COURSE STRUCTURE
AND
DETAILED SYLLABUS

FOR

B. Tech Regular Four Year Degree Courses
(For the Batches Admitted From 2012-2013)

&

B. Tech (Lateral Entry Scheme)
(For the Batches Admitted From 2013-2014)

CIVIL ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING
SRI VENKATESWARA COLLEGE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)
R.V.S. NAGAR, CHITTOOR- 517 127
SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY  
(Autonomous)  
(Affiliated to J.N.T. University, Anantapur, Anantapur).  
ACADEMIC REGULATIONS  
B.Tech. Regular Four Year Degree Program  
(For the batches admitted from the academic year 2012-13)  
And  
B.Tech. (Lateral Entry Scheme)  
(For the batches admitted from the academic year 2013-14)  

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 2012-2013 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 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, Andhra Pradesh, with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination recognized by Board of Intermediate Education and JNTU Anantapur) or a 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, govt. of A.P 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:

A – Category & B – Category seats are filled as per the norms prescribed by the Govt. of A.P. from time to time.

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 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 Govt. of A.P. 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 (Computer Science & Engineering)
3. B.Tech (Electrical & Electronics Engineering)
4. B.Tech (Electronics & Communication Engineering)
5. B.Tech (Information Technology)
6. B.Tech (Mechanical Engineering)

5. Academic Year: The College shall follow Yearly Pattern for first year course and semester pattern from second year onwards. The first year of Four year B.Tech Program shall have a minimum of 32 instructional weeks. From second year onwards each semester shall have a minimum of 16 instructional weeks.
6. **Course Structure**: Each Program of study shall consist of:

- **General subjects comprising of the following**: (5 to 10%)
  - i. English Language /Communication Skills / Mind Skills
  - ii. Humanities and Social Sciences
  - iii. Economics
  - iv. Principles of Management
  
  The above courses are common to all Branches.

- **Basic science subjects comprising of the following**: (15 to 25%)
  - i. Computer Literacy with Numerical Analysis
  - ii. Mathematics
  - iii. Physics
  - iv. Chemistry
  
  The above courses are common to all branches.

- **Basic Engineering subjects comprising some of the following, depending upon the branch**: (15 to 25%)
  - i. Engineering Drawing
  - ii. Engineering & IT workshop
  - iii. Engineering Mechanics
  - iv. Basic Mechanical Engineering
  - v. Electrical & Electronics Engineering
  - vi. Computer Programming

- **Core Subjects**: (45 to 55%)
  
  The list of professional subjects are chosen as per the suggestions of the experts to impart broad based knowledge needed in the concerned branch of study.

- **Elective subjects**: (10 to 15%)

  Electives will be offered to the students to diversify the spectrum of knowledge. These electives can also be chosen from outside the main discipline, based on the interest of the student to broaden his individual skill and knowledge.

**The students shall complete:**

A mini project in an industry during the summer term following the second semester of third year B. Tech Program for a period of 4 weeks. A report shall be submitted to Department after successful completion of the mini project, during IV year I semester.

A Main project in the institution / industry during IV year II semester for a period of one semester. A report shall be submitted to the department after successful
completion of the main project.

7. **Credit System**: Credits are assigned based on the following norms.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Yearly Pattern</th>
<th>Semester Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Periods / Week</td>
<td>Credits</td>
</tr>
<tr>
<td>Theory</td>
<td>01</td>
<td>02</td>
</tr>
<tr>
<td>Practical</td>
<td>03</td>
<td>04</td>
</tr>
<tr>
<td>Mini Project</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Seminar</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Comprehensive Viva - Voce</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Final Year Project</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

i. As a norm, for the theory subjects, **one credit** for one contact period per week is assigned in semester system. In yearly pattern **two credits** for one contact period per week is assigned.

ii. As a norm, for practical courses **two credits** will be assigned for three contact periods per week in semester pattern. In yearly pattern **four credits** will be assigned for three contact periods per week.

iii. Tutorials do not carry any credits. However, each of the analytical and problem oriented courses will have one tutorial period per week.

iv. For Mini project/Project/Seminar/Comprehensive Viva-Voce, where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

- The four year curriculum of any B.Tech, Program of study shall have a total of 224 credits.
- In the case of lateral entry students, B.Tech. program of study shall have a total of 172 credits.
- The exact requirements of credits for each subject will be as recommended by the concerned Board of Studies and approved by the Academic Council.

8. **Examination System**: All components in any Program of study will be Evaluated continuously through internal evaluation and an external evaluation component conducted as year/semester-end examination.
### 8.1 Distribution of Marks:

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Examination</th>
<th>Marks %</th>
<th>Examination and Evaluation</th>
<th>Scheme of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Theory</td>
<td>70</td>
<td>Year/Semester-end examination (external Paper setting and evaluation)</td>
<td>This Examination question paper in theory subjects will be for a maximum of 70 marks. The question paper shall be of descriptive type with 8 questions (one question from each unit) out of which 5 are to be answered in 3 hours duration of the examination.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30</td>
<td>Mid-Examination of 120 Min. duration (Internal evaluation). The question paper shall be of descriptive type with 5 questions out of which 4 are to be answered and evaluated for 20 marks.</td>
<td><strong>In Yearly Pattern:</strong> Three (03) mid – term exams, each for 20 marks are to be conducted. Average of the best two mid-term exams shall be considered. <strong>Mid-I:</strong> After first spell of instructions (I to II Units). <strong>Mid-II:</strong> After second spell of instructions (III to V Units). <strong>Mid-III:</strong> After third spell of instructions (VI to VIII Units) <strong>In Semester pattern:</strong> Two (02) mid-term exams, each for 20 marks are to be conducted. Better of the two shall be considered. <strong>Mid-I:</strong> After first spell of instructions (I to IV Units) <strong>Mid-II:</strong> After second spell of instructions (V to VIII Units.)</td>
</tr>
<tr>
<td>Course</td>
<td>Year/ Semester</td>
<td>Evaluation Type</td>
<td>Marks</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>----------------</td>
<td>-----------------</td>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>Laboratory</td>
<td>Year/Semester-end</td>
<td>Laboratory Examination</td>
<td>50</td>
<td>50 marks are allotted for laboratory examination during year/semester-end.</td>
</tr>
<tr>
<td>Drawing</td>
<td>Year/Semester-end</td>
<td>Drawing Examination</td>
<td>50</td>
<td>50 marks are allotted for drawing examination during year/semester-end.</td>
</tr>
<tr>
<td>Seminar</td>
<td>Internal Evaluation</td>
<td>Evaluation</td>
<td>50</td>
<td>Evaluation during a semester by the Departmental Committee (DC).</td>
</tr>
</tbody>
</table>

**In yearly pattern:** Four assignments shall be given and each will be evaluated for 10 marks. Average of four Assignments shall be taken as internal marks for the assignments.

**In Semester pattern:** Two assignments shall be given and each will be evaluated for 10 marks. Average of two Assignments shall be taken as internal marks for the assignments.
8.2 Project Work : Evaluation

The Semester-End Examination (Viva-voce) shall be conducted by a Committee consisting of External examiner (nominated by the Chief Controller of Examinations), HOD, & Supervisor. The evaluation of project work shall be conducted at the end of the IV year second semester. The Internal Evaluation shall be made by the Departmental Committee, on the basis of two project reviews of each student.

8.3 Eligibility to appear for the year/ Semester-End examination:

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

8.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in first year or 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.

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

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

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

8.4 Evaluation: Following procedure governs the evaluation.

8.4.1 The marks for the internal evaluation components will be added to the external evaluation marks secured in the Year/Semester –End examinations, to arrive at total marks for any subject in that Year/semester.
8.4.2 Performance in all the subjects is tabulated program-wise and will be scrutinized by the Examination Committee and moderation is applied if needed, and subject-wise marks lists are finalized. Total marks obtained in each subject are converted into letter grades.

8.4.3 Student-wise tabulation is done and student-wise Grade Sheet is generated and issued to the students.

8.5 Revaluation / Recounting:
Students shall be permitted for request for recounting/revaluation of the year / 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.

8.6 Supplementary Examination:
8.6.1 In addition to the regular year/ Semester-End examinations conducted, the College may also schedule and conduct supplementary examinations for all the subjects of other year/ semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

8.6.2 If any candidate fails to secure pass marks in the Seminar / Comprehensive Viva-Voce / Mini Project, he can be permitted to register for supplementary examinations.

9. Academic Requirements for Promotion/ completion of regular B.Tech Program 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.

9.1 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 year / Semester End examination and a minimum of 40% of marks in the sum total of the internal evaluation and year / Semester-End examination taken together. For the seminar, mini project and comprehensive viva he should secure 40% of marks in the internal evaluation.

ii. A student shall be promoted from second year to third year only if he fulfills the academic requirement of securing 54 credits from:
a) Two Regular and One Supplementary examinations of I year.
b) One Regular and One Supplementary examination of Second year I semester.
c) One Regular Examination of Second year II semester.

Irrespective of whether the candidates 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 82 credits from:
   a) Three regular and two supplementary examinations of first year
   b) Two regular and two supplementary examination of second year first semester.
   c) Two regular and one supplementary examinations second year second semester.
   d) One regular and one supplementary examination of third year first semester.
   e) 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 9.1(ii) and 9.1 (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 224 credits and earn all the 224 credits. Marks obtained in all the 224 credits shall be considered for the award of the class based on CGPA.

v. A student who fails to earn 224 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit his seat in B. Tech. Program and his admission stands cancelled.

9.2 For Lateral Entry Students (batches admitted from 2013-2014):

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. For the Seminar he should secure 40% of marks in the internal evaluation.

ii. A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing 56 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 172 credits and earn all the 172 credits.

Marks obtained in all 172 credits shall be considered for the award of the class based on CGPA

iv. A student who fails to earn 172 credits as indicated in the Course structure within six academic years from the year of their admission shall forfeit his seat in B.Tech. Program and his admission stands cancelled.

10. 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.

11. Grades, Grade Point Average and Cumulative Grade Point Average

11.1 Grade System: After all the components and sub-components of any subject (including laboratory subjects) are evaluated, the final total marks obtained will be converted to letter grades on a “10 point scale” described below.

<table>
<thead>
<tr>
<th>% of marks obtained</th>
<th>Grade</th>
<th>Grade Points(GP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 to 100</td>
<td>A+</td>
<td>10</td>
</tr>
<tr>
<td>80 to 89</td>
<td>A</td>
<td>9</td>
</tr>
<tr>
<td>Grade Range</td>
<td>Letter</td>
<td>GPA</td>
</tr>
<tr>
<td>-------------</td>
<td>--------</td>
<td>-----</td>
</tr>
<tr>
<td>70 to 79</td>
<td>B</td>
<td>8</td>
</tr>
<tr>
<td>60 to 69</td>
<td>C</td>
<td>7</td>
</tr>
<tr>
<td>50 to 59</td>
<td>D</td>
<td>6</td>
</tr>
<tr>
<td>40 to 49</td>
<td>E</td>
<td>5</td>
</tr>
<tr>
<td>Less than 40 in sum of Internal &amp; External Marks (or) Less than 25 in External</td>
<td>F</td>
<td>0</td>
</tr>
<tr>
<td>Not Appeared</td>
<td>N</td>
<td>0</td>
</tr>
</tbody>
</table>

- **Pass Marks:** A student is declared to have passed theory and/or laboratory subject, if he secures minimum of 35% marks in external examination, and a minimum of 40% marks in the sum total of internal evaluation and external examination taken together. Otherwise he will be awarded fail grade – F in such subject irrespective of internal marks.

- **F** is considered as a fail grade indicating that the student has to pass the year/semester-end examination in that subject in future and obtain a grade other than F and N for clearing this subject.

### 11.2 Grade Point Average (GPA):

Grade Point Average (GPA) will be calculated as given below on a “10 Point scale” as an Index of the student’s performance at the end of I year/each semester:

\[
GPA = \frac{\Sigma (C \times GP)}{\Sigma C}
\]

Where C denotes the credits assigned to the subjects undertaken in that Year/semester and GP denotes the grade points earned by the student in the respective subjects.

### 11.3 Cumulative Grade Point Average (CGPA):

At the end of every year/semester, a Cumulative Grade Point Average (CGPA) on a 10 Point scale is computed considering all the subjects passed up to that point as an index of overall Performance up to that Point as given below:

\[
CGPA = \frac{\Sigma (C \times GP)}{\Sigma C}
\]

Where C denotes the credits assigned to subjects undertaken upto the end of the current year/semester and GP denotes the grade points earned by the student in the respective courses.

### 11.4 Grade Sheet:

A grade sheet (Marks Memorandum) will be issued to each student indicating his performance in all subjects registered in that year/semester indicating the GPA and CGPA. GPA and CGPA will be rounded off to the second place of decimal.
12. **Transcripts:** After successful completion of the entire Program of study, a transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee.
13. **Award of Degree**: The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapur on the recommendation of The Principal of SVCET (Autonomous).

13.1 **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 5.0 (Minimum requirement for declaring as passed.)

13.2 **Award of Class**: Declaration of Class is based on CGPA.

<table>
<thead>
<tr>
<th>Cumulative Grade Point Average</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥7.0</td>
<td>First Class with Distinction</td>
</tr>
<tr>
<td>≥6.0 and &lt;7.0</td>
<td>First Class</td>
</tr>
<tr>
<td>&gt;5.0 and &lt;6.0</td>
<td>Second Class</td>
</tr>
<tr>
<td>5.0</td>
<td>Pass Class</td>
</tr>
</tbody>
</table>

14. **WITH – HOLDING OF RESULTS**: If the candidate has not paid dues to the university/college or if any case of in-discipline is pending against him, the result of the candidate shall be withheld and he will not be allowed/promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

15. **Additional academic regulations**:

i. A regular student has to complete all the eligibility requirements within the maximum stipulated period of *eight* years, and a lateral entry student within *six* years.

ii. A student can appear for any number of supplementary examinations till he clears all subjects within the stipulated period.

iii. A grade sheet (marks memorandum) will be issued to the student indicating his performance in all the courses of that year/semester along with the GPA and CGPA.

iv. A transcript containing the performance in all the components required for eligibility for award of the Degree will be issued to the student.

v. Any canvassing/impressing the administration, examiners, faculty or staff in any form, the candidate is liable for punishment as per the mal practice rules appended here with.
vi. When a student is absent for any examination (internal or external) he is treated as to have appeared and obtained zero marks in that component (course) and grading is done accordingly.

vii. When a component is cancelled as a penalty, he is awarded zero marks in that component.

16. Amendments to regulations:
The Academic Council Sri Venkateswara College of Engineering and Technology (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other Policy relevant to the needs of the society or industrial requirements etc., without prior notice.

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

Note: Failure to read and understand the regulations is not an excuse.
## I B.Tech

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>Hours/ Week</th>
<th>Credits</th>
<th>Scheme of Examination (M Marks)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td>1</td>
<td>12AHS01</td>
<td>TECHNICAL ENGLISH</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>12AHS02</td>
<td>ENGINEERING MATHEMATICS-I</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>12AHS03</td>
<td>ENGINEERING PHYSICS</td>
<td>2</td>
<td>-</td>
<td>-</td>
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<tr>
<td>4</td>
<td>12AHS04</td>
<td>ENGINEERING CHEMISTRY</td>
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<td>PROGRAMMING IN C AND DATA STRUCTURES</td>
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<td>7</td>
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<td>8</td>
<td>12AHS05</td>
<td>ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB</td>
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<td>9</td>
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<td>ENGINEERING AND IT WORKSHOP</td>
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<tr>
<td>11</td>
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<td>ENGLISH LANGUAGE &amp; COMMUNICATION SKILLS LAB</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>17</td>
<td>3</td>
<td>16</td>
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TOTAL
### II B.Tech - I Semester

<table>
<thead>
<tr>
<th>S.No</th>
<th>Course Code</th>
<th>Subject</th>
<th>Hours/Week</th>
<th>Credits</th>
<th>Scheme of Examination (M Marks)</th>
</tr>
</thead>
<tbody>
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<td>12AEE07</td>
<td>ELECTRICAL TECHNOLOGY &amp; MECHANICAL TECHNOLOGY</td>
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<td>4.</td>
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<td>CIVIL ENGINEERING MATERIALS AND BUILDING CONSTRUCTION</td>
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<td>8.</td>
<td>12ACE07</td>
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### II B.Tech - II Semester

<table>
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<th>S.No</th>
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<th>Hours/Week</th>
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<td>STATISTICS AND NUMERICAL METHODS IN CIVIL ENGINEERING</td>
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## III B.Tech I Semester

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## III B.Tech II Semester

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### IV B.Tech  I Semester

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<td>12ACE37</td>
<td>RAILWAYS, DOCKS AND HARBOUR ENGINEERING</td>
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<td>12ACE38</td>
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### IV B.Tech  II Semester

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<td>ENVIRONMENTAL IMPACT ANALYSIS OF CIVIL ENGINEERING PROJECTS</td>
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SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

I YEAR B.TECH CE 12AHS01 TECHNICAL ENGLISH
(Common to all Branches)

Objectives:
1. To train the students to think logically and reasonably
2. To train students to use language effectively and to expose the students to a varied blend of self-instructional, learner-friendly modes of language learning.
3. To improve the students’ proficiency in English at all levels.
4. To enhance the confidence of the students by exposing them to various situations and context which they face in their career.

Outcomes:
After completion of the course the student will be able to
1. master in four basic skills (LSRW) to channelize their notions in simple and grammatical English.
2. use English for communication and for performing the technical functions
3. use English as a vehicle to touch the technical sky
4. use logical and reasonable ability while attending written examination and interviews

UNIT-I
Text: IN LONDON - by M.K. Gandhi
Non- Detailed: Wings of Fire by Abdul Kalam – lessons 1 to 3

UNIT-II
Text: MAN’S PERIL by Bertrand Russell
Non- Detailed: Wings of Fire- lessons 4 to 6

UNIT-III
Text: THE GOLD FRAME by R.K. Laxman
Non- Detailed: Wings of Fire- lessons 7 to 9

UNIT-IV
Text: A SERVICE OF LOVE by O. Henry
Non- Detailed: Wings of Fire- lessons 10 to 12

UNIT-V
Text: ENVIRONMENT by C.V. Raman
Non – Detailed: Wings of Fire –lessons 13 to 15

UNIT- VI
Text: C.V. RAMAN by Subhashree Desikan.
Non – Detailed: Wings of Fire –lessons 16 to 18

UNIT- VII
Text: THE MAN WHO WOULD BE KING by Rudyard kipling
Non-Detailed: wings of fire- lessons 19 to 21

UNIT- VIII
Text: LIVING OR DEAD by Rabindranath Tagore
Non-Detailed: Wings of Fire –lessons 22 to 24

REMEDIAL GRAMMAR:
1. Correction of sentences
2. Sub-verb agreement
3. Use of articles and prepositions, active/passive voice and reported speech
4. Vocabulary development
   a) Synonyms and antonyms
   b) Prefixes and suffixes
   c) One word substitutions
   d) Idioms and phrases
   e) Words often confused
   f) Homophones, Homo graphs and Homonyms

Text Books:
1. Text: Technical English
References:
Objectives:

1. To model and analyze real life problems
2. To apply Differential equations, Laplace transforms, Integrals and multiple integrals to Engineering problems.
3. To increase the student's appreciation of the basic role played by mathematics in modern technology

Outcomes:

After completion of the course the student will be able to

1. familiar with the applications of differential equations, Laplace transforms, Vector Integrals and Multiple integrals, Curve tracing and vector calculus.
2. appreciate the usage of above concepts to engineering applications.

UNIT-I


UNIT-II

NON-HOMOGENOUS AND LINEAR DIFFERENTIAL EQUATION: Non-homogenous and Linear Differential equation of 2nd order and higher order with Constant co-efficient with R.H.S terms of the type e^{ax}, sin(ax), cos(ax), polynomials in x, e^{v(x)}, xV(x),Method of variation of parameters.-Variable Coefficients-L-R-C Circuits.

UNIT-III

MEAN VALUE THEOREMS: Rolle’s theorem-Lagrange’s mean value theorem (without proof)-Taylor’s theorem and Maclaurin’s series-functions of several variables -Jacobian-maxima and Minima for functions of two variables-Lagrangean method of multipliers of 3 variables only.

UNIT-IV

RADIUS OF CURVATURE: Curve tracing-Cartesian, polar, parametric curves. Applications of Integration: length, Volume and surface area of solid of revolution Cartesian and polar co-ordinates.

UNIT-V

MULTIPLE INTEGRALS: Double and Triple integrals-Change of variables-change of Order of integration.

UNIT-VI

LAPLACE TRANSFORMS-I: Laplace transforms of standard functions-Inverse Transforms-First -Shifting Theorem-transforms of derivatives and integrals-Unit step Function-2nd Shifting Theorem -Dirac delta Functions-.

UNIT-VII

LAPLACE TRANSFORMS-II: convolution theorems- Laplace transforms of periodic functions. Differentiation and integration Laplace transforms. Applications of Laplace transform ordinary differential equation of 1st and 2nd order.
UNIT-VIII

VECTOR CALCULUS: Gradient, Divergence, curl and their properties. Vector Integration: line Integrals –potential functions-area, surface and volume integrals -Vector Integral theorems: Green’s theorem-Stoke’s theorem& Gauss Divergence theorems (without proof)-Verification of Green’s, Stoke’s and Gauss’s Theorem

Text Books:


References:

Objectives:
1. To understand the basic concepts of light, crystallography and X-ray diffraction, Quantum mechanics, Lasers and Fiber optics applicable to basic engineering concepts.
2. To understand the importance of semiconductors, superconductors, nano materials, dielectric & magnetic materials in the various engineering fields

Outcomes:
After completion of the course students will be able to
1. imbibe the knowledge of wave nature of light, crystallography, behavior of electrons in various potential fields, band theory solids, semiconductors & super conductors, magnetic & dielectric materials applicable to material science
2. get knowledge about the advanced concepts of engineering physics.

UNIT I

UNIT II

CRYSTAL PLANES AND X-RAY DIFFRACTION: Directions and planes in crystals – Miller Indices – Separation between successive [ h k l ] planes – Diffraction of X-rays by crystal planes – Bragg’s law – Laue method and powder method.

UNIT III

UNIT IV


UNIT V

UNIT VI

UNIT VII

UNIT VIII

Text Books:
2. Rajendran and Thyagarajan: Engineering Physics, Delhi, TMH Publishers, 2011

Reference Books:
OBJECTIVES:
1. To understand importance of Hard water treatments, corrosion factors, polymer properties, fuels-calorific values, lubricants, explosives and propellants.
2. Basic concept of Batteries function, nano materials, composite materials, principles of absorption and emission of radiations.

OUTCOMES:
After Completion of the course student will be able to
1. understand the disadvantages of hard water, designing of corrosion resistance metallic part, selection of suitable polymers and fuels, handling of explosives and propellants.
2. understand the difference between batteries and fuel cells, application of nano materials and composite materials, estimation of metal ion concentration.

UNIT I

UNIT II
CORROSION ENGINEERING: Definition, Types (dry and wet corrosion) and causes of corrosion - Theories and mechanism of corrosion - Galvanic Series, Galvanic Corrosion, Concentration Cell Corrosion, Oxygen absorption type of corrosion - Factors influencing corrosion. Control of Corrosion - Cathodic Protection - Sacrificial anodic and Impressed Current cathodic protection - Corrosion Inhibitors - Electro Plating and Electro less plating (Principles and applications with copper and nickel plating as examples).

UNIT III

UNIT IV
UNIT- V


UNIT- VI

ELECTROCHEMICAL ENERGY SYSTEMS: Electrochemical Cells: Measurement of EMF, Standard electrode potential, concentration cells; Basic concepts, working principles, characteristics and applications of different electrochemical energy systems - Conventional Primary battery - Dry cell; Advanced Primary batteries - Lithium and alkaline; Conventional secondary batteries: Lead-acid, Nickel-Cadmium; Advanced secondary batteries: Nickel-Metal hydride and Lithium-ion. Fuel cells: Hydrogen-oxygen and methanol-oxygen construction, working and applications.

UNIT- VII


UNIT- VIII


TEXT BOOKS:


REFERENCE BOOKS:

2. Fuel Cells principle and applications by B.Viswanath, M.Aulice Scibioh-Universities press
4. Physical Chemistry-Glasston & Lewis.
Objectives:
1. Learn how these principles are implemented in the C programming language.
2. Develop problem-solving skills to translate ‘English’ described problems into programs written using the C language.
3. An understanding of the function and operation of development software such as the compiler, interpreter, editor, IDE (Integrated Development Environment), and debugger.

Outcomes:
At the end of the subject, students will be able to:
1. Solve engineering problems using the C language
2. Students are expected to improve their programming skills.
3. Students are expected to apply the knowledge gained for their project work.

UNIT – I

UNIT - II
Introduction to C Language – Background, Simple C Program, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bitwise operators, Statements, Simple C Programming examples. Selection Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, GOTO, Simple C Programming examples.

UNIT - III
Designing Structured Programs, Functions, basics, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programs Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - IV
Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, an array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments. Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

UNIT - V
Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

UNIT - VI
Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C program examples.

UNIT – VII
UNIT - VIII
Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly
linked list implementation, insertion, deletion and searching operations on linear list, Stacks-
Operations, array and linked representations of stacks, stack application-infix to postifix
conversion, postfix expression evaluation, recursion implementation, Queues-operations, array
and linked representations.

TEXT BOOKS:
Learning.
2. J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Programming in C and Data Structures,
Pearson Education.
3. R.G.Dromey, "How to Solve it by Computer ", PHI, 1998

REFERENCES:
2. B.W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI/Pearson Education
   Education / PHI
7. P. Dey, M Ghosh R Thereja, C Programming & Data Structures, Oxford University Press
8. E V Prasad and N B Venkateswarlu, C & Data structures, S. Chand&Co.
Objectives:
1. To calculate the reactive forces
2. To analyse the structures
3. To know the geometric properties of different cross sections
4. To know about the Mechanical Vibrations

Outcome: Student will be able to
1. Formulate the equilibrium forces
2. Identifying the method of analysis to be used
3. Understand the principles of Virtual work
4. Calculate the sectional properties of the different geometric shapes

UNIT – I Basic Concepts
Fundamental Principles - Vectorial Representation of Forces and Moments Coplanar forces - Resolution and Composition of forces and equilibrium of particles - Forces of a particle in space - Equivalent system of forces - Principle of transmissibility - Single equivalent force - Free body diagram - Equilibrium of rigid bodies in two dimensions and three dimensions


Unit– II
Static Analysis of Simple Plane Trusses: Analysis of simple trusses by method of joints and method of sections.

UNIT – III

UNIT – IV
Centroid and Center of Gravity: Centroids – Theorem of Pappus, Centroids of Composite figures – Centre of Gravity of Bodies.

UNIT - V
Area moments of Inertia: Definition – Parallel axis and perpendicular theorems - Polar Moment of Inertia, Transfer Theorem. Moments of Inertia of Composite Figures.

Mass Moment of Inertia: Moment of Inertia of simple solids, Mass moment of inertia of composite bodies. (simple problems only)

UNIT – VI
Kinematics: Rectilinear and Curve linear motion - Velocity and Acceleration – Motion of a Rigid Body – Types of their Analysis in Planar Motion.
UNIT – VII


UNIT – VIII


TEXT BOOKS:

REFERENCE BOOKS:
1. Engineering Mechanics by Timoshenko & Young
2. Engineering Mechanics by Tayal
3. Engineering Mechanics (Statics) by R.C. Hibbeler
4. Engineering Mechanics (Dynamics) by R.C.Hibbeler
6. Applied Mechanics by Kurmi
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I Year B.Tech CE  12AME01 ENGINEERING DRAWING
(Common to all branches)

Objectives:

To understand
1. The importance of Engineering Drawing and to enhance imagination capacity.
2. The Use of Engineering Drawing instruments and improve free hand Lettering.
3. Apply principles of orthographic projections and Prepare pictorial drawings.

Out-Comes:
After completion of this course, the student will be able to:
1. Prepare pictorial drawings as per the standards.
2. Communicate his/her ideas effectively by using orthographic projections.
3. Prepare the development of surfaces of engineering objects.

UNIT I
a) Conic Sections – General method only.
b) Scales – plain and diagonal scales

UNIT II

UNIT III
PROJECTIONS OF PLANES: Projections of regular Plane surfaces, Projection of lines and planes using auxiliary planes.

UNIT IV
PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to one plane.

UNIT V

UNIT VI

UNIT VI
Orthographic projections: Principles of orthographic projections- conventions- conversion of Isometric projections/views of orthogonal projections

UNIT VII
INTERPENETRATION OF RIGHT REGULAR SOLIDS: Projections of curves of Intersection of Cylinder Vs Cylinder, Square Prism Vs Square Prism.

UNIT VIII
PERSPECTIVE PROJECTIONS: perspective view: plane and simple solids.

TEXT BOOKS:

REFERENCES:
2. Engineering Drawing, Shah and Rana, 2/e, Pearson Education, 2009
I Year B.Tech CE 12AHS05 ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB:
A minimum of 10 experiments to be conducted during the academic year
1. Determination of wavelength of given light source - Spectrometer.
2. Dispersive power of prism
4. Determination of particle size by using laser
5. Determination of thickness of thin wire by producing parallel fringes.
7. Magnetic field along the axis of a current carrying coil – Stewart and Gee’s method.
10. Determination of wavelength of IR source using optical fiber.
11. Determination of Hall Coefficient and Carrier concentration in the given Semiconductor.

ENGINEERING CHEMISTRY LAB:
2. Estimation of Copper by Iodometry.
4. Estimation of Copper by EDTA method
5. Determination of Chemical Oxygen Demand
6. Estimation of Dissolved oxygen
7. Determination of strength of the given Hydrochloric acid using standard sodium hydroxide solution by Conductometric titration
8. Determination of viscosity of oils through Redwood viscometer
9. Determination of calorific value of a fuel using Bomb calorimeter
10. Determination of Eutectic Temperature of binary system (Urea – Benzoic Acid)

EXAMINATION PATTERN

Evaluation is made separately in both the laboratories and average of the marks obtained in both the laboratories is considered for awarding marks in internals and end examination.
Week 1.
a) Write a C program to find the sum of individual digits of a positive integer.
b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 2.
a) Write a C program to calculate the following Sum:
\[ \text{Sum} = \sum_{k=1}^{10} \frac{(-x^2/2!) + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!}{x^{10}/10!} \]
b) Write a C program to find the roots of a quadratic equation.

Week 3
a) Write C programs that use both recursive and non-recursive functions
   i) To find the factorial of a given integer.
   ii) To find the GCD (greatest common divisor) of two given integers.
   iii) To solve the Towers of Hanoi problem.

Week 4
a) The total distance travelled by the vehicle in 't' seconds is given by distance = ut+1/2at^2 where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec2). Write a C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)

Week 5
a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices
   ii) Multiplication of Two Matrices

Week 6
a) Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to 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 if the given string is a palindrome or not

Week 7
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 8
a) Write a C program to generate Pascal’s triangle.
b) Write a C program to construct a pyramid of numbers.

Week 9
Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
\[ 1 + x + x^2 + x^3 + \ldots + x^n \]
For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
Print x, n, the sum Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n < 0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 10
a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 1100 is 00100. Write a C program to find the 2's complement of a binary number.
b) Write a C program to convert a Roman numeral to its decimal equivalent.
Week 11
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 12
a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Week 13
a) Write a C programme to display the contents of a file.
b) Write a C programme to merge two files into a third file (i.e., the contents of the first file
    followed by those of the second are put in the third file)

Week 14
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 15
Write C programs that implement stack (its operations) using
i) Arrays ii) Pointers

Week 16
Write C programs that implement Queue (its operations) using
i) Arrays ii) Pointers

Week 17
Write a C program that uses Stack operations to perform the following:
i) Converting infix expression into postfix expression
ii) Evaluating the postfix expression

Week 18
Write a C program that implements the following sorting methods to sort a given list of
integers in ascending order
i) Bubble sort ii) Selection sort

Week 19
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) Linear search ii) Binary search

Week 20
Write C program that implements the following sorting method to sort a given list of
integers in ascending order:
i) Quick sort

Week 21
Write C program that implement the following sorting method to sort a given list of integers
in ascending order:
i) Merge sort

Week 22
Write C programs to implement the Lagrange interpolation and Newton- Gregory forward
interpolation.

Week 23
Write C programs to implement the linear regression and polynomial regression algorithms.

Week 24
Write C programs to implement Trapezoidal and Simpson methods.
**Objectives:** The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. **TRADES FOR EXERCISES:**
   a. Carpentry shop: Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock
   b. Fitting shop: Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock
   c. Sheet metal shop: Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet
   d. House-wiring: Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.
   e. Foundry: Preparation of two moulds (exercises): for a single pattern and a double pattern.
   f. Welding: Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint

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:**
2. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas
I.T. WORKSHOP

Objectives:
The IT Workshop for engineers is a training lab course. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on a working PC (PIV or higher) to disassemble and assemble back to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace for usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spreadsheet, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX. (It is recommended to use Microsoft office 2007 in place of MS Office 2003)

PC Hardware
Exercise 1 – Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Exercise 2 – Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video shall be given as part of the course content.

Exercise 3 – Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Exercise 4 – Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Exercise 5 – Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Exercise 6 – Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

OFFICE TOOLS
LaTeX and Word
Exercise 7 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 1 : Using LaTeX and Word to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Excel
Exercise 8 – Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.
**Task 1: Creating a Scheduler** - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

**LaTeX and MS/equivalent (FOSS) tool Power Point**

**Exercise 9 - Task 1:** Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Powerpoint. Students will be given model power point presentation which needs to be replicated (exactly how it’s asked).

**Exercise 10 - Task 2 :** Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

**Internet & World Wide Web 2 Exercises**

**Exercise 11 - Task 1: Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

**Web Browsers, Surfing the Web:** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

**Exercise 12 - Task 2: Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated by the student to the satisfaction of instructors.

**Cyber Hygiene:** Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer.

**REFERENCES:**

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill
4. Upgrading and Repairing, PC’s 18th e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dreamtech
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I Year B.Tech CE 12AHS06 ENGLISH LANGUAGE & COMMUNICATIONS SKILLS LAB  
(Common to all branches)

Syllabus:
The following course content is prescribed for the English Language Laboratory Sessions.
1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues (giving directions etc.)
4. Speaking on the mobiles and telephone conversation
5. Role play.
7. ‘Just A Minute’ Sessions (JAM)
8. Describing Objects/ Situations/ People.
9. Information Transfer
10. Debate.

MINIMUM REQUIREMENT:
The English Language Lab shall have two parts:
1. The computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.
2. The communication Skills Lab with movable chairs and audio-visual aids with P.A system, a T.V., a digital stereo- audio & video system and camcorder etc.

System Requirement (Hardware component):
Computer network with LAN with minimum 60 multimedia systems with the following specifications:
   i)    P-IV Processor
   a)   Speed – 2.8 GHZ
   b)   RAM – 512 MB Minimum
   c)   Hard Disk – 80 GB
   ii)  Headphones of High quality.

PRESCRIBED SOFTWARE: GLOBARENA
Suggested Software:
- Cambridge Advanced Learners English Dictionary with CD.
- The Rosetta stone English Library.
- Clarity Pronunciation Power- Part I
- Mastering English in Vocabulary, Grammar, Spellings, and Composition.
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd with CD
- Learning to Speak English – 4 CDs
- Microsoft Encarta with CD
- Murphy’s English Grammar, Cambridge with CD

English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
II B.Tech – I Semester CE

12AHS07 ENGINEERING MATHEMATICS-II
(Common to all Branches)

Objectives:

1. To develop the basic concepts of Matrices, interpolation, partial differential equations and finite series.
2. To appreciate the applications of PDE to engineering problems.

Outcomes:

After completion of the course the student will be able to
1. conversant with the basics of matrices, PDEs, finite series etc.
2. model and solve different engineering problems with the above concepts.

UNIT-I


UNIT-II

EIGEN VALUES AND EIGEN VECTORS: Eigen values and Eigen vectors - Inverse and powers of a matrix by Cayley-Hamilton theorem - Linear Transformations - Orthogonal transformations - Diagonalization of a matrix. Quadratic forms - Reduction of Quadratic form to canonical form and their nature.

UNIT-III


INTERPOLATION: Forward Differences - backward differences - Newton’s forward and backward differences formulae for interpolation - Lagrange’s interpolation formula - Inverse interpolation.

UNIT-IV

CURVE FITTING: Fitting a straight line - Second degree curve - Exponential curve - Power curve by method of least squares. Numerical Differentiation and integration - Trapezoidal rule - Simpson’s 1/3 rule.

UNIT-V


UNIT-VI


UNIT-VII

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions - Method of separation of variables - solution of one dimensional wave equation, heat equation and two-dimensional Laplace’s equation under initial boundary conditions.
UNIT-VIII

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:

References:
OBJECTIVES:

1. To understand the basic fundamentals in Electrical Circuits.
2. To study the construction, Principle of operation and performance of DC machine and AC machine and also to know the principles of measuring instruments.

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

1. Acquire the concept of all types of Electrical Machines like DC Motor, AC Motor, Generators, Alternators and principles of measuring instruments.

UNIT I
INTRODUCTION TO ELECTRIC CIRCUITS: Circuit elements - Sources- Ohm’s Law- Kirchhoff’s Law- Network reduction Techniques, Mesh analysis and Nodal Analysis –Thevenin’s, Norton’s, Superposition and Maximum Power Transfer Theorems- Simple Problems. Sinusoidal Alternating Quantities – Concept of Frequency, Period, Phase Average and RMS Values – Concept of Impedance- Simple Problems.

UNIT II

UNIT III

UNIT IV

TEXT BOOKS:

1. HUGHES, Electrical and Electronic Technology- Pearson Publications.
2. Helfrick and copper: Modern Electronic Instrumentation and Measurement Techniques-PHI Publications

REFERENCE BOOKS:

MECHANICAL TECHNOLOGY

Objectives:
1. To make the students to learn about the equipments and welding processes used in the infrastructure construction.
2. To make the students to learn about the basics of engines, turbines, compressors, used to run the construction equipment s.
3. To make the students to learn about the mechanical devices and varies mechanical handling equipments and earth moving machinery
4. To make the students to learn about basic of refrigeration and air conditioning systems used in the building.

Out comes:
1. Students get the knowledge about various equipments used in the infrastructure construction.
2. Students understood the basic working principles of I.C Engines, steam engines, steam turbines, and gas turbines.
3. Students get the knowledge about various material handling equipments used in the civil construction works.
4. Students understood the basic working principles of refrigeration and air conditioning systems.

UNIT- V
WELDING PROCESSES: introduction to welding classification of welding processes, oxyacetylene welding – equipment, welding fluxes and filler rods, gas cutting, and introduction to arc welding – manual metal arc welding. Submerged arc welding, TIG and MIG processes, soldering and brazing importance, comparison and applications.

UNIT- VI
Description and working of steam engine and steam turbine (prime movers) – impulse and reaction turbines. Description and working of I.C. Engines – 4 stroke and 2 stroke engines – comparison – gas turbines – closed and open type gas turbines.

UNIT- VII
Reciprocating Air compressors – description and working of single stage and multi stage reciprocating air compressors – inter cooling transmission of power; chain and gear drive- simple problems.

UNIT- VIII
Block diagram of a vapour compression refrigeration system. Names of common refrigerants. Basic principles of air-conditioning. Room and general air conditioning system. Ducting – different types of ventilation system.

Text Books:
1. Kurmi, Mechanical Technology
3. Construction planning, equipment methods-purify
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II B.Tech – I Semester CE

12ACE02  STRENGTH OF MATERIALS - I

Objectives
1. To study the internal effects produced and deformations of bodies caused by externally applied forces.
2. To understand the strength characteristics of different materials and structural members subjected to shear, torsion and bending.

Outcomes: Students will be able to
1. Understand the concepts of stress and strain
2. Determine the internal forces in the beams
3. Formulate the expressions for deflection
4. Identify the behaviour of columns

UNIT – I

UNIT – II
SHEAR FORCE AND BENDING MOMENTS: Types of supports – Types of beams – Shear force and bending moment diagrams for simply supported, cantilever and over hanging beams with point loads, uniformly distributed load, uniformly varying loads and couples – Relationship between shear force and bending moment.

UNIT – III

UNIT – IV
SHEAR STRESS DISTRIBUTION: Derivation of formula – Shear stress distribution in rectangular, triangular, circular, I and T sections.

UNIT – V
DEFLECTIONS OF BEAMS: Bending into a circular are – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay’s methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U.D.L uniformly varying load. Mohr’s theorems – Moment area method – application to simple cases including overhanging beams

UNIT – VI
DIRECT AND BENDING STRESSES: Combined direct and bending stresses – Eccentric loading – Limit of eccentricity and core of section.

UNIT – VII
COLUMNS AND STRUTS: Introduction, slenderness ratio – Euler’s formulae for long columns with different end conditions – Rankine’s and I.S. Code formulae.
UNIT – VIII
TORSION OF CIRCULAR SHAFTS: Torsion – Torsional theory applied to circular shafts – Power transmission.

Strain Energy: Strain energy in tension, compression, bending and torsion – Strain energy due to impact loading.

Text Books:

Reference Books:
4. Timoshenko & Young, Elements of Strength of materials, Eastern Wiley Publications.
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II  B.Tech – I Semester CE

12ACE03  CIVIL ENGINEERING MATERIALS AND BUILDING CONSTRUCTION

Objectives:
1. To teach students about the Physical and Mechanical properties of construction materials and their respective testing procedure.
2. To teach students about the building materials available in market to be used for many components of building industry.
3. To teach students about the principles and methods to be followed in constructing various components of a building.
4. To teach students about the deterioration and repair of buildings.

Outcomes:
1. Learn and 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. Develop ability to choose the modern construction material appropriate to the climate and functional aspects of the buildings.
4. Ability to supervise the construction technique to be followed in brick, stone and hollow block masonry, concreting, flooring, roofing, plastering and painting etc.
5. Learn about the causes of deterioration, crack pattern, and assessment of damages.
6. Learn about the construction techniques in repairing of buildings.

UNIT – I

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

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

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

UNIT – II
LIME: Constituents of lime stone – Classification of lime – Manufacturing of lime.

CEMENTS: Composition, manufactures of Portland cement, field-testing of cement, special types of cements, storage of cement.

STEEL: Types of steel, marketable forms, stress- strain behaviour.

UNIT – III
CEMENT CONCRETE: Various constituents, preparation and properties of concrete in fresh state, factors affecting workability, durability and strength, characteristic strength, stress-strain behaviour, acceptance criteria, mix- design and physical tests – Admixtures – Plasticizers.


UNIT – IV
FOUNDATIONS: Shallow foundations – Spread, combined, strap and mat footings.
MASONRY: Types of masonry, English and Flemish bonds, rubble and ashlar masonry–Cavity and partition walls.

UNIT – V
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 & Green roofs

UNIT – VI

MISCELLANEOUS TOPICS: Form work and scaffolding.

UNIT – VII
CONSTRUCTION DAMAGES & REPAIR TECHNIQUES: Causes of deterioration – crack pattern – Assessment of damages – methods of repairs and rehabilitation

UNIT – VIII
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.

Test Books:

Reference Books:
II  B.Tech – I Semester  
CE

Objective:
1. To acquaint with basic principles & basic instruments related with surveying & leveling.
2. To help the students to learn about Tachometry.

Outcomes: Student will be able to:
1. Learn about basics involved in different types of surveying like tape, compass, leveling, and Theodolite (Total station).
2. Demonstrate skills in performing measurement of distance, angles, leveling, and curve setting.
3. Develop skills for estimating distance between given points, area of a given plot and earthwork involved in cuttings and fillings.

UNIT-I
INTRODUCTION: Definition, objectives, principles and classification of surveying – Plan and map. Overview of Plane surveying (chain, compass and plane table), Objectives, Principles and Classifications.

DISTANCES AND DIRECTION: Distance measurement conventions and methods; use of chain and tape, Electronic distance measurements, Meridians, Azimuths and bearings, declination, computation of angle.

UNIT – III

CONTOURING: Definition of contour – Contour interval – Characteristics of contours – Direct and indirect methods of contouring – Applications of contour maps.

UNIT-IV
COMPUTATION OF AREAS AND VOLUMES: Area from field notes and from plan by dividing into triangles, square etc. computation of areas along boundaries using Simpson's rule, and their comparison, computation of areas using planimeter, construction and working planimeter. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity reservoir, volume of barrow pits.

UNIT – V
THEODOLITE: Main parts of a Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite.

THEODOLITE TRAVERSING: Traverse survey by included angles & bearings –Checks in traverse plotting – Traverse computations – Coordinate system – Balancing the traverse – Degree of accuracy in traversing – Omitted measurements.

UNIT – VI
TRIGONOMETRIC LEVELING: Heights and distances problems for accessible and inaccessible stations (For same and different planes).

TACHEOMETRIC SURVEYING: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

UNIT – VII
SIMPLE CURVES: Types of curves – Definitions & Notations of curve – Elements of simple circular curve – Setting out the simple circular curves by using linear and angular methods.
**COMPOUND CURVES:** Elements of compound curve – Transition curve – Types – Methods for determination of length – Characteristics and elements of transition curve – Vertical curve – Types and length of vertical curve.

**SETTING OUT WORKS:** Setting out of foundation trench of a building, culverts and bridges.

**UNIT-VIII**

**ELECTRONIC DISTANCE MEASUREMENTS (EDM) AND TOTAL STATION:** Measurement principle of EDM instrument – EDM instrument characteristics – Accuracy in EDM – Field procedure of EDM – Total station – Introduction – Advantages – Types of total stations – Applications of total station

**Geodetic surveying:** Introduction to geodetic surveying, Triangulation surveying – base line measurement & correction, satellite station. Surveying adjustments – principle of least square and adjustment of triangulation network.

**GPS – PRINCIPLES:** EDM – Principle, sources and error, GPS – Principles, Errors, Differential GPS, Instruments and Setting out of tunnel, bridge.

**Text books:**

**Reference books:**
Objective:
1. This course gives an introduction to the fundamentals of fluid flow and its behavior so as to equip the students to learn related subjects and their applications in the higher semesters.

Outcomes: Student will be able
1. To find frictional losses in a pipe when there is a flow between two places.
2. Explain the various methods available for the boundary layer separation.
3. To understand about various flow measuring devices.

UNIT – I

UNIT – II
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 – Bourdon’s pressure gauge – Hydrostatic forces on plane and curved surfaces – Center of pressure.

UNIT – III

UNIT – IV

UNIT – V
BOUNDARY LAYER THEORY: Concept of Boundary Layer Flow- Boundary layer along a thin flat plate, laminar, turbulent boundary layer equations. Boundary layer Separation and its Control, Flow around submerged objects-Drag and lift – Magnus effect.

UNIT – VI

UNIT – VII

UNIT – VIII
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:

Reference Books:
3. Fluid Mechanics and Fluid Power Engineering : Dr R.S.Kumar
List of Experiments:

1. To study the stress–strain characteristics of mild steel rod using universal testing machine.
2. To find the compressive strength of wood and Concrete cube using compressive testing machine.
3. To find the direct shear strength of rod using compressive testing machine.
4. To find the modulus of elasticity of given material by measuring deflection in beams
   a. Simply supported beam.
   b. Over hanging beam.
5. To find the modulus of rigidity of given material using torsion testing machine.
6. To find the modulus of rigidity of given material using spring testing machine.
7. To find Brinnell’s hardness & Rock well hardness numbers of given material.
8. To find impact strength (Izod and Charpy) using impact testing machine.
9. To determine the compressive strength of a stone sample.
10. To determine the water absorption of burnt clay bricks.
11. To assess the liability of blank burnt clay to efflorescence.
12. To determine the compressive strength of burnt clay bricks.
II B.Tech – I Semester CE

12ACE07 SURVEYING LABORATORY– I

List of Experiments:

I. Chain Surveying:
   1. To find the area of the given plot using chain, tape & cross--staff.
   2. To find the distance between inaccessible points.

II. Compass Surveying:
   3. Traversing using prismatic compass.
   4. To find the distance between inaccessible points.

III. Levelling:
   5. Fly levelling, reduction of levels by rise and fall method.
   6. Differential leveling, reduction of levels by height of collimation method.
   7. Profile leveling: L.S. and C.S.
   8. Preparation of contour map by using grid contouring.

IV. Theodolite Surveying:
   9. Measurement of horizontal angle by repetition method
   10. a) Measurement of horizontal angle by reiteration method
       b) Measurement of vertical angle

V. Plotting:
   1. Conventional signs and symbols used in surveying.
   2. Plotting of closed traverse compass surveying and adjusting error by Bowditch method.
   3. Plotting of L.S. & C.S.

VI. Study of Instruments:
   1. Study of Minor instruments: Planimeter, pantagraph, clinometer, hand levels, Quick setting level, Cylon Ghat Tracer, sextent and Subtense bar
   2. Demonstration of digital level, Electronic Theodolite, Automatic Levels and Distance meter.

VII. Setting out of building plans
II B.Tech – II Semester CE

12AHS14 STATISTICS AND NUMERICAL METHODS IN CIVIL ENGINEERING

Objectives:
1. To understand the development of algorithm/ flow charts using various methods for solution of linear simultaneous equation
2. Able to understand the application of solution of linear system of equations and application of root finding to various civil engineering problems
3. To understand application of numerical integration for solving simple beam problems:

Outcomes:
1. Understand and able to develop algorithm/ flow charts using various methods for solution of linear simultaneous equation, solutions of linear system of equations and application of root finding to various civil engineering problems.
2. To apply numerical integration for beam problems.

PART -A

UNIT - 1
INTRODUCTION: Historical development of Numerical techniques, role in investigations, research and design in the field of civil engineering

DEVELOPMENT OF ALGORITHM/ FLOW CHARTS FOR FOLLOWING METHODS FOR SOLUTION OF LINEAR SIMULTANEOUS EQUATION:
- a) Gaussian elimination method,
- b) Gauss-Jordan matrix inversion method,
- c) Gauss-Siedel method and
- d) Factorization method

UNIT - 2
APPLICATION OF SOLUTION OF LINEAR SYSTEM OF EQUATIONS TO CIVIL ENGINEERING PROBLEMS: Construction planning, slope deflection method applied to beams, frames and truss analysis.

UNIT - 3
APPLICATION OF ROOT FINDING TO CIVIL ENGINEERING PROBLEMS: Development of algorithm for a) Bisection method and b) Newton-Raphson method and its applications for solution of non linear algebraic and transcendental equations from problems in hydraulics, irrigation engineering, structural engineering and environmental engineering.

UNIT - 4
APPLICATION OF NUMERICAL INTEGRATION FOR SOLVING SIMPLE BEAM PROBLEMS: Development of algorithm for a) Trapezoidal rule and b) Simpson’s one third rule and its application for computation of area of BMD drawn for statically determinate beams.

REFERENCE BOOKS:
PART-B

Objectives:
1. This course is intended to provide a comprehensive introduction to the statistical methods most likely to be encountered and used by students in their careers in engineering.

Outcomes:
1. The student is able to sample the data and analyse it.
2. Student is able to apply suitable tests and evaluate the acceptance of the hypothesis.

UNIT-V
ESTIMATION: Point Estimation – Interval estimation – Bayesian estimation.

UNIT-VI
TESTS 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-VII
TEST OF SIGNIFICANCE: Student- t-test, F-test, Chi-square \( \chi^2 \) test: \( \chi^2 \) test goodness of fit – the analysis of RxC tables

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

Text Books:

References:
Objectives

1. To understand the behaviour of indeterminate structures
2. To study the internal effects produced and deformations of bodies caused by externally applied forces.
3. To understand the strength characteristics of different materials and structural members subjected to shear, torsion and bending.

Outcomes: Students will be able to

1. Identify the method of analysis for indeterminate structures
2. Understand the concepts of stress and strain
3. Determine the internal forces in the beams
4. Formulate the expressions for deflection
5. Identify the behaviour of columns

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.

UNIT – II

THEORIES OF FAILURES:
Introduction – 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 – III

Springs: Close and open coiled helical springs under axial loads and axial twist – Carriage springs.

UNIT – IV

Thin Cylinders: Thin cylindrical and thin spherical shells – Wire wound thin pipes.

Thick Cylinders: Thick cylinders – Lame’s equation – Design of thick cylindrical shells – Compound cylinders – Shrink fit allowance – Initial difference of radii at the junction.

UNIT – V

Indeterminate Structures: Introduction.

Propped Cantilever: Analysis of propped cantilever beams for bending moments, shear forces, slopes and deflections.

UNIT – VI

Fixed Beams: Analysis of fixed beams for bending moments, shear forces, slopes and deflections with and without sinking of supports for point loads, uniformly distributed loads and uniformly varying loads.

UNIT – VII

Continuous Beams: Clapeyron’s theorem of three moments – Derivation of theorem – Application to continuous beams – Effect of sinking of supports – Shear force and bending moment diagrams.
Unit –VIII
Unsymmetrical Bending of Beams: Centroidal principal axes of bending – Moment of inertia about the principal axes – Resolution of bending moment into two components along principal axes – Determination of stresses.

Text books:

Reference Books:
Objectives
1. To understand the behaviour of types of flows, types of channels
2. To study the different hydraulic models
3. To understand the basics of turbo machinery, hydraulic turbines and performance of turbines

Outcomes: Students will be able to
1. Aware about the types of flows and types of channels and velocity distribution
2. Understand the concepts hydraulic models, turbo machinery, hydraulic turbines
Determine the performance of turbines and pumps

UNIT – I
OPEN CHANNEL FLOW: Types of flows - Type of channels - Velocity distribution - Energy and momentum correction factors - Chezy’s, Manning’s; and Bazin formulae for uniform flow - Most Economical sections. Critical flow: Specific energy-critical depth - computation of critical depth - critical sub-critical and super critical flows.

UNIT II
OPEN CHANNEL FLOW II: Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT - III
HYDRAULIC SIMILITUDE: Dimensional analysis-Rayleigh’s method and Buckingham’s pi theorem-study of Hydraulic models - Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

UNIT – IV
BASICS OF TURBO MACHINERY: 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, Applications to radial flow turbines.

UNIT - V
HYDRAULIC TURBINES: Layout of a typical Hydropower installation - Heads and efficiencies-classification of turbines Pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency.

UNIT – VI
PERFORMANCE OF TURBINES: Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

UNIT – VII

UNIT – VIII
Text Books:

Reference Books:
3. Fluid mechanics and fluid machines by Rajput, S.Chand &Co.
12ACE13
STRUCTURAL ANALYSIS - I

Objectives:
1. To understand the behaviour of indeterminate structures
2. To know the concepts of elastic analysis and plastic analysis
3. To understand the concepts of matrix analysis of structures.

Outcome: Students will be able to
1. Identify the method of analysis for indeterminate structures
2. Know the importance of the shape factor and its importance
3. Distinguish determinate and indeterminate structures
4. Perform matrix methods of analysis

UNIT – I
MOVING LOADS: 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, U.D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.

UNIT – II
INFLUENCE LINES: 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-single point load, U.D.load longer than the span, U.D.load shorter than the span-Influence lines for forces in members of Pratt and Warren trusses.

UNIT – III
CASTIGLIANO’S THEOREM – Analysis of determinate beams and determinate pin joined trusses

UNIT – IV
APPLICATION OF CASTIGLIANO’S THEOREM TO SIMPLE BEAMS & TRUSSES: Analysis of statically indeterminate beams and trusses up to two degree of indeterminacy by Castigliano’s theorem of minimum strain energy

UNIT -V
Slope Deflection Method: Slope deflection equation – Application to continuous beams
(with and without sinking of supports).

UNIT –VI
Moment Distribution Method: Stiffness and carry over factors – Distribution factors – Analysis of continuous beams – Effect of yielding of supports – Analysis of single bay and single storey portal frames with and without sway.

UNIT – VII
Kani’s Method: Kani’s method of analysis applied to continuous beams up to three spans with and without settlement of supports.
Application of Kani’s Method: Analysis of single bay single storey portal frames with and without side sway.

UNIT – VIII
**Text Books:**

**Reference Books:**
Objectives:
1. To create awareness about environmental problems and find the solutions to solve the problems.
2. To motivate the public to participate in the environment protection to free man from all sorts of pollutions.
3. To know global atmospheric changes and inculcate the public to conserve and to use the natural resources judiciously.

Outcomes:
After completion of the course the student will be able to
1. aware of how to conserve the natural resources
2. They will be aware of maintain the ecological balance based on the cultural and biological diversity
3. They will find solutions to solve the different varieties of environmental problems.

UNIT-I
Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness.

UNIT-II
Natural Resources: Renewable and non-renewable resources-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. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Renewable and Non-renewable energy resources

UNIT-III
Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem – Producers, Consumers and decompers – Energy flow in the ecosystem –Ecological Succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:
   a. Forest ecosystem   b. Grassland ecosystem c. Desert ecosystem
d. Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-IV
Biodiversity and its Conservation: Introduction, Definition, Types of biodiversity(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)-Biodiversity at global, national and local levels-India as a mega diversity nation-Hot spots of biodiversity-Threats to biodiversity(habitat loss, Poaching of wildlife, man-wildlife conflicts)-Endangered and endemic species of India-Conservation of biodiversity(In-situ and Ex-situ conservation of biodiversity).

UNIT-V
Environmental Pollution: Definition, causes, effects and control measures of:
Solid Waste Management: Causes, effects and control measures of urban and industrial wastes-Role of an individual in prevention of pollution-Pollution case studies-Disaster management: Floods, Earthquake, Cyclone and Landslides.
UNIT VI

UNIT VII

UNIT VIII
**Field Work:** Visit to a local area to document environmental assets River/forest/grassland/hill/mountain-Visit to a local polluted site-Urban/rural Industrial/Agricultural Study of common plants, insects, birds-river, hillslopes etc.

Text books:
1. Erach Bharucha ,Textbook of *Environmental Studies* for Undergraduate courses by from UGC.

References:
2. J.P.Sharma ,*Comprehensive Environmental Studies* by, Laxmi Publications.
OBJECTIVES:
1. To understand the regulations as per National Building Code
2. To identify the functional requirements and building rules.
3. To understand the sketches and working drawings
4. At the end of this course the student should be able to draft on computer building drawings (Plan, elevation and sectional views) in accordance with development and control rules satisfying orientation and functional requirements for the following:

OUTCOME:
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

PART - A
BUILDING BYELAWS AND REGULATIONS:

UNIT – II
RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

UNIT – III
PUBLIC BUILDINGS: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

UNIT – IV
Planning of construction projects – scheduling and monitoring Bar chart – CPM and PERT Network planning – computation of times and floats – their significance.

PART-B
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 (Copying Exercise)
3. Drawing plan, elevation and section of a single storied residential building for the given line sketch and specifications
4. Multi–storied residential building with RCC roof
5. Drawing plan, elevation and section of an industrial building for the given line sketch and specifications
6. Planning and drawing of plan, elevation and section of a single storied residential building with RCC roof for the given site and accommodation details

Note: Subject to the availability of classes, there shall be 10 (Ten) drawing classes of two periods each.
LIST OF EXPERIMENTS:
1) Introduction to CAD (Computer Aided Drafting).
2) General commands and their practices.
3) Software for CAD and Introduction to different softwares.
4) Practice exercise on CAD software. (Not to Scale figure).
5) Draw a plan to single storeyed building (1BHK, 2BHK, 3BHK).
6) Draw a plan for multi storeyed building (1BHK, 2BHK, 3BHK).
7) Development of sections and elevations for single and multi storeyed buildings.
8) Development components of buildings
   I. Doors. II. Windows. III. Trusses.

FINAL EXAMINATION PATTERN:
The end examination paper should consist of Part A and Part B. Part A consists of five questions in planning portion out of which three questions are to be answered. Part B should consist of two questions from drawing part out of which one is to be answered in drawing sheet. Weightage for Part – A is 60% and Part- B is 40%.

Text Books:
2. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi Publications.

Reference:
1. Building by laws bye state and Central Governments and Municipal corporations.
EXERCISE – 1:
Measurement of horizontal angles by Repetition method.

EXERCISE – 2:
Measurement of horizontal angles by Reiteration method.

EXERCISE – 3:
Measurement of vertical angles – Determination of heights of objects.

EXERCISE – 4:
To determine the distance and difference in elevation between two inaccessible points using theodolite.

EXERCISE – 5:
To determine the tachometric constants and to determine the distance between two points using stadia Tacheometry.

EXERCISE – 6:
To determine the distance between two points using tangential tacheometry.

EXERCISE – 7:
To set out simple curve using linear methods – Perpendicular offsets from long chord.

EXERCISE – 8:
To set out simple curve using Rankine’s deflection angles method.

EXERCISE – 9: Demonstration of Total Station Instrument.
   a) Determine of area using total station
   b) Traversing using total station
   c) Contouring using total station
   d) Determination of remote height using total station
   e) Determination of distance between two inaccessible points using total stations

EXERCISE – 10:
Demonstration of GPS Receiver. Overview of GPS.

Note: Survey camp for a period 1 week has to be conducted during the semester
II B.Tech – II Semester CE

12ACE16 FLUID MECHANICS & HYDRAULIC MACHINERY LABORATORY

List of Experiments:

1. Verification of Bernoulli’s equation
2. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
3. Calibration of Venturimeter & Orifice meter
4. Determination of Coefficient of discharge for a small orifice by a constant head method.
5. Determination of Coefficient of discharge for an external mouth piece by variable head method.
6. Calibration of contracted Rectangular Notch and /or Triangular Notch
7. Impact of jet on vanes
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump.
Objectives:
1. This course equip the students to develop economic way of thinking in dealing with practical business problems and challenges
2. Also enable the students by providing the basic knowledge of book keeping, accounting and make analysis of financial statements of a business organization.

Outcomes:
1. After the completion of the course the student will be able to
2. Know the application of financial accounting in the field of Engineering.

UNIT I
Introduction to Managerial Economics: Definition, nature and scope of managerial economics - relation with other disciplines - Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

UNIT II
Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand forecasting, factors governing demand forecasting, purposes of demand forecasting, methods of demand forecasting (Survey methods, Statistical methods, Expert opinion method, Test marketing, Controlled experiments, Judgmental approach to Demand Forecasting).

UNIT III
Theory of Production and Cost analysis: Production Function – Isoquants and Isocosts, MRTS, least cost combination of inputs, Cobb-Douglas production function, laws of returns, internal and external economies of scale.
Cost Analysis: Cost concepts, opportunity cost, fixed Vs variable costs, explicit costs Vs Implicit costs, out of pocket costs Vs Imputed costs. Break-Even Analysis (BEA) - Determination of Break Even Point (Simple Problems) - Managerial significance and limitations of BEA.

UNIT IV

UNIT V

UNIT VI
Capital and Capital Budgeting: Capital and its significance, types of capital, estimation of fixed and working capital requirements, methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposal, methods of capital budgeting – Payback Period, Accounting Rate of Return(ARR), Net Present value(NPV), Internal Rate of Return(IRR) and Profitability Index (PI) Methods (Simple problems).
UNIT VII


UNIT VIII

Financial Analysis through Ratios: Computation, Analysis and Interpretation of financial statements through Liquidity Ratios (Current and Quick ratio), Activity ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt- Equity Ratio, Interest Coverage Ratio) and Profitability ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratios and EPS).

TEXT BOOKS:

REFERENCES:
5. Ahuja.H.L, Managerial Economics, S.Chand, 3/e, 2009
Objectives:
1. To know the basic concept of structural design
2. To understand the usage of IS codes
3. To understand the concepts detailing & drawing

Outcomes:
Students will be able to
1. Identify and calculate the different types of loadings
2. Identify the method of analysis
3. Design the structures and draw the reinforcement detailing

UNIT –I

UNIT –II

UNIT –III
BEAMS: Limit state design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – IV
SHEAR, TORSION AND BOND: Limit state design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, including detailing.

UNIT – V
COLUMNS: Short and long columns – under axial loads, uniaxial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

UNIT – VI
FOOTINGS: Different types of footings – Design of isolated, square, rectangular and circular footings.

UNIT – VII
SLABS: Design of one way slab - Two-way slab, continuous slab Using I S Coefficients.

UNIT – VIII
SERVICEABILITY: Limit state design of serviceability for deflection, 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 T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, Two way and continuous slabs
**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:**
4. Krishnam Raju, N. *Structural Design and Drawing*. Hyderabad: University Press,
8. Relevant IS codes such as IS 456 – 2000 etc.

**References :**

**Codes/Tables:** IS 456-2000 and SP-16 code books to be permitted into the examinations Hall.
Objectives:
1. To know the types of cement, mineral and chemical admixtures, aggregates
2. To understand the properties of concrete.
3. To know the methodology of mix design.
4. 

Outcomes:
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

UNIT – II

Unit – III
Types of Admixtures: Mineral admixtures – Chemical admixtures – Plasticizers – Super plasticizers – Retarding plasticizers – Accelerating plasticizers – Air entraining admixtures – Puzzolonic or mineral admixtures

UNIT – IV

UNIT – V

TESTING OF HARDENED CONCRETE: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Non-destructive testing methods – codal provisions for NDT.

UNIT – VI
UNIT – VII

UNIT – VIII

Text Books:
2. Shetty, M.S. Concrete Technology. S.Chand & Co, 2004
3. Neville, A.M. Concrete Technology. Pearson publication

References:
Objectives:
1. To get the exposure about the developments of water resources for the purpose of controlling & utilising water for a variety of purposes
2. to understand the concepts of irrigation, water supply, flood control, navigational improvement,
3. To have idea about land drainage & pollution control etc.

Outcomes:
Students will be able to
1. Identify the different types & methods of irrigation for better water management
2. Know the occurrence & distribution of natural waters of the earth
3. Implement the practices of structural design facilities for water resources project
4. Implement and study the planning and management for single & multi purpose projects

UNIT –I
INTRODUCTION: Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data.

UNIT-II
ABSTRACTIONS FROM RAINFALL: Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation-evapotranspiration-Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT-III
RUNOFF: Runoff-components of runoff, factors affecting runoff, stream gauging, effective rainfall, separation of base flow.

UNIT-IV
HYDROGRAPHY: Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph, S-hydrograph, IUH, Synthetic Unit Hydrograph. Design Discharge, Computation of design discharge-rational formula, SCS method

UNIT-V
GROUND WATER: Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy’s law, radial flow to wells in confined and unconfined aquifers. Hydraulics of wells – Pumping test and recovery test – Well losses – Specific capacity – Efficiency of a well – Types of wells – Open wells – Tube wells – Selection of suitable site for tube well – Yield of wells – Advantages and disadvantages of well Irrigation.

UNIT-VI
IRRIGATION: Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility, preparation of land for Irrigation, standards of quality for Irrigation water.

UNIT-VII

UNIT-VIII
CANALS: Classification of canals, design of Irrigation canals by Kennedy’s and Lacey’s theories, balancing depth of cutting, canal lining.
Text Books:

References:
Objectives:
1. To understand the behaviour of indeterminate structures
2. To know the concepts of elastic analysis and plastic analysis
3. To understand the concepts of matrix analysis of structures.

Outcomes:
Students will be able to
1. Identify the method of analysis for indeterminate structures
2. Know the importance of the shape factor and its importance
3. Distinguish determinate and indeterminate structures
4. Perform matrix methods of analysis

UNIT I

UNIT – II
TWO HINGED ARCHES: Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – (No analytical question).

UNIT-III
SLOPE DEFORMATION METHOD: Analysis of single bay, single storey, portal frame including side sway.

UNIT – IV
MOMENT DISTRIBUTION METHOD: Stiffness and carry over factors – Distribution factors – Analysis of single storey portal frames – including Sway - Substitute frame analysis by two cycle method.

UNIT – V
KANI’S METHOD: Analysis of continuous beams – including settlement of supports and single bay, single storey portal frames with side sway by Kani’s method.

UNIT T – VI
FLEXIBILITY METHODS: Flexibility methods, Introduction, application to continuous beams including support settlements.

UNIT – VII
STIFFNESS METHOD: Introduction, application to continuous beams including support settlements.

UNIT – VIII
INTRODUCTION TO MATRIX METHODS OF STRUCTURAL ANALYSIS: Static and kinematic indeterminacy of structures – Equilibrium and compatibility conditions
FLEXIBILITY METHOD: Flexibility methods – Applications to continuous beams (degree of static indeterminacy not exceeding three)

Text Books:
References:
III B.Tech – I Semester CE

12ACE21 ENGINEERING GEOLOGY

Objectives:
1. The overall objective of the lecture portion of Engineering Geology is to demonstrate the importance of Geology in making engineering decisions
2. Introduce the fundamentals of the engineering properties of earth materials for the use of civil Engineering constructions
3. Develop quantitative skills and a frame work for solving basic engineering geology problems

Outcomes:
Students will be able to
1. Characterize the engineering properties of rocks and soils
2. Assess the geological hazards
3. Use seismic and electrical methods to investigate the subsurface Geology
4. Develop a native construction plan incorporating all relevant aspects of geology

UNIT – I
INTRODUCTION: Importance of geology from Civil Engineering point of view. Brief study of case histories of failures of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology, Petrology and Structural geology.

WEATHERING OF ROCKS: Its effect over the properties of rocks importance of weathering with REFERENCE to dams, reservoirs and tunnels weathering of common rock like “Granite”

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. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

UNIT – III

UNIT – IV
STRUCTURAL GEOLOGY: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults, unconformities, and joints – their important types. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India.

UNIT – V
GEOLOGICAL HAZARDS: EARTHQUAKES: Terminology, Causes, Classification, Earthquake waves, Seismograph, Locating Epicenter, Determination of depth of focus, Intensity, Magnitude, Prediction, Effects, Seismic belts, Shield areas – Seismic zones of India – Civil Engineering considerations in seismic areas – Safety measures for buildings and dams – Reservoir induced seismicity.

LANDSLIDES: Causes, effects, preventive measures

UNIT – VI
UNIT – VII

UNIT – VIII
TUNNELS : Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (i.e. Lithological, structural and ground water) in tunneling over break and lining in tunnels – Case studies.

TEXT BOOKS:

REFERENCES:
1. Description of Geological Models
2. Study and Identification of Minerals by their physical properties
3. Study and Identification of Rocks by their physical properties
4. Structural Geology Problems:
   a) Interpretation and drawing of sections for Geological maps & thickness of beds.
   b) Strike and Dip problems
5) Electrical Resistivity Surveys; Interpretation of resistivity data and assessment of bed rock and groundwater table

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.

REFERENCE:

I

III B. Tech – I Semester CE

12AHS13 APTITUDE & ADVANCED ENGLISH COMMUNICATION SKILLS LAB

APTITUDE

Quantitative Aptitude
• Number Systems, Averages, Problems on ages, Allegations, Percentages, Profit and Loss, Simple interest and Compound Interest, Ratio and Proportions and Variation, Time and Work, Time and Distance, Mensuration, Functions, Set Theory, Permutation and Combinations, Probability, Progressions, Inequalities, Coordinate Geometry, quadratic Equations, Logarithms

• HCF and LCM, Decimal Fractions, Simplification, Square Roots and Cube Roots, Surds and Indices, Pipes and Systems, Area, Volume and Surface Areas, Races and Games, Calendar, Clocks, Stocks and Shares, True Discount, Banker’s Discounts

• Data Interpretation – Tabulation – Bar Graphs – Pie Charts – Line Graphs.

Reasoning
Directions, Blood Relations, Problems on cubes, Series and sequences, odd man out, Coding and decoding, Data Sufficiency, logical deductions, Arrangements and Combinations, Groups and Teams, General Mental Ability, Puzzles to puzzle you, More Puzzles, Brain Teasers, Puzzles and Teasers.

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

FUNCTIONAL ENGLISH – start a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.

READING COMPREHENSION – Reading for facts, guessing meanings from context, speed reading, scanning, skimming for building vocabulary (synonyms and antonyms, one word substitutes, prefixes and suffixes, idioms and phrases.)

LISTENING COMPREHENSION – Listening for understanding, so as to respond relevantly and appropriately to people of different backgrounds and dialects in various personal and professional situations

VOCABULARY BUILDING – synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.

TECHNICAL REPORT WRITING - Types of formats and styles, subject matter, organization, clarity, coherence and style, data-collection, tools, analysis.

RESUME WRITING – Structure, format and style, planning, defining the career objective, projecting one’s strengths, and skills, creative self marketing, cover letter

GROUP DISCUSSION: - communicating views and opinions-discussing-intervening- providing solutions on any given topic across a cross-section of individuals- group dynamic-leadership-kinesics

PRESENTATION SKILLS: Importance of presentation skills – Knowledge of the audience – Body language – The impact of voice – Overcoming stage fear / nervousness – Stage etiquettes – Importance of content – Introduction, body, conclusion – Creating an impact.

INTERVIEW SKILLS: - concept- pre interview planning-answering strategies- resume writing- format- types of resume.
References:
Objectives:
1. To understand the concepts of steel design
2. To know the analysis and design of plate girder and gantry girder and its applications
3. To identify the different types of roofs and roofing system

Outcomes: Students will be able to
1. Design a simple beam and built up beam
2. Design plate girders
3. Design roof trusses
4. Design overhead water tanks.

UNIT – I
WELDED & BOLTED CONNECTIONS: Introduction, Advantages and disadvantages of welding-Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of welds fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints, beam to beam and beam to Column connections.


UNIT – II
BEAMS: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, Beam to beam connection, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

UNIT – III
TENSION AND COMPRESSION MEMBERS: General Design of members subjected to direct tension and bending – effective length of columns. Slenderness ratio – permissible stresses. Design of compression members, struts etc.

UNIT – IV

UNIT – V
DESIGN OF COLUMN FOUNDATIONS: Design of slab base and gusseted bases. Column bases subjected to moment.

UNIT – VI
ROOF TRUSSES: Different types of trusses – Design loads – Load combinations IS Code recommendations, structural details – Design of simple roof trusses involving the design of purlins, members and joints – design of tubular trusses.

UNIT – VII

UNIT – VIII
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 curtailing 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**

**REFERENCES**
3. Dayaratnam, P. *Design of Steel Structures*. S. Chand Publishers

**Codes/Tables:**
**IS Codes:**
1) IS 800 – 2007
2) IS 875 – Part I, II & III
3) IS 806
4) **steel tables** to be permitted into the examination hall.

**Note:**
**For End examination:**
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%.

**For Sessional examination:**
The Sessional 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 **Three** questions on design out of which **Two** are to be answered. Weightage for Part – A is 40% and Part- B is 60%.
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III B.Tech – II Semester CE

12ACE24 WATER RESOURCES ENGINEERING

Objectives:

1. To understand the design of irrigation/hydraulic structures for storage, diversion, distribution and control.
2. To learn watershed hydrology, management and harvesting techniques.

Outcome: Students will be able to

1. Design dams, spillways, canals and cross-drainage works. These sketches are furnished with all details and dimensions (workable drawings) with lucid and complete designs.
2. Understand various water harvesting techniques and manage watersheds.

UNIT I

UNIT II
Dams: Classification – Factors governing selection of type of dam – Selection of site for a dam.

GRAVITY DAMS: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, stability analysis, drainage galleries.


UNIT III


WATER HARVESTING TECHNIQUES:
Farm ponds – percolation tanks – Drop spillway chutes and flumes – Pipe spillways.

UNIT IV

UNIT V
DIVERSION HEAD WORKS: Types of Diversion head works-diversion and storage head works, weirs and barrages, layout of diversion head works, components. Causes and failure of hydraulic structures on permeable foundations, Bligh’s creep theory, Khosla’s theory, determination of uplift pressure, impervious floors using Bligh’s and Khosla’s theory, exit gradient, functions of U/s and d/s sheet piles.
UNIT-VII
CANAL STRUCTURES: Types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacis fall. Canal regulation works, principles of design of distributory and head regulators, canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

UNIT-VIII
CROSS DRAINAGE WORKS: types, selection of site, design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS:
5. Prof. R. Suresh, "Watershed Hydrology " Standard Publishers

REFERENCES:
2. Varshney. *Concrete dams*.
5. Murthy J. V. S., "Watershed Management".
Objectives:
1. To impart the fundamental concepts of soil mechanics
2. To understand the bearing capacity
3. To know the importance of index properties like grain size, consistency limits, soil classification
4. To understand the concept of compaction and consolidation of soils

Outcomes:
Students will be able to
1. Identify the properties for good foundation sites
2. Students should be able to find permeability of soil.
3. Know the importance engineering properties such as Consolidation, Shear strength.

UNIT I

UNIT – II

UNIT – III

UNIT – IV

UNIT – V
COMPACATION: Mechanism of compaction – Optimum moisture content and maximum dry density – Factors affecting compaction – effects of compaction of soil properties – Laboratory determination of OMC and MDD – Field compaction methods – Compaction control.

UNIT – VI

UNIT – VII
SHEAR STRENGTH OF SOILS: Mohr – Coulomb failure theories – Types of laboratory shear strength tests – Strength tests based on drainage conditions and their field applicability – Shear strength of cohesion less soils – Critical void ratio – Liquefaction – Shear strength of cohesive soils.
UNIT – VIII
STABILITY OF EARTH SLOPES

Text Books

References:
Objectives:

1. To understand the concept of water and human health and per capita demand of water and fluctuations in diurnal demand of water supply by public.
2. To identify assured water supply sources for future demands and strategies in collection, conveyance and treated water distribution to the consumer.
3. To understand the specific functions of various treatment units (aeration, chemical coagulation and flocculation, sand filtration, and disinfection processes) to drinking water quality standards.
4. To employ specific treatment processes for the removal of fluorides, arsenic, hardness, iron and manganese, salinity, colour, organic chemicals and biological residues.

Outcomes:

1. The students develop specific skills in the planning, designing and implementation of major water supply schemes in urban and rural areas.
2. The student can gain in-sight in operation maintenance and trouble shooting of various mechanical and electrical items involved in unit operations and process of water treatment units.

UNIT-I
INTRODUCTION: Importance of water supply Engineering – Need for/Protected water supply – objective of water supply systems – Flow diagram of water supply systems – Basic design considerations of major public water supply systems.

UNIT – II

UNIT-III

UNIT-IV
QUALITY REQUIREMENTS OF WATER: Sources of water pollution – water borne diseases-physical, chemical and biological impurities – Tests conducted for determining impurities – Water standards for different uses.

UNIT-V

UNIT-VI
UNIT- VII
ADVANCED TREATMENT METHODS: Removal of fluorides, arsenic, hardness, iron and manganese, salinity, colour, organic chemical and biological residues – Adsorption with activated carbon, ion exchange resins, membrane processes, chemical oxidation and softening.

UNIT - VIII
WATER SUPPLY ARRANGEMENTS IN BUILDINGS: Definition of technical terms used in water supply arrangements – Identification of different water supply of pipes – General layout of water supply in single storey and multi storeyed buildings – Principles and precautions in laying pipe lines in the Premises of buildings – Connections from water main to building – Water supply fittings – Detection and prevention of leakage.

Text BOOKS

References
TRANSPORTATION ENGINEERING

Objectives:
1. To understand various transportation modes
2. To know the various components involved in their respective modes and their basic design concepts.
3. To understand the techniques involved in harbour layout.

Outcomes:
Students will be able to
1. Know various highway constructions techniques and its maintenance
2. Understand the components of railway engineering and their functions
3. Identify the requirements of an Airport and Harbour

UNIT I

UNIT – II
HIGHWAY GEOMETRIC DESIGN: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Stopping sight Distance, Overtaking sight Distance and intermediate Sight Distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves- Design of Vertical alignment-Gradients- Vertical curves.

UNIT – III

UNIT – IV

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

UNIT – VI

UNIT – VII
INTRODUCTION TO AIR PORT ENGINEERING :Factors affecting airport site selection – Surveys for site selection – Aircraft characteristics and their influence on design elements – Planning of Terminal area – Typical Air port layouts.
UNIT – VIII


Text books:

References:
Objectives:
1. To understand the types of estimates
2. To identify the methods used for different structural components
3. To understand rate analysis and process of preparation of bills

Outcomes:
Students will be able to
1. Prepare a detailed estimate for different types of structures
2. Prepare valuation reports and cost quality control

UNIT – I

UNIT – II
ESTIMATION OF BUILDINGS: Detailed Estimates of Buildings

UNIT – III
EARTHWORK ESTIMATION: Earthwork for roads and canals.

UNIT – IV
RATE ANALYSIS: Working out data for various items of work over head and contingent charges.

UNIT-V
REINFORCEMENT ESTIMATION: Reinforcement bar bending and bar requirement schedules.

UNIT – VI

UNIT – VII
VALUATION : Valuation of buildings.

UNIT – VIII
STANDARDS SPECIFICATIONS: Standard specifications for different items of building construction.

Text Books

References:
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)

Note: Standards scheduled of rates is permitted in the examination hall.
1. (a) Determination of pH and Electrical Conductivity.
   (b) Determination of Turbidity.

2. Determination of
   (a) Total, Suspended and Dissolved Solids.
   (b) Organic and Inorganic Solids.

3. (a) Determination of Acidity.
   (b) Determination of Alkalinity.

4. Determination of Hardness

5. (a) Determination of Chlorides.
   (b) Determination of Sulphates.

6. (a) Determination of Dissolved Oxygen.
   (b) Determination of Residual Chlorine.

7. (a) Determination of Optimum Coagulant Dose.
   (b) Determination of MPN Index of water.

8. Determination of BOD of sewage water.

9. Determination of COD.

10. Solid Waste Analysis for physical components.

Text books:

Reference:
1. Relevant IS Codes.
III B. Tech – II Semester CE

12ACE30 GEOTECHNICAL ENGINEERING LAB

List of Experiments

1. (a) Specific Gravity
   (b) Differential free swells Index
2. (a) In-situ density by core cutter method
   (b) In-situ density by sand replacement method
3. Grain size distribution by sieve analysis
4. Determination of relative density sand
5. Atterberg limits (LL, PL & SL)
6. (a) Coefficient of permeability by constant head method
   (b) Coefficient of permeability by falling head method
7. I.S. Light compaction test
8. California Bearing Ratio (CBR) test
9. Direct Shear Test
10. Unconfined Compression Test
11. Hydrometer Analysis
12. Triaxial Compression Test
13. Consolidation Test (Demonstration only)

Any Ten experiments may be completed.

Text books:
3. Relevant IS Codes.
Objectives:
1. To understand the basic concepts of Matrix Methods of Structural Analysis
2. To distinguish between force method and displacement method
3. To understand the behavior of plane trusses & plane frames

Outcomes:
Students will be able to
1. Know the concept of static and kinematic indeterminacy
2. Understand the concept of flexibility method and stiffness method
3. Analyze plane trusses & plane frames
4. Know the use of software package STAAD PRO.

UNIT -I

UNIT -II
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 -III
ONE DIMENSIONAL ELEMENT: Stiffness matrix for bar element – shape functions for one dimensional element – one dimensional problems.

UNIT -IV
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 -V
GENERATION OF ELEMENT: Generation of element stiffness and nodal load matrices for 3-node triangular element and four nodded rectangular elements.

UNIT -VI

UNIT-VII
AXI-SYMMETRIC ANALYSIS: Basic principles-Formulation of 4-noded iso-parametric axi-symmetric element

UNIT-VIII
SOLUTION TECHNIQUES: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.
**Text Books:**

**References:**
BRIDGE ENGINEERING

Objectives:
1. To understand the design of columns and footing
2. To understand the design of bridges
3. To know the importance of the shear wall and its applications

Outcomes: Students will be able to
1. Design columns
2. Design raft foundations
3. Design Bridges
4. Implement the analysis and design of shear walls

UNIT - I

UNIT - II
BOX CULVERT: General aspects. Design loads, Design of Box culvert subjected to RC class AA tracked vehicle only.

UNIT - III
DECK SLAB BRIDGE: Introduction – Effective width method of Analysis Design of deck slab bridge (Simply supported) subjected to class AA Tracked Vehicle only.

UNIT – IV
BEAM & SLAB BRIDGE (T-BEAM BRIDGE): General features – Design of interior panel of slab – Pigeauds method – Design of a T-beam bridge subjected to class AA tracked vehicle only.

UNIT – V
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.

UNIT – VI
COMPOSITE BRIDGES: Introduction – Advantages – Design of Composite Bridges consisting of RCC slabs over steel girders’ including shear connectors

UNIT – VII

UNIT VIII
Text Books :
4. Victor, D.J. *Design of Bridges Structure*.
5. Relevant – IRC & Railway bridge Codes.

References :-
2. Ramachandra. *Design of Steel structures*. 
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IV B.Tech – I Semester CE  
12ACE34  
FOUNDATION ENGINEERING

Objectives:
1. To understand different methods of soil exploration
2. To understand stress distribution in soil due to self weight of the soil as well as due to surface loads
3. To understand the concept involved in computing lateral earth pressures on retaining walls in cohesion less and cohesive soils
4. To understand settlement analysis of shallow and deep foundations in cohesive and cohesion less soils

Outcomes: Students will be able to
1. Able to design various types of retaining walls
2. Able to estimate safe bearing capacity of shallow foundation and load carrying capacity of piles
3. Able to analyse the lateral stability of well foundation
4. Able to estimate probable settlements of foundation in cohesive and cohesion less soils

UNIT – I

UNIT – II
STRESS DISTRIBUTION IN SOILS: Boussinesa’s Equation vertical stress due to point load, line load, strip load, uniformly loaded circular area, uniformly loaded rectangular area, Newmark’s chart – westergaard’s approach, pressure bull concept – Approximate methods – contact pressure distribution.

UNIT – III
LATERAL EARTH PRESSURE: Types of Earth Pressures – Plastic equilibrium in soils – Rankine’s theory – Earth pressures in cohesion less and cohesive soils – Coulomb’s wedge theory – Earth pressure on retaining walls of simple configurations – Graphical methods (Rebhann and Culmann) – Pressure on the wall due to single line load alone.

UNIT – IV
EARTH RETAINING STRUCTURES: Types of retaining Structures – Stability considerations of gravity and cantilever retaining walls – proportioning of retaining walls – Cantilever sheet pile walls – Anchored bulk heads (free earth support method only).

UNIT V
BEARING CAPACITY OF SHALLOW FOUNDATIONS: Types and choice of foundation – Depth of foundation – Types of shear failure – Safe bearing capacity – Terzaghi’s Meyerhof’s, Skempton’s and IS methods – Effect of groundwater table on bearing capacity.

UNIT VI
PILE FOUNDATION: Types of piles – Factors influencing the selection of pile – Load carrying capacity of piles in granular and cohesive soils – Static and dynamic pile formulae – In – site penetration tests – Pile load tests – Negative skin friction – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT VII
UNIT VIII
SETTLEMENT ANALYSIS: Types of Settlements - Tolerable settlements – Settlement analysis of shallow & deep foundations (Pile foundations) – Cohesive & Cohesion less soils – settlement from field tests (Standard penetration test and plate load test)

Text Books:

References:
Objective:
1. To estimate the sewage and storm water from cities and towns for arriving design flows.
2. To know the different types of sewers and their appurtenances to be adopted in the design of sewerage system
3. To understand the different types of treatment units used in the purification of sewage and disposal practices
4. To understand the urban generation and nature of solid wastes, collection and disposal practices in a sanitary way

Outcomes:
1. The student will develop skills in planning, design and implementation of sewerage schemes in urban areas.
2. The student also gains knowledge in the inherent selection of sewage treatment units and development of treatment process trains
3. The students can be in a position to handle urban solid wastes in terms of recycling of materials and other waste disposal practices

UNIT-I
INTRODUCTION: Definition of terms-Sewage, sullage, refuse, garbage-Objectives of sewerage collection and treatment systems. Water carriage systems-Merits and demerits-Sewerage systems-Combined, separate and partially separate systems-Merits and demerits.

UNIT-II
QUANTITY OF SEWAGE: Estimation of quantity of municipal sewage-Estimation of quantity of storm water-Different types of sewers, design flows through sanitary sewers, storm sewers and combined sewers-Hydraulic design of sewers-Sewer appurtenances-House drainage and plumbing systems.

UNIT-III
CHARACTERISTICS OF SEWAGE: Sampling of sewage-Characteristics and composition of sewage-physical, chemical and biological-Total solids-C.O.D-B.O.D Equation and factors affecting the BOD rate of reaction-Population equivalent.

UNIT-IV
PRELIMINARY AND PRIMARY SEWAGE TREATMENT: Concept of waste water treatment, primary, secondary and tertiary treatment-Conventional treatment process flow diagrams of municipal wastewater treatment plants-Functions of each unit principles and design of screens, grit chamber, and primary setting tanks.

UNIT-V

UNIT-VI
SLUDGE MANAGEMENT: Quantity and characteristics and types of sludge-Sludge conditioning and dewatering-Handling, treatment, sludge utilization and disposal-Tertiary treatment-Removal of nitrogen, phosphorus, refractory organics, heavy metals, suspended solids and pathogenic bacteria.

UNIT-VII
UNIT-VIII

MUNICIPAL SOLID WASTE: Characteristics, generation, collection and transportation of solid wastes-Engineered systems for solid waste management-Reuse-Recycling-Energy recovery by incineration biocomposting and sanitary landfills.

Text Books:

References:
12ACE36 CONSTRUCTION TECHNOLOGY AND PROJECT MANAGEMENT (ELECTIVE-I)

Objectives:
1. To provide techniques to develop personal skills of practical use in the Management and implementation of Civil Engineering projects
2. To know the Management techniques, the development of personal, interpersonal and Project Management skills
3. To know the project management skills
4. To provide a fundamental of understanding of the social, economic, resource management within which the Construction Project takes place.

Outcomes: Students will be able to
1. Implement generic and special Construction Project Management skills to a higher level
2. Understand the special management skills required in multidisciplinary and global Construction Industry
3. Integrate and apply theoretical concepts, ideas, tools and techniques to Construction practice


UNIT- VIII

Text Books:

References:
Objectives:
1. To understand various transportation modes
2. To know the various components involved in their respective modes and their basic design concepts.
3. To understand the techniques involved in harbour layout.

Outcomes: Students will be able to
1. Know various highway constructions techniques and its maintenance
2. Understand the components of railway engineering and their functions
3. Identify the requirements of an Airport and Harbour

UNIT – I
INTRODUCTION TO RAILWAY ENGINEERING: Permanent way components – Cross Section of Permanent Way – Functions of various Components like Rails, Sleepers and Ballast – Rail Fastenings – Creep of Rails - Theories related to creep – Adzing of Sleepers- Sleeper density.

UNIT – II
GEOMETRIC DESIGN OF RAILWAY TRACK: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – Crossings and Turn outs.

UNIT- III

UNIT – IV

UNIT – V

UNIT – VI

UNIT – VII

UNIT – VIII
**Text Books:**
12ACE38 URBAN AND REGIONAL PLANNING
(ELECTIVE –I)

Objectives:
1) To understand the principles of urban and regional planning
2) To understand the urban development policies and strategies, planning process and principles of sustainable development
3) To understand plan evaluation and plan implementation institutional arrangement

Outcome: Students will be able to
1) Learn considerations and principles of urban and regional planning
2) Develop policies and strategies for development, plan for sustainable development

UNIT-I
URBAN AND REGIONAL PLANNING PRINCIPLES AND CONSIDERATIONS: Urban structure; Urban typology, density and sustainability - spatial types and morphologies related to intensity of use, consumption of resources and production and maintenance of viable communities; Accessibility – ease, safety and choice when moving to and through places; Legibility and way finding; Designing places to stimulate public activity; Function and fit; Complementary mixed uses- constructive interaction; Character and meaning; Order and incident; Continuity and change in time and place, contemporary culture; Civil society-building social capital

UNIT-II
URBAN DEVELOPMENT POLICIES AND STRATEGIES - Definition and classification of urban areas - Trend of urbanisation - District, state, national and international urbanisation levels - Impact on regional and national development - Social systems and its impact on urban planning - Slums in Indian cities - Indicators of urbanisation - Historical development of urban settlements - Impact of technology on urban settlements - National policies related to urban development.

UNIT-III
Planning process - urban and regional plans Goals, objectives, and strategies - Planning process - Delineation of planning areas - Different types of plans - Regional plan - Master plan - Structure plan - Detailed development plan - Preparation of plans - Surveys and analysis –

UNIT-IV
PRINCIPLES OF SUSTAINABLE DEVELOPMENT - Formulation of sectorial projects - Sites and services - Neighbourhoods - regional planning.

UNIT-V
LAND USE PLANNING - land use and its interaction - Residential planning - importance of housing - Industrial and commercial land use - community facilities - educational system - recreational system - utility system - public buildings - Urban renewal and their application - community improvement - Slum improvement programmes - Preparation of profile - Preparation of action plans.

UNIT-VI
PLAN EVALUATION - Principles of economic and financial evaluation techniques - cost benefit studies - Cash flow analysis.

UNIT-VII
UNIT-VIII
ECONOMICS: Introduction, Definition & scope of economics in Urban Planning, Regional planning macro and micro economics. Planning need, issues and five year plans, Economic uplift, backwardness, Poverty alleviation; Sustainable development, conservation measures, reduce recycle, reuse concept, care for future generation, carrying capacity and limits, study of water as a resource

References
Objectives:
1. To study the concepts of traffic engineering and its facilities
2. To understand the methods for efficient management of traffic in urban roads
3. To understand the design principles of pavement

Outcomes: Students will be able to
1. Perform traffic studies
2. Know importance of traffic management
3. Identify the specification of traffic facilities
4. Design different types of pavements

UNIT-I
TRAFFIC CHARACTERISTICS: Basic characteristics of Traffic – Volume, Speed and Density – Relationship among Traffic parameters.

UNIT –II

UNIT – III
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.

UNIT – IV

UNIT – V

UNIT –VI
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.

UNIT – VII
UNIT – VIII

Text Books:

References:
SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

IV B.Tech – I Semester CE

12ACE40 GROUND WATER HYDROLOGY
(ELECTIVE – II)

Objectives:
1. To educate on ground water movement analysis & predictions
2. To understand the concept to increase ground water potential
3. To identify the sources of the ground water

Outcomes: 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

UNIT – I
INTRODUCTION: Scope – Utilisation of ground water in hydrologic cycle – Ground water potential in India


UNIT – II

UNIT – III
WELL HYDRAULICS (STEADY FLOW): Drawdown curve, radius of influence – Steady state flow (Equilibrium condition) in to a well – Steady radial flow in to an unconfined aquifer – Dupuit’ s equation – Steady radial flow in to a confined aquifer – Theim’s Equation.


UNIT – IV
Analysis and Evaluation of Pumping Test
Definition of terms - static water level, pumping level, drawdown – residual, drawdown pumping rate - automatic water level recorder - time drawdown analysis - distance drawdown analysis, Jacob’s methods, pumping test methods.

UNIT – V

UNIT – VI

UNIT – VII
UNIT – VIII


Text Books:
2. Raghunath, H.M. *Groundwater*. Wiley Eastern Ltd.

References:
Objectives:
1. To make the students understand the fundamental concepts in the analysis of the structures subjected to seismic forces.
2. To enable the students to do a competent design & detailing of seismic resistant structures.

Outcomes: Student will be able to:
1. Understand the concepts of theory of vibrations, free vibrations of different degree of freedom and dynamic response to time dependent forces.
2. Learn about the computation of design moments and shears for framed structure as per IS:1893 and its detailing
3. Understand the estimation of member forces in single-storied R.C.C., design and detailing of members.
4. Understand the principles of earthquake design
5. Learn about the application of response spectrum theory to seismic design of structures.
6. Understand the concepts of earthquake resistance design and code provisions for design of building as per IS 1893 and IS 13920.
7. Learn about the interactions of frame and shear wall.

UNIT – I

UNIT – II

UNIT – III

UNIT – IV

UNIT – V

UNIT – VI
CODAL DETAILING PROVISIONS: Review of the latest Indian Seismic codes IS:4326 and IS:13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

UNIT – VII
UNIT – VIII
SHEAR WALLS: Types – Design of Shear walls as per IS:13920 – Detailing of reinforcements.

Text Books:

References:

Codes/Tables:
**IS Codes:** IS:1893, IS:4326 and IS:13920 to be permitted into the examinations Hall.
CAD:
SOFTWARE:
1. STAAD PRO or Equivalent

EXCERCISIES:
1. 2-D Frame Analysis and Design
2. Steel Tabular Truss Analysis and Design
3. 3-D Frame Analysis and Design
4. Retaining Wall Analysis and Design
5. Simple tower Analysis and Design
6. One Way Slab Analysis & Design
7. Two Way Slab Analysis & Design
8. Column Analysis & Design

Text Book:
List of Experiments:

I. TESTS ON AGGREGATES:
1. Determination of strength of the aggregate by crushing test using compression testing machine.
2. a) Determination of toughness value of aggregate by impact test.
   b) Determination of water absorption value of aggregate by using water absorption test.
3. Determination of flakiness index and elongation index by shape test using thickness gauge and length gauge.

II. TESTS ON BITUMEN:
4. a) Determination of grade of bitumen by penetration test using penetrometer.
   b) Determination of stripping value of aggregate by using stripping value test.
5. Determination of ductile value of bitumen using ductility testing machine.
7. Determination of softening value of the bitumen using ring and ball test.
8. Determination of flash point and fire point by using Penskey Martin’s testing machine.

DEMONSTRATION:
10. Determination of separation of bitumen from aggregate by using bitumen extraction test.

III. CEMENT AND CONCRETE:
1. a) Fineness of cement by dry–sieving method & Blairs air permeability apparatus.
   b) Specific gravity of cement.
2. a) Standard consistency of cement paste.
   b) Soundness of cement (By Lechatelier method).
3. Initial and final setting of cement.
5. a) Grain size distribution of fine aggregate.
   b) Specific gravity of fine aggregate.
6. a) Grain size distribution of coarse aggregate.
   b) Specific gravity of coarse aggregate.
7. Bulking of sand.
8. a) Workability of fresh concrete by slump cone method.
   b) Workability of fresh concrete by compaction factor method.
   b) Split tensile strength of concrete.
   c) Modulus of rupture of concrete.
10. Demonstration of rebound test hammer.

Text Books:
Objectives:
1. To understand the design of flat slab, concrete bunkers and chimney
2. To understand the design of water tanks and retaining walls
3. To understand the design of grid floor, stair case

Outcomes: Students will be able to
1. Design Flat slab, concrete bunkers, chimneys, water tanks, retaining walls, grid floor and stair case.

1. Design of a flat slab (Interior panel only).
2. Design of Intz water tank excluding staging.
3. Design of circular and rectangular water tank resting on the ground.
4. Design of cantilever retaining wall with horizontal back fill.
5. Design of grid floor.
6. Design of waist slab of simple dog legged stair case.
7. Design of Cinema balcony.

Text Books:

Reference books:
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.

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.
Objectives:
1. To teach students about types of natural and environmental disasters.
2. To help students to develop skills in various stages of disaster preparedness, mitigation and management.
3. To teach the students the methodologies for disaster risk assessment.

Outcomes: Student will be able to:
1. Learn about the types of natural and environmental disasters and its causes.
2. Learn about organizational and Administrative strategies for managing disasters.
3. Learn about the early warning systems, monitoring of disasters effect and necessity of rehabilitation.
4. Learn about the engineering and non-engineering controls of mitigating various natural disasters.
5. Understand the key roles of capacity building to face disaster among government bodies, institutions, NGO’s, etc.
6. Learn methodologies for disaster risk assessment with the help of latest tools like GPS, GIS, Remote sensing, information technologies, etc.

UNIT- I
INTRODUCTION: Types of disasters – Natural disasters – Impact of disasters on environmental – Infrastructure and development – Concepts of hazards and vulnerability analysis.

UNIT -II
HAZARD ASSESSMENT: Guidelines for hazard assessment and vulnerability analysis – Basic principles and elements of disaster mitigation.

UNIT- III

UNIT- IV

UNIT- V

UNIT- VI

UNIT- VII
UNIT- VIII

DISASTER MANAGEMENT: Disaster management organization and methodology – Disaster management cycle – Disaster management in India – Typical cases – Cost – benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

TEXT BOOKS


REFERENCES

5. website: www.odihpn.org;, Disaster Preparedness Programme in India. A Cost Benefit Analysis, Commissioned and Published by the Humanitarian Practice Network ‘at ODI HPN.
SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)

IV B. Tech – II Semester CE  

12ACE49 WATER RESOURCES SYSTEM PLANNING AND MANAGEMENT  
(ELECTIVE –III)

Objectives:  
1. To understand the basic concepts of systems analysis & optimization techniques  
2. To understand linear & dynamic programming and its application in Water resources  
3. To understand Non-linear optimization techniques and application of simulation techniques in water resources  
4. To understand water resources economics and Management

Outcomes: Student will be able to:  
1. Learn basic concepts of systems analysis & optimization techniques  
2. Learn linear & dynamic programming and thereby able to apply for Water resources applications  
3. Learn Non-linear optimization techniques  
4. Learn simulation techniques in water resources  
5. Learn economics and Management aspects of water resources

UNIT – I
INTRODUCTION: concepts of systems analysis, definition, systems approach to water resources planning and management, role of optimization models, objective function and constraints, types of optimization techniques.

UNIT – II
LINEAR PROGRAMMING –I: Formulation linear programming models, graphical method, simplex method, application of Linear programming in water resources.

UNIT – III
LINEAR PROGRAMMING – II: Revised simplex method, duality in linear programming, sensitivity and post optimality analysis.

UNIT – IV
DYNAMIC PROGRAMMING: Belman’s of principles of optimality forward and backward recursive dynamic programming, case of dimensionality, application of dynamic programming for resource allocation.

UNIT – V
NON-LINEAR OPTIMIZATION TECHNIQUES: Classical method optimization, Kun-Tecker, gradient based research techniques for simple unconstrained optimization.

UNIT – VI
SIMULATION: application of simulation techniques in water resources.

UNIT – VII
WATER –RESOURCES ECONOMICS: Principles of Economics analysis, benefit cost analysis socio economic intuitional and pricing of water resources.

UNIT – VIII
WATER RESOURCES MANAGEMENT: Planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, conjunctive use of surface and sub-surface water resources.

Text Books:  
References:
Objectives:
1. To impart the students fundamental principles of shallow foundations and the theories to compute their bearing capacity
2. To teach the students about some special types of shallow foundations like mats and combined footings
3. To equip them with skills to compute settlements of shallow foundations
4. To teach them about pile foundations and different aspects of pile foundations

Outcomes
Student will be able to:
1. Learn the basics of different types of shallow foundations
2. Learn to compute the bearing capacity of shallow footings in various types of soils and situations
3. Learn about special footings like mats and also about computation of settlements of shallow foundations
4. Equip with the knowledge of special geotechnical conditions that call for the design of pile foundations, negative skin friction and pullout capacity

UNIT-I

UNIT-II
ISOLATED FOOTINGS: Classification and purpose – Contact pressure under footings – proportioning of isolated footings – Principles of footing design.

UNIT-III

UNIT-IV
MAT FOUNDATIONS: Types of Mats – Allowable bearing pressure for mat foundations – conventional design of mat foundations – Modulus of sub grade reaction approach.

UNIT-V
DEEP FOUNDATIONS: Single piles versus pile groups – pile spacing – pile caps – Analysis of pile load in a group of piles.

UNIT-VI
SHEET PILE WALLS: Cantilever sheet piles and anchored bulkheads, Earth Pressure diagram, Determination of depth of embedment in sands and clays – Timbering of Trenches – Earth Pressure Diagrams – Forces in struts.

UNIT-VII

UNIT-VIII
DESIGN OF UNDER REAMED PILES FOUNDATIONS: Under reamed piles – principle of functioning of under reamed pile – Analysis and structural design of under reamed pile.
**Text Books:**


**References:**

Objectives:
5. To understand the basic concepts of remote sensing
6. To know the applications of Geographic information systems in Civil Engineering

Outcomes: Student will be able to:
6. Identify the basic remote sensing concepts and its characteristics
7. Implement the photogrammetry concepts and fundamentals of Air photo Interpretation
8. Use various analysis and interpretation of GIS results

UNIT- I

UNIT - II
REMOTE SENSING I: Basic concepts and foundation of remote sensing – Elements involved in remote sensing, electromagnetic spectrum – Spectral reflectance and spectral regions remote sensing terminology and units.

UNIT- III

UNIT- IV

UNIT- V

UNIT- VI
GIS SPATIAL ANALYSIS: Computational analysis methods (CAM) –visual analysis methods (VAM) – data storage – Vector data storage – Attribute data storage – Overview of the data manipulation and analysis – Integrated analysis of the spatial and attribute data.

UNIT- VII
SURFACE WATER RESOURCES APPLICATIONS: Land use / Land cover in water resources – Surface water mapping and inventory – Rainfall – Runoff relations and runoff potential indices of watersheds – Flood and drought impact assessment and monitoring – watershed management for sustainable development and watershed characteristics.
UNIT –VIII

Text books

References
SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

IV B.Tech – II Semester CE

12ACE52          PRESTRESSED CONCRETE
              (ELECTIVE –IV)

Objectives:
1. To understand the basic principles of pretensioning and post tensioning
2. To know the methods of prestressing and losses of prestress
3. To understand the analysis and design of sections for flexure & shear
4. To understand the analysis and design of composite sections
5. To know about the deflections in prestressed concrete beams

Outcomes: Student will be able to:
1. Design the sections for flexure and shear
2. Design the composite sections
3. Identify factors influencing the deflections.

UNIT – I
INTRODUCTION: Historic development – General principles of prestressing - pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

UNIT – II
METHODS OF PRESTRESSING: Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

UNIT – III
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 – IV
ANALYSIS OF SECTIONS FOR FLEXURE: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – V

UNIT – VI
DESIGN OF SECTION FOR SHEAR: Shear and Principal Stresses – Design for Shear in beams.

UNIT – VII

UNIT – VIII
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:
2. N.Rajasekharan Prestressed Concrete - Narosa publications.
3. Ramamrutham Prestressed Concrete -Dhanpatrai Publications
References:
2. E.G.Nawy Pre stressed concrete

Codes/Tables:
Codes: BIS code on prestressed concrete, IS 1343 to be permitted into the examination Hall.
12ACE53 ENVIRONMENTAL IMPACT ANALYSIS OF CIVIL ENGINEERING PROJECTS
(ELECTIVE –V)

Objectives:
1. To identify the sources of impacts from the civil Engineering project activities and recognize the environmental components (air, water, noise, land, flora and fauna and socio-economic environmental) which are critical to the change or the impacts.
2. To predict the likely environmental impacts of projects on the identified environmental components either using quantitative, qualitative, semi-quantitative, or hybrid methods.
3. To find ways to reduce unacceptable impacts and enhance the positive contributions of project by recommending mitigation measures or by exploring a change in the capacity, technology, or design or even by evaluating alternative sites.
4. To present to decision makers and other concerned agencies the results of impact identification, prediction, and assessment with options of suggested measures of mitigation and monitoring.

Outcomes:
1. The student can gain an in-sight of Environmental impacts of civil Engineering projects, which he will supposed to be involved in his profession.
2. The student can develop expertise to adopt mitigative measures to reduce the impacts on environmental components for sustainable development of the project.
3. He can also search for alternatives of the project which yields minimum impacts.

UNIT-I
INTRODUCTION TO EIA-OBJECTIVES OF EIA STUDIES: EIA notification, 1994 and its salient features. Legal and Procedural framework for Environmental Clearance of major developmental projects as per notification, 2006.EIA and the project cycle.

UNIT-II
EIA Process-Principles in managing EIA from work of environmental impacts. EIA Process screening scoping, initial environmental examination, Rapid or Comprehensive EIA.

UNIT-III
Baseline Environmental Status of 10 km radius of the project: Environmental Components for study under EIA –Site specific micrometrolology, ambient air environment, Noise levels, Water Resources, Land or Soil quality, biological (flora and fauna), Socio-economic conditions. Air Pollution Index and water quality indices. Process of EIA- Screening, Scoping, Prediction and Mitigation, Management and Monitoring & Audit.

UNIT-IV
Identification of impacts of major civil Engineering Projects-Ad-hoc methods, check list methodologies, Matrix methods, Network methods, overlays, cost—benefit analysis etc.

UNIT-V

UNIT -VI
Disaster management plans - Identification, Assessment and management of major civil Engineering project disasters. On-site and Off-site emergency preparedness plans. Environmental monitoring and during construction and operational phases of the projects.
UNIT-VII
Environmental management plans - Development of appropriate mitigation or remediation plans for reducing adverse impacts of major civil Engineering Projects. Alternatives Analysis for the projects to minimize adverse impacts.

UNIT-VIII

Text Books:

References:
Objectives:
1. To give an overview of latest ground improvement techniques
2. To understand the problems related to soil and select the best method

Outcomes: Students will be able to
1. Identify the problems in Expansive soils
2. Implement the stabilization methods
3. Apply grouting and dewatering techniques

UNIT - 1

UNIT - 2

UNIT - 3

UNIT - 4

UNIT - 5
Works, Water Proofing works, Drainage Works, Quality Assurance and Control, Patching and Transportation of Concrete.

UNIT - 6
METHOD STATEMENT: Introduction, Concrete Works, Earthworks and Compaction, General Soil Investigation works, Survey works, Concrete Repair works, Concrete Demolition works, Road Works, Fencing works etc.

UNIT – 7
JOB DESCRIPTION: Introduction, Job Description of : Managing Director, Project Manager, Site Manager, Site Engineer, QA/QC Engineer, Foreman, Typist/Clerk, Design Engineer, Planning Engineer.


UNIT - 8

Text Books:

REFERENCE BOOKS:
5. Data Book for Civil Engineers Field Practice - Elwyn E. Seelye - John Wiley & Sons, Inc.
Objectives:
1. To bring focus on appropriate rural water supply and sanitation practices, which are traditionally different in comparison with urban areas.
2. To plan, design and implement the rural water supply schemes on sustainable basis.
3. To adopt unsewered rural sanitation practices for human excreta disposal to eliminate communicable diseases.
4. To take measures in the control of flies, mosquitoes and rodent which are the vectors in disease transmission.
5. To effectively adopt the milk and food, and cattle shed sanitation practices.

Out Comes:
1. The students can develop expertise in adopting appropriate rural water supply and sanitation practices, in the filed.
2. The student can also understand the use of night soil and dung, which solves the energy problems to a large extent

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.

UNIT-II
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 harewasting systems.

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.

UNIT-III
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.

TREATMENT PROCESS CONFIGURATIONS: Process schemes based on source supply. Guidelines for design of rural water supply schemes.

UNIT-IV
TREATMENT OF WATER: Slow sand filters, chemical Coagulation, disinfection and other lowe cost water treatment methods. Disinfection of dug –wells water, pumps and pump houses, over head tanks and public taps.


UNIT-V
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, Bore-hole privy, ventilated Improved pit(VIP) latrine, Two-pit leaching toilet with water-seal, pour flush water-seal, single-pit privy, Ultra-mark privy, Aqua-privy, Septic tank and soak-pit etc.
UNIT-VI

UNIT-VII
INSECT CONTROL: Fly & Mosquito Life cycles, diseases transmission, and control measures.
MILK AND FOOD SANITATION: Diseases transmitted, planning a cow shed sanitation, pasteurization, quality control. Food poisoning and prevention methodologies.

UNIT-VIII
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.

References: