JAWARELAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR
ANANTAPUR – 515 002 (A.P) INDIA

ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABI

CIVIL ENGINEERING

B.Tech. Regular Four Year Degree Course
(Applicable for the batches admitted from 2009-2010)
&
B.Tech. (LES) (for the batches admitted from 2010–11)
Academic Regulations 2009 for B. Tech (Regular)
(Effective for the students admitted into I year from the Academic Year 2009-2010 onwards)

1. Award of B.Tech. Degree
A student will be declared eligible for the award of the B.Tech. Degree if he fulfils the following academic regulations:
   i. Pursue a course of study for not less than four academic years and in not more than eight academic years.
   ii. Register for 220 credits and secure all 220 credits

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

3. Courses of study
The courses of study are offered at present for specialization for the B. Tech. Course:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Aeronautical Engineering.</td>
</tr>
<tr>
<td>2.</td>
<td>Biotechnology.</td>
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<tr>
<td>3.</td>
<td>Civil Engineering.</td>
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<td>5.</td>
<td>Computer Science and System Engineering.</td>
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<td>6.</td>
<td>Electrical and Electronics Engineering.</td>
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<tr>
<td>11.</td>
<td>Information Technology.</td>
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<tr>
<td>12.</td>
<td>Mechanical Engineering.</td>
</tr>
</tbody>
</table>

and any other course as approved by the authorities of the University from time to time.
4. Credits

<table>
<thead>
<tr>
<th></th>
<th>I Year</th>
<th></th>
<th>Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Periods / Week</td>
<td>Credits</td>
<td>Periods / Week</td>
<td>Credits</td>
</tr>
<tr>
<td>Theory</td>
<td>03</td>
<td>06</td>
<td>03</td>
<td>04</td>
</tr>
<tr>
<td></td>
<td>02</td>
<td>04</td>
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<tr>
<td>Practical</td>
<td>03</td>
<td>04</td>
<td>03</td>
<td>02</td>
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<tr>
<td>Drawing</td>
<td>06</td>
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<td>03</td>
<td>02</td>
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<td></td>
<td>06</td>
<td>04</td>
<td>06</td>
<td>04</td>
</tr>
<tr>
<td>Seminar</td>
<td>--</td>
<td>--</td>
<td>6</td>
<td>02</td>
</tr>
<tr>
<td>Project</td>
<td>--</td>
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<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>

5. Distribution and Weightage of Marks

i. The performance of a student in each semester / I year shall be evaluated subject-wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition seminar and project work shall be evaluated for 50 and 200 marks respectively.

ii. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

iii. For theory subjects, during the semester there shall be Two midterm examinations. Each mid term examination consists of objective paper for 10 marks and subjective paper for 20 marks with duration of 1 hour 50 minutes (20 minutes for objective and 90 minutes for subjective paper).

   Objective paper is set for 20 bits for 10 marks. Subjective paper shall contain 5 questions of which student has to answer 3 questions evaluated* for 20 marks. First mid term examination shall be conducted for I-IV units of syllabus and second mid term examination shall be conducted for V-VIII units. The total marks secured by the student in each mid term examination for 30 marks is considered and the better of the two mid term examinations shall be taken as the final sessional marks secured by each candidate in the subject.

However for first year, there shall be Three midterm examinations as in the above pattern and the average marks of the best two midterm examinations secured in each subject shall be considered as final marks for sessionals.
Note 1: The subjective paper shall contain 5 questions of equal weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 20 marks, any fraction rounded off to the next higher mark.

Note 2: The mid term examination shall be conducted first by distribution of the Objective paper simultaneously marking the attendance, after 20 minutes the answered objective paper is collected back. The student is not allowed to leave the examination hall. Then the descriptive question paper and the answer booklet are distributed. After 90 minutes the answered booklets are collected back.

iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Day-to-day work in the laboratory shall be evaluated for 25 marks by the concerned laboratory teacher based on the report of experiments/jobs. The end examination shall be conducted by the laboratory teacher and another examiner.

v. For the subject having design and/or drawing, such as Engineering Drawing, Machine Drawing and estimation, the distribution shall be 30 marks for internal evaluation and 70 marks for end examination. The Internal evaluation for sessionals will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm exams in a Semester for a duration of 2 hrs each, evenly distributed over the syllabi for 15 marks and the better of the two shall be considered as internal test marks. The sum of day to day evaluation and the internal test marks will be the final sessionals for the subject. However in the I year class, there shall be three midterm exams and the average of best two will be taken into consideration.

vi. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department before presentation. The report and the presentation shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar shall be evaluated for 50 marks and marks shall be submitted to the
University along with internal marks. There shall be no external examination for seminar.

vii. Out of a total of 200 marks for the project work, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination (Viva-voce). The viva-voce shall be conducted by a committee consisting of HOD, Project Supervisor and an External Examiner nominated by the University. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be made by the departmental committee, on the basis of two seminars given by each student on the topic of his project.

viii. Laboratory marks and the sessional marks awarded by the College are not final. They are subject to scrutiny and scaling by the University wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding.

ix. The laboratory records and internal test papers shall be preserved in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.

6. Attendance Requirements:

i. A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester/ I year.

ii. **Shortage of Attendance below 65% in aggregate shall in NO case be condoned.**

iii. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee.

iv. Students whose shortage of attendance is not condoned in any semester / I year are not eligible to take their end examination of that class and their registration shall stand cancelled.

v. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester / I year, as applicable. They may seek readmission for that semester / I year when offered next.
vi. A stipulated fee shall be payable towards condonation of shortage of attendance to the University.

7. **Minimum Academic Requirements:**
   The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no. 6
   
   i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. In the Seminar he should secure 40%.

   ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of securing **40** credits from

   a. One regular and one supplementary examinations of I year.
   b. One regular examination of II year I semester irrespective of whether the candidate takes the end examination or not as per the normal course of study.

   iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing **68** credits from the following examinations,

   a. Two regular and two supplementary examinations of I year.
   b. Two regular and one supplementary examinations of II year I semester.
   c. One regular and one supplementary examinations of II year II semester.
   d. One regular examination of III year I semester.

   irrespective of whether the candidate takes the end examination or not as per the normal course of study.

   And in case of getting detained for want of credits by sections ii and iii above, the student may make up the credits through supplementary exams of the above exams before the date of class work commencement of Third or Fourth year I semester respectively.

   iv. A student shall register and put up minimum attendance in all 220 credits and earn all the 220 credits. Marks obtained in all 220
credits shall be considered for the calculation of percentage of marks obtained.

v. Students who fail to earn 220 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Course pattern:
   i. The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years on semester pattern.
   ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
   iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations, whereas he continues to be in the academic regulations he was first admitted.

9. Transitory Regulations:
Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2. and they continues to be in the academic regulations they were first admitted.

10. With–holding of results:
    If the candidate has any dues not paid to the university or if any case of indiscipline or malpractice 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.

11. Award of Class:
    After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:
Class Awarded | % of marks to be secured | From the aggregate marks secured for the best 220 Credits.
--- | --- | ---
First Class with Distinction | 70% and above |  
First Class | Below 70% but not less than 60% |  
Second Class | Below 60% but not less than 50% |  
Pass Class | Below 50% but not less than 40% |  

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

12. Minimum Instruction Days:
The minimum instruction days including exams for each semester / I year shall be 90/180 days respectively.

13. There shall be no branch transfers after the completion of admission process.

14. There shall be no place transfer within the Constituent Colleges.

15. General:
   i. The academic regulations should be read as a whole for purpose of any interpretation.
   ii. Malpractices rules- nature and punishments is appended
   iii. Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
   iv. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
   v. The University may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on roles with effect from the dates notified by the University.

*_*_*_
ACADEMIC REGULATIONS FOR B. TECH.
(LATERAL ENTRY SCHEME)
(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2010-2011 and onwards)

1. **Award of B.Tech. Degree**
   A student admitted in LES will be declared eligible for the award of the B. Tech Degree if he fulfils the following academic regulations:
   i. Pursue a course of study for not less than three academic years and in not more than six academic years.
   ii. Register for 168 credits and secure all 168 credits from II to IV year of Regular B.Tech. program

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

3. The regulations 3 to 6 are to be adopted as that of B. Tech. (Regular).

7. **Minimum Academic Requirements**:
   The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6
   i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. For the Seminar he should secure 40% in the internal evaluation.
   ii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 42 credits from the following examinations.
      a. Two regular and one supplementary examinations of II year I semester.
      b. One regular and one supplementary examinations of II year II semester.
      c. One regular examination of III year I semester.
      irrespective of whether the candidate takes the 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 class work commencement of Fourth year I semester.
8. Course Pattern
   i. The entire course of study is three academic years on semester pattern.
   ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
   iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations, whereas he continues to be in the academic regulations he was first admitted.

9. The regulations 9 to 10 are to be adopted as that of B. Tech. (Regular).

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

<table>
<thead>
<tr>
<th>First Class with Distinction</th>
<th>70% and above</th>
<th>From the aggregate marks secured for 168 Credits. (i.e. II year to IV year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Class</td>
<td>Below 70% but not less than 60%</td>
<td></td>
</tr>
<tr>
<td>Second Class</td>
<td>Below 60% but not less than 50%</td>
<td></td>
</tr>
<tr>
<td>Pass Class</td>
<td>Below 50% but not less than 40%</td>
<td></td>
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</tbody>
</table>

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

12. The regulations 12 to 15 are to be adopted as that of B. Tech. (Regular). All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)
# RULES FOR
# DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

<table>
<thead>
<tr>
<th>Nature of Malpractices/Improper conduct</th>
<th>Punishment</th>
</tr>
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<tbody>
<tr>
<td><strong>If the candidate:</strong></td>
<td></td>
</tr>
<tr>
<td>1. Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only.</td>
</tr>
<tr>
<td>2. Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.</td>
</tr>
<tr>
<td>2. Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.</td>
</tr>
</tbody>
</table>
3. Impersonates any other candidate in connection with the examination. The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.

4. Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination. Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for
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<tbody>
<tr>
<td>5.</td>
<td>Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.</td>
<td>Cancellation of the performance in that subject.</td>
</tr>
<tr>
<td>6.</td>
<td>Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</td>
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</table>

In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
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<tbody>
<tr>
<td>7.</td>
<td>Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.</td>
</tr>
<tr>
<td></td>
<td>Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</td>
</tr>
<tr>
<td>8.</td>
<td>Possess any lethal weapon or firearm in the examination hall.</td>
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<tr>
<td></td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The</td>
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<tr>
<td>9.</td>
<td>If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.</td>
</tr>
<tr>
<td>10.</td>
<td>Comes in a drunken condition to the examination hall.</td>
</tr>
<tr>
<td>11.</td>
<td>Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.</td>
</tr>
</tbody>
</table>
12. If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.

<table>
<thead>
<tr>
<th>Malpractices identified by squad or special invigilators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Punishments to the candidates as per the above guidelines.</td>
</tr>
<tr>
<td>2. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)</td>
</tr>
<tr>
<td>(i) A show cause notice shall be issued to the college.</td>
</tr>
<tr>
<td>(ii) Impose a suitable fine on the college.</td>
</tr>
<tr>
<td>Shifting the examination centre from the college to another college for a specific period of not less than one year.</td>
</tr>
</tbody>
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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR

Course structure for B.Tech. (Regular)
I year (2009-10) for affiliated Engineering Colleges.

Civil Engineering (C.E.)
(Common For Branches: M.E., C.E, Bio-Tech., Aero.E.)

<table>
<thead>
<tr>
<th>S.No</th>
<th>Course code</th>
<th>Subject</th>
<th>Th</th>
<th>Tu/Drg./Lab.</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9ABS101</td>
<td>English</td>
<td>2</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>9ABS102</td>
<td>Engineering Physics</td>
<td>2</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>9ABS103</td>
<td>Engineering Chemistry</td>
<td>2</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>9ABS104</td>
<td>Mathematics – I</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>9A05101</td>
<td>Programming in C and Data Structures</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>9A03101</td>
<td>Engineering Drawing                   *</td>
<td></td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>9A01101</td>
<td>Engineering Mechanics</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>9A05102</td>
<td>C Programming &amp; Data Structures Lab</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>9A03102</td>
<td>Engineering &amp; I.T. Workshop #</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>9ABS106</td>
<td>Engineering Physics and Engineering Chemistry Lab **</td>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>9ABS107</td>
<td>English Language &amp; Communication Skills Lab</td>
<td></td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

contact periods/week 15 3 6 12
Total/week 36

Total Credits (7 Theory + 4 Labs) 52

Th = Theory; Tu = Tutorial; Drg = Drawing & Lab = Laboratory:
* Engineering Drawing will have University External Exam.
** The Students attend the Physics lab and Chemistry lab in alternate weeks. The end exam shall be conducted separately and average of the two exams will be recorded by the University exam section.
# Students attend Engineering and IT workshop as a single lab every week and the end exam is conducted as a single lab. sharing the Maximum marks and time for one task each from Engineering workshop and IT workshop. The sum of the marks awarded will be recorded

**Civil Engineering (C.E.)**

**B.Tech II - I Semester**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course code</th>
<th>Subject</th>
<th>Theory</th>
<th>Lab</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>9ABS301</td>
<td>Mathematics – II</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>9A02303</td>
<td>Electrical &amp; Mechanical Technology</td>
<td>4</td>
<td>4</td>
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<tr>
<td>3.</td>
<td>9A01302</td>
<td>Strength of Materials – I</td>
<td>4</td>
<td>4</td>
<td></td>
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<tr>
<td>4.</td>
<td>9A01303</td>
<td>Surveying</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>9A01304</td>
<td>Fluid Mechanics</td>
<td>4</td>
<td>4</td>
<td></td>
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<tr>
<td>6.</td>
<td>9A01305</td>
<td>Building Materials &amp; Construction</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>9A01306</td>
<td>Surveying Lab – I</td>
<td>3</td>
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<tr>
<td>8.</td>
<td>9A01307</td>
<td>Strength of Materials Lab</td>
<td>3</td>
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</table>

contact periods/week 24 Lab. 6 Total/Week 30

Total Credits (6 Theory + 2 Labs) 28

*NOTE:* In Electrical & Mechanical Technology at least two questions from each part should be chosen for answering five questions in the End semester examination.
## B.Tech II - II Semester

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course code</th>
<th>Subject</th>
<th>Theory</th>
<th>Lab</th>
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<tr>
<td>1.</td>
<td>9ABS304</td>
<td>Probability &amp; Statistics</td>
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<td>2.</td>
<td>9ABS303</td>
<td>Environmental Science</td>
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<td>3.</td>
<td>9A01401</td>
<td>Strength of Materials – II</td>
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<td>4.</td>
<td>9A01402</td>
<td>Hydraulics &amp; Hydraulic Machinery</td>
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<td>5.</td>
<td>9A01403</td>
<td>Structural Analysis – I</td>
<td>4</td>
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<td>6.</td>
<td>9A01405</td>
<td>Building Planning &amp; Drawing</td>
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<td>7.</td>
<td>9A01406</td>
<td>Fluid Mechanics &amp; Hydraulic Machinery Lab</td>
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<td>8.</td>
<td>9A01408</td>
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**Total/Week** 30

Total Credits (6 Theory + 2 Labs) 28
### B.Tech III - I Semester

<table>
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<th>S. No</th>
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<th>Subject</th>
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<th>Lab.</th>
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<tr>
<td>1.</td>
<td>9AHS401</td>
<td>Managerial Economics &amp; Financial Analysis</td>
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<td>2.</td>
<td>9A01501</td>
<td>Design &amp; Drawing of reinforced concrete structures</td>
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<td>3.</td>
<td>9A01502</td>
<td>Concrete Technology</td>
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<td>-</td>
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<td>4.</td>
<td>9A01503</td>
<td>Water resources Engineering – I</td>
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<td>5.</td>
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<td>Structural Analysis - II</td>
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<td>9A01505</td>
<td>Engineering Geology</td>
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<td>9A01506</td>
<td>Engineering Geology Lab</td>
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<td>8.</td>
<td>9AHS601</td>
<td>Advanced English Communication Skills Lab</td>
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<td>Total/Week 30</td>
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**Total Credits (6 Theory + 2 Labs)** 28
## B.Tech III - II Semester

<table>
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<tr>
<th>S. No</th>
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<th>Theory</th>
<th>Lab.</th>
<th>Credits</th>
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<tbody>
<tr>
<td>1.</td>
<td>9A01601</td>
<td>Design &amp; Drawing of Steel Structures</td>
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<td>2.</td>
<td>9A01602</td>
<td>Geotechnical Engineering - I</td>
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<td>3.</td>
<td>9A01603</td>
<td>Environmental Engineering - I</td>
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<td>4.</td>
<td>9A01604</td>
<td>Water Resources Engineering - II</td>
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<td>5.</td>
<td>9A01605</td>
<td>Estimation, Costing and valuation</td>
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<td>6.</td>
<td>9A01606</td>
<td>Transportation Engineering</td>
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<td>7.</td>
<td>9A01607</td>
<td>Geotechnical Engineering Lab</td>
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<td>8.</td>
<td>9A01608</td>
<td>Environmental Engineering Lab</td>
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**contact periods/week**

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Total/Week 30

Total Credits (6 Theory + 2 Labs) 28
B.Tech IV - I Semester

<table>
<thead>
<tr>
<th>S. No</th>
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<th>Subject</th>
<th>Theor</th>
<th>Lab.</th>
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<tr>
<td>1.</td>
<td>9A01701</td>
<td>Finite Element Methods in Civil Engg.</td>
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<td>2.</td>
<td>9A01702</td>
<td>Bridge Engineering</td>
<td>4</td>
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<td>3.</td>
<td>9A01703</td>
<td>Geotechnical Engineering – II</td>
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<td>4.</td>
<td>9A01704</td>
<td>Environmental Engineering - II</td>
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<td>5.</td>
<td>9A01705</td>
<td>Elective – I</td>
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<td></td>
<td>9A01706</td>
<td>1. Earthquake Resistant Design</td>
<td>4</td>
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<td>9A01707</td>
<td>2. Air Pollution &amp; Control</td>
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<td></td>
<td></td>
<td>3. Railways, Docks and Harbor Engineering</td>
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<td>6.</td>
<td>9A01708</td>
<td>Elective – II</td>
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<td></td>
<td>9A01709</td>
<td>1. Water resources System Planning &amp; Management</td>
<td>4</td>
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<td></td>
<td>9A01710</td>
<td>2. Advanced Structural Analysis</td>
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<td></td>
<td></td>
<td>3. Construction Technology and Project Management</td>
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<td>7.</td>
<td>9A01711</td>
<td>CAD Lab</td>
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<td>8.</td>
<td>9A01712</td>
<td>Concrete &amp; Highway Materials Lab</td>
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Contact periods/week

|       | 24 | 6 |
|       |    |   |
| Total/Week | 30 |

Total Credits (6 Theory + 2 Labs) 28
# B.Tech IV - II Semester

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course code</th>
<th>Subject</th>
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<tr>
<td>1.</td>
<td>9A01801</td>
<td>Advanced Structural Engineering</td>
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<td>2.</td>
<td>9A01802</td>
<td>Design and Drawing of Irrigation Structures</td>
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<td>3.</td>
<td>9A01803</td>
<td>Elective – III Advanced Foundation Engineering</td>
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<td></td>
<td>9A01804</td>
<td>Ground Improvement Techniques</td>
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<td></td>
<td>9A01805</td>
<td>Remote Sensing &amp; GIS</td>
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<td>4.</td>
<td>9A01806</td>
<td>Elective – IV Experimental Stress Analysis</td>
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<td></td>
<td>9A01807</td>
<td>Prestressed concrete</td>
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<tr>
<td></td>
<td>9A01808</td>
<td>Environmental Impact Assessment and Management</td>
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<tr>
<td>5.</td>
<td>9A01809</td>
<td>Seminar</td>
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<td>9A01810</td>
<td>Project</td>
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<td>Total Credits (4Theory + Seminar + Project Work)</td>
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</table>
The sweeping changes in the world have elevated English to the status of a tool of global communication and transformed it into e-English. The syllabus has been drafted to improve the competence of students in communication in general and language skills in particular. The books prescribed serve as students’ handbooks.

