Ratio, Strength, ingredients including admixtures, workability, testing for strength, elasticity, non-destructive testing.

WOOD: Structure – Properties – Seasoning of timber- Classification of various types of wood used in buildings –Defects in timber.

Modern Materials of construction: Galvanized iron, Fiber-reinforced plastics, steel aluminum, Properties and uses of iron, aluminum, glass, plastic, rubber, gypsum.

UNIT III

BUILDING COMPONENTS: Foundation, Sub and Super structure, roofing, doors and windows and flooring.

FOUNDATIONS: Shallow foundations – Spread, combined strap and mat footings.

FLOORS: Materials used-Different types of floors-Concrete, mosaic, terrazzo, tiled floors.

ROOFS: Pitched, flat and curved roofs _ Lean-to-roof, couple roofs, trussed roofs-King and queen post trusses – RCC roofs.

UNIT IV

SURFACE FINISHES: Plastering – Pointing – White washing and distempering –Damp proofing- Painting – Constituents of paint – Types of paints – Processing and defects of painting. Form work and scaffolding.

BUILDING SERVICES:

VENTILATION: Necessity – Functional requirements – Natural and mechanical ventilation.

LIGHTING: Day and artificial lighting – Types of lighting in working places.

FIRE PROTECTION: Causes – Fire load – General fire safety requirements – Fire resistant construction, rain water harvesting for buildings.

GREEN BUILDING: Outlines of Green Building Concept.

UNIT V

Staircases: Technical terms; Types of stair-cases, design considerations.

Acoustics Of Buildings: Important Technical terms; Factors to be considered in Acoustics of building; Sound absorbing materials; Sound insulation.

Scaffolding, Shoring, Under Pinning And Form Work: Types of scaffolding; Types of shoring; Methods of underpinning; Types of formwork; Centering.

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, Building construction, Tenth Edition, 2012, Laxmi Publications (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, New Delhi.
3. Bureau of Indian Standards, National Building Code of India-2005, New Delhi.
4. R.N.Raikar, Diagnosis and treatment of structures in distress, Published by R&D Centreof 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
CO1	3	--	--	--	--	--	--	--	--	--	--	--	3	2
CO2	3	--	--	--	--	--	--	--	--	--	--	--	2	2
CO3	3	--	--	--	--	--	--	--	--	--	--	--	3	1
CO4	3	--	--	--	--	2	2	--	--	--	--	--	2	2

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17ACE06

FLUID MECHANICS

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

1. Analyse fluid flow under static and dynamic conditions using fundamental principles.
2. Analyse the different types of flows, momentum applications.
3. Analyse the boundary layer problems.
4. Analyse the pipes flows and its losses and know the application of Moody's chart.
5. Use working principles of different flow measuring devices in engineering practice

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. Dr R.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

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3	1	0	3

17ACE07

SURVEYING

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

1. Apply the basic principle of surveying and usage of surveying instruments in all civil engineering activities, including the construction of buildings, bridges, roads and high ways, pipe lines, dams, ports and harbours
2. Apply demarcation of ownership and / or delimitation of land, property, etc through surveying process.
3. Select surveying techniques to collect data for planning, designing and execution, able to employ green field.
4. Use total station and able to assess the electromagnetic distances.

UNIT I

INTRODUCTION: Principle of Surveying. Different types of Surveys. Overview of plane surveying (chain, compass and plane table surveying)

ANGLES, AZIMUTHS AND BEARINGS: Units of angle measurement. Meridians, bearings, Whole circle bearing system and reduced bearing system. Surveyor and prismatic compass
Magnetic declination, Local attraction and its corrections

UNIT II

LEVELLING: Concept and Terminology, Temporary adjustments for a dumpy level. Determinations of Reduced Levels by Height of Instrument (HI) and Rise and Fall Methods.

CONTOURS: Basic terminology. Characteristics and Uses of contours-Methods of conducting contour surveys. Methods of plotting contours

UNIT-III

COMPUTATION OF AREAS AND VOLUMES: Computation of areas and volumes for regular and irregular boundaries (Mid ordinate rules, Trapezoidal rule, Simpson's one-third rule). Determination of the capacity of reservoir, volume of barrow pits .

THEODOLITE: Theodolite, description, uses and temporary adjustments Measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Sources of error in Theodolite work (Instrumental, Personal, and Natural).

UNIT IV

CURVES: Types of curves, design and setting out-simple and compound curves.

TOTAL STATION: Introduction to total station. Advantages and disadvantages, types, measuring angles . Electronic distance measurements.

UNIT V

GLOBAL POSITIONING SYSTEM (GPS): Principles and operation. Coordinate systems for GPS. Fundamentals of GPS positioning. Errors in GPS observations.

REMOTE SENSING: Principles of Remote sensing, different types of satellites, Simple Image Processor, Digital Index number (DIN), Digital Elevation model (DEM)

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
CO1	3		--	--	--	--	--	--	--	--	--	--	2	2
CO2	3	3	--	--	--	--	--	--	--	--	--	--	2	2
CO3	3	3	--	--	2	--	--	--	--	--	--	--	2	2
CO4	3	3	--	3	2			--	3	3	--	2	2	2

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II B.Tech – I Semester (CE)

L	T	P	C
3	0	0	3

17ACE08 BUILDING PLANNING AND COMPUTER DRAFTING

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

1. Implement the regulations for layout planning and preparation of drawings.
2. Prepare building drawings for residential building and hospital buildings.
3. Prepare scheduling and network planning of a construction project.
4. Draw the symbols and plan of a residential building using Auto Cad Software.

PART-A

UNIT I

Principles of Building Planning: Introduction – Selection of Site – Orientation, location of buildings, thermal comfort, roominess, grouping, circulation, privacy, sanitation, elegance, economy, flexibility and practical considerations, Eco system concept.

UNIT II

Building Bye-laws and Regulations: Introduction-Objectives of building bye-laws-Principles underlying building bye laws-Terminology – Floor area ratio (FAR), Floor space index (FSI)- Classification of buildings-Open space requirements- Built up area limitations-Height of the buildings-Wall Thickness-Lighting and ventilation requirements.

Planning of Residential Buildings: Introduction-Minimum standards for various parts of the buildings - Requirements of different rooms and their grouping-Verandah-Drawing room –Bed Room-Kitchen-Dining room-Store room-Bath room-Water closet-Staircase-Garage.

UNIT III

Planning of Public Buildings: Introduction-Educational buildings-Hospitals and dispensaries- Office buildings-Banks-Industrial buildings-Hotels and motels-Buildings for recreation.

PART-B

UNIT IV

DRAWING EXERCISES (Hands on Exercises):

- 1 a) Conventional signs used in building drawing
b) Doors, windows and ventilator
- 2 Single storied residential building with RCC Roof.
- 3 Drawing plan, elevation and section of a single storied residential building for the given line sketch and specifications
- 4 Drawing plan, elevation and section of an industrial building for the given line sketch or specifications
- 5 Drawing of plan, elevation and section of a Educational building roof for the line sketch or specifications
- 6 Drawing of plan, elevation and section of an Hospital building roof for the line sketch or specifications
- 7 Drawing of plan, elevation and section of an Bank building roof for the line sketch or specifications

Note: Subject to the availability of classes, there shall be 10 (Ten) drawing classes of three periods each.

LIST OF EXPERIMENTS:

- 1) Introduction to CAD and Drawing of Conventional Signs (Computer Aided Drafting).
- 2) Practice exercise on Doors and Windows.
- 3) Practice exercise on drawing plan, elevation and section of Single storey residential building.
- 4) Practice exercise on drawing plan, elevation and section of Multi storey residential building.
- 5) Practice exercise on drawing plan, elevation and section of Industrial building.
- 6) Practice exercise on drawing plan, elevation and section of Educational building.
- 7) Practice exercise on drawing plan, elevation and section of Hospital building.
- 8) Practice exercise on drawing plan, elevation and section of Bank building.

FINAL EXAMINATION PATTERN:

The end examination paper shall consist of **Part A** and **Part B**. Part A consists of three questions (from the syllabus of the Units I, II, & III), out of which two questions are to be answered. Each question carries 15 marks. Part B consists of compulsory question with internal choice (from the syllabus of Unit IV) for 30 marks.

FOR INTERNAL ASSESSMENT:

Out of the total sessional marks of 40 allotted for this subject, 35 marks are to be awarded based on the performance in the two sessional examinations, 5 marks are to be awarded based on the day to day work of submission of drawing sheets.

Text Books:

1. Gurucharan Singh and Jagadish Singh, Planning and Designing and Scheduling, 2014, Standard publishers, New

Delhi.

2. Kumaraswamy N., Kameswara Rao A., Building planning & Drawing, Seventh Edition, 2013, Charotar Publishing.

New Delhi.

Reference:

1. Building by laws by state and Central Governments and Municipal corporations.

2. Shah.M.G., Building drawing, 2002, Tata McGraw-Hill, 1992.

3. S.C.Rangwala, Civil Engineering Drawing, Second Edition, 1991, Charotar Publishing House., New Delhi.

4. Dr.B.C.Punmia & Khandelwal, PERT and CPM, Fourth Edition, 2002, Project planning and control, Laxmi

Publications.

5. Bureau of Indian Standards, National Building Code of India, 2016, 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	2	--	1	2	--	--	--	1	--	--	1	3	--
CO2	3	2	--	1	2	--	--	--	1	--	--	1	2	--
CO3	3	2	--	1	2	--	--	--	1	--	--	1	3	--
CO4	3	2	--	1	2	--	--	--	1	--	--	1	2	--

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II B.Tech – I Semester (CE)

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0	0	2	1

17ACE12

FLUID MECHANICS LAB

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

1. Calibrate Venturimeter & Orifice meter
2. estimate losses in flows
3. Analyze the coefficient discharge for small orifice and external mouth piece.
4. Calculate the coefficient discharge for different notches.

List of Experiments:

1. Verification of Bernoulli's equation
2. Determination of loss of head in a sudden contraction.
3. Determination of friction factor for a given pipe.
4. Calibration of Venturimeter
5. Calibration of Orifice meter
6. Determination of Coefficient of discharge for a small orifice by a constant head method.
7. Determination of Coefficient of discharge for an external mouth piece by variable head Method.
8. Calibration of contracted Rectangular Notch and
9. Calibration of contracted Triangular Notch
10. Determination of coefficient of discharge by Turbine flow meter
(Demonstration Experiments).

REFERENCE BOOK:

1. Dr.N.KumaraSwamy, Fluid Mechanics and Machinery Laboratory manual, First Edition,2008, Charotar publishing House Pvt.Ltd., Anand.

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

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II B.Tech – I Semester (CE)

L	T	P	C
0	0	3	1.5

17ACE13

SURVEYING LAB

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

1. Demonstrate operation of various survey instruments for computation of area of a land.
2. Conduct 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.
3. Enumerate accurate measurement of horizontal and vertical angles by theodolite and total station.
4. Compute 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 by the 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.

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0	0	3	1.5

17ACE14 CIVIL ENGINEERING MATERIAL TESTING LAB

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

1. Estimate Young's modulus, torsional rigidity of mild steel rods.
- 2 Estimate hardness of mild steel and HYSD specimens.
3. Analyze the strength of wood, concrete, stone and bricks.
4. Assess the quality of wood, concrete, stone and bricks

LIST OF EXPERIMENTS

1. Study the stress–strain characteristics of mild steel rod using universal testing machine.
2. Determination of compressive strength of wood and concrete cube using compressive testing machine.
3. Determination of direct shear strength of rod using compressive testing machine.
4. Estimation of the modulus of elasticity of given material by measuring deflection in beams
 - a. Simply supported beam.
 - b. Over hanging beam.
5. Determination of the modulus of rigidity of given material using torsion testing machine.
6. Determination of the modulus of rigidity of given material using spring testing machine.
7. Determination of Brinnell's hardness & Rock well hardness numbers of given material.
8. Determination of impact strength (Izod and Charpy) using impact testing machine.
9. Determination of the compressive strength of a stone sample.
10. Test on bricks – Water absorption, Efflorescence, Compressive strength

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II B.Tech – I Semester (CE)

**17AME64 INTRODUCTION TO ENGINEERING PROJECTS
(EPIC – I Activity based course)**

Lecture / Activity: 2/ Week

Int. Max Marks: 40

Ext. Max Marks: 60

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

1. Define various disciplines technology and engineering challenges.
2. Judge the responsibilities as professional engineer in solving the societal problems.
3. Develop the broad set of skills needed to be successful in the changing global workplace and world.
4. Identify the new opportunities to formulate and solve engineering problems.
5. Predict the importance of oral, written and academic skills.
6. Adopt social context of engineering practice.
7. Apply engineering reasoning to problem solving.
8. Integrate working with multi-disciplinary teams and build team work skills.

UNIT - I

Engineering Process: Brief history of engineering and technology, engineering as a profession, science Vs engineering, stages of design – from the world of imagination to world of objects.

Assignment: Report on an identified technological evolution and factors driving technological evolution.

UNIT – II

Opportunity Identification: Opportunity Identification from inspiration – an act of creative awareness, how to find inspiration, brainstorming method for identifying opportunities. Methods of evaluating opportunities. Case studies.

Assignment: Identify new potential opportunities based on the customer pain points and evaluate them to identify real opportunities.

UNIT – III

Conceptualization: Methods for generating ideas to solve the customer pain points including brainstorming, concept maps, and SCAMPER.

Assignment: Application of idea generation methods to improve an existing product

UNIT – IV

Skill Development: Sketching, Prototyping Communication. Interaction with peers, demonstration of projects developed by senior students and alumni.

UNIT – V

Project Work: An open-ended design project executed from opportunity to prototype. Culminating with a presentation, model, display and report.

Text books:

1. Karl Aspelund, “The Design Process –Fairchild books”, Bloomsbury Publishing Inc.
2. ND Bhatt, “Engineering Drawing, Plane and Solid Geometry”, Charotar Publishing House Pvt. Ltd., Publishers of Engineering Text Books.

References:

1. Paul H Wright, “Introduction to Engineering”, John Wiley and Sons, Inc.
2. SaeedMoaveni, “Engineering Fundamentals: an Introduction to Engineering”, Cengage Learning, printed in USA.
3. Reymond B Landis, “Studying Engineering: A Road Map to rewarding career”, Discovery press.

E-books:

1. Robin Mckenzie and Robin Mckenzie, “Product Design and Engineering”.
2. IdrisMootee, “Design Thinking for strategic Innovation”, Wiley publication.
3. Carl Liu, “Innovative product design practice”.

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II B.Tech – I Semester CE, ME & AE

II B. Tech - II Semester: EEE, ECE, CSE & IT

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17AHS19 QUANTITATIVE APTITUDE AND REASONING –II

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

1. Evaluate various real-life situations by resorting to analysis of key issues and factors.
2. Define various languages structures.
3. Demonstrate different principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
4. Explore the possibilities of utilization of concepts of reasoning.

Syllabus for Quantitative Aptitude

Competency 1:

Area : Formulas for Areas - Problems on Areas, **Volumes & Surface Areas :** Problems on volumes - Problems on Surface Areas, **Races & Games of Skill , Calendars :** Definition of a Leap Year - Finding the number of Odd days - Framing the year code for centuries - Finding the day of any random calendar date , **Clocks :** Finding the angle when the time is given - Finding the time when the angle is known - Relation between Angle, Minutes and Hours - Exceptional cases in clocks , **Stocks & Shares, Permutation and Combinations:** Definition of permutation - Definition of Combinations - Problems on Combinations.

Competency 2:

Probability: Definition of Probability - Problems on coins - Problems on dice - Problems on Deck of cards - Problems on Years. **True Discount, Banker's Discount, Heights & Distances, Odd man out & Series:** Problems on number Odd man out - Problems on letter Odd man out - Problems on verbal Odd man out. **Data Interpretation:** Problems on tabular form - Problems on Line Graphs - Problems on Bar Graphs - Problems on Pie Charts.

Syllabus for Reasoning

Competency 3:

Deductions: Finding the conclusions using Venn diagram method - Finding the conclusions using Venn diagram method - Finding the conclusions using syllogism method. **Connectives:** Definition of a simple statement - Definition of compound statement - Finding the Implications for compound statements - Finding the Negations for compound statements.

Competency 4:

Analytical Reasoning puzzles: Problems on Linear arrangement - Problems on Circular arrangement - Problems on Double line-up - Problems on Selections - Problems on Comparisons.

Competency 5:

Blood relations: Defining the various relations among the members of a family - Solving Blood Relation puzzles - Solving the problems on Blood Relations using symbols and notations.

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

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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II B.Tech – I Semester : CE, ME & AE

II B. Tech - II Semester: EEE, ECE, CSE & IT

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17AHS20

LEGAL SCIENCES

0 0 0 0

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

1. Apply comparative public laws and human rights.
2. Use appropriate Principles of corporate law.
3. Analyse law with scientific methods.

UNIT-I

CONCEPT OF LEGAL SCIENCE: Fundamentals of legal science- law systems in India, comparative public law-law and justice in a globalizing world-Impact of the human rights instruments on domestic law.

UNIT-II

TECHNOLOGY & LEGAL SYSTEMS: Principles of corporate law conjunction-temporal, subordinate clauses complex sentences-intellectual property rights- contract law-cyber law.

UNIT-III

CONSTITUTION AND ADMINISTRATIVE LAW: Minorities law-human rights-international and national sphere-media law-Health law-globalization vis-à-vis human rights-significance of human rights.

UNIT-IV

HUMAN RIGHTS INTERNATIONAL AND NATIONAL SPHERE:

Human rights with special reference to right to development-rights of disadvantaged and vulnerable groups-critical analysis-cultural relativism and human rights-human rights in the Indian sphere-an over view-constitution and the analysis of preamble-social action litigation and

the role of Indian judiciary-critical examination of the human rights council and human rights commission-treaty mechanism with respect to covenants ICESCR and ICCPR-convention on the elimination of discrimination against women and child rights convention.

UNIT-V

SCIENTIFIC METHODOLOGY IN LEGAL SYSTEMS: The science of research and scientific methodology - analysis of law with scientific methods-scientific approach to socio legal problems, interrelation between speculation-fact and theory building fallacies of scientific methodology with reference to socio legal research-inter-disciplinary research and legal research models-arm chair research vis-a-vis empirical research-legal research-common law and civil law legal systems.

Text Books:

1. Robert Watt, "Concise book on Legal Research", Abe Books Publishers, 1st Edition, 2015.
2. Ram Ahuja, "Research Method", News Way Publishers, 1st Edition, 2012.
3. Goode, Hatt, "Research Methodology", Eastern Limited Publication, 1st Edition reprinted, 2006.

Reference Books:

1. Somekh, C. Lewin, "Research Methods", Vistaar Publications, 1st Edition, 2005.
2. Bhandarkar, "Research Methods, Research Styles and Research Strategies", Wilkinson Publishers, 1st Edition, 2009.

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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17AHS21

GENDER SENSITIVITY

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

1. Explain basic concepts relating to gender and to provide logical understanding of gender roles.
2. Analyze present various perspective of body and discourse on power relationship.
3. Develop cultural construction of masculinity and femininity.

UNIT-I

INTRODUCTION: Sex and gender; types of gender, gender roles and gender division of labour, gender stereotyping and gender discrimination-the other and objectification, male gaze and objectivity

UNIT-II

GENDER PERSPECTIVES OF BODY: Biological-phenomenological and socio-cultural perspectives of body, body as a site and articulation of power relations- cultural meaning of female body and women's lived experiences -gender and sexual culture.

UNIT-III

SOCIAL CONSTRUCTION OF FEMININITY: Bio-social perspective of gender, gender as attributional fact, essentialism in the construction of femininity, challenging cultural notions of femininity.

Butler, Douglas, Foucault and Haraway, images of women in sports, arts, entertainment and fashion industry, media and feminine identities.

UNIT-IV

SOCIAL CONSTRUCTION OF MASCULINITY: Definition and understanding of masculinities, sociology of masculinity, social organization of masculinity and privileged position of masculinity, politics of masculinity and power, media and masculine identities.

UNIT-V

WOMEN'S STUDIES AND GENDER STUDIES: Evolution and scope of women's studies, from women's studies to gender studies: A paradigm shift, women's studies vs. gender studies, workshop, gender sensitization through gender related.

Text Books:

1. Gender, "How Gender Inequality Persists in the Modern World", Oxford University Press, Reprinted Edition, 2011.
2. William M Johnson, "Recent Reference Books in Religion", Duke University Publications, Reprinted Edition, 2014.

Reference Books:

1. Alolajis. Mustapha, Sara Mils, "Gender Representation in Learning Materials", Pearson Publications, 1st Edition 2015.

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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II B.Tech – I Semester : CE, ME & AE

II B. Tech - II Semester: EEE, ECE, CSE & IT

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17AHS22

FRENCH LANGUAGE

0 0 0 0

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

1. Develop language skills
2. Communicate in French which is the second most commonly used language worldwide.

UNIT-I

INTRODUCTION & PRESENTATION: Conversation, Introduction, Grammar verb “appeller”, Alphabets & Accents Culture, Formal & Informal – Use of ‘tu’ and ‘vous’, Map of France: Geographical & Administrative Greeting & Taking leave, presenting oneself, someone to someone, Asking & giving identity Grammar- Definite articles (le,la,les,l’) ,Pronouns-Verb ‘avoir’ and ‘etre’, Negatives (ne ~ pas) Days of the week, Months of the year, Numbers, Nationality, Profession, Making a visiting Card Salutations & Taking leave, Gestures & Handshakes.

UNIT-II

RENDEZVOUS: Conversation, Approaching someone, Tele conversation, Give direction to places, Buying a train ticket. Grammar-Verbs “aller”, “partir”, “venir”, “prendre”, Definite & Indefinite Articles, Numbers the formula to write a post card, Culture, Life in France.

UNIT-III

AGENDA & INVITATION: Conversation, Time, Fixing a meeting, Grammar-Pronoun ‘on’, Expression of quantity with partitif article. Possessive Adjectives, verbs “finir” and “faire”, Alimentation, Moments of the day, from morning to night. Culture, Punctuality, Good moments of the day, Inviting someone, Accepting & Refusing Invitations, Family tree, Describing a house-interior, Grammar-Passe Compose, Verbs “savoir”, “vouloir” , “pouvoir”, Future Proche, Pronom Tonique Consists of exercises and images to be used in the class by the students.

UNIT-IV

VACATION & SHOPPING:

Describing an event in Past tense, Reservations at a Hotel, Describing a person – Physical & Moral, Expressing opinion, Grammar- Imparfait& Passe Compose, 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, Grammar- Adjectives, Comparison, Dress & weather, Dialogue between a client and an employee of a store, Culture, Money in everyday life in France- Parking ticket / telephone card.

UNIT-V

ITINERARY, EXCURSION & WEEKEND: Asking for way / direction, Giving directions, Giving order / advice / prohibition, Numbers – ordinal Verbs of Movement, Reservation at a restaurant, Taking an order / Asking for bill(Restaurant)Expression of Quantity, Alimentation – portions, Shopping list (portions),Making Suggestion & Proposal, Going for an outing, Acceptance & Refusal of an invitation, Giving arguments / favour & against, Subjonctif-II faut, pour que Invitation – Refusal or acceptance, A French Weekend.

Text Books:

1. CAMPUS 1 Methode de Francais, Jacques Pecheur et Jacky Girardet, CLE International Paris 2002.
2. La France de toujours, Nelly Mauchamp; CLE international., 2005
3. Sans Frontieres - Vols. 1, 2, & 3 – Hachette, 2004

Reference Books:

1. Declic 1; Jacques Balnc, Jean-Michel Cartier, Pierre Lederlion; CLE International, 2004.
2. Nouveau Sans Frontieres – Vols. 1, 2 & 3., (French Edition) (9782090334609): Philippe Dominique: Books.1989
3. Cours de langue et de civilisation Francaise – Hachette, Editeur : **Hachette**; Édition : 01 (1 janvier 1967); Collection : **Hachette**; Langue : **Français**; ISBN-10: 2010079442; ISBN-13: 978-2010079443, 1986.

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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II B.Tech – II Semester (CE)

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3	0	0	3

**17AMB01 MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to All Branches)**

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

1. Describe concepts of managerial economics
2. Develop an understanding of economic principles and develop skills in high-level problem solving and critical thinking
3. Evaluate the economic environment and the impact of governmental economic policies on consumers and financial institutions.
4. Apply 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 Even Point (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.

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II B.Tech – II Semester (CE)

L	T	P	C
3	1	0	3

17ACE16 REINFORCED CONCRETE STRUCTURES –I

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

1. Apply the basic concepts of limit state method of design for reinforced concrete structural elements such as beams.
2. Analyse the stability of structures for shear, torsion, deflection & development length to design using Limit State of Serviceability.
3. Design beams, under limit state design method
4. Detail (Drawings) the reinforcement of beams.
5. Apply IS code to design of various structural elements using Limit state design.

UNIT I

Introduction: Design Philosophies – Working stress method, Ultimate load method and Limit state method.

Design of Beams: Working Stress Method- Assumptions – permissible stresses in concrete and steel – Balanced design- Transformed area method- Analysis and design for flexure of singly and doubly reinforced and flanged sections.

UNIT II

Limit State Method: Design principles: Basic Design Principles - Stress strain curves for concrete and steel - Characteristic strengths and loads - Partial safety factors - Stress block - Various limit states.

Design For Flexure: Limit state of collapse in flexure - Ultimate flexural strength - Balanced, under-reinforced and over-reinforced sections - Design of singly and doubly reinforced rectangular beams - Design of flanged beams.

UNIT III

Design For Shear, Torsion And Bond: Shear-Truss analogy - Design of beams for shear and torsion - Anchorage and development length.

UNIT IV

Design of Slabs : Design of one-way slabs, two way slabs using Limit State Method.

UNIT V

Limit State of Serviceability: Deflection (short and long term), cracking and codal provision.

NOTE: All the designs to be taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement particulars of Singly Reinforced beams.
2. Reinforcement particulars of Doubly Reinforced Beams.
3. Reinforcement particulars of T-beams and L-beams.
4. Reinforcement detailing of continuous beams.

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. Weight age 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, Publications Pvt. Ltd., New Delhi, 2007
2. S.Unnikrishna Pillai & Devdas Menon - Reinforced concrete design, Tata McGraw Hill, New Delhi, 2002

Reference Books:

1. A. K.Jain- Limit State Design, Nemchand&Brothers, New Delhi, 7th edition, 2012.
- 2.P.C.Varghese - Limit state designed of reinforced concrete, Prentice Hall of India, NewDelhi,2002
3. N.C. Sinha and S.K Roy - Fundamentals of reinforced concrete, S. Chand publishers, New Delhi,1996

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
CO1	3	2	3	--	2	--	--	3	--	--	--	--	3	2
CO2	3	2	1	--	2	--	--	3	--	--	--	--	2	2
CO3	3	2	3	--	2	--	--	1	--	--	--	--	3	2
CO4	3	2	--	--	3	--	--	--	--	--	--	--	2	2
CO5	3	2	--	--	--	--	--	--	--	--	--	1	3	2

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

II B.Tech – II Semester (CE)

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

17ACE17

ENGINEERING GEOLOGY

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

- 1 Identify different types of Rocks and minerals
- 2 Define the principles of petrology.
- 3 explain concepts structural geology, ground water and landslides.
- 4 Use concepts of geology in understanding dams and tunnels.

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 in 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

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. Parbingsingh, 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
4. D.Venkata Reddy, Engineering Geology, First Edition, 2014, Vikas Publications, New Delhi.

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

II B.Tech – II Semester (CE)

L T P C
3 1 0 3

17ACE18

CONCRETE TECHNOLOGY

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

1. Determine the properties of concrete ingredients i.e., cement, sand, Coarse aggregate.
2. Use different types of cement as per their properties for different field applications.
3. Design economic mix proportion.
4. Use different types of admixtures to improve the properties of concrete for different field applications.
5. Describe different types of concrete.

UNIT I

CEMENT: Portland cement – Chemical composition – Hydration – Setting and fineness of cement – Structure of hydrated cement – Mechanical strength of cement gel – Water held in hydrated cement paste – Heat of hydration – Influence of compound composition and properties of cement – 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 – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates - Maximum aggregate size.

UNIT II

TYPES OF ADMIXTURES: Mineral admixtures – Chemical admixtures – Plasticizers – Superplasticizers – Retarding plasticizers – Accelerating plasticizers – Air entraining admixtures – Pozzolonic or mineral admixtures

FRESH CONCRETE: Workability – Factors affecting workability – Measurement of workability– Slump test, Compaction factor test, flow test, Vee–Bee test and ball penetration test–

Setting times of concrete – Effect of time and temperature on workability – 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 – Effectiveness of 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 – codal provisions for NDT.

UNIT IV

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

MIX DESIGN: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – ACI method & 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 – Factors affecting properties of F.R.C – Applications – Polymer concrete – Types of Polymer concrete – Properties of polymer concrete – Applications – High performance concrete – Self consolidating concrete – High strength concrete.

Text Books:

1. Neville, A.M. Properties of Concrete. 4th 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.

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

II B.Tech – II Semester (CE)

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17ACE19 HYDRAULICS & HYDRAULIC MACHINERY

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

1. Demonstrate various types of flows and types of channels
2. describe velocity distribution in GVF.
3. Define various concepts of jets
4. Explain various concepts of different turbines.
5. Explain and use performance of different centrifugal pumps in engineering applications.

UNIT I

OPEN CHANNEL FLOW-UNIFORM FLOW: Introduction, Classification of flows, Types of channels; Flow analysis: The Chezy equation, Empirical formulae for the Chezy constant, hydraulically efficient channel sections: Rectangular, Trapezoidal, Triangular and Circular channels; Velocity distribution; Energy and momentum correction factors.

OPEN CHANNEL FLOW- NON – UNIFORM FLOW: Concept of specific energy; Specific energy curves; Critical flow; Critical flow in a rectangular channel; Critical slope; discharge curve, Different slope conditions; Channel transitions- Reduction in width of a rectangular channel, raised bottom in a rectangular channel, venture flume, Momentum principle applied to open channel flow; Specific force; Specific force curve.

UNIT II

OPEN CHANNEL FLOW- GRADUALLY VARIED FLOW: Introduction, Dynamic equation; Dynamic equation for GVF in wide Rectangular channel, classification of channel bottom slopes, Surface Profiles; Characteristics of surface profiles, Back water Curves and Drawdown curves; Examples of various types of water surface profiles; Control section, Computation of surface profiles by single step method.

OPEN CHANNEL FLOW- RAPIDLY VARIED FLOW: Hydraulic jump; Elements and characteristics of hydraulic jump; Hydraulic jump in rectangular channels, height and length of the jump, Energy loss in a hydraulic jump, Types of hydraulic jump; applications of hydraulic jump; Location of hydraulic jump.

UNIT III

IMPACT OF JETS: Hydrodynamic force of jets on stationary and moving flat inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Torque and head transferred in rotodynamic machines.

UNIT IV

HYDRAULIC TURBINES-I: Introduction, head and efficiencies of hydraulic turbines, Classification of turbines; pelton wheel: parts, Velocity triangles, work done and efficiency, working proportions, design of pelton wheel. Radial flow reaction turbines: velocity triangles and work done for inward radial flow turbine, degree of reaction, discharge, speed ratio, flow ratio.

HYDRAULIC TURBINES-II: Francis turbine: main components and working, work done and efficiencies, design proportions; design of Francis turbine runner. Kaplan turbine: main components and working, working proportions. Draft tube theory and efficiency; specific speed, unit quantities, characteristic curves of hydraulic turbines. Cavitations: causes, effects.

UNIT V

CENTRIFUGAL PUMPS: Introduction, component parts and working of a centrifugal pump, work done by the impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head(NPSH);Performance and characteristic curves; Cavitation's effects; Multistage centrifugal pumps; troubles and remedies.

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. K. Subramanya, Flow in open channels, Third Edition, 2008. Tata McGraw Hill Publishing Co. Ltd, New Delhi

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II B.Tech – II Semester (CE)

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17ACE20

STRUCTURAL ANALYSIS - I

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

1. Identify the method of analysis for indeterminate structures
2. identify importance of the shape factor, deflection of beams
3. Analyze a member with moving loads.
4. Perform analysis for truss members.

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's method –Analysis of single bay, single storey portal frames with side sway.

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II B.Tech – II Semester (CE)

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17ACE21

HYDRAULIC MACHINERY LAB

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

1. Calculate the impact of jet on vanes
2. Investigate the depth of hydraulic jump
3. Estimate the efficiency of different pumps.
4. Evaluate the performance of different turbines.

LIST OF EXPERIMENTS:

1. Impact of jet on Flat vane
2. Impact of jet on curved vane
3. Study of Hydraulic jump
4. Efficiency test on Pelton wheel turbine
5. Efficiency test on Francis turbine.
6. Efficiency test on single stage centrifugal pump.
7. Efficiency test on multi stage centrifugal pump.
8. Efficiency test on reciprocating pump.
9. Study of turbines based on Constant head and Constant speed (Demo)
10. Study on characteristic curves of turbines and pumps.

Reference Book:

1. Dr.N.KumaraSwamy, Fluid Mechanics and Machinery Laboratory manual, First Edition,2008, Charotar publishing House Pvt.Ltd., Anand.

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II B.Tech – II Semester (CE)

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17AHS17 TECHNICAL WRITING AND CONTENT DEVELOPMENT LAB

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

1. The students will use English fluently in communication by following LSRW.
2. The students will develop the art of oral presentation to develop leadership qualities.
3. The students will assimilate the importance of English in the modern world to compete with the career in the challenging world.
4. The students will strengthen the required skills to be employable.
5. The students will face the interviews confidently and improve the chances of getting a job.

1. Listening comprehension: Listening to passage – Understanding the passage – answering the questions – personal and professional situations.

2. Resume writing: Structure – format style – defining career objective – projecting the strengths – preparing covering letter.

3. Speaking Activities:

Just A Minute (JAM) – importance – rules – etiquette – body language.

Debates – importance – rules - beginning – taking a stand – supporting & defending.

Describing objects/people/situations: how to describe – physical properties – material-functions – features - complexion - Attire - situation – place – time – theme.

4. Interview: Preparing for interview – physically and mentally – answering strategy – face-to-face interview – panel interview - tele interview – video conferencing.

5. Oral & PowerPoint Presentation: Importance – developing and organizing the presentations – verbal and visual support - using body language – how to make it effective.

Minimum Requirement for ELCSlab:

- 1) Computer aided language lab for 70 students, 70 systems – one master console software for self-study.
- 2) T.V, digital stereo – audio – visual system.

3) Computer laboratory with LAN Connectivity of minimum 70 multimedia systems with the following configuration.

a) Intel Pentium® D 3.00GHZ

b) RAM-1GB minimum

c) Hard disk – 160GB

d) Headphones of durable quality.

Prescribed Software – Globarena

Suggested Software:

- K-Van Advanced Communication Skills
- TOEFL&GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- Cambridge Advanced Learners' English Dictionary with CD.
- Oxford AdvancedLearner'sCompass,8th Edition
- SanjayKumar&PushpLata.2011. Communication Skills, OUP

Reference Books:

1. Meenakshi Raman – Technical Communication,2/e, Oxford University Press, New Delhi.
2. Krishna Mohan &MeeraBenerji Developing Communication Skills by (Macmillan)
3. English Skills for Technical Students, WBSCTE with British Council, OL
4. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
5. Robert J Dixson, Everyday Dialogues in English by Prentice – Hall of India Ltd.
6. Koneru, Professional Communication by McGraw Hill.

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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II B.Tech – II Semester (CE)

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0	0	3	1.5

17ACE22

ENGINEERING GEOLOGY LAB

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

1. Identify different types of rocks and minerals.
2. Define the properties of rocks and minerals
3. Use the concepts structural geology, ground water and landslides in civil engineering practice
4. Perform subsurface analysis 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., “Text book of Engineering Geology”, Second Edition, 2013, LaxmiPublications., New Delhi, 2009.
2. Structural Geology Manual.

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II B.Tech – II Semester (CE)

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17AHS18 ENGLISH FOR COMMUNICATION – II

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

1. The students will enrich their communication skills both in academic and social arena.
2. The students will master LSRW skills.
3. The students will become proficient in English language and make use of it to be good in his subject.
4. The students will cultivate skills for societal service and inculcate passion for work.
5. The students will understand the human values of life and work.

UNIT I

Chapter entitled ‘Humour’ from “Using English”

Listening-Techniques-Importance of phonetics

L-Meet & Greet and Leave taking, Introducing Oneself and Others (Formal and Informal situations)

R- Reading Strategies-Skimming and Scanning

W-Writing strategies-sentence structures

G-Parts of Speech–Noun-number, pronoun-personal pronoun, verb-analysis

V-Affixes-prefix and suffix, root words, derivatives

UNIT II

Chapter entitled ‘Inspiration’ from “Using English”

L-Listening to details

S- Apologizing, Interrupting, Requesting and Making polite conversations

R- Note making strategies

W-Paragraph-types-topic sentences, unity, coherence, length, linking devices

G-Auxiliary verb sand question tags

V-synonyms-antonyms, homonyms, homophones, homographs, words often confused

UNIT III

Chapter entitled 'Sustainable Development' from "Using English"

L-Listening to the themes and notes taking

S-Giving instructions and Directions, making suggestions, Accepting ideas, fixing a time and Advising

R- Reading for details-1

W-Resume and cover letter

G-Tenses–Present tense, Past tense and Future tense

V-Word formation and One-Word Substitutes

UNIT IV

Chapter entitled 'Relationships' from "Using English"

L-Listening to news

S- Narrating stories, Expressing ideas and opinions and telephone skills

R- Reading for specific details and Information

W-Technical Report writing- strategies, formats- types- technical report writing

G-Voice and Subject–Verb Agreement

V- Idioms and prepositional Phrases

UNIT V

Chapter entitled 'Science and Humanism' from "Using English"

L-Listening to speeches

S- Making Presentations and Group Discussions

R- Reading for Information

W-E-mail drafting

G-Conditional clauses and conjunctions

V-Collocations and Technical Vocabulary and using words appropriately

Remedial Grammar:

1. Adjectives and Adverbs.
2. Use of Articles.
3. Review of prepositions and conjunctions.
4. Transformation of sentences
 - (a) Active and Positive Voice.
 - (b) Synthesis and analysis.

(C) Direct and indirect speech.

5. Common errors in English.

Vocabulary:

1. Synonyms and antonyms.
2. One word substitutions.
3. Phrasal verbs and idioms.
4. Commonly confused words
5. Verbal ability.

Writing practice (composition):

1. Essay writing
2. Report writing
3. Resume writing
4. Creative writing
5. Letter writing

Text Books:

1. B. C. Punmia, Ashok Kumar Jain & Arun Kumar Jain, SMTS –2, Theory of structures, twelfth edition 2005 Laxmi Publications.
2. S. S. Bhavikatti, Strength of Materials, Third edition 2009, Vikas publishers, New Delhi.

Reference Books:

1. Subramanian, Strength of Materials, Second Edition 2010 Oxford University Press, New Delhi.
2. L. S. Srinath et al., Strength of Materials, Macmillan India Ltd., New Delhi.
3. S. B. Junnarkar & Adavi, Mechanics of structures –1, Charotar Publications House, Anand, Gujarat
4. R. K. Bansal, A Text book of Strength of materials, Fourth edition 2010 Laxmi Publications (P) Ltd., New Delhi.

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

**ENGINEERING PROJECTS IN COMMUNITY SERVICE
(EPIC-II Activity based course)**

II B.Tech – II Semester (CE)

Lecture / Activity: 2/ Week

Int. Max Marks: 40

Ext. Max Marks: 60

Outcomes: At the end student will be able to

1. Apply disciplinary knowledge to real and possibly ill-defined problems.
2. Collaborate with people from other disciplines and develop an appreciation for cross-disciplinary contributions in design.
3. Develop the broad set of skills needed to be successful in the changing global workplace and world.
4. Identify the customer requirements and community demands.
5. Design the products useful for the community service.
6. Communicate effectively with widely varying backgrounds.
7. Provide significant service to the community while learning; gain an understanding of the role that engineering (and their discipline) can play in society.
8. Follow social ethics in engineering

UNIT - I

Project Survey and Identification: Introduction to Epics, importance of multi disciplinary projects, rural area Survey (societal issues), interaction with NGOs, Idea Generation and Group Discussions. Identification of objectives and outcome deliverables of the project and need of the community partner.

UNIT – II

Project Initiation and Specification: Market Survey (similar products), Customer Requirements, Design Constraints, Engineering Specifications of the product, Design Skill development Sessions - Different kinds of design thinking and its challenges, overall understanding of design processes.

UNIT – III

Design Skill Development for Implementation: Basics of design process, Concept Design Process, problem solving and Mathematical Analysis, Concept Testing, Design fixation, Design start- to- finish process, proposed methodology, and prototype Design activity.

UNIT – IV

Project Design for Deployment: code of ethics, Create Prototype, model refinement, product development, testing with Customer, Design documentation, identifying delivery phases of the design process and model demonstration.

UNIT – V

Project Review and Delivery: Effective delivery, Design review Presentations, Making Projects User-Ready, feedback from community partners, and extension of the product for consultancy work.

Text Books:

1. How to Conduct Surveys: A Step-by-Step Guide, Fink, Arlene. 1998. Sage Publications
2. Examples of good practice in Special Needs Education & Community-Based Programs, UNESCO PRESS
3. Project Management , Gary R. Heerkens, McGraw-Hill
4. Engineering Design-A Systematic Approach, Gerhard Pahl, Wolfgang Beitz, Jörg Feldhusen, Karl-Heinrich Grote ,ISBN: 978-1-84628-318-5 (Print) 978-1-84628-319-2

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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III B.Tech – I Semester (CE)

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17AMB02

**MANAGEMENT SCIENCE
Common to (CIVIL, ECE, EEE, CSE & IT)**

Outcomes: After completion of this course students 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. Handle intricacies of projects efficiently.
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 – Introduction to Organization –Types of Mechanistic and organic structures.

UNIT II

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-Statistical Quality Control: \bar{x} chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, TQM Concept - Deming's principles, Six sigma, Bench marking.

UNIT III

MATERIALS MANAGEMENT: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records, MRP, JIT, Marketing: Functions of Marketing, Marketing Mix, Product Life Cycle, Channels of Distribution.

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

III B.Tech – I Semester (CE)

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17ACE24 REINFORCED CONCRETE STRUCTURES –II

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

1. Apply the basic concepts of limit state method of design for reinforced concrete structural elements such as slabs, columns, footings and stairs (PO1).
2. Design beams, columns, slabs, footings and stair case under limit state design method (PO3).
3. Detail (Drawings) the reinforcement of columns, slabs, footings and staircase under Limit State design Method using both traditional and modern tools. (PO5).
4. Apply IS code to design of various structural elements using Limit state design.

UNIT I

Continuous Slabs :Continuous slab Using I S Coefficients, Cantilever slab/Canopy slab Using Limit State Method.

UNIT II

Design of compression members: Short and Long columns–axial loads, uni-axial and biaxial bending (I S Code provisions) Using Limit State Method.

UNIT III

Design of Footings: Isolated (square, rectangular) and Combined footings Using Limit State Method.

UNIT IV

Design of Stair case: Design of dog legged and open well stair cases.

UNIT V

Design of Shear Walls – Design of Shear Walls by Limit State Method

NOTE: All the designs to be taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.

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17ACE25

GEOTECHNICAL ENGINEERING –I

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

1. Identify engineering properties for solving geotechnical operations
2. Analyse and design seepage through earth dams.
3. Apply the knowledge of one-dimensional consolidation theory in computing settlements of structures
4. Evaluate the factor of safety of an earth slope.

UNIT I

Basic Definitions and Simple Tests: Soil formation–Three phase diagram–Volume–Weight relationships – Water content – Specific gravity – In-situ density – Relative density.

UNIT II

Index Properties and Soil Classification: Grainsizeanalysis–Sieveand hydrometer methods – Consistency limits and indices – IS classification system of soils.

UNIT III

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

Consolidation of Soils: 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: 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
CO1	3	3	--	2	--	--	--	--	--	--	--	--	3	2
CO2	3	3	3	--	2	--	--	--	--	--	--	--	3	2
CO3	3	2	--	--	--	2	--	--	--	--	--	--	2	2
CO4	3	2	--	--	--	--	2	--	--	--	--	1	3	2

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17ACE26

STRUCTURAL ANALYSIS - II

Outcomes: After completion of the course the Students will be able to

1. demonstrate the arch action, identify types of arches and analyze the same.
2. apply the knowledge of mathematics(matrices) in analyzing the structural elements such as continuous beam portal frames by flexibility and stiffness methods.
3. work individually as well as in teams through project work
4. engage in life-long learning.
5. apply appropriate techniques and software for analyzing the building systems.

UNIT I

THREE HINGED ARCHES & TWO HINGED ARCHES : Elastic theory of arches – Eddy’s theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature-Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches(No analytical question).

UNIT II

MOVING LOADS & INFLUENCE LINES: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U.D load longer than the span, UDL load shorter than the span, two point loads with fixed distance between them and several point loads – Equivalent uniformly distributed load – Focal length. Definition of influence line for SF, Influence line for BM – load position for maximum SF at a section – Load position for maximum BM at a section Point loads, UDL longer than the span, UDL shorter than the span

UNIT III

APPROXIMATE METHODS OF STRUCTURAL ANALYSIS :Analysis of multistory frames by Portal Method, Cantilever Method and Substitute frame method.

UNIT IV

FLEXIBILITY & STIFFNESS METHODS:

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3	0	0	3

17ACE27

ENVIRONMENTAL ENGINEERING – I

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

1. Identify, formulate and analyze the sustainable source of water for public water supply system.
2. Explain the need of water and its impact on human health, safety and demand.
3. design water treatment plant by application of mathematical and scientific principles.
4. Prepare reports, specifications, drawings either individually or a member in a team.
5. Design treatment process for fluoride, arsenic iron and manganese and salts and disposal of sludge residues in the environment.

UNIT I

INTRODUCTION: Need for potable water supply systems. Objectives of natural water treatment. Basic design consideration in major public water supply system – (Design period, estimation methods of future population, source selection, treatment process train, plant siting, layout and plant Hydraulics).

SOURCES OF WATER: Surface, ground and seawaters as a source of public water supply and their merits and demerits. Source selection and protection practices.

QUALITY OF WATER: Physical, chemical and biological impurities in water. Water borne diseases. MPN Index calculation by multiple-tube fermentation. Water quality standards for drinking purpose.

UNIT II

DEMAND OF WATER: Estimation of per capita demand of water and variations of water demand. Factors Influencing water demand. Design flows for design of various components of water supply scheme.

WATER COLLECTION: Purpose and considerations in the location of intake structure. Intake structures for river, canal, reservoir, lakes and ponds. Design of infiltration galleries and Radial-wells.

TRANSMISSION OF RAW WATER: Design of economical conveying main and pumping system. Accessories in conveying main. Design of pumping machinery.

UNIT III

WATER TREATMENT PROCESSES: Unit operations and processes in conventional water supply schemes and their functions. General treatment process flow diagrams for different sources and quality of waters.

AERATION: Objectives of aeration of impounding waters. Design of cascade aeration system.

COAGULATION PROCESS: Objectives of coagulation of natural waters. Common coagulants of used in water treatment system and their reactions. Determination of optimum dose of alum for coagulation of natural surface water. Mechanism of coagulation process. Design of rapid mix and clari-flocculators.

REVERSE OSMOSIS: Introduction and principle.

UNIT IV

FILTRATION: Theory of filtration. Different types of filters and their working and operational system. Basic differences between the slow and rapid sand filters. Design of slow and rapid sand filters. Head losses in filters.

DISINFECTION METHODS: Common disinfectants used in disinfection of water and their merits and demerits Available chlorine in different disinfectants. Mechanism of disinfection process .Determine of optimum dose of chlorine for raw and filtered water. Break Point Chlorination and its importance. Design of chlorine contact chambers. De-chlorination practices during epidemics

UNIT V

SPECIFIC TREATMENT METHODS: Specific treatment methods used for the removal of fluorides, arsenic, hardness, iron and manganese, colour and refractory organics. Desalination of seawater.

DISTRIBUTION SYSTEM: Different methods of water distribution systems. Layout of water distribution systems. Analysis of distribution networks – Hardycross and equivalent pipe methods. Computation of capacity of storage reservoirs.Valves and pipe joints used in water distribution

system. Leak detection and prevention in water distribution net work. Water connection to the house from municipal water main.

SLUDGE HANDLING AND DISPOSAL: Sources of residuals and their characteristics in water treatment processes. Residual processing methods and disposal practices.

Text Books:

1. Punmia, B.C, Ashok Jain , and Arun Jain “ Water supply Engineering” Arihant Publications, Bombay, (1995).
2. Santoshkumar Garg “ Environmental Engineering (Vol.1). Water supply Engineering “ Khanna Publishers, NewDelhi, 1996.

Reference Books:

1. Syed R. Qasium“ Water works Engineering ” Prentice – Hall of India Pvt. Ltd., New Delhi, 2002.
2. Susumu Kawamura “ Integrated Design and operation of water Treatment Facilities. Johan wiley and sons, Inc.,New York , 2000.
3. Peavy, H.S., and D.R. Rowe “ Environmental Engineering” MC – Graw Hill Publishing company, New York, 1984.

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	2	--	--	--	--	--	3	2
CO2	3	3	3	--	--	2	2	--	--	--	--	--	3	2
CO3	3	2	3	--	--	1	1	1	--	--	--	--	2	2
CO4	3	2	--	--		2	2	--	3	3	--	1	3	2
CO5	2	2	3	--	--	2	2	--	--	--	--	--	2	--

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3	0	0	3

**17ACE28 GROUNDWATER DEVELOPMENT AND MANAGEMENT
(PROFESSIONAL ELECTIVE-I)**

Outcomes: After 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 ground water sources
4. Perform Surface and sub surface investigation methods.

UNIT I

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 of aquifers, 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

Analysis of Pumping Test Data – I: Steady flow groundwater 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 – Jacob and Chow's simplifications, Leak aquifers.

UNIT III

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 Subsurface Investigation.

UNIT IV

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**17ACE29 GEOGRAPHIC INFORMATION SYSTEMS
(PROFESSIONAL ELECTIVE-I)**

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

1. Interpret the aerial photographs and satellite imageries
2. Create and use spatial data for GIS application
3. Apply RS concepts in water resources engineering
4. Apply GIS concepts in water resources engineering

UNIT I

Introduction to remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces characteristics of remote sensing systems. Sensors and platforms: Introduction, types of sensors, airborne remote sensing, space borne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT.

UNIT II

Geographic Information System: Introduction, key components, application areas of GIS, map projections. Data entry and preparation: spatial data input, raster data models, vectordata models.

UNIT III

Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing.

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**17ACE30 ADVANCED CONSTRUCTION TECHNIQUES
(PROFESSIONAL ELECTIVE-I)**

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

1. Apply modern construction techniques in the construction of buildings
2. Describe substructure construction and superstructure construction
3. Duplicate special structures and also rehabilitation
4. Explain strengthening techniques
5. Perform demolition techniques

UNIT I

SUB STRUCTURE CONSTRUCTION: Box jacking - Pipe jacking - Under water construction of diaphragm walls and basement - Tunneling techniques - Piling techniques - Driving well and caisson - sinking cofferdam - cable anchoring and grouting - Driving diaphragm walls, Sheet piles - Laying operations for built up offshore system - Shoring for deep cutting - Large reservoir construction - well points - Dewatering for underground open excavation.

UNIT II

SUPER STRUCTURE CONSTRUCTION FOR BUILDINGS: Vacuum dewatering of concrete flooring – Concrete paving technology – Techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections – Erection techniques of tall structures, Large span structures – launching techniques for heavy decks – in-situ prestressing in high rise structures, Post tensioning of slab- aerial transporting – Handling and erecting lightweight components on tall structures.

UNIT III

CONSTRUCTION OF SPECIAL STRUCTURES: Erection of lattice towers - Rigging of transmission line structures – Construction sequence in cooling towers, Silos, chimney, sky

scrapers - Bow string bridges, Cable stayed bridges – Launching and pushing of box decks – Construction of jetties and break water structures – Construction sequence and methods in domes – Support structure for heavy equipment and machinery in heavy industries – Erection of articulated structures and space decks.

UNIT IV

REHABILITATION AND STRENGTHENING TECHNIQUES: Seismic retrofitting - Strengthening of beams - Strengthening of columns - Strengthening of slab -Strengthening of masonry wall, Protection methods of structures, Mud jacking, grouting and for foundation – Micro piling and underpinning for strengthening floor and shallow profile - Sub grade - Water proofing, Soil Stabilization techniques.

UNIT V

DEMOLITION: Demolition Techniques, Demolition by Machines, Demolition by Explosives, Advanced techniques using Robotic Machines, Demolition Sequence, Dismantling Techniques, Safety precaution in Demolition and Dismantling.

Text Books:

1. Peter.H.Emmons, “Concrete repair and maintenance illustrated”, Galgotia Publications Pvt.Ltd., 2001.Press, 2008.
2. Sankar, S.K. and Saraswati, S., Construction Technology, Oxford University Press, New Delhi, 2008.

Reference Books:

1. Robertwade Brown, Practical foundation engineering hand book, McGraw Hill Publications, 1995.
2. Sankar, S.K. and Saraswati, S., Construction Technology, Oxford University Press, NewDelhi, 2008.
3. Patrick Powers. J., Construction Dewatering: New Methods and Applications, John Wiley & Sons, 1992.
4. Jerry Irvine, Advanced Construction Techniques, CA Rocketr, 1984

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17ACE31

**AIR POLLUTION AND CONTROL
(PROFESSIONAL ELECTIVE-I)**

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

1. Explain the causes and effects of air pollution
2. Identify meteorological phenomena on Air Quality
3. Demonstrate the control of particulates
4. Design methods of control of gaseous compounds
5. Monitor the emission of gaseous compounds

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 Areal Sources of air pollution- stationary and mobile sources.

UNIT II

EFFECTS OF AIR POLLUTION: Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes

THERMODYNAMIC OF AIR POLLUTION: Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like Sox, Nox, CO, HC etc., 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.

POLLUTANT DISPERSION MODELS: Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

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3	0	0	3

17ACE32

**TRAFFIC ENGINEERING
(PROFESSIONAL ELECTIVE-I)**

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

1. Conduct traffic studies
2. Estimate the congestion in an area and also to design parking facility
3. Design intersections and prepare traffic management plans.
4. Identify the type of provision of various traffic and road indicators.
5. Evaluate traffic impacts on the environment and safety.

UNIT I

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

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 & 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: 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: 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, 2010.
2. Dr. L.R Kadiyali. Traffic Engineering & Transportation Engineering. 6th Edition, Khanna Publishers, 1997.

Reference Books:

1. 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
CO1	3	3	--	--	--	--	--	--	--	--	--	--	2	1
CO2	3	3	3	3	--	--	--	--	--	--	--	--	3	3
CO3	3	2	3	--	--	--	--	--	--	2	--	--	2	3
CO4	2	3	--	3	--	--	--	--	--	1	--	--	2	2
CO5	1	2	1	--	--	--	2	--	--	--	--	--	3	3

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L	T	P	C
0	0	3	1.5

17ACE33 GEOTECHNICAL ENGINEERING LAB

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

1. Determine index properties of soils.
2. evaluate coefficient of permeability of soils.
3. apply consolidation and shear characteristics of soils.
4. Determine compaction characteristics of soils, CBR of sub-grade soils.

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

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L	T	P	C
0	0	3	1.5

17ACE34

GIS LAB

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

1. Analyze the basic components of GIS
2. Classify the maps, coordinate systems and projections
3. Use spatial and attribute data in preparing thematic maps
4. Identify and rectify mapping inaccuracies
5. Formulate and solve geospatial problems

SOFTWARE:

1. Arc GIS 10.1
2. ERDAS
3. Mapinfo

Any one or Equivalent

MANUALS:

1. Arc GIS 10.1 user manuals, 2013
2. ERDAS Imagine 2013 user manual

EXERCISIES:

1. Digitization of Points and Lines
2. Editing Map Elements
3. Attribute Data Entry and Manipulation
4. Cleaning, Building and Transformation
5. Data Analysis –Overlay, Buffer
6. Map Generation with Patterns and Legends
7. Buffer Analysis Network Analysis
8. Digitization of Map/ Topo sheet
9. Creation of Thematic Maps

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L	T	P	C
0	0	3	1.5

17ACE35

CONCRETE TESTING LAB-I

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

1. Assess the quality of cement for preparation of cement mortar and concrete
2. Assess the quality of fine and coarse aggregates after testing the aggregates according to IS specifications.
3. Test the quality of cement mortar by conducting compressive strength on mortar cubes.
4. Assess the effect of mineral admixtures by partial replacement of cement in cement mortar.

LIST OF EXPERIMENTS:

1. Specific Gravity of Cement
2. Specific gravity of Fine aggregate
3. Specific gravity and water absorption of Coarse Aggregate
4. Consistency of cement
5. Initial and final setting of cement
6. Fineness of cement by Blane's apparatus
7. Soundness of cement
8. Casting and measurement of Compressive strength of cement with suitable consistency
9. Bulking of Fine aggregates
10. Bulk density and void percentage of
 - (a) Fine Aggregate
 - (b) Coarse Aggregate
11. Fineness Modulus of
 - (a) Fine Aggregate
 - (b) Coarse Aggregate
12. Study on effect of mineral admixtures on cement mortar cubes.

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L	T	P	C
3	1	0	3

17ACE37 DESIGN AND DRAWING OF STEEL STRUCTURES

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

1. Assess the quality of cement for preparation of cement mortar and concrete
2. Assess the quality of fine and coarse aggregates after testing the aggregates according to IS specifications.
3. Test the quality of cement mortar by conducting compressive strength on mortar cubes.
4. Assess the effect of mineral admixtures by partial replacement of cement in cement mortar.

UNIT I

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: Design of Beams – Plastic moment Bending and shear strength laterally supported and unsupported beams design – Built up sections – large plates Web buckling Crippling and Deflection of beams - Design of purlins.

UNIT IV

Eccentric and Moment Connection: Beam-column connections- design of welded and bolted framed connections. Seated and framed connections. Moment resistant connections.

UNIT V

Plate Girder: Design consideration – I S Code Recommendations 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.

Note: The students should prepare the following plates.

Plate 1 Detailing of simple beams

Plate 2 Detailing of Compound beams including curtailment of flange plates.

Plate 3 Detailing of Column including lacing and battens.

Plate 4 Detailing of Column bases – slab base and gusseted base

Plate 5 Detailing of steel roof trusses including particulars at joints.

Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. Part A consist 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. S.K. Duggal - Limit State Design of steel structures , Tata Mcgraw 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 Pubilishers,2010

Codes/Tables:

IS Codes:

- 1) IS -800 – 2007
- 2) IS – 875 – Part III

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L	T	P	C
3	1	0	3

17ACE38

GEOTECHNICAL ENGINEERING -II

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

1. Apply the knowledge of compaction in selecting the compaction equipment.
2. Analyze the stresses in soils due to applied loads.
3. Evaluate the probable settlements of foundations and SBC of soils.
4. Estimate load carrying capacity of piles
5. use design principles of a gravity retaining wall in engineering practice.

UNIT I

SOIL EXPLORATION: Need–methods of soil exploration–Boring and sampling methods–penetration tests – planning of programme and preparation of soil investigation report.

COMPACTION: Mechanism of compaction–factors affecting–effect of compaction on soil properties – field compaction equipment – compaction control.

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.

UNIT III

EARTH PRESSURE ON RETAINING WALLS: Introduction – 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.

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L	T	P	C
3	1	0	3

17ACE39

ENVIRONMENTAL ENGINEERING – II

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

1. Estimate sewage and storm water for arriving design flows.
2. Plan, design, operate and maintain sewerage and sewage treatment units.
3. Apply principles of effluent disposal practices.
4. Use techniques in disposal of solid wastage managements.
5. Estimate air and noise pollution impact in civil engineering projects.

UNIT I

ESTIMATION OF SEWAGE AND STORM WATER: Definition of terms – sewage, sullage, storm water and sludge. Objectives of sewage and storm water estimations and general methods available for estimations in urban areas. Average, peak and minimum sewage flows and their importance in collection and treatment systems. Design period for various components of sewerage and sewage treatment process components.

COLLECTION OF SEWAGE: Sewage collection by different sewers and their functions. Separate and combined sewers and their merits and demerits. Hydraulic design of sewers for full and partial flow system. Self-cleaning velocity of sewers. Construction of sewers. Sewer appurtenances and their location and functions. House drainage and plumbing systems.

UNIT II

CHARACTERIZATION OF SEWAGE: Objectives of sewage characterization. Frequency of sampling of sewage for different parameters. Chemical composition of sewage – solids, BOD and COD, nutrients and biological impurities. Numerical problems on BOD equation. Population equivalent. Carbon, Nitrogen and Sulfur cycles.

PRELIMINARY AND PRIMARY TREATMENT: Basic concept of sewage treatment – Preliminary, primary, secondary and tertiary sewage treatment processes. Sewage treatment

process flow diagrams for urban and rural areas. Design of bar screen, grit chamber and primary sedimentation tanks.

UNIT III

SECONDARY TREATMENT: Necessity of secondary treatment principles of biological treatment of sewage and mechanism of purification factors influencing biological treatment of sewage. Suspended and attached growth of biological system. Design of conventional and extended type of activated sludge processes, sequential batch reactors, UASB reactors, aerated lagoons and facultative oxidation ponds. Design of secondary sedimentation tanks. Operational problems and trouble-shooting of biological treatment process units.

UNIT IV

TERTIARY TREATMENT: Objectives of tertiary treatment. Removal 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 MANAGEMENT: Qualitative and quantitative aspects of different sludges generated from different treatment units operation and processes. Sludge stabilization by aerobic and anaerobic processes. Design of anaerobic sludge digesters. Sludge dewatering practices –sludge drying beds and centrifugation. Sludge disposal practices. Design of septic tank and soak – pit. In rural and semi urban areas.

UNIT V

SOLID WASTE MANAGEMENT: Sources, characteristics and generation of solid wastes. Collection and disposal. Design and management of sanitary landfills.

AIR AND NOISE POLLUTION: Types of air pollutants, sources and effect of air pollution, air pollution metrology, air pollution control, air quality standards and limits. Sources and effects of noise pollution, measurement of noise and control of noise pollution. Permissible limits of noise pollution.

ENVIRONMENTAL ASSESSMENT: Introduction and basic principles of environmental impact assessment.

Text Books:

1. KariaG.L , and R.A. Christian, “ Waste water Treatment : Concepts and Design Approach”, Prentice Hall of India, New Delhi,2001

2. Punmia, B.C and A.K. Jain, “ Waste water Engineering, Lakshmi Publications (p) Ltd., New Delhi, 1996.

Reference Books

1. Met calf & Eddy “ Waste water Engineering – Treatment and Reuse”, Tata Mc Graw –Hill Edition, New Delhi,2003.

2. Arcadio P. Sincero Sr., GregoriaA.Sincero, “Environmental Engineering a design approach”. Prentice, Hall of India Private Limited , New Delhi-110 001,1999.

3. Peavy, H.S and D.R. Rowe “ Environmental Engineering” MC Graw-Hill Publishing company, Newyork, 1984.

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	2	--	--	--	--	--	3	2
CO2	3	3	3	--	--	2	2	--	--	--	--	--	3	2
CO3	3	2	--	--	--	1	1	--	--	--	--	--	2	2
CO4	3	2	--	--	--	2	2	--	3	3	--	1	3	2
CO5	3	3	--	--	--	2	2	--	--	--	--	--	3	2

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17ACE40 HYDROLOGY AND IRRIGATION ENGINEERING

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

- 1 Explain the concepts of duty and delta
- 2 Analyze the hydrographs, ground water resources
- 3 Use concepts of irrigation, types of soils and water requirement for effective crop yield.
- 4 Design Head works, canal outlets, canal lining and diversion head works.

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 HEADS WORKS: 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
CO1	3	2	--	--	--	--	--	--	--	--	--	--	3	3
CO2	3	1	--	--	--	--	--	--	--	--	--	--	2	2
CO3	3	--	--	--	--	--	--	--	--	--	--	--	2	2
CO4	3	--	--	--	--	2	2	--	--	--	--	2	3	3

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**17ACE41 SOIL DYNAMICS AND MACHINE FOUNDATIONS
(PROFESSIONAL ELECTIVE-II)**

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

1. explain causes and characteristics of vibration
2. define dynamic soil properties and analyze soil properties due to dynamic loading
- 3 Design the machine foundations.
4. Analyse the piles under vibrations.
5. define methods involved in vibration isolation methods and dynamic soil properties

UNIT I

FUNDAMENTALS OF VIBRATION: Definitions – Simple harmonic motion– Free and forced vibrations with and without viscous damping –Frequency dependent excitation – Systems under transient loads –Rayleigh’s method of fundamental frequency – Logarithmic decrement.

FREQUENCY OF SOIL SYSTEMS: Determination of viscous damping –Transmissibility – Systems with two and multiple degrees of freedom –Vibration measuring instruments.

UNIT II

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.

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 III

VIBRATION ANALYSES :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 – Vibration isolation.

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**17ACE42 HEALTH MONITORING AND RETROFITTING OF STRUCTURES
(PROFESSIONAL ELECTIVE-II)**

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

1. Assess strength and materials deficiency in concrete structure.
2. Suggest methods and techniques used in repairing / strengthening existing concrete structures.
3. Apply non-destructive testing techniques to field problems.
4. Apply cost effective retrofitting strategies for repairs in 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.

Text Books:

1. Diagnosis and treatment of Structures in Distress – R N Raikar, 1994
2. A.R. Santakumar. Concrete Technology, Oxford University press, 2006

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**17ACE43 ENVIRONMENTAL IMPACT ASSESSMENT & MANAGEMENT
(PROFESSIONAL ELECTIVE-II)**

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

1. Perform a critical quality review of an EIA and EIS;
2. Design EIA working process considering the need for inter disciplinarily;
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. Define 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 into 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

E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods and cost/benefit Analysis.

UNIT 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 activities. Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface

water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT IV

ASSEMENT OF IMPACT ON VEGETATION AND WILDLIFE

Introduction - Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

ENVIRONEMNTAL AUDIT : Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocel, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT V

ENVIRONEMENTAL ACTS (PROTECTION AND PREVENTION)

Post Audit activities, The Environmental protection Act, The water prevention Act, The Air (Prevention & Control of pollution 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, 2010.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers, 1989

Reference Books:

1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K., Katari & Sons Publication., New Delhi, 2013
2. Environmental science and Engineering by Alok Debi, Universities Press, 2008
3. Environmental Impact Assessment, Canter, L.W., 1977, McGraw Hills, New York.
4. John G. Rau and David C. Wooten (Ed), Environmental Impact Analysis Handbook, McGraw Hill Book Company, 1979.

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	2	--	--	--	--	--	3	2
CO2	3	3	3	--	--	2	2	--	--	--	--	--	3	2
CO3	3	2	--	--	--	1	1	--	--	--	--	--	2	2
CO4	3	2	--	--	--	2	2	--	3	3	--	1	3	2
CO5	3	3	--	--	--	2	2	--	--	--	--	--	3	2

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**17ACE44 INTEGRATED WATER RESOURCES & PLANNING
(PROFESSIONAL ELECTIVE-II)**

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

1. Analyse the suitability of different types and methods of irrigation for better water management.
2. Investigate the planning and management of single & multipurpose projects.
3. Organise the various methods for river engineering.
4. Apply principles of water resources in selecting suitable type of turbines for hydro-power plant.
5. Design the hydraulic structures to suit various public health and safety and the cultural, societal and environmental considerations

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UNIT I

Introduction: World water resources, water resources in India, water as finite resource, variability of water in time & space, history of water resources development, water infrastructure -problems and perspectives, present institutional framework for water management.

Water laws: Constitutional provisions, National Water Policy, riparian rights / ground water owner ship, prior appropriation, permit systems, acquisition and use of rights, scope for privatization.

UNIT II

Economics of water: Water as economic good, intrinsic value, principles of water pricing & water allocation, capital cost, opportunity cost, internal rate of return, benefit cost analysis, principles of planning and financing of water resources project - Discussion on any two case studies.

Paradigm shift in water management: Global and national perspectives of water crisis, water scarcity, water availability and requirements for human and nature, concepts of ‘blue water’, ‘Green water’, and ‘virtual water’, and their roles in water management. Sustainability principles for water management, framework for planning a sustainable water future.

UNIT III

Basin scale hydrology : a) Estimation of surface water, estimation of ground water draft/recharge import/export of water (inter basin water transfer), recycling and reuse and storage, control of water logging, salinity, & siltation of storages.

b) Flood & Drought management: causes of floods, structural and non - structural measures, mitigation plan, flood damage assessment, use of geo-informatics for flood management. Types of droughts, severity index, drought forecasting, damage assessment, mitigation plan, use of geo-informatics for drought management

UNIT IV

Water demand and supply based management

a) Consumptive & non consumptive demands, irrigation demand estimation, water utilization, irrigation efficiency, water management in irrigation sector,

b) demand estimation in hydro/thermal/nuclear power sector, estimation & forecasting of water demands of domestic & industrial sector, navigation and recreational water demands

UNIT V

Environmental and social aspects

a) Environmental management: protection of vital ecosystem, water requirements for environmental management, aquaculture, minimum flows, water quality management for various uses.

b) Social impact of water resources development: direct/ indirect benefits, employment generation, industrial growth, agro-industry, enhanced living standards, education & health, co-operative movement, management of rehabilitation & resettlement.

Text Books:

1. Water Resources Systems Planning and Management, Chaturvedi, M.C. Tata McGraw Hill, 1992
2. Economics of Water Resources Planning, James L.D and Lee R.R, McGraw Hill, NY 1971

Reference Books:

- 1 Water Resources Systems Engineering, W. A. Hill & J. A. Dracup, McGraw Hill, 1996,
3. Water resources hand book; Larry W. Mays, McGraw International Edition, 2010
4. Design of Water Resources Systems, Arthur Mass, MacMillan 1962

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

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**17ACE45 RAILWAYS, TUNNELS AND HARBOUR ENGINEERING
(PROFESSIONAL ELECTIVE-II)**

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

1. Explain various aspects related to construction and maintenance of Railway, Harbour and Tunnel structures.
2. Describe various procedures for construction activities related to Railway, Harbour and Tunnel structures.
3. Supervise Railway, Harbour and Tunnel related maintenance work.
4. Supervise the construction of berthing structure.
5. Select and test materials on site and laboratory as per IS requirement.

UNIT I

RAILWAY ENGINEERING: Introduction – permanent way components – cross section of permanent way – functions and requirements of rails, sleepers and ballast – types of gauges – creep of rails – theories related to creep – coning of wheels – adzing of sleepers – rail fastenings.

UNIT II

GEOMETRIC DESIGN OF RAILWAY TRACK: Gradients – grade compensation – cant and negative super elevation – cant deficiency – degree of curves – safe speed on railway track – points and crossings – layout and functioning of left hand turn out and right hand turn outs – station yards – signaling and interlocking.

UNIT III

TUNNEL ENGINEERING: Introduction, methods of surveying, size and shape of tunnels, construction of tunnels, explosives, safety precautions

UNIT IV

TUNNEL LINING, VENTILATION AND DRAINAGE: Ventilation - methods, Lining-Objectives - Types- Merits, Drainage – Source – Handling – Permanent solutions

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17AME37

RENEWABLE ENERGY SOURCES

(OPEN ELECTIVE - I)

(Common to ME, AE & CE)

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

1. Classify various sources of renewable energy like solar, bio-mass, geo-thermal, ocean, wind, tidal and fuel cells.
2. Select & design the best suitable mechanical systems to harness various renewable sources for real life problems of industry and as well service sectors.
3. Use the optimized eco-friendly advanced technology to find solutions for betterment of society with system integration and synergy.
4. Formulate a committee to take up projects with managerial skills and knowledge to achieve goals and organization development with available resources.
5. Develop innovative ideas by up-dating knowledge and concept to promote higher learning and research.

UNIT – I

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.

UNIT – III

BIOMASS ENERGY: Energy from biomass – Sources of Biomass – Conversion of biomass into fuel – Energy through fermentation – Pyrolysis – Gasification– Aerobic and Anaerobic bio-conversion – Biogas digesters – Properties and characteristics of biogas and utilization.

GEOHERMAL ENERGY: Fundamental of Geophysics – Classification of Geothermal sources – Extraction techniques – Utilization of Geothermal energy

UNIT – IV

WIND ENERGY: Basic principles of Wind energy conversion, Classification of WEC systems, Horizontal and Vertical axis windmills-Performance characteristics – Betz criteria

OCEAN, WAVE&TIDAL ENERGY: OTEC Principle –Open and closed cycle of OTEC – Wave and Tidal Energy – Potential and conversion techniques.

UNIT – V

DIRECT ENERGY CONVERSION: See beck, Peltier, Thomson,Joule, andHall effects – Ionization–Need for DEC - Principle of DEC,Thermo Electric Generators, MHD generators– Applications.

FUEL CELLS: Principle of fuel cell – Types of fuel cells – PEMFC, PAFC, SOFC– Merits and demerits – Applications of fuel cells.

Text Books:

1. G.D. Rai, Non-Conventional Energy Source, 4th edition, Khanna Publishers., 2000.
2. Dr. R.K. Raj put, Non-Conventional Energy Sources and Utilization, 2nd revised edition, S. Chand Publishers, 2014.

Reference Book:

1. B.S. Magal, Frank Kreith&J.F. Kreith, Solar Power Engineering, 1st edition, Tata McGraw Hill, 1899.
2. J P Navani&SonalSapra, Non-Conventional Energy Resources, Revised Edition, S Chand Publishers, 2013.

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**17AME31 INSTRUMENTATION AND CONTROL SYSTEMS
(OPEN ELECTIVE-I)
(Common to ME, AE & CE)**

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

1. Describe the mechanical, electrical and electronic measuring systems for various applications in the industry.
2. Analyze mechanical, electrical and electronic instruments to promote advanced technologies to find innovative solutions.
3. Compare measuring systems to utilize resources like machines and materials to achieve short- & long-term objectives.
4. Produce simple eco-friendly measuring systems as a group and capable to work in the organization.
5. Differentiate various measurement such as speed, acceleration vibration and control System.

UNIT I

DEFINITION: Basic principles of measurement - Measurement systems, generalized configuration and functional descriptions of measuring instruments - examples. Dynamic performance characteristics, sources of errors, Classification and elimination of errors.

MEASUREMENT OF DISPLACEMENT: Theory and construction of various transducers to measure displacement – Piezoelectric, Inductive, capacitance, resistance, ionization and Photo electric transducers, Calibration procedures.

UNIT II

MEASUREMENT OF TEMPERATURE: Classification - Ranges - Various Principles of measurement - Expansion, Electrical Resistance - Thermistor - Thermocouple - Pyrometers - Temperature Indicators.

MEASUREMENT OF HUMIDITY: Moisture content in the gases, sling psychrometer, Absorption psychrometer, Dew point meter.

UNIT III

MEASUREMENT OF LEVEL: Direct method, Indirect methods, capacitative, ultrasonic, magnetic, cryogenic fuel level indicators, Bubbler level indicators.

MEASUREMENT OF PRESSURE: Units - classification - different principles used- Manometers, Piston, Bourdon pressure gauges, Low pressure measurement, Thermal conductivity gauges, ionization pressure gauges, McLeod pressure gauge.

FLOW MEASUREMENT: Rotameter, magnetic, Ultrasonic, Turbine flow meter, Hot - wire anemometer Laser Doppler Anemometer (LDA).

UNIT IV

STRESS & STRAIN MEASUREMENTS: Various types - electrical strain gauge - gauge factor - method of usage of resistance strain gauge for bending, compressive and tensile strains - usage for measuring torque, Strain gauge Rosettes.

MEASUREMENT OF FORCE, TORQUE AND POWER: Elastic force meters, load cells, Torsion meters, Dynamometers.

UNIT V

MEASUREMENT OF SPEED, ACCELERATION AND VIBRATION: Mechanical Tachometers - Electrical tachometers - Stroboscope, Non contact type of tachometer, Different simple instruments, Principles of Seismic instruments, Vibrometer and accelerometer.

ELEMENTS OF CONTROL SYSTEMS: Introduction, Importance – Classification, Open and closed systems Servomechanisms-Examples with block diagrams, Temperature, speed & position control systems.

Text Books:

1. S. Bhaskar, Instrumentation and Control Systems, Wiley Publications, 4th Edition, Anuradha Agencies, 2008.
2. D.S. Kumar, Measurement Systems, Applications & design, New Delhi, 8th Edition, Lakshmi Publication, 2010.

Reference Books:

1. R.K. Jain, Mechanical and Industrial Measurements, New Delhi, 11th Edition, Khanna Publishers, 2011.

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17AMB03

**PROFESSIONAL ETHICS
Common to (ECE, EEE, CE, MEC, CSE & IT)
(OPEN ELECTIVE-I)**

Outcomes: After completion of this course students will be able to:

1. Practice human values and ethical standards to lead career accordingly.
2. Follow appropriate safety measures in designing systems.
3. Identify the role of “responsible engineer” in the society.
4. Use natural resources in a sustainable manner and be conscious of environment.
5. Practice safety measures in engineering and product design aspects.

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

REFERENCE BOOKS:

1. Fundamentals of Ethics for scientists and Engineers, Edmond G Seebauer and Robert L. Barry, 1st edition Oxford University Press, 2008.
2. R. R. Gaur, R. Sangal and G. P. Bagaria, Human Values and Professional Ethics: Excel Books, New Delhi.2010.
3. Professional Ethics and Human Values – M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi, 2013.
4. Professional Ethics and Human Values: Prof. D.R. Kiran, TATA McGraw Hill Education, 2007.

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**17ACS06 OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(OPEN ELECTIVE-I)**

Outcomes: Successful completion of this course, students should be able to:

1. describe concept and underlying principles of Object-Oriented Programming.
2. use object-oriented concepts in the Java programming language
3. Develop problem-solving and programming skills using OOP concept.
4. Develop the ability to solve real-world problems through software development in high-level programming language like Java

UNIT-I

OBJECT ORIENTED CONCEPTS: OOP principles- Class fundamentals, declaring objects, introducing methods, usage of static with data and methods. **JAVA BASICS:** Java buzzwords, JVM architecture, data types, variables, scope and life time of variables, arrays, operators, control statements, type conversion and casting, simple java program, constructors, string and String Buffer handling functions.

UNIT-II

INHERITANCE AND POLYMORPHISM: Basic concepts, types of inheritance, member access rules, usage of this and super key word, method overloading, method overriding, abstract classes, dynamic method dispatch, usage of final keyword, Garbage Collection. **PACKAGES AND INTERFACES:** Defining package, access protection, importing packages, defining and implementing interface, and variables in interface and extending interfaces.

UNIT-III

EXCEPTION HANDLING: Exception handling fundamentals, exception types, uncaught exceptions, usage of try, catch, throw, throws and finally keywords, built-in exceptions, creating own exception sub classes.

MULTI THREADING: Concepts of thread, thread life cycle, creating threads, synchronization, thread priorities, inter thread communication.

COLLECTIONS: set,list, Queue

UNIT -IV

APPLETS: Life cycle of an applet, inheritance hierarchy for applets, differences between applets and applications, developing applets, simple applet display methods, passing parameters to applets.

EVENT HANDLING: Events, event sources, event listeners, relationship between event sources and listeners, delegation event model, handling mouse and keyboard events, adapter classes.

UNIT -V

AWT CONTROLS: The AWT class hierarchy, user interface components- labels, button, text components, check box, check box groups, choices, list box, and panels - scroll pane, menu, scrollbars. Working with frame windows, color, font

SWINGS: Introduction to swings. Containers, top level containers – JFrame, JWindow, JDialog- JPanel, swing components – JButton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JTable, JTree, JTabbedPane, JScrollPane.

NETWORKING:Remote Method Invocation(RMI),Client server communications

TEXT BOOK:

1. Herbert schildt, “The complete reference JAVA”, 7th edition, Tata Mcgraw Hill, New Delhi, 2010.

REFERENCE BOOKS:

1. T. Budd, “An Introduction to Object Oriented Programming”, 3rd edition, Pearson Education, India, 2009.
2. J. Nino, F. A. Hosch, An Introduction to programming and OO design using Java, John Wiley & sons, New Jersey, 2002.
3. Y. Daniel Liang, Introduction to Java programming, 7th edition, Pearson education, India, 2010.

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(AUTONOMOUS)**

III B.Tech – II Semester (CE)

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17AME39

**OPERATIONS RESEARCH
(OPEN ELECTIVE-I)
(Common to ME, AE, CE & CSE)**

Outcomes: Successful completion of this course, students should 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

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: 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

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.

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.

UNIT IV

Waiting lines: Introduction, single channel, Poisson arrival, exponential service time with finite population and infinite population –

Simulation Definition – types of simulation models – phases of simulation – application of simulation – inventory and queuing problems – merits and demerits -- simulation languages.

UNIT V

Project Management by PERT/CPM: Introduction, simple network techniques, construction rules of drawing, Fulkerson's rules, **Critical path method (CPM)**- floats, critical path, project duration,

PERT: Introduction, different Time estimates, expected time, variance, expected project duration and probability of completion.

Text Books

1. Taha, Introduction to Operations Research, New Delhi, 8thEdition, Printice Hall International Publisher,2016.
2. A.M. Natarajan, P. Blalsubramani& A Tamilarasi, Operatiaons Research, New Delhi. 1st Edition, Pearson Piblishers, 2005.

References

1. Hiller &Liberman, Introduction to Operations Research, Noida RC, 8thEdition,Tata Mc Graw Hill publication, 2009.
2. R. Panneerselvam, Operations Research, New Delhi, 2nd Edition, Prentice Hall International Publisher, 2006.

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

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III B.Tech – II Semester (CE)

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17ACE46 ENVIRONMENTAL ENGINEERING LAB

Outcomes: After 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 pollution potential.
2. Apply gravimetric, titrimetric and colorimetric and other instrumental methods in water, waste water and solid waste analysis
3. Select appropriate unit operates and processes on engineering tools.
4. Assess the impact of waste water and solid waste pollution on public, safety aquatic, terrestrial and environment.

LIST OF EXPERIMENTS

1. (a) Determination of pH and Electrical Conductivity of water and waste water.
(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.
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.

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IV B.Tech – I Semester (CE)

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17ACE50 ESTIMATING COSTING AND VALUATION

Outcomes: After 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. Analyse cost for construction practices
5. Understand 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.

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17ACE51 DESIGN AND DRAWING OF IRRIGATION STRUCTURES

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

1. Apply knowledge of mathematics, science, engineering
2. Classify the maps, coordinate systems and projections
3. Use spatial and attribute data in preparing thematic maps
4. Identify and rectify mapping inaccuracies
5. Formulate and solve geospatial problems

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

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17ACE53

**BRIDGE ENGINEERING
(PROFESSIONAL ELECTIVE-III)**

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

1. Apply the knowledge of mathematics in bridge design system.
2. Analyse the bridge components
3. Design the bridge components
4. practice professional ethics and responsibilities.

UNIT I

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 IRC class-AA tracked vehicle only.

UNIT II

DECK SLAB BRIDGE: Introduction, Effective width method of Analysis, Design of deck Slab Bridge (Simply supported) 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.

UNIT IV

PLATE GIRDER BRIDGE: Introduction, Elements of a plate girder and their design, Design of a Deck type welded plate girder Bridge of single line B.G.

COMPOSITE BRIDGES: Introduction, Advantages, Design of Composite Bridges consisting of RCC slabs over steel girders including shear connectors.

UNIT V

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. Ponnu Swamy. *Bridge Engineering*, TATA Mcgraw Hill Company, New Delhi.
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**.

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

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IV B.Tech – I Semester (CE)

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**17ACE54 RURAL WATER SUPPLY AND SANITATION
(PROFESSIONAL ELECTIVE-III)**

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

1. Develop expertise in adopting appropriate rural water supply and sanitation practices, in the field.
2. Plan, design and implement the rural water supply schemes on sustainable basis
3. Use night soil and dung, to solve the energy problems
4. Apply cattle shed sanitation practices.
5. Identify measures in the control of flies, mosquitoes and rodent which are the vectors in disease transmission.

UNIT I

INTRODUCTION: Importance of rural water supply and sanitation practices. Present status of Indian villages with special regard to water supply and sanitation. Problems and constraints in rural water supply and sanitation systems and suggestive measures for improvement. Goals of drinking water supply and sanitation decade (1981-90). Water borne diseases in rural areas opportunities and challenges of community based rural drinking water supplies. Concepts of Holistic cleanliness.

SOURCES OF WATER: Basic consideration of rural water supply schemes. Surface and ground water resources. Selection and Protection of sources for water supply. Source improvements – hydro fracturing of ground water aquifers, Suitable well locations and Rain water harvesting systems.

UNIT II

REQUIREMENTS AND QUALITY OF WATER: Design norms for per capitates supply and stand posts. Water demand of domestic animals. Water quality stands for domestic and potable water supplies.

PLANNING OF RURAL WATER SUPPLY SCHEMES: Rational planning for wells – ground water, artesian ground water and perched water. Infiltration galleries and Radial wells on river beds. Well drilling practices. Well repairs and damage prevention practices. Planning for storm water management in rural areas.

UNIT III

RURAL SANITATION: Factors to be considered in the selection and design of rural sanitation system collection and disposal of dry refuse and sullage. Night soil disposal –pit privy ,Borehole privy, ventilated Improved pit(VIP) latrine ,Two-pit leaching toilet with water-seal trap, pour flush water-seal, single-pit privy, Ultra-mark privy, Aqua-privy, Septic tank and soak-pit etc.

UNIT IV

ANIMAL WASTE DISPOSAL: Sanitary way of dung storage. Dung usage in bio-gas plants. Different types of bio-gas plants and their operation and maintenance problems.

NIGHT-SOIL DISPOSALS: Night-Soil based bio-gas plants – Fundamental aspects, Public health aspects and practical approaches. Various types of night-soil based bio-gas plants.

INSECT CONTROL: Fly & Mosquito Life cycles, diseases transmission, and control measures.

RODENT CONTROL: Diseases transmitted, common rodents – R.Rattus, R.Norvegicus and R.Musculus, Habits, Physical feats, control measures – Trapping – Baiting – Fumigation, Rat – Proof construction.

MILK AND FOOD SANITATION: Diseases transmitted, planning a cow shed sanitation, pasteurization, quality control. Food poisoning and prevention methodologies

UNIT V

SMOKELESS CHULAH: Various types and their merits and demerits. Technical details of chulah's.

OCCUPATIONAL HAZARDS AND PREVENTION: Definition, significant occupational hazards, prevention of occupational hazards.

NATURAL ENVIRONMENTAL HAZARDS AND PREVENTION: Classification of natural hazards. Impact of hazards on mankind and their prevention.

Text Book:

1. Wagner.E.G. and J.N.Lanoix. Water Supply for Rural Areas and Small Communities. Geneva: World Health Organization. 1959.

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IV B.Tech – I Semester (CE)

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**17ACE55 DISASTER MITIGATION AND MANAGEMENT
(PROFESSIONAL ELECTIVE-III)**

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

1. Differentiate the types of disasters, causes and their impact on environment and society
2. Assess vulnerability and various methods of risk reduction measures as well as mitigation.
3. Draw the hazard and vulnerability profile of India, Scenarios in the Indian context.
4. Know the Disaster damage assessment and management.
5. Awareness of institutional processes in the country and to develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live.
6. Complete preparedness, response and recovery in order to reduce the impact of 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.

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	--	--	2	2	--	--	2	--	3	3
CO2	3	3	3	3	--	--	2	1	--	--	2	--	2	2
CO3	3	3	3	3	--	--	2	2	--	--	-	--	2	2
CO4	3	3	2	3	--	--	2	1	--	--	2	--	3	3
CO5	3	3	2	3	--	--	2	2	--	--	2	--	3	3
CO6	3	3	3	3	--	--	2	2	--	--	2	--	3	3

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IV B.Tech – I Semester (CE)

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17ACE56

**PRESTRESSED CONCRETE STRUCTURES
(PROFESSIONAL ELECTIVE-III)**

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

1. Analyze the prestress losses and deflections
2. Design the Prestressed sections for shear and flexure.
3. Demonstrate professional ethics and responsibilities.
4. Engage in life-long learning

UNIT I

INTRODUCTION: Historic development, General principles of pretensioning and post tensioning, Advantages and limitations of prestressed concrete, Materials, High strength concrete and high tensile steel their characteristics.

METHODS OF PRESTRESSING: Prestressing systems: Definitions of common terms in prestressing, Tensioning devices and anchorage devices, Pre-tensioning and post tensioning methods, Different systems of prestressing like Hoyer System, Magnel-Blaton System, Freyssinet system and Gifford – Udall System, Analysis of post- tensioning.

UNIT II

LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of stress in steel, slip in anchorage ,bending of member and wobble frictional losses.

UNIT III

ANALYSIS & DESIGN OF SECTIONS FOR FLEXURE: 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

DESIGN OF SECTION FOR SHEAR: Shear and Principal Stresses, Design for Shear in beams.

COMPOSITE SECTION: Introduction, Analysis of stress, Differential shrinkage, General designs considerations.

UNIT V

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections, factors influencing deflections, short term deflections of uncracked members, prediction of long term deflections.

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 Wiley & Sons. New York, 1996
2. Praveen Nagrajan, Prestressed Concrete design, Pearson publications, 2013 editions.

Codes/Tables:

Codes: IS code for pre-stressed concrete (IS- 1343-2012).

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

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IV B.Tech – I Semester (CE)

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**17ACE57 EARTH AND EARTH RETAINING STRUCTURE
(PROFESSIONAL ELECTIVE-III)**

Outcomes: After completion of the course the Students will be able to

1. explain Theories of earth pressure and Earth retaining structures.
2. Define Soil reinforcement, Earth slopes and coffer dams.
3. estimate how earth retaining walls and earth slopes behave under loads.
4. Exercise professional judgment in analysis and design.
5. describe sheet pile structures behavior.

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.

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**17ACE58 FINITE ELEMENT METHODS IN CIVIL ENGINEERING
(PROFESSIONAL ELECTIVE-IV)**

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

1. Develop shape functions and stiffness matrices for 1D, 2D elements, global stiffness matrices and global vectors.
2. Analyze planar structural system using finite element model.
3. Apply natural and area co-ordinate system to CST & LST
4. Analyze the static loading problems.
5. Compute the stiffness matrix for iso-parametric elements.

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 in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT II: 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 for 3-node triangular element and four node rectangular elements.

UNIT IV: ISOPARAMETRIC FORMULATION: Concepts of, isoparametric elements for 2D 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

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**17ACE59 ELEMENTS OF EARTHQUAKE ENGINEERING
(PROFESSIONAL ELECTIVE-IV)**

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

1. Explain causes and effects of earthquake
2. Calculate time period of a structure
3. Evaluate seismic performance of building
4. Design seismic resistant building
5. Retrofit existing building

UNIT I

ENGINEERING SEISMOLOGY: Causes of earthquakes - Seismic waves -Magnitudes, Intensity and energy release - characteristics of strong earthquakes, ground motions, soils effects and liquefaction.

UNIT II

THEORY OF VIBRATIONS: Introduction, long and short period structure; single, two and multi-degree of freedom systems, damped and un-damped variations, concepts of damped and un-damped vibrations, response spectrum - Response spectrum analysis.

UNIT III

SEISMIC DESIGN PHILOSOPHY: Concept of Seismic resistant design, reduction factors - Over strength, Ductility and Redundancy -Determination of earthquake forces on structures. Seismic Design and detailing of Masonry, Reinforced Concrete and Steel Buildings.

UNIT IV

SEISMIC PERFORMANCE OF BUILDINGS: Case Studies of few serious earthquakes in the country in the past, damages to buildings - Damage Patterns - Performance of Non-Engineered Buildings, Rural houses during the Earthquakes.

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IV B.Tech – I Semester (CE)

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**17ACE60 GROUND IMPROVEMENT TECHNIQUES
(PROFESSIONAL ELECTIVE-IV)**

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

1. Plan highway networks
2. Carry out surveys involved in planning and highway alignment
3. Design highway geometrics and pavements
4. Estimate traffic for various studies
5. Determine the characteristics of pavement materials

UNIT I

DEWATERING: Methods of de-watering- sumps and interceptor ditches- single, multi stage well points - vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains –Electro-Osmosis.

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

STABILISATION: Methods of stabilization-mechanical-cement- lime bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum

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17ACE61

**SOLID WASTE MANAGEMENT
(PROFESSIONAL ELECTIVE-IV)**

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

1. Estimate reduction of wastes at source
2. identify methods of transportation of wastes
3. explain treatment of wastes
4. select recovery and disposal of waste techniques
5. plan reuse and recovery of materials from waste

UNIT I

INTRODUCTION, COLLECTION AND TRANSPORTATION: INTRODUCTION: 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 air pollution, pyrolysis, 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.

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**17ACE62 ADVANCED STRUCTURAL DESIGN
(PROFESSIONAL ELECTIVE-IV)**

Outcomes: After 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 counterfort 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 counterfort retaining wall with horizontal back fill, Design of Cinema balcony

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Code : 17ACS55

ARTIFICIAL INTELLIGENCE

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

1. Define basic concepts of AI and Intelligent Agents
2. Evaluate Searching techniques for problem solving in AI.
3. Apply First-order Logic and chaining techniques for problem solving
4. Handle knowledge representation techniques for problem solving
5. Apply supervised, unsupervised learning and Neural Networks for solving problem in AI.

UNIT – I

Introduction: What Is AI, the Foundations of Artificial Intelligence, the History of Artificial Intelligence, the State of the Art

Intelligent Agents: Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, And The Structure of Agents

UNIT – II

Solving Problems by Searching: Problem-Solving Agents, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions

Beyond Classical Search: Local Search Algorithms and Optimization Problems, Searching with Nondeterministic Actions and Partial Observations, Online Search Agents and Unknown Environments **Constraint Satisfaction Problems:** Definition, Constraint Propagation, Backtracking Search, Local Search, the Structure of Problems

UNIT – III

Logical Agents: Knowledge-Based Agents, Propositional Logic, Propositional Theorem Proving, Effective Propositional Model Checking, Agents Based on Propositional Logic

First-Order Logic: Syntax and Semantics, Knowledge Engineering in FOL, Inference in First Order Logic, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution

UNIT – IV

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17AME56 OPTIMIZATION TECHNIQUES

(COMMON TO CE & EEE)

Outcomes: After completion of the course, the student 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 OT 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.

UNIT I

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: 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

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.

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.

UNIT IV

Waiting lines: Introduction, single channel, Poisson arrival, exponential service time with finite population and infinite population –

Simulation Definition – types of simulation models – phases of simulation – application of simulation – inventory and queuing problems – merits and demerits -- simulation languages.

UNIT V

Project Management by PERT/CPM: Introduction, simple network techniques, construction rules of drawing, Fulkerson's rules, **Critical path method (CPM)**- floats, critical path, project duration,

PERT: Introduction, different Time estimates, expected time, variance, expected project duration and probability of completion.

Text Books

1. Taha, Introduction to Operations Research, New Delhi, 8thEdition, Printice Hall International Publisher, 2006.
2. A.M. Natarajan, P. Blalsubramani& A Tamilarasi, Operations Research, New Delhi. 1st Edition, Pearson Publishers, 2005.

Reference Books

1. Hiller & Liberman, Introduction to Operations Research, Noida RC, 8thEdition, Tata Mc Graw Hill publication, 2009.
2. R. Panneerselvam, Operations Research, New Delhi, 2nd Edition, Prentice Hall International Publisher, 2006.

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ELECTRICAL SAFETY

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

1. Identify electrical safety and maintenance methods.
2. Design of electrical safety protection equipment and fire hazards.
3. Develop insulators, human safety scheme and preventive maintenance
4. Identify hazardous zones and cable joints

UNIT - I

CONCEPTS AND STATUTORY REQUIREMENTS: Introduction – electrostatics –electro magnetism – stored energy- energy radiation and electromagnetic interference- working principles of electrical equipment – Indian electricity act and rules – statutory requirements from electrical 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 circuit current – 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

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17AME57

TOTAL QUALITY MANAGEMENT

(Common to ECE, CSE, CIVIL & AE)

(Choice Based Credit Course, Inter-Departmental)

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

1. Summarize TQM concepts with quality standards, tools, value addition and reliability concept.
2. Organize a team and play a key role in decision making with interpretation skills besides continuous learning.
3. Solve industry problems with available sources, software tools, modern TQM techniques with system approach.
4. Select the best solution for problem solving using QFD model and obtain patents for innovative idea and models.
5. Judge the solutions to sustain customer trust-worth-ship besides industry growth by getting ISO certification.

UNIT I

INTRODUCTION: Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Costs of quality.

UNIT II

TQM PRINCIPLES: Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle.

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17AME58 ENTREPRENEURSHIP DEVELOPMENT

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

1. Summarize the need of entrepreneurship in the development of economy.
2. Illustrate the application of concept to become successful entrepreneur and 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 TO ENTREPRENEURSHIP DEVELOPMENT: Introduction -- meaning and definition of Entrepreneur and Entrepreneurship. Characteristics of Entrepreneur-Functions of Entrepreneur-Attitude and leadership of Entrepreneur – Entrepreneur Vs Manager – Role of Entrepreneurship in Economic development – Need for rural Entrepreneurship – Women Entrepreneurship.

UNIT-II

ENTREPRENEURSHIP DEVELOPMENT: Economic and non- Economic Factors affecting Entrepreneurship Development – Government actions -Entrepreneurship and environment-Policies governing entrepreneurs.

UNIT-III

ENTREPRENEURIAL MOTIVATION: Entrepreneurial Motivation, competencies and Mobility – Entrepreneurship Development Programmes (EDPs), Institutions for entrepreneurship

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17ACE64 TRANSPORTATION ENGINEERING LAB

Outcomes: After completion of the course the Students will be able to

1. Conduct basic tests on pavement materials
2. Characterize the pavement materials
3. Perform quality control tests on pavements and pavement materials
4. Estimate quantity of pavement materials
5. Design the pavement based on quality of 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.

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17ACE65

STAAD LAB-II

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

1. Develop skills in relating different softwares like AutoCAD and STAAD Pro.
2. Analyze and design Multi storey multi bay structure.
3. Analyze and design space truss structure for different purposes.
4. Analyze and design any water tank.

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.

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17ACE68

BUILDING SERVICES ENGINEERING

(PROFESSIONAL ELECTIVE-V)

Outcomes: After learning the course the students should be able to:

1. Explain concepts relating to Basics of buildings, Plans and its elements
2. Define concepts of Thermal insulation, Ventilation and Air Conditioning.
3. Explain concepts involving Electrical Installation and Plumbing Services.
4. Demonstrate Fire Safety of Buildings
5. Apply anti-Termite Treatment methods for termite prevention in Buildings

UNIT-I:

BASICS OF BUILDINGS

Types of structures: Load bearing walled structures & Framed structures – Different types of buildings: Residential, Public, Assembly, Hospitals, Institutional etc -Zoning regulations; Regulations regarding layouts or sub-divisions; Building height regulations; Calculation of plinth, floor and carpet area; Floor space index.

BASIC BUILDING PLANNING AND ELEMENTS

Site planning; Space requirement – Establishing areas for different units - Grouping, Circulation, Orientation, Aspect and prospect, Privacy, Elegance and economy; Climatic considerations – Basic building elements: Stair cases, doors and windows -Guidelines for staircase planning; Guidelines for selecting doors and windows; Terms used in the construction of stair case, doors and windows

UNIT-II:

VENTILATION AND AIRCONDITIONING,

Ventilation – Necessity of Ventilation – Functional Requirements – Types: Natural Ventilation – Artificial Ventilation – Air Conditioning – Systems of Air Conditioning – Essentials of Air Conditioning systems – Protection against fire to be caused by Air Conditioning systems

THERMAL INSULATION:

Heat transfer – Thermal Insulating Materials – Thermal Insulation Methods –Economics of Thermal Insulation – Insulation of Walls – Roofs – Doors & Windows.

UNIT-III:

PLUMBING SERVICES

Types of plumbing – Fixing pipes in buildings – Plumbing fittings and accessories –Water Supply System: guidelines for mains, communication and consumer pipes –Water Meters; Drainage – Sanitary Fittings: Bathtubs, wash basins, sinks, flushingcisterns, water closets – Principles governing design of building drainage –Guidelines for laying of Gas supply systems.

ELECTRICAL INSTALLATION IN BUILDINGS

Considerations for Office Buildings, School Buildings & Residential Buildings;Lighting– Fannage – Electrical Installation for Air Conditioning/Heating –Reception and distribution of main supply – Electrical Fittings and accessories-Method of internal wiring – Earthing – Planning of electrical Installations –Lightening arrestors

UNIT-IV:

FIRE SAFETY:

Causes of fire in buildings – Planning considerations for fire resistance - Non-combustible materials in construction, staircases and lift lobbies, fire escapes -Special features required for physically handicapped and elderly people – Heat andsmoke detectors – Fire alarm system, snorkel ladder – Fire fighting pump and waterstorage – Dry and wet risers – Automatic sprinklers

UNIT-V:

ANTI- TERMITE TREATMENT

Pre construction treatment – Post construction treatment – Construction of antitermite groove in buildings for termite prevention.

Text Books:

1. Building Construction by B.C. Punmia; Ashok Kumar Jain; Arun Kumar Jain, 2005; Laxmi Publications, New Delhi
2. Building Construction by Janardhan Jha; S.K. Sinha; 2007; Jain Book Agency, New Delhi

Reference Books:

1. National Building Code, 2005
2. Building Construction by P.C. Varghese, 2005, PHI Publications, New Delhi

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17ACE69 ARCHITECTURE AND TOWN PLANNING

(PROFESSIONAL ELECTIVE-V)

Outcomes: After learning the course the students should be able to:

1. Describe History of Architecture and impact of environmental studies in building science on design of building
2. Apply Techniques of planning, Land Scape design and Housing.
3. Define concepts involving Urban Design.
4. Apply Concepts involved in city planning
5. Design systems using Concepts of Urban infrastructure, services and amenities.

UNIT-I:

HISTORY OF ARCHITECTURE:

Indian – Indus valley, Vedic, Buddhist, Indo-Aryan, Dravidian and Mughal periods; European – Egyptian, Greek, Roman, medieval and renaissance periods construction and Architectural styles; vernacular and traditional architecture. Principles of Architecture.

ENVIRONMENTAL STUDIES 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:

TECHNIQUES OF PLANNING:

Planning survey techniques; preparation of development plans; site planning principles and design; application of G.I.S and remote sensing techniques in urban and regional planning;

LANDSCAPE DESIGN:

Principles of landscape design and site planning; history of landscape styles; landscape elements and materials.

HOUSING:

Concept of housing; neighborhood concept; site planning principles; housing typology; housing infrastructure; housing policies, finance and management; housing programs in India;

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

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**17ACE70 COMPUTATIONAL HYDRAULICS
(PROFESSIONAL ELECTIVE-V)**

Outcomes: After learning the course the students should be able to:

1. define concepts of Computational Hydraulics.
2. classify types of Fluid Flows.
3. use concepts involving characteristics of fluid flows.
4. To know various laws governing fluid flow and its applications
5. Apply Numerical methods to fluid flow.

UNIT-I:

INTRODUCTION:

Introduction, significance of computational hydraulics, discrete forms of the laws of conservation of mass, momentum and energy, examples of free surface flows.

UNIT-II:

FLUID FLOWS:

Continuous forms of the conservation laws, lateral inflow's 1-D expansions and contractions, homogeneous and stratified fluid flows.

UNIT-III:

CHARACTERISTICS OF FLUID FLOW:

Method of characteristics – Characteristics and invariants, regions of state, Computation of Turbulence, computation of hydraulic jump, indeterminary conditions, the linearised method of characteristics.

UNIT-IV:

LAWS GOVERNING FLUID FLOW AND ITS APPLICATIONS:

Difference forms of conservation laws, weak solutions applications, storm-sewer networks, diffusion problems, river morphology, linear wave propagation.

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17ACE72

RELIABILITY ENGINEERING

(PROFESSIONAL ELECTIVE-V)

Outcomes: After learning the course the students should be able to:

1. Describe Power Generation Schemes.
2. Explain Under Ground Projects with Pressure and Diversion Systems.
3. Apply concepts involving Hydro Power Conveyance Systems.
4. Use Water Conducting Systems in hydropower engineering
5. Apply Concepts of advanced Water Conducting Systems

UNIT-I:

SYSTEM RELIABILITY CONCEPTS:

Basic Probability Theory Basic concepts – Rules for combining Probabilities of events – Failure Density and Distribution functions – Bernoulli's trials – Binomial distribution – Expected value and standard deviation for binomial distribution – Examples.

UNIT-II:

NETWORK MODELING AND RELIABILITY EVALUATION:

Basic concepts – Evaluation of network Reliability / Unreliability – Series systems, Parallel systems, Series - Parallel systems, partially redundant systems – Types of redundancies - Evaluation of network Reliability / Unreliability using conditional probability method – Paths based and Cutset based approach – complete event tree and reduced event tree methods - Examples.

UNIT-III:

TIME DEPENDENT PROPOBILITY:

Basic concepts – Reliability functions $f(t)$, $F(t)$, $R(t)$, $h(t)$ – Relationship between these functions – Baths tubs curve – Exponential failure density and distribution functions - Expected value and standard deviation of Exponential distribution – Measures of reliability – MTTF, MTTR, MTBF – Evaluation of network reliability / Unreliability of simple Series, Parallel, Series-Parallel systems - Partially redundant systems - Evaluation of reliability measure – MTTF for series and parallel systems – Examples.

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17ACE73 GREEN BUILDING & SUSTAINABILITY

(PROFESSIONAL ELECTIVE-VI)

Outcomes: After learning the course the students should be able to:

1. Define concepts of Tacheometric Surveying and Trigonometric Surveying
2. Use Electronic Distance Measurement devices in surveying and applying Triangulation concepts
3. Apply concepts of surveying for setting out works like for sewer and culvert.
4. Apply Concepts involved in Ariel Photography
5. Interpret Concepts of Photographic Surveying.

UNIT-I:

INTRODUCTION

What is Green Building, Why to go for Green Building, Benefits of Green Buildings, Green Building Materials and Equipment in India, What are key Requisites for Constructing a Green Building, Important Sustainable features for Green Building,

UNIT-II:

GREEN BUILDING CONCEPTS AND PRACTICES

Indian Green Building Council, Green Building Moment in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation; Green Building Opportunities And Benefits: Opportunities of Green Building, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy Saving Approach in Buildings, LEED India Rating System and Energy Efficiency,

UNIT-III:

GREEN BUILDING DESIGN

Introduction, Reduction in Energy Demand, Onsite Sources and Sinks, Maximize System Efficiency, Steps to Reduce Energy Demand and Use Onsite Sources and Sinks, Use of Renewable Energy Sources. Ecofriendly captive power generation for factory, Building requirement,

UNIT-IV:

AIR CONDITIONING

Introduction Godrej Green business center, Design philosophy, Design interventions, Energy modeling, HVAC System design, Chiller selection, pump selection, Selection of cooling towers, Selection of air handling units, Precooling of fresh air, Interior lighting system, Key feature of the building. Eco-friendly captive power generation for factory, Building requirement.

UNIT-V:

MATERIAL CONSERVATION

Handling of non process waste, waste reduction during construction, materials with recycled content, local materials, material reuse, certified wood ,Rapidly renewable building materials and furniture; Indoor Environment Quality And Occupational Health: Air conditioning, Indore air quality, Sick building syndrome, Tobacco smoke control, Minimum fresh air requirements avoid use of asbestos in the building, improved fresh air ventilation, Measure of IAQ, Reasons for poor IAQ, Measures to achieve Acceptable IAQ levels,

Text Books:

1. Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers, 2009.
2. Green Building Hand Book by Tomwoolley and Samkimings, 2009.

Reference Books:

1. Complete Guide to Green Buildings by Trish riley
2. Standard for the design for High Performance Green Buildings by Kent Peterson, 2009

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
CO2	3	--	--	--	--	--	--	--	--	--	--	--	2	2
CO3	3	--	--	--	--	--	--	--	--	--	--	--	3	1
CO4	3	--	--	--	--	2	2	--	--	--	--	--	2	2

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17ACE74 ADVANCED SURVEYING

(PROFESSIONAL ELECTIVE-VI)

Outcomes: After learning the course the students should be able to:

1. Define concepts of Tacheometric Surveying and Trigonometric Surveying
2. Use Electronic Distance Measurement devices in surveying and applying Triangulation concepts
3. Apply concepts of surveying for setting out works like for sewer and culvert.
4. Apply Concepts involved in Ariel Photography

UNIT-I:

TACHEOMETRIC SURVEYING

Advantages of tacheometric surveying; Basic systems of tacheometric measurements; Determination of constants K and C; Inclined sight with staff vertical; inclined sight with staff normal to the line of sight.

TRIGONOMETRIC LEVELLING

Introduction; Determination of the level of the top of an object, When its base is inaccessible and When its base is not accessible; Determination of the height of the object when the two instrument stations are not in the same vertical plane; Axial signal correction; Difference in elevation by single observation and reciprocal observations.

UNIT-II:

ELECTRONIC DISTANCE MEASUREMENTS

Basic concepts, Classification of Electronic Radiation, Basic principle of Electronic Distance Measurement, Computing the distance from the phase differences, Total Station, Instrumental errors in EDM.

TRIANGULATION

Principles of triangulation; Uses of triangulation survey; Classification of triangulation; Field and office work in triangulation – Selection of triangulation stations, Signals and towers, Satellite station; Base line & Extension of the base line;

UNIT-III:

SETTING OUT WORKS

Control station; Horizontal control; Reference grid; Vertical control; Positioning of a structure; Setting out a foundation: Setting out with a theodolite; Graded stakes; setting out a sewer; Setting out a culvert.

UNIT-IV:

AERIAL PHOTOGRAMMETRY

Introduction, Principle, Uses, Aerial camera, Aerial photographs, Definitions, Scale of vertical and tilted photograph, Ground Co-ordinates, Displacements and errors, Ground control, Procedure of aerial survey, Photomaps and mosaics, Stereoscopes, Parallax bar.

UNIT-V:

HYDROGRAPHIC SURVEYING

Purpose of hydrographic surveying – Soundings, sounding equipment, methods of locating sounding, plotting of soundings by rangelines, two angles from a boat.

Text Books:

1. Surveying Vol I & II by K R Arora, Standard Book house... (Edition :Fifteenth ,2016).
2. Remote Sensing & Geographical Information Systems by M.Anji Reddy, BPS Publications- Hyderabad.(Third Edition, Year 2013).
5. Higher Surveying by Dr.A.M.Chandra, Newage International Publishers.(Year 2006)

Reference Books:

1. Remote sensing and Image interpretation by TM Lillesand and RW Kiefer; John Willey and sons.(Edition :Seventh ,2016)
2. Surveying Vol I & II by B.C. Punmia, Laxmi Publications.(Edition :Sixteenth, 2016)
3. Remote Sensing & GIS by Basudeb Bhatta, Oxford University Press.(Edition :Second, 2011)

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

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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IVB.Tech – II Semester

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17ACE75 INDUSTRY ORIENTED CIVIL COURSE

(PROFESSIONAL ELECTIVE-VI)

Outcomes: After learning the course the students should be able to:

1. Develop an understanding of laws relating to housing industry.
2. Use various planning schemes for urban and regional land use
3. Explain various laws and rights for land pooling, acquisition and other government schemes
- 4 Identify buildings by laws, zoning regulations, layouts and procedures for obtaining building permissions

UNIT-I:

EVOLUTION OF PLANNING LEGISLATION IN INDIA

Municipal Acts - Improvement Trust Acts - Town and Country Planning Acts -Gram Panchayats Acts - Development Authority Acts - And Special Purpose legislations - Legislations for creating special purpose bodies such as Housing Board, Slum Clearance Boards and Water Supply and Sewerage Boards –Land Acquisition Act, 1894 - Urban Land (Ceiling and Regulation) Act of 1976 – Water Pollution (Prevention and Control) Act of 1974 - Pollution (Prevention and Control)Act of 1981 and the Environmental Protection Act of 1986- Urban Art CommissionAct of 1973

UNIT-II:

URBAN AND REGIONAL LAND USE PLANNING

Land use planning - Town Planning Schemes - Master Plans - Zonal DevelopmentPlans for urban local bodies - Regional Master Plans - 73rd and 74th amendments tothe Constitution of India- functions of urban local bodies.

UNIT-III:

LAND BANKING

Land pooling Schemes - Land Acquisition Act - Transfer of Development Rights(TDR) to obtain land for road widening schemes - PPP schemes – BOOTmodeprojects

UNIT-IV:

DEVELOPMENT PROMOTION REGULATIONS-1

Model Building bye laws drafted by Town and Country Planning organization(TCPO) - Zoning Regulations - A.P. State Common Building Rules - FAR and Coverage - Layout Rules for sub-division of land into residential plots.

UNIT-V:

DEVELOPMENT PROMOTION REGULATIONS-2

Procedure for obtaining permission for individual buildings / group housing / Apartments / row-housing / gated community - procedure to obtain permission for sub-division of land for the development of residential layout.

Text Books:

1. Inclusive planning and social infrastructure – A.K.Jain, Jain Book Depot, New Delhi
2. Urban Planning and Governance – A.K.Jain, Jain Book Depot, New Delhi

Reference Books:

- 1.. Urban Land Policy – A.K.Jain , Jain Book Depot, New Delhi
2. New Dimesnions of Urban Management in India, Nishith Rai, Awadhesh Kumar Singh, Jain Book Depot, 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	--	--	--	--	--	--	--	--	--	--	--	2	2
CO2	3	--	--	--	--	--	--	--	--	--	--	--	2	2
CO3	3	--	--	--	2	2	--	--	--	--	--	--	2	2
CO4	3	--	--	3	2	2	2	--	3	3	--	2	2	2

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17ACE76 CONSTRUCTION TECHNIQUES, EQUIPMENT AND PRACTICES

(PROFESSIONAL ELECTIVE-VI)

Outcomes: After learning the course the students should be able to:

1. Select Construction Practices.
2. Apply various concepts relating to Sub Structure construction
3. Apply various concepts relating to Super Structure Construction.
4. Use concepts and techniques relating to Repair and Rehabilitation
5. Define Concepts of Construction Equipment.

UNIT-I:

CONSTRUCTION PRACTICES

Specifications, details and sequence of activities and construction co-ordination – Site Clearance – Marking – Earthwork - masonry – stone masonry – concrete hollow block masonry – flooring – damp proof courses – construction joints – movement and expansion joints – pre cast pavements – Building foundations – basements – temporary shed – centering and shuttering sheet piles – slip forms – scaffoldings – de-shuttering forms – Fabrication and erection of steeltrusses - laying brick — weather and water proof – roof finishes – air conditioning – acoustic and fire protection.

UNIT-II:

SUB STRUCTURE CONSTRUCTION

Techniques of Box jacking – Pipe Jacking -under water construction of diaphragm walls and basement-Tunneling techniques – Piling techniques- driving well and caisson –Dewatering-- well points- sinking cofferdam - cable anchoring and grouting-driving diaphragm walls, sheet piles - shoring for deep cutting

UNIT-III:

SUPER STRUCTURE CONSTRUCTION

Launching girders, bridge decks, off shore platforms – special forms for shells - techniques for heavy decks –Introduction to pre-stressing and Post tensioning, aerial transporting handling - erection of transmission towers - Construction sequences in cooling towers, silos, chimney, sky scrapers, bow string bridges, cable stayed bridges -Support structure for heavy Equipment and conveyors -Erection of articulated structures, braced domes and space decks

UNIT-IV:

REPAIR AND REHABILITATION

Study on causes of building damage and deterioration –Methods of repair and restoration – Materials for repair

UNIT-V:

CONSTRUCTION EQUIPMENT

Selection of equipment for earth work - earth moving operations - types of earthwork equipment - tractors, motor graders, scrapers, earth movers – Equipment for foundation and pile driving. Equipment for compaction, batching and mixing and concreting - Equipment for material handling and erection of structures - Equipment for dredging, trenching, tunneling, drilling, blasting — dewatering and pumping equipment – Transporters.

Text Books:

1. Varghese , P.C. Building construction, Prentice Hall of India Pvt. Ltd, New Delhi, 2007.
2. Shetty, M.S, Concrete Technology, Theory and Practice, S. Chand and Company Ltd, New Delhi, 2005
3. Arora S.P. and Bindra S.P., Building Construction, Planning Techniques and Method of Construction, Dhanpat Rai and Sons, 1997.

Reference Books:

1. Gambhir, M.L, Concrete Technology, Tata McGraw – Hill Publishing Company Ltd, New Delhi, 2004
2. Jha J and Sinha S.K., Construction and Foundation Engineering, Khanna Publishers, 1993.
3. Sharma S.C. “Construction Equipment and Management”, Khanna Publishers New Delhi, 1988.
4. Deodhar, S.V. “Construction Equipment and Job Planning”, Khanna Publishers, New Delhi, 1988

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

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17ACE77 MODERN STRUCTURAL MATERIALS AND SYSTEMS DESIGN

(PROFESSIONAL ELECTIVE-VI)

Outcomes: After learning the course the students should be able to:

1. Make use of the high strength and high-performance concrete according to the need.
2. Select the respective alloy steel, aluminum and use the components in the respective construction methods.
3. Use wide variety of polymer and composites for building components.
4. Understand numerous materials such as water proofing, admixtures from different manufacturers and select the best choice to the end application.

UNIT-I:

CONCRETES: High strength and High performance concrete-Fiber Reinforced concrete

UNIT-II:

STEEL: Steel production-Steel alloys-Heat treatment-Corrosion.

UNIT-III:

ALUMINIUM: Production-Alloys-Heat treatment-Corrosion.

UNIT-IV:

COMPOSITES: Plastics-Reinforced polymers-FRP-Cellular cores.

UNIT-V:

OTHER MATERIALS: Water proofing compounds-Non -weathering Materials-Flooring and Facade Materials.

Text Books:

1. Shan Somayaji, "Civil Engineering Materials ", 2nd Edition, Prentice Hall Inc., 2001.
2. Derucher, K.Korfiatis. G. and Ezeldin, S., " Materials for Civil and Highway Engineers ", 4th Edition, Prentice

Reference Books:

1. Mamlouk, M.S. and Zaniewski, J.P., " Materials for Civil and Construction Engineers ", 2nd Edition, Prentice Hall Inc., 1999.
2. Aitkens, "High Performance Concrete ", McGraw Hill, 1999.

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