The teacher should focus on the skills of reading, writing, listening and speaking while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two way communications in place of the one-sided lecture.

The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.

2. OBJECTIVES:
   a. To improve the language proficiency of the students in English with an emphasis on LSRW skills.
   b. To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.
   c. To develop study skills as well as communication skills in formal and informal situations.
3. SYLLABUS:

Listening Skills:
Objectives
1. To enable students to develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and dialects.

Students should be given practice in listening and identifying the sounds of English language and to mark stress, right intonation in connected speech.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:
Objectives
1. To make students aware of the role of ability to speak fluent English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities
- Just A Minute (JAM) Sessions.
(Using exercises from all units of the prescribed text)

Reading Skills:
Objectives
1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
2009-10

• Inferring lexical and contextual meaning
• Understanding discourse features
• Recognizing coherence/sequencing of sentences

The students shall be trained in reading skills using the prescribed text for detailed study. They shall be examined in reading and answering questions using ‘unseen’ passages which may be taken from the non-detailed text or other authentic texts, such as articles from magazines/newspapers

Writing Skills:
Objectives
1. To develop an awareness in the students the skill to write exact and formal writing
2. To equip them with the components of different forms of writing.
   • Writing sentences
   • Use of appropriate vocabulary
   • Paragraph writing
   • Coherence and cohesiveness
   • Narration / description
   • Note Making
   • Formal and informal letter writing
   • Editing a passage

4. TEXTBOOKS PRESCRIBED:
In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content are prescribed and divided into Eight Units:

For Detailed study: ENJOYING EVERYDAY ENGLISH,
Sangam Books (India) Pvt Ltd, Hyderabad, 2009
For Non-detailed study: INSPIRING LIVES,
Maruti Publications, Guntur, 2009

UNIT -I
a. Heaven’s Gate from ENJOYING EVERYDAY ENGLISH
b. Mokshagundam Visvesaraya from INSPIRING LIVES
UNIT -II
   a. Sir C.V.Raman from ENJOYING EVERYDAY ENGLISH
   b. Mother Teresa from INSPIRING LIVES

UNIT -III
   a. The Connoisseur from ENJOYING EVERYDAY ENGLISH
   b. Dr. Amartya Kumar Sen from INSPIRING LIVES

UNIT -IV
   a. The Cuddalore Experience from ENJOYING EVERYDAY ENGLISH
   b. Gertrude Elion from INSPIRING LIVES

UNIT -V
   a. Bubbling Well Road from ENJOYING EVERYDAY ENGLISH
   b. Vishwanathan Anand from INSPIRING LIVES

UNIT-VI
   a. Odds Against Us from ENJOYING EVERYDAY ENGLISH
   b. Charlie Chaplin from INSPIRING LIVES

UNIT – VII
   Exercises on
   Reading and Writing Skills
   Reading Comprehension
   Letter writing
   Report writing

UNIT – VIII
   Exercises on Remedial Grammar covering Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions, Active/Passive Voice, Reported speech, Tenses Vocabulary development covering Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

Evaluation: The question paper shall contain two parts, Part A containing questions from Units I - VI and Part B containing questions from units VII & VIII. The student is required to answer five full questions choosing at least one from Part B.
REFERENCES:
1. Technical Communication, Principle and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2009
UNIT I - OPTICS: Interference - Interference in thin films by reflection
- Newton’s rings - Diffraction - Fraunhofer diffraction at a single slit -
Fraunhofer diffraction at a double slit - Diffraction grating - Grating
spectrum - polarization - Nicol prism -Theory of circular and elliptical
polarized light - Quarter and half wave plates.

UNIT II - CRYSTAL STRUCTURES AND X-RAY DIFFRACTION:
Introduction -Space lattice - Basis - Unit cell - Lattice parameter - Bravais
lattices - Crystal systems - Structure Simple cubic - Body Centered Cubic
– Face Centered Cubic crystals - Miller indices of planes and directions in
crystals – Separation between successive (h k l) planes - X-ray diffraction
by crystal planes - Bragg’s law – Laue and Powder methods.

UNIT III- PRINCIPLES OF QUANTUM MECHANICS &
ELECTRON THEORY: Waves and Particles - de- Broglie’s hypothesis
– Heisenberg’s uncertainty principle - Schroedinger’s one dimensional
wave equation (Time Independent) - Particle in a one dimensional
potential box – Energy levels - Fermi-Dirac distribution and effect of
Temperature (qualitative treatment only) – Scattering - Source of
electrical resistance - Kronig-Penney model (qualitative treatment only) -
energy bands – metals, semi conductors & insulators.

UNIT IV- SEMICONDUCTORS: Intrinsic and extrinsic
semiconductors – Law of mass action – Continuity equation – Drift &
diffusion - Einstein’s relation – Hall effect – Direct & indirect band gap
semiconductors – p-n junction - Band diagram of p-n junction diode –
Diode Equation-LED, LCD & Photo diode.

UNIT V- MAGNETIC PROPERTIES: Introduction - Origin of
magnetic moment – Classification of magnetic materials - Dia, Para, 

44
Ferro, anti-Ferro and Ferri magnetism - Hysteresis - Soft and hard magnetic materials – Magnetic bubbles memory.

**DIELECTRIC PROPERTIES:** Introduction - Dielectric constant - Electronic, Ionic and Orientation polarizations (qualitative treatment only) - Local field - Clausius-Mossotti equation –Frequency dependence of polarisability (qualitative treatment only) – Ferro electricity- BaTiO₃.

**UNIT VI - SUPERCONDUCTIVITY:** General properties - Meissner effect - Penetration depth - Type I and Type II superconductors - Flux quantization – Josephson effects – BCS theory - Applications of superconductors.


**UNIT VII- FIBER OPTICS:** Introduction - Principle of optical fiber - Acceptance angle and Acceptance cone - Numerical aperture – Types of Optical fibers and refractive index profiles – Optical fiber communication systems - Application of optical fibers.


**TEXT BOOKS:**
1. Engineering Physics by P.K.Palanisamy, Scitech Publications
REFERENCES:
1. Physics Volume 2, by Halliday, Resnick and Krane; John Wiley India
2. Solid State Physics by C.Kittel, Wiley India
3. Engineering Physics by Mittal, I.K.International


UNIT IV: Chemistry of nano materials: Nano materials definition, properties and applications;
Explosives and Propellants: Explosives, Classification, precautions during storage, blasting fuses, important explosives. Rocket propellants, classification of propellants.
Lubricants: Principles and function of lubricants - Classification and properties of lubricants – Viscosity, flash and fire points, cloud and pour points, aniline point, Neutralisation Number and Mechanical Strength.

Electrochemical Cells: Measurement of EMF, Standard electrode potential, concentration cells, batteries (Ni–Cd cell), Lithium batteries. Fuel cell: hydrogen oxygen fuel cell and methanol fuel cell
Insulators – Definition, Properties and Characteristics of Insulating Materials; Engineering Applications.

UNIT VI: Phase rule: Definition, Terms involved in Phase Rule and Phase rule equation. Phase diagrams – one component system (water system), two component system (lead- silver system) Eutectics, heat treatment based on iron-carbon phase diagram, hardening, annealing.


Refractories: Definition, Classification With Examples; Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material

TEXT BOOKS:
2009-10

1. Engineering Chemistry  Prof. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C. Ramachandraiah, McGraw Hill Higher Education Hyd., 2009

REFERENCES:
2. Fuel Cells principles and applications by B.Viswanath, M.Aulice Scibioh-Universities press
UNIT I– Differential equations of first order and first degree – Exact, linear and Bernoulli equations. Applications: to Newton’s law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT II– Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type $e^{ax}$, $\sin ax$, $\cos ax$, polynomials in $x$, $e^{ax} V(x)$, $xV(x)$, method of variation of parameters.

UNIT III– Rolle’s Theorem – Lagrange’s Mean Value Theorem – (excluding proof). Simple examples of Taylor’s and Maclaurin’s Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

UNIT IV– Radius of Curvature – Curve tracing – Cartesian, polar and parametric curves. Applications of integration to lengths, volume and surface area of solids of revolution in Cartesian and polar coordinates

UNIT V– Multiple integral: – Double and triple integrals – Change of Variables – Change of order of integration.

UNIT VII– Differentiation and integration of Laplace transform – Application of Laplace transforms to ordinary differential equations of first and second order.


TEXT BOOKS:

REFERENCES:

UNIT II- Introduction to C Language - C Language Elements, Variable Declarations and Data Types, Executable Statements, General Form of a C Program, Expressions, Precedence and Associativity, Expression Evaluation, Operators and Expressions, Type Conversions, Decision Statements - If and Switch Statements, Loop Control Statements - while, for, do-while Statements, Nested for Loops, Other Related Statements - break, continue, goto.

UNIT III- Functions - Library Functions, Top-Down Design and Structure Charts, Functions with and without Arguments, Communications Among Functions, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands.
Arrays - Declaring and Referencing Arrays, Array Subscripts, Using For Loops for Sequential Access, Using Array Elements as Function Arguments, Arrays Arguments, Multidimensional Arrays.

Strings - String Basics, String Library Functions, Longer Strings, String Comparison, Arrays of Pointers, Character operations, String-To-Number and Number-To- String Conversions, Pointers and Strings.

UNIT V- Structure and Union – Introduction, Features of Structures, Declaration and Initialization of Structures, Structure within Structure,
Array of Structures, Pointer to Structure, Structure and Functions, typedef, Bit Fields, Enumerated Data Type, Union, Union of Structures.

UNIT VI- Files - Introduction, Streams and File Types, Steps for File Operations, File I/O Structures, Read and Write, Other File function, Searching Errors in Reading/Writing of Files, Low Level Disk I/O, Command Line Arguments, Application of Command Line Arguments, File Status functions (error handling).


TEXT BOOKS :
1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education

REFERENCES :
3. C and Data Structures, a snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand
UNIT I– INTRODUCTION TO ENGINEERING DRAWING:
Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions. Curves used in Engineering Practice:
a) Conic Sections including the Rectangular Hyperbola – General method only.
b) Cycloid, Epicycloids and Hypocycloid
c) Involutes.
d) Helices

UNIT II– PROJECTION OF POINTS AND LINES: Principles of Orthographic Projection – Conventions – First and Third Angle Projections. Projections of Points, Lines inclined to one or both planes, Problems on projections, Finding True lengths & traces only.

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

UNIT IV– PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to one or both planes – Auxiliary Views.


Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their Sectional parts.

UNIT VI– ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS:
Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and
Compound Solids – Isometric Projection of objects having non-isometric lines. Isometric projections of spherical parts.

Conversion of Isometric projections/views to Orthographic Views – Conventions.

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


TEXT BOOKS:
1. Engineering Drawing, N.D. Bhat, Charotar Publishers
2. Engineering Drawing, Johle, Tata McGraw-Hill
3. Engineering Drawing, Shah and Rana, 2/e, Pearson Education

REFERENCES:
1. Engineering Drawing and Graphics, Venugopal/ New age
2. Engineering Drawing, B.V.R. Guptha, J.K. Publishers
UNIT I– BASIC CONCEPTS - System of forces– Moment of forces and its Application – Couples and Resultant of Force System


UNIT II– ANALYSIS OF PERFECT FRAMES: Types of frames – cantilever frames and simply supported frames – Analysis of frames using method of joints, Tension Coefficient method and methods of sections for vertical loads, horizontal loads and inclined loads.


UNIT IV– CENTROID AND CENTER OF GRAVITY: Centroids of simple figures – Centroids of Composite figures – Centre of Gravity of bodies – Centre of Gravity of Composite figures. (Simple problems only).

UNIT V– AREA MOMENT OF INERTIA - Parallel axis and perpendicular axis theorems - Moments of Inertia of Composite Figures

MASS MOMENT OF INERTIA: Moment of Inertia of Simple solids, Moment of Inertia of composite masses.( Simple problems only)


TEXT BOOKS:

3. Engineering Mechanics, Bhavikatti and Rajasekharappa

REFERENCES:

2. Mechanics of Materials by Timoshenko & Gere, CBS
   – Brooks/Cole – Cengage Learning
(9A05102) C PROGRAMMING AND DATA STRUCTURES LAB
(Common to all Branches)

Objectives:
- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:
- Intel based desktop PC with ANSI C Compiler and Supporting Editors

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:
   \[ \text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! \]
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 Towers of Hanoi problem.
Week 4
a) The total distance travelled by vehicle in ‘t’ seconds is given by distance $S = ut + \frac{1}{2}at^2$ where ‘u’ and ‘a’ are the initial velocity (m/sec.) and acceleration (m/sec$^2$) respectively. Write 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 the 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. Find if any values of \(x\) are 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 11100 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

ii) 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 Quick sort method to sort a given list of integers in ascending order.

**Week 21**
Write C program that implement the Merge sort method to sort a given list of integers in ascending order.
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.

REFERENCE BOOKS
1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education
ENGINEERING WORKSHOP

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:

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 spread sheets, 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
Week 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.

Week 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.

Week 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.

Week 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

Week 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
2009-10

Week 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

Week 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

Week 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

Week 9 - Task1: 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).

**Week 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 Week**

**Week 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.

**Week 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
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR

B.Tech. I Year (C.E.)

T   P   C
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(9ABS106) ENGINEERING PHYSICS LAB and ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

Any TEN of the following experiments are to be performed during the Academic year.

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of the Experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Dispersive power of the prism – Spectrometer.</td>
</tr>
<tr>
<td>4.</td>
<td>Determination of particle size by using a laser source.</td>
</tr>
<tr>
<td>5.</td>
<td>Determination of thickness of a thin wire using parallel fringes.</td>
</tr>
<tr>
<td>7.</td>
<td>Magnetic field along the axis of a current carrying coil – Stewart and Gee’s method.</td>
</tr>
<tr>
<td>8.</td>
<td>Numerical aperture of an optical fiber.</td>
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<tr>
<td>9.</td>
<td>Hall effect.</td>
</tr>
<tr>
<td>11.</td>
<td>Energy gap of a material of p-n junction</td>
</tr>
<tr>
<td>12.</td>
<td>Determination of rigidity modulus of a wire material – Torsional pendulum</td>
</tr>
<tr>
<td>13.</td>
<td>Determination of dielectric constant.</td>
</tr>
<tr>
<td>15.</td>
<td>Melde’s experiment – Transverse &amp; Longitudinal modes.</td>
</tr>
</tbody>
</table>
2009-10

**Equipment required:**

Spectrometer, Grating, Prism, Mercury vapour lamp, Sodium vapour lamp, Travelling Microscope, Wedge arrangement, Newton rings setup, Stewart-Gee’s apparatus, He-Ne laser source, Optical fiber, Hall effect kit, B-H loop kit, Energy gap kit (four probe method), Torsional pendulum, Dielectric constant kit, Sonometer, Melde’s apparatus

**ENGINEERING CHEMISTRY LAB**

2. Preparation of Standard Potassium Dichromate and Estimation of Copper, by Iodometry.
4. Preparation of Standard EDTA and Estimation of Copper
5. Determination of Manganese in Steel and Iron in Cement.
6. Determination of strength of the given Hydrochloric acid against standard sodium hydroxide solution by Conductometric titration
7. Determination of viscosity of the oils through Redwood viscometer
8. Determination of calorific value of fuel using Bomb calorimeter
9. Estimation of dissolved oxygen
10. Determination of Eutectic Temperature of binary system (Urea – Benzoic Acid)

**BOOKS:**

1. Chemistry-lab manual by Dr K.N.Jayaveera and K.B. Chandra Sekhar, S.M. Enterprizes Ltd.
Equipment Required:

1. Glass ware: Pipettes, Burettes, Volumetric Flasks, Beakers, Standard flasks, Measuring jars, Boiling Test tubes, reagent bottles, (Borosil)
2. Analytical balance (keroy) (15 Nos)
3. Calorimeter
4. Bomb Calorimeter
5. Redwood viscometer No.1 & No.2
6. Conductometer/ Conductivity bridge
7. Wash bottles, test tube stands, burette stands
8. Gas cylinders with Bunsen burners
9. Chemicals: Hydrochloric acid, sodium hydroxide, EDTA, EBT indicator, fast sulfon black-f, urea, benzoic acid, methanol, Mohr’s salt, copper sulphate, magnesium sulphate, ammonia, ammonium sulphate, calcium sulphate etc.,
The Language Lab focuses on the production and practice of sounds of language and equips students with the use of English in everyday situations and contexts.

**Objectives:**

1. To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
2. To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm
4. To initiate them into greater use of the computer in resume preparation, report-writing, format-making etc.
5. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL, GMAT etc.

**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:

i) **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.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a 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, 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
Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

3. **Speaking English Effectively**, Krishna Mohan & NP Singh (Macmillan)
8. **DELTA’s key to the Next Generation TOEFL Test**, 6 audio CDS, New Age International Publishers, 2007
UNIT – I

UNIT – II
Symmetric, skew – Symmetric, Orthogonal, Hermitian, Skew Hermitian and unitary matrices and their properties - Quadratic forms – Reduction of quadratic forms to canonical form and their nature.

UNIT – III

UNIT – IV

UNIT – V
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace’s equation under initial and boundary conditions.
UNIT – VI


UNIT – VII

UNIT – VIII

TEXT BOOKS:

REFERENCES:
UNIT – I

UNIT – II

UNIT – III

UNIT – IV
INSTRUMENTS : Basic Principles of indicating instruments – permanent magnet moving coil and moving iron instruments.

PART – B
MECHANICAL TECHNOLOGY

UNIT – V
WELDING PROCESSES : Introduction to welding classification of welding processes, Oxyacetylene welding – equipment, welding fluxes and filler rods, Gas cutting, 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 engines and steam turbines (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 multistage reciprocating air compressors – inter cooling. Transmission of power; Belt, Rope, 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 systems. Ducting – Different types of ventilation system.

Earth moving machinery and Mechanical handling equipment – bull dozers – power showels – Excavators – concrete mixer – Belt and bucket conveyers.

TEXT BOOKS :

1. Electrical Technology by B.L. Theraja, S.Chand Publishers.
2. Introduction to Electrical Engineering – M.S. Naidu & S.Kamakshaiah, TMH
4. Mechanical Technology by Kodandaraman C.P.
5. Construction Planning; Equipment and Methods – Purify.

NOTE: In Electrical & Mechanical Technology minimum of two questions from each part should be chosen for answering five questions in the End semester examination.
UNIT – I

UNIT – II
SHEAR FORCE AND BENDING MOMENT : Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

UNIT – IV
SHEAR STRESSES : Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT – V
DEFLECTION OF BEAMS 1: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay’s methods.

UNIT – VI
DEFLECTION OF BEAMS 2: 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-deflections of propped cantilevers for simple loading cases.

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

TEXT BOOKS :

REFERENCES :
UNIT – I
INTRODUCTION : – Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications.

UNIT – II
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

UNIT – IV
COMPUTATION OF AREAS AND VOLUMES : Area from field notes computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT – V

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

UNIT – VII
CURVES : Types of curves, design and setting out – simple and compound curves.

UNIT – VIII
TOTAL STATION: Introduction to geodetic surveying, Total Station, Advantages and disadvantages, types, measuring angles.

TEST BOOKS:
1. Surveying (Vol – 1,2 &3), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) Ltd., New Delhi

REFERENCES:
2. Arora K R “Surveying (Vol-1 & 2), Standard Book House, Delhi, 2004
(9A01304) FLUID MECHANICS

UNIT – I
INTRODUCTION: Dimensions and units – Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal’s law, Hydrostatic law – atmospheric, gauge and vacuum pressure – measurement of pressure. Pressure gauges, manometers: differential and Micro Manometers.

UNIT – II
HYDROSTATIC FORCES: Hydrostatic forces on submerged plane, horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT – III
FLUID KINEMATICS: Description Of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two, three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT – IV
FLUID DYNAMICS: Surface and body forces – Euler’s and Bernoulli’s equations for flow along a stream line for 3-D flow, Momentum equation and its application – forces on pipe bend.

UNIT – V
BOUNDARY LAYER THEORY: Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkamen momentum integral equation, laminar and turbulent Boundary layers (no deviation), separation of BL, control of BL, flow around submerged objects-Drag and Lift-Magnus effect.

UNIT – VI
LAMINAR & TURBULENT FLOWS: Reynold’s experiment – Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes.

UNIT – VII

UNIT – VIII
MEASUREMENT OF FLOW: Pitot tube, Venturi meter and orifice meter – classification of orifices and mouth pieces flow over rectangular, triangular and trapezoidal and Stepped notches – Broad crested weirs.

TEXT BOOKS:

REFERENCES:
3. Introduction to Fluid Machines by Edward J.Shaughnessy, Jr.Ira M.Katz and james P.Schaffer, Oxford University, New Delhi.
UNIT – I
STONES AND BRICKS:
Properties of building stones – relation to their structural requirements. Classification of stones – Stone quarrying – precautions in blasting, Dressing of stone, Composition of good brick earth, various methods of manufacture of bricks. Comparison between clamp burning and kiln burning.

UNIT-II
ROOFING MATERIALS:

UNIT – III
LIME AND CEMENT:

UNIT-IV

UNIT - V
MASONERY:
Types of masonry, English and Flemish bonds, Rubble and Ashlar masonry, cavity and partition walls.

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

UNIT – VII
BUILDING COMPONENTS: Lintels, Arches, Vaults-stair cases – Types. Different types of floors-Concrete, Mosaic, Terrazo floors, Pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. RCC Roofs, Madras Terrace/Shell Roofs.

UNIT – VIII

TEXT BOOKS:

REFERENCES:
2. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi
LIST OF EXERCISES:
1. Survey of an area by chain survey (Closed traverse) & Plotting
2. Chaining across obstacles
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (Closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane Table survey
6. Two point and three point problems in plane table survey.
7. Traversing by plane table survey
8. Fly leveling (differential leveling)
10. Two exercises on contouring.

LIST OF MAJOR EQUIPMENT:
1. Chains, tapes, Ranging rods, cross staff, arrows
2. Compasses and Tripods, Optical square.
3. Plane tables, Alidade, Plumbing fork, trough compasses.
4. Leveling instruments and leveling staves.
5. Box sextants, planimeter.
LIST OF EXERCISES/TESTS:
1. Tension test.
2. Bending test on (Steel/Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test.
5. Hardness test.
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell’s Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges.

LIST OF MAJOR EQUIPMENT:
1. UTM for conducting tension test on rods
2. Steel beam for flexure test.
3. Wooden beam for flexure test.
4. Torsion testing machine
5. Brinnell’s/Rock well’s hardness testing machine.
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell’s theorem verification.
11. Continuous beam setup
UNIT – I

UNIT – II

UNIT – III
Binomial and poisson’s distributions Normal distribution – Related properties.

UNIT – IV
Sampling distribution: Populations and samples – Sampling distribution of mean (known and unknown) proportions, sums and differences.

UNIT – V
Estimation: Point estimation – Interval estimation – Bayesian estimation

UNIT – VI
Test of Hypothesis – Means – Hypothesis concerning one and two means – Type I and Type II errors. One tail, two-tail tests.

UNIT – VII
Tests of significance – Student’s t-test, F-test, $\Psi^2$ test. Estimation of proportions.
UNIT – VIII

Queuing Theory: Pure Birth and Death process, M/M/1 model and simple problems.

TEXT BOOKS:

REFERENCES:
3. Introduction to Probability, Charles M. Grinstead, J. Laurie Snell, University Press.
B.Tech. II-II-Sem. (C.E)  T  P  C  4  0  4

(9ABS303) ENVIRONMENTAL SCIENCE
(Common to CE, BT, CSE, IT, ME, AE)

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:

UNIT – III
ECOSYSTEMS : Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological sucession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT – IV
Biodiversity and Its Conservation: Introduction


UNIT – V
Environmental Pollution: Definition, cause, effects and control measures of:
   a. Air Pollution
   b. Water pollution
   c. Soil pollution
   d. Marine pollution
   e. Noise pollution
   f. Thermal pollution
   g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – 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, hill slopes, etc..

TEXT BOOKS :
4. Environmental Studies by R.Rajagopalan, Oxford University Press.

REFERENCES :
2. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
4. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.
UNIT – I

UNIT – II

UNIT – III

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

UNIT – V
COLUMNS AND STRUTS: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler’s theorem for long columns – assumptions –

UNIT – VI
DIRECT AND BENDING STRESSES : Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis.

UNIT – VII

UNIT – VIII
BEAMS CURVED IN PLAN : Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semicircular beam simply-supported on three equally spaced supports.

TEXT BOOKS :

2. Strength of Materials by S.S. Bhavikatti – Vikas publishers

REFERENCES :

UNIT – I

UNIT – II

UNIT – III
HYDRAULIC SIMILITUDE : Dimensional Analysis -Reyleigh’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 - I : Layout of a typical Hydropowe installation – Heas 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
HYDRAULIC TURBINES – II: Governing of turbines-surge tanks-unit and specific turbine-unit speed-unit quantity-unti power-specific speed performance characteristics-geometric similarity cavitation.

UNIT – VII

UNIT – VIII

TEXT BOOKS:

REFERENCES:
1. Fluid Mechanics & Fluid Machines by Narayana Pillai, universities press.
2. Elements of Open channel flow by Ranga Raju, Tata MC.Graw Hill, Publications.
3. Fluid mechanics and fluid machines by Rajput, S.Chand & Co.
UNIT – I
FIXED BEAMS: Introduction to statically indeterminate beams with uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams – Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT – II
CONTINUOUS BEAMS: Introduction – Clapeyron’s theorem of three moments – Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang.

UNIT – III
SLOPE-DEFLECTION METHOD: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

UNIT – IV
MOMENT DISTRIBUTION METHOD: Introduction, application to continuous beams with and without settlement of supports.

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

UNIT – VI
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 – VII
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 Point loads, UDL longer than the span, UDL shorter than the span – Influence lines for forces in members of Pratt and Warren trusses.

UNIT – VIII
INDETERMINATE STRUCTURAL ANALYSIS: Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies – Solution of trusses with upto two degrees of internal and external indeterminacies – Castigliano’s theorem.

TEXT BOOKS:

REFERENCES:
2. Structural analysis – Hibbler – Pearson education
6. Introduction to structural analysis by B.D.Nautiyal, Ne Age international publishers, New Delhi.
UNIT – I
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

PART-B
UNIT – V
SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminium alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.
UNIT - VI

UNIT – VII
SLOPED AND FLAT ROOF BUILDINGS

UNIT - VIII
Given line diagram with specification to draw, plan, sections and elevation

FINAL EXAMINATION PATTERN:
The end examination paper should consist of Part A and Part B. Part A consist 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. Weight age for Part – A is 60% and Part- B is 40%.

TEXT BOOKS:
1. 1.Building drawing – M.G.Shah, C.M.Kale, S.Y Patki
2. 2.Planning and Designing and Scheduling – Gurucharan singh and Jagadish singh- Standard publishers.
3. Planning and Designing of Buildings – Y.S.Sane

REFERENCE:
1. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi publications.
2. ‘A’ Series & ‘B’ Series of JNTU Engineering College, Anantapur,
B.Tech. II-II-Sem. (C.E) 

(9A01406) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

SYLLABUS:
1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and/or Triangular Notch.
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Varification of Bernoulli’s equation.
7. Impact of jet on vanes.
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump.

LIST OF EQUIPMENT:
1. Venturi meter Setup.
2. Orifice meter setup.
3. Small orifice setup.
4. External mouthpiece setup.
5. Rectangular and Triangular notch setups.
6. Friction factor test setup.
7. Bernoulli’s theorem setup.
8. Impact of jets.
10. Pelton wheel and Francis turbines.
11. Centrifugal and Reciprocating pumps.
LIST OF EXERCISES:

3. Trigonometric Leveling – Heights and distance problem (Two Exercises).
4. Heights and distance using Principles of tachometric surveying (Two Exercises)
5. Curve setting – different methods. (Two Exercises)
6. Setting out works for buildings & pipe lines.
7. Determination of area using total station.
8. Traversing using total station.
9. Contouring using total station.
10. Determination of remote height using total station.
11. Distance, gradient, Diff. height between tow inaccessible points using total stations.

LIST OF EQUIPMENT:

1. Theodolites, and leveling staffs.
2. Tachometers.
3. Total station.

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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, 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: INTRODUCTION TO MARKETS AND PRICING POLICIES
Market structures: Types of competition, features of perfect competition, monopoly- monopolistic competition. Price-Output determination under perfect competition and monopoly - Methods of Pricing-cost plus pricing, marginal cost, limit pricing, skimming pricing, bundling pricing, sealed bid pricing and peak load pricing.
UNIT V: BUSINESS ORGANISATIONS AND NEW ECONOMIC ENVIRONMENT
Characteristic features of business, features and evaluation of sole proprietorship, partnership, Joint Stock Company, public enterprises and their types, changing business environment in post-liberalization scenario.

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 method, accounting rate of return (ARR) and Net present value method (Simple problems).

UNIT VII: INTRODUCTION TO FINANCIAL ACCOUNTING

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), Du Pont Chart.

TEXT BOOKS:

REFERENCES
5. H.L. Ahuja: Managerial Economics, S.Chand, 3/e, 2009
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. Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad
8. Relevant IS codes such as IS 456 – 2000 etc.

REFERENCES:
2. Limit state designed of reinforced concrete – P.C. Varghese, Printice Hall of India, New Delhi

Codes/Tables: IS 456-2000 and IS-800 code books to be permitted into the examinations Hall.
B.Tech. III - I sem (C.E.)

(9A01502) CONCRETE TECHNOLOGY

UNIT I

UNIT II

UNIT III

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. Concrete Technology by M.S.Shetty. – S.Chand & Co. ; 2004
3. Concrete Technology by A.M.Neville – Pearson publication

REFERENCES:
2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi
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
ABSTRACTION FROM RAINFALL – I:–
Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation-evapotranspiration-Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT-III
ABSTRACTION FROM RAINFALL – II:–
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.
UNIT-VI
IRRIGATION-I:-
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
IRRIGATION-II:-
Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, estimation of consumptive use, Duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

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:
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications Pvt. Ltd., New Delhi

REFERENCES:
2. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
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 DEFLECTION 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 – 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
PLASTIC ANALYSIS:

TEXT BOOKS:
5. Structural Analysis by D.S.Prakasha Rao, Univ.Press, Delhi.
6. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi

REFERENCES :
5. Analysis Of Structures By Dev Das Menon – John wiley pubilcation
B.Tech. III - I sem (C.E.)

(9A01505) ENGINEERING GEOLOGY

UNIT – I
INTRODUCTION:
Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological draw backs. 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, Chrorite , Galena , Pyrolusite , Graphite, Magnesite, and Bauxite.

UNIT – III
PETROLOGY :
UNIT – IV
STRUCTURAL GEOLOGY:
Outcrop, 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
GROUND WATER, EARTH QUAKE & LAND SLIDES:
Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and land slides.

UNIT – VI
GEOPHYSICAL STUDIES:

UNIT – VII
GEOLOGY OF DAMS AND RESERVOIRS:

UNIT – VIII
TUNNELS:
Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (ie. Tithological, structural and ground water) in tunneling over break and lining in tunnels.
TEXT BOOKS:
1) Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications
2) Engineering Geology by N.Chennkesavulu, Mc-Millan, India Ltd. 2005

REFERENCES:
1. Engineering geology by Prabin singh
2. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992
1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic description and identification of rocks referred under theory.
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.

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.
1. Introduction

The Advanced English Language Skills Lab introduced at the 3rd year B.Tech level is considered essential for the student for focusing on his/her career. At this stage it is imperative for the student to start preparing for the ever growing competition in the job market. In this scenario, in order to be on par with the best, he/she needs to improve his/her Communication and soft skills.

This course focuses on the practical aspects of English incorporating all the four (LRSW) skills relevant to the requirements of the prospective employers in view of globalization. The proposed course will enable the students to perform the following:

- Intensive reading to improve comprehension and communication
- Attentive listening for better understanding
- Write project/research/technical reports
- Write Resume’ to attract attention
- Discuss ideas / opinions for better solutions
- Face interviews confidently
- Gather information, organize ideas, and present them effectively before an audience
- To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL, CAT, GMAT etc.

Objectives:

Keeping in mind the previous exposure of the student to English, this lab focuses on improving the student’s proficiency in English at all levels.
The lab intends to train students to use language effectively, to participate in group discussions, to help them face interviews, and sharpen public speaking skills and enhance the confidence of the student by exposing him/her to various situations and contexts which he/she would face in his/her career.

**Syllabus**

The following course content is prescribed for the Advanced Communication Skills Lab:

- **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.

- **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 (keeping an eye on modulation of voice, clarity, body language, relevance, fluency and coherence) in personal and professional lives.

- **Interview Skills** — Concept and process, pre-interview planning, mannerisms, body language, organizing, answering strategies, interview through tele and video-conferencing

- **Technical Presentations (Oral)** — Collection of data, planning, preparation, type, style and format, use of props, attracting audience, voice modulation, clarity, body language, asking queries.

**Minimum Requirements**

The English Language Lab shall have two parts:

- 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.
The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a TV, A digital stereo-audio and video system, Camcorder etc

System Requirement (Hardware Component):
Computer network with LAN with a minimum of 60 multimedia systems with the following specifications:

- P-IV Processor
- Speed-2.8 GHZ
- RAM_512 MB minimum

- Hard Disk-80 GB
- Headphones

Prescribed Software: GLOBARENA

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

6. The ACE of Soft Skills by Gopal Ramesh and Mahadevan Ramesh, Pearson Education, 2010
9. From Campus To Corporate by KK Ramachandran and KK Karthick, Macmillan Publishers India Ltd, 2010
10. **English Language Communication : A Reader cum Lab Manual**  
   Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.


UNIT – I
WELDED 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 – tubular trusses.
UNIT – VII
PLATE GIRDER: Design consideration – I S Code recommendations
Design of plate girder-Welded – Curtailment of flange plates stiffeners – splicings and connections.

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 curtailment of flange plates.  
Plate 3 Detailing of Column including lacing and battens.  
Plate 4 Detailing of Column bases – slab base and gusseted base  
Plate 5 Detailing of steel roof trusses including particulars at joints.  
Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

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

TEXT BOOKS
1 Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad  
2 Design of Steel Structures by Ramachandra. Vol – 1, Universities Press. Hyderabad  
3 Steel Structures by Subramanyam.N, Oxford Higher Education, New Delhi  
5 Design of Steel Structures by K.S.Sai Ram , Pearson Publishers.  
6 Design of steel structures by Bhavikatti.

REFERENCES
2. Structural design in steel by Sarwar Alam Raz, New Age International Publishers, New Delhi
3. Design of Steel Structures by P. Dayaratnam; S. Chand Publishers
4. Design of Steel Structures by M. Raghupathi, Tata Mc. Graw-Hill

Codes/Tables:
IS Codes:
1) IS -800 – 2007
2) IS – 875 – Part III
3) Steel Tables.
4) Railway Design Standards Code.
and steel tables to be permitted into the examination hall.
UNIT – I

UNIT – II
INDEX PROPERTIES OF SOILS: Moisture Content, Specific Gravity, Insitu density, Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils

UNIT – III

UNIT – IV
SEEPAGE THROUGH SOILS: Total, neutral and effective stresses – quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT – V
STRESS DISTRIBUTION IN SOILS: Boussinesq’s and Wester gaard’s theories for point loads and areas of different shapes – Newmark’s influence chart.

UNIT – VI

UNIT – VII
UNIT – VIII
SHEAR STRENGTH OF SOILS : Mohr – Coulomb Failure theories –
Types of laboratory strength tests – strength tests based on drainage
conditions – Shear strength of sands – Critical Void Ratio – Liquefaction-
shear strength of clays.

TEXT BOOKS:
   age International Pvt. Ltd, New Delhi
   Publishers and Distributors, Delhi.
3. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain
   and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
4. Geotechnical Engineering V.N.S.Murthy, CRC Press, Newyork,
   Special Indian Edition.

REFERENCES:
1. Geotechnical Engineering by C. Venkataramiah, New age
   Publishing Company, Newyork.
   Delhi.
4. Geotechnical Engineering by Purushotham Raj
5. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR

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UNIT – I

UNIT-II
WATER TREATMENT : Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants – feeding arrangements

UNIT – III

UNIT-IV
WATER DISTRIBUTION NETWORK ANALYSIS : Distribution systems – Requirements. Layout of Water distribution systems - Design procedures- Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

UNIT V

UNIT VI

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UNIT – VII
WASTE WATER TREATMENT: Layout and general out line of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – biological treatment – trickling filters – standard and high rate – Construction and design of Oxidation ponds.

UNIT-VIII

TEXT BOOKS:
4. Water supply and sanitary Engineering by S.A.Garg,

REFERENCES:
2. Water and Waste Water Technology by Steel
3. Water and Waste Water Engineering by Fair Geyer and Okun
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
6. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age International
UNIT-I
DAMS: Types of dams, merits and demerits, factors affecting selection of type of dam, factors governing selecting site for dam, types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve.

UNIT-II
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
EARTH DAMS: Types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

UNIT-IV
SPILLWAYS: Types of spillways, design principles of Ogee spillways, types of spillway gates.

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-VI
CANAL STRUCTURES I: Types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacis fall.
UNIT-VII
CANAL STRUCTURES II: 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:
1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation engineering by K.R.Arora
4. Irrigation and Water Power Engineering by Punmia and Lal, Laxmi Publications, New Delhi

REFERENCES:
1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Concrete dams by Varshney.
3. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
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 contigent 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
2. Estimating and Costing by G.S. Birdie

REFERENCES:
2. I.S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.

Note: Standards scheduled of rates is permitted in the examination hall.
UNIT I
HIGHWAY DEVELOPMENT AND PLANNING:
Highway development in India – Necessity for Highway Planning-
Different Road Development Plans- Classification of Roads- Road
Network Patterns – Highway Alignment- Factors affecting Alignment-
Engineering Surveys – Drawings and Reports.

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 Superelevation and Extra
widening- Design of Transition Curves-Design of Vertical alignment-
Gradients- Vertical curves.

UNIT – III
TRAFFIC ENGINEERING:
Basic Parameters of Traffic-Volume, Speed and Density – Definitions and
their inter relation - Traffic Volume Studies- Data Collection and
Presentation-speed studies- Data Collection and Presentation- Parking
Studies and Parking characteristics- Road Accidents-Causes and
Preventive measures- Accident Data Recording – Condition Diagram and
Collision Diagrams.

UNIT – IV
TRAFFIC REGULATION AND MANAGEMENT:
Road Traffic Signs – Types and Specifications – Road markings-Need for
Road Markings-Types of Road Markings- Specifications - Design of
UNIT – V
INTERSECTION DESIGN:
Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelisation: 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
PAVEMENT DESIGN :

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
RUNWAY AND TAXIWAY DESIGN:

TEXT BOOKS:
REFERENCES:
5. Traffic and Highway Engineering Nicholas.J.Garber & Lester A.Hoel
6. High way engineering by Paul .H.Wright & Karen K.Dixon,wiley india limited
LIST OF EXPERIMENTS
1. Atterberg’s Limits.
2. Field density-core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant and variable head test
5. Compaction test
6. CBR Test
7. Consolidation test
8. Unconfined compression test
9. Tri-axial Compression test
10. Direct shear test.
11. Vane shear test

Any eight experiments may be completed.

LIST OF EQUIPMENT:
1. Casagrande’s liquid limit apparatus.
2. Apparatus for plastic and Shrinkage limits
3. Field Density apparatus for
   a) Core cutter method
   b) Sand Replacement method
4. Set of sieves: 4.75mm, 2mm, 1mm, 0.6mm, 0.42mm, 0.3mm, 5.15mm, and 0.075mm.
6. Hydrometer
7. Permeability Apparatus for
   a) Constant Head test
   b) Variable Head test
8. Universal Auto compactor for I.S light and heavy compaction tests.
9. Apparatus for CBR test
10. Sampling tubes and sample extractors.
11. 10 tons loading frame with proving rings of 0.5 tons and 5 tons capacity
12. One dimensional consolation test apparatus with all accessories.
13. Tri-axial cell with provision for accommodating 38 mm dia specimens.
14. Box shear test apparatus
15. Laboratory vane shear apparatus.
16. Hot Air ovens (Range of Temperature 50-150°C)
17. Moisture cans – 2 dozens.
18. Electronic balances pf 500 g capacity with 0.01g least count and 5 kg capacity with least count of 1gm
19. Measuring Jars - 1000CC - 6
    - 100CC - 4
20. Mercury - 500 g
21. Rammers - 2
    Crow bars - 2

TEXT BOOKS:
3. Relevant IS Codes.
LIST OF EXPERIMENTS
1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids.
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination and Estimation of total solids, organic solids and inorganic solids.
6. Determination of iron.
10. Determination of B.O.D
11. Determination of C.O.D
NOTE: At least 8 of the above experiments are to be conducted.

LIST OF EQUIPMENT
1) pH meter,
2) Turbidity meter,
3) Conductivity meter,
4) Hot air oven,
5) Muffle furnace,
6) Dissolved Oxygen meter,
7) U – V visible spectrophotometer,
8) Reflux Apparatus,
9) Jar Test Apparatus,
10) BOD incubator.
11) COD Extraction apparatus
TEXT BOOKS:
1. Chemistry for Environmental Engineering by Sawyer and Mc. Carty

REFERENCE
1. Relevant IS Codes.
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 ELEMENTS: Stiffness matrix for bar element – shape functions for one dimensional elements – 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 noded rectangular elements.
UNIT –VI
ISOPARAMETRIC FORMULATION:
Concepts of, isoparametric elements for 2D analysis –formulation of CST element, 4 –Noded and 8-noded iso-parametric quadrilateral elements –Lagrangian and Serendipity elements.

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 BOOK:
2. Finite element analysis by S.S. Bhavakatti-New age international publishers

REFERENCES:
2. Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi
UNIT - I
INTRODUCTION:

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
BRIDGE BEARINGS:

UNIT VIII
PIERS & ABUTMENTS:

TEXT BOOKS:
1. Bridge Engineering by Ponnu Swamy, TATA Megraw Hill Company, New Delhi.
4. Design of Bridges Structure by D.J.Victor
5. Relevant – IRC & Railway bridge Codes.

REFERENCE:-
2. Design of Steel structures by Ramachandra.
UNIT – I

UNIT – II

UNIT – III
EARTH PRESSURE THEORIES: Rankine’s theory of earth pressure – earth pressures in layered soils – Coulomb’s earth pressure theory – Rebhann’s and Culmann’s graphical method

UNIT-IV
RETAINING WALLS: Types of retaining walls – stability of retaining walls.

UNIT – V
SHALLOW FOUNDATIONS: Types – choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi’s, Meyerhoff’s and Skempton’s Methods

UNIT-VI
ALLOWABLE BEARING PRESSURE : Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures – Settlement Analysis
UNIT –VII
PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT–VIII

TEXT BOOKS:
2. Geotechnical Engineering by C.Venkataramaiah,

REFERENCES:
UNIT – I
INTRODUCTION: Air Pollution – sources of pollution – Classification – effects on human beings, Plants and Materials – Global effects of Air pollution – Air emissions standards.

UNIT – II
AIR POLLUTION CONTROL METHODS AND DEVICES :
Air pollution Control Methods – Particulate control devices – General Methods of Controlling Gaseous Emission.

UNIT – III

UNIT – IV

UNIT – V

UNIT – VI
UNIT – VII

UNIT – VIII

TEXT BOOKS:
1. Environmental Science and Engineering by J.G.Henry and G.W.Heinke – Person Education.
4. Environmental Pollution Control Engineering by C.S Rao

REFERENCES:
1. Physico – Chemical process for waster quality control by Weber


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 – VIII  **Shear walls** : - Types – Design of Shear walls as per IS:13920 – Detailing of reinforcements.

**TEXT BOOKS:**
2. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande – Printice Hall of India, New Delhi
3. Earthquake Resistant Design of Structures by S.K.Duggal, Oxford University press, New Delhi

**REFERENCES:**
3. Structural Dynamics by Mario Paaz.

**Codes/Tables:**
**IS Codes:** IS:1893, IS:4326 and IS:13920 to be permitted into the examinations Hall.
UNIT – I
INTRODUCTION : Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non- Point, Line and Areal Sources of air pollution- stationary and mobile sources.

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

UNIT-III
THERMODYNAMIC OF AIR POLLUTION:
Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like Sox, Nox, CO, HC etc., air-fuel ratio. Computation and Control of products of combustion.

UNIT – IV
PLUME BEHAVIOUR : Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams.

UNIT-V
POLLUTANT DISPERSION MODELS : Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.
UNIT-VI  
**CONTROL OF PARTICULATES** : Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control, Equipment’s – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – VII  
**CONTROL OF GASEOUS POLLUTANTS** : General Methods of Control of Nox and Sox emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT – VIII  
**AIR QUALITY MANAGEMENT** : Air Quality Management – Monitoring of SPM, SO; NO and CO Emission Standards.

**TEXT BOOKS:**
1. Air Quality by Thod godish, Levis Publishers, Special India Edition, New Delhi

**REFERENCE:**
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
STATIONS AND YARDS
Introduction-purposes of a rail way station – selection of a site for a
railway station – types of railway station, PLAT FORMS – Definition of
a yard – types of yards – level crossing— signaling systems and inter
locking – staff quarters – goods traffic at way side stations

UNIT – IV
TUNNELLING
Definition – types of tunneling – Drainage in tunnels – ventilation of
tunnels – lining of tunnels – underground railways – tube railways –
maintenance of rail way tunnels

UNIT – V
HISTORICAL DEVELOPMENT OF PORTS HARBOURS AND
DOCKS

UNIT – VI
HARBOURS, DOCKS AND BREAK WATER:

UNIT – VII
JETTIES, LANDING STAGES AND WHARVES:

UNIT – VIII
DREDGING AND MAINTENANCE:

TEXT BOOKS:
1. Railway Engineering by Rangwala Chrotar Publisihing House, Anand.
2. Railway Engineering – A text book Transportation Engineering by S.P.Chandola, S. Chand and Co Ltd.
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:
3. Optimisation technique by S.S.Rao

REFERENCES:
UNIT - I
MOMENT DISTRIBUTION METHOD:
Application to the analysis of portal frames with inclined legs.

UNIT – II
STRAIN ENERGY METHOD:
Application to the analysis of continuous beams and simple portal frames.

UNIT – III
ARCHES:-
Analysis of two hinged and three hinged arches using influence lines.

UNIT – IV
FLEXIBILITY METHOD:-
Analysis of portal frames by flexibility method - Drawing of bending moment diagram

UNIT – V
STIFFNESS METHOD:-
Analysis of portal frames by stiffness method – Drawing of bending moment diagram up to 3X3 stiffness matrix.

UNIT - VI
CABLE AND SUSPENSION BRIDGES :-
Introduction – equilibrium of cable under a given system of loading - equation of the cable – Horizontal thrust on the cable – Tension in the cable – Anchor cable – Length of the cable.

UNIT - VII
PLASTIC ANALYSIS:

UNIT – VIII
APPLICATIONS OF PLASTIC ANALYSIS:
Application of plastic analysis to single bay, single storey, steel portal frames – design of sections of the portal frame (excluding gable frame).

TEXT BOOKS:

REFERENCES:
1. Structural Analysis by D.S.Prakash Rao - Sagar books
1. FUNDAMENTALS OF CONSTRUCTION TECHNOLOGY:

2. PREPARATORY WORK AND IMPLEMENTATION

3. EARTHWORK:

4. EXCAVATION BY BLASTING:

5. PROJECT MANAGEMENT AND BAR CHARTS AND MILESTONE CHARTS:
Introduction – Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives Operation research – Methods of planning and programming problems –
Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT network problems.

6. ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK:

7. PERT: TIME ESTIMATES & TIME COMPUTATIONS:

8. PERT AND CPM: NETWORK ANALYSIS:

TEXT BOOKS:
2. Project Planning and Control with PERT and CPM by Dr. B.C. Punmia, K.K. Khandelwal, Lakshmi Publications New Delhi.
REFERENCES:
B.Tech. IV - I sem (C.E.)

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(9A01711) CAD LAB.

CAD:

SOFTWARE:
1. STAAD PRO or Equivalent

EXERCISIES:
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:
1. Computer Aided Design Lab Manual by Dr. M.N. Sesha Prakash And Dr. C.S. Suresh
I. ROAD AGGREGATES:
1. Aggregate Crushing value
2. Aggregate Impact Test.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS :
1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. CEMENT AND CONCRETES :
TESTS ON CEMENTS :
1. Normal Consistency of fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration)

LIST OF EQUIPMENT:
1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Deval’s Attrition test machine
6. Length and elongation gauges
7. Bitumen penetration test setup.
8. Bitumen Ductility test setup.
9. Ring and ball apparatus
10. Penskey – Morten’s apparatus
11. Vicat’s apparatus
12. Specific gravity bottle.
13. Lechatlier’s apparatus.
14. Slump and compaction factor setups
16. Relevant IS Codes

TEXT BOOKS:-
(9A01801) ADVANCED STRUCTURAL ENGINEERING

1. Design of a flat slab (Interior panel only)
2. Design of concrete bunkers of circular shape – (excluding staging)
   – Introduction to silos
3. Design of concrete chimney
4. Design of Intz water tank excluding staging
5. Design of circular and rectangular water tank resting on the ground
6. Design of cantilever and counter forte retaining wall with
   horizontal back fill
7. Design of grid floor
8. (A) Design of slab less tread – riser stair case.
    (B) Design of Cinema balcony

TEXT BOOKS :-

2. Structural Design and drawing (RCC and steel) by Krishnam Raju, Univ.Press, New Delhi
3. R.C.C Structures by **Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain**, Laxmi Publications, New Delhi

Reference books :-

1. R.C.C Designs by Sushil kumar, standard publishing house.
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. Design of minor irrigation and canal structures by C.Satyanarayana Murthy, Wiley eastern Ltd.
1. **SHALLOW FOUNDATIONS-I:**
General requirements of foundations. Types of shallow foundations and the factors governing the selection of a type of shallow foundation. Bearing capacity of shallow foundations by Terzaghi’s theory and Meyerhof’s theory (derivation of expressions and solution to problems based on these theories). Local shear and general shear failure and their identification.

2. **SHALLOW FOUNDATIONS-II:**
Bearing capacity of isolated footing subjected to eccentric and inclined loads. Bearing capacity of isolated footing resting on stratified soils-Button’s theory and Siva Reddy analysis.

3. **ANALYSIS AND STRUCTURAL DESIGN OF R.C.C. FOOTINGS:**
Analysis and structural design of R.C.C. isolated, combined and strap footings.

4. **DEEP FOUNDATIONS-I:**

5. **DEEP FOUNDATIONS – II:**
Well foundations – elements of well foundation. Forces acting aon a well foundation. Depth and bearing capacity of well foundation. Design of individual components of well foundation (only forces acting and principles of design). Problems associated with well sinking.
6. 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.

7. FOUNDATIONS IN PROBLEMATIC SOILS:
Foundations in black cotton soils - basic foundation problems associated with black cotton soils. Lime column techniques - Principles and execution. Use of Cohesive Non Swelling (CNS) layer below shallow foundations.

8. 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/REFERENCE BOOKS:
2. Foundation Design - Teng.
4. Geotechnical engineering by V.N.S.Murthy, CRC Press, New Delhi

REFERENCES:
UNIT – I
DEWATERING: Methods of de-watering- sumps and interceptor ditches- single, multi stage well points - vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains – Electro-osmosis.

UNIT – II
GROUTING: Objectives of grouting- grouts and their properties- grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- post grout test.

UNIT – III
DENSIFICATION METHODS IN GRANULAR SOILS:-
In – situ densification methods in granular Soils:- Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

UNIT – IV
DENSIFICATION METHODS IN COHESIVE SOILS:-
In – situ densification methods in Cohesive soils:- preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – V
STABILISATION: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum
UNIT – VI
**REINFORCED EARTH:** Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

UNIT – VII
**GEOSYNTHETICS :** Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.

UNIT - VIII
**EXPANSIVE SOILS:** Problems of expansive soils – tests for identification – methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

**TEXT BOOKS:**

**REFERENCES:**
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jericy, USA
UNIT – I
INTRODUCTION TO PHOTOGRAMMETRY:
Principle and types of aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

UNIT – II
REMOTE SENSING – I:
Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

UNIT – III
REMOTE SENSING – II:
Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – IV
GEOGRAPHIC INFORMATION SYSTEM:
Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

UNIT – V
TYPES OF DATA REPRESENTATION:
Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning,
Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

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
WATER RESOURCES APPLICATIONS-I:
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
WATER RESOURCES APPLICATIONS – II:
Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:
1 Remote Sensing and GIS by B.Bhatta, Oxford University Press, New Delhi.
2 Advanced surveying : Total station GIS and remote sensing – Satheesh Gopi – Pearson publication.
3 Geographical Information Science by Narayana Panigrahi, University press, New Delhi
4 GIS by Kang – tungs chang, TMH Publications & Co.,
5 Principals of Geo physical Information Systems – Peter A Burragh and Rachael Mc Donnell, Oxford Publishers 2004

REFERENCES:
1. PRINCIPLES OF EXPERIMENTAL APPROACH:

2. STRAIN MEASUREMENT USING STRAIN GAUGES:

3. ELECTRICAL STRAIN GAUGES:
Inductance strain gauges – LVDT – Resistance strain gauges – various types – Gauge factor – Materials of adhesion base etc.

4. STRAIN ROSETTES:

5. NON-DESTRUCTIVE TESTING:
Ultrasonic Pulse Velocity method – Application to Concrete – hammer Test Application to Concrete.

6. BRITTLE COATING METHODS:
Introduction – Coating Stress – Failure Theories – Brittle Coating Crack Patterns – Crack Detection – Types of Brittle Coating – Test Procedures
for Brittle Coating Analysis – Calibration Procedures – Analysis of Brittle Coating Data.

7. THEROY OF PHOTOELASTICITY:

8. TWO DIMENSIONAL PHOTOELASTICITY:

Reference Books:
1. Experimental stress analysis by J.W.Dally and W.F.Riley
2. Experimental stress analysis by Dr.Sadhu Singh.
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR

B.Tech. IV -II sem (C.E.)

T P C
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(9A01807) PRESTRESSED CONCRETE

(ELECTIVE –IV)

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
DESIGN OF SECTIONS FOR FLEXURE :-
Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure – Kern – lines, cable profile.

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

UNIT – VII
COMPOSITE SECTION:

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. Prestressed Concrete by N.Rajasekharan; - Narosa publications.
3. Prestressed Concrete by Ramamrutham,Dhanpatrai Publications

REFERENCE:
2. Prestressed concrete by E.G.Nawy

Codes/Tables:
Codes: BIS code on prestressed concrete, IS 1343 to be permitted into the examination Hall.
(9A01808) ENVIRONMENTAL IMPACT ASSESSMENT & MANAGEMENT (ELECTIVE –IV)

UNIT – I
INTRODUCTION:-
Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.

UNIT – II
EIA METHODOLOGIES:-

UNIT – III
IMPACT OF DEVELOPMENTAL ACTIVITIES AND LAND USE:-
Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives.

UNIT-IV
ENVIRONMENTAL IMPACT ASSESSMENT :
Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT – V
ASSESSMENT OF IMPACT ON VEGETATION AND WILDLIFE :
Introduction - Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT – VI
ENVIRONMENTAL AUDIT :
Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT-VII
ENVIRONMENTAL ACTS (PROTECTION AND PREVENTION)

UNIT-VIII
CASE STUDIES :
Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCES:
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi