ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABI
OF
CIVIL ENGINEERING
FOR
B.TECH REGULAR FOUR YEAR DEGREE COURSE
(for the batches admitted from 2014-2015)
&
for B.TECH LATERAL ENTRY COURSE
(for the batches admitted from 2015-2016)
VISION
To be one of the Nation’s premier Engineering Colleges by achieving the highest order of excellence in Teaching and Research.

MISSION
➢ To foster intellectual curiosity, pursuit and dissemination of knowledge.
➢ To explore students’ potential through academic freedom and integrity.
➢ To promote technical mastery and nurture skilled professionals to face competition in ever increasing complex world.

QUALITY POLICY
Sree Vidyanikethan Engineering College strives to establish a system of Quality Assurance to continuously address, monitor and evaluate the quality of education offered to students, thus promoting effective teaching processes for the benefit of students and making the College a Centre of Excellence for Engineering and Technological studies.
DEPARTMENT OF CIVIL ENGINEERING

VISION

To become a leading centre of excellence in Civil Engineering education through teaching and research.

MISSION

To impart strong basic and advanced knowledge for a successful career in civil engineering and provide skills in state-of-the-art research and design for creating innovative solutions to serve industry and community. The Department is established to inculcate intellectual curiosity, integrity and technical & communication skills for individual development and produce outstanding Civil Engineering graduates with highest ethics. The Department organizes development programmes for faculty, staff and students to improve in their respective interested field of study and perform to the best of their abilities.
PROGRAM EDUCATIONAL OBJECTIVES

After few years of graduation, the graduate will be able to:

1. Pursue higher education in the areas of their interest.

2. Address the contemporary issues in Civil Engineering and provide appropriate solutions through professional career.

3. Exhibit leadership qualities, participate in continuing educations programmes for lifelong learning and contribute individually and as a member in multidisciplinary teams to meet social and ethical constraints.

PROGRAM OUTCOMES

After the completion of the program, a successful student will be able to:

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Engineering knowledge)

2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Problem analysis)

3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. (Design/development of solutions)

4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. (Conduct investigations of complex problems)

5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. (Modern tool usage)
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. (The engineer and society)

7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development). (Environment and sustainability)

8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. (Ethics)

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

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

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

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

After the completion of the program, a successful student will be able to:

1. Apply knowledge of Construction Engineering, Environmental Engineering, Geotechnical Engineering, Structural Engineering, Surveying, Transportation Engineering and Water Resources Engineering in real time.

2. Analyse a system, component or process in sub-disciplines of civil engineering in real time problems.

3. Design a system, component, or process in more than one Civil Engineering context.

4. Conduct investigations and address complex civil engineering problems; Utilize and develop novel tools and techniques that are appropriate in civil engineering practice.
“Mastery of change is in fact the challenge of moving human attention from an old state to a new state. Leaders can shift attention at the right time and to the right place. The real crisis of our times is the crisis of attention. Those who lead are the ones who can hold your attention and move it in a purposeful way. Transformation is nothing but a shift in attention from one form to another. The form of a beautiful butterfly breaks free from a crawling caterpillar. If you pay enough attention, you would be able to see how the butterfly hides within the caterpillar. The leader points out a butterfly when the follower sees only a caterpillar”.

- Debasish Chatterjee
SREE VIDYANIKETHAN ENGINEERING COLLEGE
(Autonomous)
(Affiliated to J.N.T. University Anantapur, Anantapuramu)

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Program
(for the batches admitted from the academic year 2014–15)
&
B.Tech. (Lateral Entry Scheme)
(for the batches admitted from the academic year 2015–16)

For pursuing four year undergraduate Degree Program of study in Engineering (B.Tech) offered by Sree Vidyanikethan Engineering College under Autonomous status and herein after referred to as SVEC (Autonomous):

1. **Applicability**: All the rules specified herein, approved by the Academic Council, shall be in force and applicable to students admitted from the academic year 2014-2015 onwards. Any reference to "College" in these rules and regulations stands for SVEC (Autonomous).

2. **Extent**: All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, Sree Vidyanikethan Engineering College shall be the Chairman, Academic Council.

3. **Admission**

3.1. **Admission into first year of Four Year B.Tech. Degree Program of study in Engineering**:

3.1.1. **Eligibility**: A candidate seeking admission into the First Year of four year B.Tech. Degree Program should have

   (i) passed either Intermediate Public Examination (I.P.E.) conducted by the Board of Intermediate Education, Andhra Pradesh, with Mathematics, Physics and Chemistry as optional courses (or any equivalent examination recognized by JNTUA, Anantapuramu) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or equivalent Diploma recognized by JNTUA, Anantapuramu) for admission as per the guidelines of Andhra Pradesh State Council of Higher Education (APSCHE).

   (ii) secured a rank in the EAMCET examination conducted by APSCHE for allotment of a seat by the Convener, EAMCET, for admission.
3.1.2. Admission Procedure: Admissions shall be made into the first year of four year B.Tech. Degree Program as per the stipulations of APSCHE, Government of Andhra Pradesh:
   (a) By the Convener, EAMCET, (for Category-A Seats).
   (b) By the Management (for Category-B Seats).

3.2. Admission into the Second Year of Four year B.Tech Degree Program in Engineering

3.2.1. Eligibility: Candidates qualified in ECET and admitted by the Convener, ECET. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained.

3.2.2. Admission Procedure: 20% of the sanctioned strength in each Program of study as lateral entry students or as stipulated by APSCHE shall be filled by the Convener, ECET.

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

Following are the four year undergraduate Degree Programs of study offered in various branches in SVEC (Autonomous) leading to the award of B.Tech (Bachelor of Technology) Degree:

1) B.Tech (Civil Engineering)
2) B.Tech (Computer Science & Engineering)
3) B.Tech (Computer Science & Systems Engineering)
4) B.Tech (Electrical & Electronics Engineering)
5) B.Tech (Electronics & Communication Engineering)
6) B.Tech (Electronics & Instrumentation Engineering)
7) B.Tech (Information Technology)
8) B.Tech (Mechanical Engineering)

5. Academic Year: The College shall follow Year-wise pattern for the First year courses of four year B.Tech Program and semester system from second year onwards for conducting all its curricula. An academic year shall consist of a first semester and a second semester from second year onwards and the summer vacation follows in sequence.

The first year of four year B.Tech Program shall have duration to accommodate a minimum of 31 instructional weeks. The first and second semesters (from second year onwards) shall have the duration to accommodate a minimum of 16 instructional weeks per semester.
### Course Structure

Each Program of study shall consist of:

- **General Courses** comprising of the following:
  1. Language / Communication Skills
  2. Humanities and Social Sciences
  3. Economics and Principles of Management
  4. Environmental Sciences

  The above areas are common to all branches.

- **Basic Science Courses** comprising of the following:
  1. Computer Programming with Numerical Analysis
  2. Mathematics
  3. Physics
  4. Chemistry

  The above courses are common to all branches.

<table>
<thead>
<tr>
<th></th>
<th>Instruction Period:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I Spell: 07 weeks</td>
</tr>
<tr>
<td></td>
<td>II Spell: 12 weeks</td>
</tr>
<tr>
<td></td>
<td>III Spell: 12 weeks</td>
</tr>
<tr>
<td></td>
<td>31 weeks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mid-term Examinations:</th>
<th>3 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Mid: 1 week</td>
<td></td>
</tr>
<tr>
<td>II Mid: 1 week</td>
<td></td>
</tr>
<tr>
<td>III Mid: 1 week</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preparation &amp; Practical Examinations</th>
<th>2 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Examinations</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>

| Summer vacation | 4 weeks |

<table>
<thead>
<tr>
<th></th>
<th>Instruction Period:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I Spell: 7 weeks</td>
</tr>
<tr>
<td></td>
<td>II Spell: 9 weeks</td>
</tr>
<tr>
<td></td>
<td>16 weeks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mid-term Examinations:</th>
<th>2 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Mid: 1 week</td>
<td></td>
</tr>
<tr>
<td>II Mid: 1 week</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preparation &amp; Practical Examinations</th>
<th>2 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Examinations</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>

| Semester Break | 2 weeks |

<table>
<thead>
<tr>
<th></th>
<th>Instruction Period:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I Spell: 7 weeks</td>
</tr>
<tr>
<td></td>
<td>II Spell: 9 weeks</td>
</tr>
<tr>
<td></td>
<td>16 weeks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mid-term Examinations:</th>
<th>2 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Mid: 1 week</td>
<td></td>
</tr>
<tr>
<td>II Mid: 1 week</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preparation &amp; Practical Examinations</th>
<th>2 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Examinations</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>

| Summer Vacation | 6 weeks |

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**First Year B.Tech. (38 weeks)**

- Instruction Period:
  - I Spell: 07 weeks
  - II Spell: 12 weeks
  - III Spell: 12 weeks
  - 31 weeks

- Mid-term Examinations:
  - I Mid: 1 week
  - II Mid: 1 week
  - III Mid: 1 week
  - 3 weeks

- Preparation & Practical Examinations: 2 weeks
- External Examinations: 2 weeks
- Summer vacation: 4 weeks

**First Semester (22 weeks)**

- Instruction Period:
  - I Spell: 7 weeks
  - II Spell: 9 weeks
  - 16 weeks

- Mid-term Examinations:
  - I Mid: 1 week
  - II Mid: 1 week
  - 2 weeks

- Preparation & Practical Examinations: 2 weeks
- External Examinations: 2 weeks
- Semester Break: 2 weeks

**Second Semester (22 weeks)**

- Instruction Period:
  - I Spell: 7 weeks
  - II Spell: 9 weeks
  - 16 weeks

- Mid-term Examinations:
  - I Mid: 1 week
  - II Mid: 1 week
  - 2 weeks

- Preparation & Practical Examinations: 2 weeks
- External Examinations: 2 weeks
- Summer Vacation: 6 weeks

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**Note:**
- The table above provides a structured overview of the course structure and instruction periods for each semester.
- It includes details such as instruction periods, mid-term examinations, and preparation/practical examinations.
- The document emphasizes the importance of balanced education across various disciplines and highlights the common areas across different branches.
• Engineering Science Courses comprising of the following, pertaining to the branch:
  i. Engineering Graphics
  ii. Workshop Practice
  iii. Engineering Mechanics
  iv. Electrical Sciences
  v. Thermodynamics
  vi. Material Sciences and Engineering
  vii. Building Materials
  viii. Surveying
  ix. Basic Electronics
  x. Computer Programming and Data Structures
  xi. IT Workshop
  xii. Fluid Mechanics

• Professional core courses:
The list of professional core courses are chosen as per the suggestions of the experts, to impart broad based knowledge needed in the concerned branch of study.

• Elective courses:
Elective courses shall be offered to the students to diversify their spectrum of knowledge. The elective courses can be chosen based on the interest of the student to broaden his individual skills and knowledge.

Distribution of types of courses is indicated below:

<table>
<thead>
<tr>
<th>Type of Courses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Courses</td>
<td>5-10%</td>
</tr>
<tr>
<td>Basic Science Courses</td>
<td>15-20%</td>
</tr>
<tr>
<td>Engineering Science Courses</td>
<td>15-20%</td>
</tr>
<tr>
<td>Professional Core Courses</td>
<td>40-50%</td>
</tr>
<tr>
<td>Elective Courses</td>
<td>10-15%</td>
</tr>
</tbody>
</table>
**Contact Hours:** Depending on the complexity and volume of the course, the number of contact hours per week shall be assigned.

**7. Credit System:** Credits are assigned based on the following norms as given in Table 1.

**Table 1**

<table>
<thead>
<tr>
<th>Course</th>
<th>Year Pattern</th>
<th>Semester Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hour(s)/Week</td>
<td>Credits</td>
</tr>
<tr>
<td>Theory</td>
<td>01</td>
<td>02</td>
</tr>
<tr>
<td>Practical</td>
<td>03</td>
<td>03</td>
</tr>
<tr>
<td>Seminar</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Comprehensive Viva-Voce</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Project Work</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

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

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

iii. Tutorials do not carry any credits.

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

The four year curriculum of any B. Tech. Program of study shall have total of **187** credits. However the curriculum for lateral entry students shall have a total of **142** credits.

**8. Examination System:** All components in any Program of study shall be evaluated through internal evaluation and/or an external evaluation conducted as year-end/semester-end examination.
8.1. Distribution of Marks:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course</th>
<th>Marks</th>
<th>Examination and Evaluation</th>
<th>Scheme of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Theory</td>
<td>70</td>
<td>Year-end / Semester-end</td>
<td>The examination question paper in theory courses shall be for a maximum of 70 marks. The question paper shall be of descriptive type with 5 questions, taken one from each unit of syllabus, having internal choice and all 5 questions shall be answered. All questions carry equal marks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>examination of 3 hours</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>duration (External</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>evaluation)</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Theory</td>
<td>30</td>
<td>Mid-term Examination of 2</td>
<td>The question paper shall be of descriptive type with 4 essay type questions out of which 3 are to be answered and evaluated for 24 marks and also 6 short answer questions out of which all are to be answered and evaluated for 6 marks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>hours duration (Internal</td>
<td>For I B.Tech: Three (03) mid-term examinations, each for 30 marks are to be conducted. For a total of 30 marks, 75% of average of better two and 25% of the other examination are added and finalized.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>evaluation)</td>
<td>Mid-I: After first spell of instruction (I Unit).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mid-II: After second spell of instruction (II to III Units).</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Mid-III: After third spell of instruction (IV to V Units).</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For a Semester: Two mid-term examinations each for 30 marks are to be conducted. For a total of 30 marks, 75% of better one of the two and 25% of the other one are added and finalized.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mid-I: After first spell of instruction (I to II Units).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mid-II: After second spell of instruction (III to V Units).</td>
</tr>
</tbody>
</table>
### Seminar/Comprehensive Viva-Voce/Project Work/
Design and Drawing of Irrigation Structures Evaluation:

#### 8.2.1
For the seminar, the student shall collect information through literature survey on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department just before presentation. The report and the presentation shall be evaluated at the end of the semester by the Departmental Committee (DC) consisting of Head of the Department, concerned supervisor and a senior faculty member. The DC is constituted by the Principal on the recommendations of the Head of the Department.

#### 8.2.2
Comprehensive Viva-Voce examination shall be conducted by a committee consisting of HOD and two senior faculty members.
8.2.3 The project Viva-Voce examination shall be conducted by a Committee consisting of External examiner (nominated by the Chief Controller of Examinations), HOD and concerned Supervisor. The evaluation of project work shall be conducted at the end of the IV year II semester. The Internal Evaluation shall be made by the DC, on the basis of two project reviews conducted on the topic of the project.

8.2.4. Mid-term examinations for Design and Drawing of Irrigation Structures shall be conducted similar to like in other theory courses. However, semester-end examination comprises of two questions and out of which one question has to be answered for 70 marks.

8.3. **Eligibility to appear for the year-end / semester-end examination:**

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

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

8.3.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned.

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

8.3.5 A student shall not be promoted to the next semester unless he satisfies the attendance requirements of the current year/ semester, as applicable. The student may seek readmission for the year/ semester when offered next. He will not be allowed to register for the courses of the year/semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that year/semester when offered next.

8.3.6 A stipulated fee shall be payable to the College towards condonation of shortage of attendance.

8.4. **Evaluation:** Following procedure governs the evaluation.

8.4.1. Marks for components evaluated internally by the faculty shall be submitted to the Controller of Examinations one week before the commencement of the End examinations. The marks for the internal evaluation components shall be added to the external evaluation marks secured in the Year-end/Semester-end examinations, to arrive at total marks for any course in that Year/semester.

8.4.2. Performance in all the courses is tabulated course-wise and shall be scrutinized by the Examination Committee and moderation is applied if needed, and course-wise marks are finalized. Total marks obtained in each course are converted into letter grades.

8.4.3. Student-wise tabulation shall be done and individual grade Sheet shall be generated and issued to the student.
8.5. **Personal verification / Revaluation / Recounting:**

Students shall be permitted for personal verification/request for recounting/revaluation of the Year-end/Semester-end examination answer scripts within a stipulated period after payment of prescribed fee.

After recounting or revaluation, records are updated with changes if any and the student shall be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a notice.

8.6. **Supplementary Examination:**

In addition to the regular year-end / semester-end examinations conducted, the College may also schedule and conduct supplementary examinations for all the courses of other year/semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

9. **Academic Requirements for promotion/ completion of regular B.Tech Program of study:**

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

**For students admitted into B.Tech. (Regular) Program:**

9.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, laboratory course and project work, if he secures not less than 40% of marks in the year-end/semester-end examination and a minimum of 40% of marks in the sum total of the internal evaluation and Year-end/Semester-end examination taken together. For the seminar and comprehensive Viva-Voce, he should secure not less than 40% of marks in the semester-end examination.

9.2 A student shall be promoted from second year to third year of Program of study only if he fulfills the academic requirement of securing 33 credits from

a. One regular and one supplementary examinations of first year.

b. One regular examination of second year first semester irrespective of whether or not the candidate appears for the year-end/semester-end examination as per the normal course of study.
9.3 A student shall be promoted from third year to fourth year of Program of study only if he fulfils the academic requirements of securing 58 credits from the following examinations,
   a. Two regular and two supplementary examinations of first year
   b. Two regular and one supplementary examination of second year first semester
   c. One regular and one supplementary examination of second year second semester
   d. One regular examination of third year first semester irrespective of whether or not the candidate appears for the year-end/semester-end examination as per the normal course of study and in case of getting detained for want of credits by sections 9.2 and 9.3 above, the student may make up the credits through supplementary examinations.

9.4 A student shall register for all the 187 credits and earn all the 187 credits. Marks obtained in all the 187 credits shall be considered for the calculation of the DIVISION based on CGPA.

9.5 A student who fails to earn 187 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit his seat in B.Tech. Program and his admission stands cancelled.

For Lateral Entry Students (batches admitted from the academic year 2015–2016):

9.6 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical course and project, if he secures not less than 40% of marks in the semester-end examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester-end examination taken together. For the seminar and comprehensive Viva-Voce, he should secure not less than 40% of marks in the semester-end examination.

9.7 A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing 36 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 or not the candidate appears for the semester-end examination 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 examinations.
9.8 A student shall register for all 142 credits and earn all the 142 credits. Marks obtained in all the 142 credits shall be considered for the calculation of the DIVISION based on CGPA.

9.9 A student who fails to earn 142 credits as indicated in the course structure within six academic years from the year of their admission shall forfeit his seat in B.Tech Program and his admission stands cancelled.

10. Transitory Regulations:
Students who got detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the Program in earlier regulations (or) who have discontinued and wish to continue the Program are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent courses as and when courses are offered and they will be in the academic regulations into which they are presently readmitted.
A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of eight years, and a lateral entry student within six years, for the award of B.Tech Degree.

11. Grades, Grade Point Average and Cumulative Grade Point Average:
11.1. Grade System: After all the components and sub-components of any course (including laboratory courses) are evaluated, the final total marks obtained shall be converted into letter grades on a “10 point scale” as described below.

<table>
<thead>
<tr>
<th>% of Marks obtained</th>
<th>Grade</th>
<th>Description of Grade</th>
<th>Grade Points (GP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; = 95</td>
<td>S</td>
<td>Superior</td>
<td>10</td>
</tr>
<tr>
<td>&gt; = 85 to &lt; 95</td>
<td>O</td>
<td>Outstanding</td>
<td>9</td>
</tr>
<tr>
<td>&gt; = 75 to &lt; 85</td>
<td>A</td>
<td>Excellent</td>
<td>8</td>
</tr>
<tr>
<td>&gt; = 65 to &lt; 75</td>
<td>B</td>
<td>Very Good</td>
<td>7</td>
</tr>
<tr>
<td>&gt; = 55 to &lt; 65</td>
<td>C</td>
<td>Good</td>
<td>6</td>
</tr>
<tr>
<td>&gt; = 45 to &lt; 55</td>
<td>D</td>
<td>Fair</td>
<td>5</td>
</tr>
<tr>
<td>&gt; = 40 to &lt; 45</td>
<td>E</td>
<td>Pass</td>
<td>4</td>
</tr>
<tr>
<td>&lt; 40</td>
<td>F</td>
<td>Fail</td>
<td>0</td>
</tr>
<tr>
<td>Not Appeared</td>
<td>N</td>
<td>Absent</td>
<td>0</td>
</tr>
</tbody>
</table>
Pass Marks: A student shall be declared to have passed theory course, laboratory course and project work if he secures minimum of 40% marks in external examination, and a minimum of 40% marks in the sum total of internal evaluation and external examination taken together. For the seminar and comprehensive Viva-Voce, he shall be declared to have passed if he secures minimum of 40% of marks in the semester-end examination. Otherwise he shall be awarded fail grade - F in such a course irrespective of internal marks. F is considered as a fail grade indicating that the student has to pass the year-end/semester-end examination in that course in future and obtain a grade other than F and N for passing the course.

11.2. Grade Point Average (GPA):
Grade Point Average (GPA) shall be calculated as given below on a "10 point scale" as an index of the student's performance at the end of 1 year/ each semester:

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

where \( C \) denotes the credits assigned to the courses undertaken in that Year/ semester and \( GP \) denotes the grade points earned by the student in the respective courses.

**Note:** GPA is calculated only for the candidates who passed all the courses in that Year/Semester.

11.3. Cumulative Grade Point Average (CGPA):
The CGPA for any student is awarded only when he completes the Program i.e., when the student passes in all the courses prescribed in the Program. The CGPA is computed on a 10 point scale as given below:

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

where \( C \) denotes the credits assigned to courses undertaken up to the end of the Program and \( GP \) denotes the grade points earned by the student in the respective courses.

12. Grade Sheet: A grade sheet (Marks Memorandum) shall be issued to each student indicating his performance in all courses registered in that semester/year indicating the GPA.

13. Transcripts: After successful completion of the entire Program of study, a transcript containing performance of all academic years shall be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued up to any point of study to a student on request.
14. **Award of Degree**: The Degree shall be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapuramu on the recommendations of the Chairman, Academic Council of SVEC (Autonomous).

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

- Registered and successfully completed all the components prescribed in the Program of study to which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained CGPA greater than or equal to 4.0 (Minimum requirement for declaring as passed).
- Has no dues to the College, Hostel, Library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

14.2. **Award of Division**: Declaration of Division is based on CGPA.

<table>
<thead>
<tr>
<th>CGPA</th>
<th>Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\geq 7.0$</td>
<td>First Class with Distinction</td>
</tr>
<tr>
<td>$6.0 \leq x &lt; 7.0$</td>
<td>First Class</td>
</tr>
<tr>
<td>$5.0 \leq x &lt; 6.0$</td>
<td>Second Class</td>
</tr>
<tr>
<td>$4.0 \leq x &lt; 5.0$</td>
<td>Pass Class</td>
</tr>
</tbody>
</table>

15. **Additional academic regulations**:

15.1 A student may appear for any number of supplementary examinations within the stipulated time to fulfill regulatory requirements for award of the degree.

15.2 In case of malpractice/improper conduct during the examinations, guidelines shall be followed as given in the Annexure-I.

15.3 Courses such as Project, Seminar and Comprehensive Viva-Voce may be repeated only by registering in supplementary examinations.

15.4 When a student is absent for any examination (Mid-term or Year-end/Semester-end) he shall be awarded zero marks in that component (course) and grading will be done accordingly.

15.5 When a component is cancelled as a penalty, he shall be awarded zero marks in that component.
16. Withholding of Results:
If the candidate has not paid dues to the College/University (or) if any case of indiscipline is pending against him, the result of the candidate shall be withheld and he will not be allowed/promoted to the next higher year/semester.

17. Amendments to regulations:
The Academic Council of SVEC (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and/or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

18. Attendance for student development activity periods indicated in the class time tables shall be considered as in the case of a regular course for calculation of overall percentage of attendance in a year / semester.

19. General:
The words such as “he”, “him”, “his” and “himself” shall be understood to include all students irrespective of gender connotation.

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

## Guide Lines for Disciplinary Action for Malpractices / Improper Conduct in Examinations

<table>
<thead>
<tr>
<th>Rule No.</th>
<th>Nature of Malpractices/ Improper conduct</th>
<th>Punishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (a)</td>
<td>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 course 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 course of the examination)</td>
<td>Expulsion from the examination hall and cancellation of the performance in that course only.</td>
</tr>
<tr>
<td>(b)</td>
<td>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 examination hall in respect of any matter.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that course 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.</td>
<td>Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the course 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 course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester/year. The Hall Ticket of the candidate is to be cancelled.</td>
</tr>
<tr>
<td>3.</td>
<td>Impersonates any other candidate in connection with the examination.</td>
<td>The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all Year-end/Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the courses of the examination (including labs and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all Year-end/Semester-end examinations. If his involvement is established. Otherwise, The candidate is debarred for two consecutive semesters from class work and all Year-end/Semester-end 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.</td>
</tr>
<tr>
<td>Rule No.</td>
<td>Nature of Malpractices/Improper Conduct</td>
<td>Punishment</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>4.</td>
<td>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.</td>
<td>Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Year-end/Semester-end 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>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 course only.</td>
</tr>
<tr>
<td>6.</td>
<td>Refuses to obey the orders of the Chief Controller of Examinations/Controller of Examinations/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 Controller of Examinations 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 Controller of Examinations, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.</td>
<td>In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester/year. If the candidate physically assaults the invigilator/Controller of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.</td>
</tr>
<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>
<td>Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Year-end/Semester-end 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>
<td>Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred and forfeits the seat.</td>
</tr>
</tbody>
</table>

Note: Whenever the performance of a student is cancelled in any course(s) due to Malpractice, he has to register for Year-end/Semester-end Examinations in that course(s) consequently and has to fulfill all the norms required for the award of Degree.
## Course Structure (2014-2015)

### Civil Engineering

I Year B.Tech. (Yearly Pattern)

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Periods per week</th>
<th>C</th>
<th>Scheme of Examination Max. Marks</th>
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<td>T</td>
<td>P</td>
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<td>14BT1HS01</td>
<td>Technical English</td>
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<td>14BT1BS02</td>
<td>Engineering Chemistry</td>
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<td>14BT10301</td>
<td>Engineering Mechanics</td>
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<td>14BT1ES01</td>
<td>Programming in C and Data Structures</td>
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<td>-</td>
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<td>14BT1ES03</td>
<td>Computer-Aided Engineering Drawing</td>
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<tr>
<td>14BT1BS05</td>
<td>Engineering Physics and Engineering Chemistry Lab.</td>
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<tr>
<td>14BT1ES04</td>
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<td>-</td>
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<tr>
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<td>Engineering and IT Workshop</td>
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<td>English Language Communication Skills Lab.</td>
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## II B.Tech I Semester

<table>
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<td>14BT30101</td>
<td>Matrices &amp; Numerical Methods</td>
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<td>14BT30101</td>
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<td>14BT30102</td>
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<td>14BT30103</td>
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<td>14BT30104</td>
<td>Fluid Mechanics-I</td>
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<td>14BT30121</td>
<td>Engineering Geology Lab</td>
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<td>25 50 75</td>
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<td>14BT30122</td>
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<td>25 50 75</td>
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<td></td>
<td><strong>230 520 750</strong></td>
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### II B.Tech II Semester

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<td>14BT3BS03</td>
<td>Probability &amp; Statistics</td>
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<tr>
<td>14BT4HS01</td>
<td>Environmental Sciences</td>
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<td>1</td>
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<td>14BT5HS01</td>
<td>Business Communication and Presentation Skills</td>
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<td>1</td>
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<tr>
<td>14BT40101</td>
<td>Structural Analysis – I</td>
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<td>14BT40102</td>
<td>Construction, Planning &amp; Project Management</td>
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<td>14BT40103</td>
<td>Surveying</td>
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<td>1</td>
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<td>14BT40121</td>
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<td>14BT40122</td>
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## III B.Tech I Semester

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<td>T</td>
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<tr>
<td>14BT5HS02</td>
<td>Management Science</td>
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<td>14BT4HS02</td>
<td>Professional Ethics</td>
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<td>14BT50101</td>
<td>Structural Analysis – II</td>
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<tr>
<td>14BT50102</td>
<td>Reinforced Cement Concrete Structures – I</td>
<td>3</td>
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<td>Water Supply Engineering</td>
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<td>Soil Mechanics</td>
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<td>14BT50105</td>
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<td>14BT50121</td>
<td>Computer Aided Building Planning &amp; Drawing Lab</td>
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<td>Geotechnical Engineering Laboratory</td>
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## III B.Tech II Semester

<table>
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<th>C</th>
<th>Scheme of Examination Max. Marks</th>
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<td>Managerial Economics and Principles of Accountancy</td>
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<td>14BT60101</td>
<td>Reinforced Cement Concrete Structures – II</td>
<td>3 1 – 3</td>
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<tr>
<td>14BT60102</td>
<td>Foundation Engineering</td>
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<tr>
<td>14BT60103</td>
<td>Transportation Engineering –I</td>
<td>3 1 – 3</td>
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<tr>
<td>14BT60104</td>
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<td>3 1 – 3</td>
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**Professional Elective – 1**

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<th>Periods per week</th>
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<tbody>
<tr>
<td>14RT60105</td>
<td>1. Advanced Structural Analysis</td>
<td>3 1 – 3</td>
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<tr>
<td>14BT60106</td>
<td>2. Geo-environmental Engineering</td>
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<tr>
<td>14BT60107</td>
<td>3. Ground Water Development and Management</td>
<td>3 1 – 3</td>
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<td>14BT60108</td>
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<td>14BT60122</td>
<td>Environmental Engineering Lab</td>
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**Total:** 18 6 6 22 230 520 750
### IV B.Tech I Semester

<table>
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<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
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<td>14BT70101</td>
<td>Steel Structures</td>
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<td>Water Resources Engineering</td>
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<td>14BT70103</td>
<td>Geospatial Technologies</td>
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<td>1. Structural Dynamics</td>
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<td>14BT70121</td>
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## OPEN ELECTIVES

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<tr>
<th>Offering Dept</th>
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<td>BS&amp;H</td>
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<td>BS&amp;H</td>
<td>14BT6HS02</td>
<td>Cost Accounting and Financial Management</td>
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<td>BS&amp;H</td>
<td>14BT6HS03</td>
<td>Entrepreneurship for Micro, Small and Medium Enterprises</td>
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<td>CE</td>
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<td>Disaster Mitigation and Management</td>
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<td>Environmental Pollution and Control</td>
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<td>14BT70107</td>
<td>Contract Laws and Regulations</td>
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<td>Artificial Intelligence and Robotics</td>
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## IV B.Tech II Semester

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<td>14BT80102</td>
<td>Estimation, Costing &amp; Valuation</td>
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### Professional Elective– III

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<td>14BT80103</td>
<td>1. Advanced Steel Structures</td>
<td>3 1 – 3</td>
<td>Int. Ext. Total</td>
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<td>14BT80104</td>
<td>2. Soil Dynamics and Machine Foundations</td>
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<td>Int. Ext. Total</td>
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<td>14BT80105</td>
<td>3. Watershed Management</td>
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<td>14BT80106</td>
<td>4. Industrial Waste Water Treatment</td>
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<td>14BT80107</td>
<td>5. Infrastructure Development and Management</td>
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<td>6. Earthquake Resistant Design of Structures</td>
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### Professional Elective– IV

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<td>2. Ground Improvement Techniques</td>
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<td>3. Rehabilitation and Retrofitting of Structures</td>
<td>3 1 – 3</td>
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<td>4. Design and Drawing of Irrigation Structures</td>
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<td>Int. Ext. Total</td>
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<td>14BT80113</td>
<td>5. Architecture and Town Planning</td>
<td>3 1 – 3</td>
<td>Int. Ext. Total</td>
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<tr>
<td>14BT80114</td>
<td>6. Railway, Harbour and Airport Engineering</td>
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<td>Int. Ext. Total</td>
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<td>Comprehensive Viva–Voce</td>
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<td>14BT80122</td>
<td>Project Work</td>
<td>– 20 10 60 140</td>
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B.Tech I Year
14BT1HS01: TECHNICAL ENGLISH
(Common to All Branches of Engineering)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L T P C
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PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION: The course consists of lessons which include characters, speeches and short stories: 'My Early Days', 'Speech by N. R. Narayana Murthy', 'Dr. C.V. Raman: The Celebrated Genius', 'The Town by the Sea' and 'The Model Millionaire'. The course also covers the principles of Language and Communication Skills (Listening, Speaking, Reading and Writing Skills).

COURSE OUTCOMES: After completion of the course, the students will be able to:

1. Acquire fundamental and functional knowledge of English Language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English Language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and lifelong learning.

Detailed Syllabus:
UNIT – I: (10 periods)
My Early Days by A. P. J. Abdul Kalam from All About English by Cambridge University Press India Pvt Ltd. 2014.

UNIT – II: (10 periods)
A Speech by N. R. Narayana Murthy from All About English by Cambridge University Press India Pvt Ltd, 2014.
Listening: Meaning and Art of Listening – Importance of Listening – Traits of a Good Listener – Reasons for Poor Listening – Types of Listening– Barriers to Effective Listening

UNIT – III: (10 periods)
The Town by the Sea by Amitav Ghosh from All About English by Cambridge University Press India Pvt Ltd, 2014.
Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: (10 periods)
Reading: Reading and Interpretation – Intensive and Extensive Reading– Critical Reading – Reading Comprehension – Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – V: (10 periods)
The Model Millionaire by Oscar Wilde from All About English by Cambridge University Press India Pvt. Ltd, 2014.

Total Periods: 50

TEXT BOOKS:

REFERENCE BOOKS:
B.Tech. I Year
14BT1BS01: ENGINEERING PHYSICS
(Common to All Branches of Engineering)

Int. Marks: 30   Ext. Marks: 70   Total Marks: 100

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: The course deals with different lasers, optical fibers and holograms, theory of relativity, acoustics of buildings, crystallography, principles of quantum mechanics, band theory of solids, properties of dielectric materials, semiconductors, properties and application of magnetic materials, nanomaterials, and superconductors.

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

1. Acquire basic knowledge of lasers, optical fibers, holography, theory of relativity, acoustics, crystallography, quantum mechanics, dielectrics, magnetic materials, semiconductors, superconductors and nanomaterials.

2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.

3. Develop problem solving skills in engineering context.

Detailed syllabus:
UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY   (18 periods)


Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.
Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.

Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine’s formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg’s law, Laue and powder methods.

UNIT-III: PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS

Principles of Quantum Mechanics: Black body radiation – Wien’s law, Rayleigh-Jeans law and Planck’s law (qualitative treatment), waves and particles, matter waves, de-Broglie’s hypothesis, G.P. Thomson experiment, Heisenberg’s uncertainty principle, Schrödinger’s one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein’s relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V: MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total: 85 periods

Textbooks:
2. P. K. Palaniswamy, Engineering Physics, Scitech Publications

Reference Books:
B.Tech. I Year  
14BT1BS02: ENGINEERING CHEMISTRY  
(Common to All Branches of Engineering)  

Int. Marks: 30  Ext. Marks: 70  Total Marks: 100  

PRE REQUISITE: Intermediate/Senior Secondary Chemistry  

COURSE DESCRIPTION: This course deals with various engineering materials, electro-chemical cells, corrosion, water technology, fuel technology, lubricants, nano chemistry, and green chemistry.  

COURSE OUTCOMES:  
After successful completion of the course the student is able to:  
1. Acquire basic knowledge in liquid crystals, conducting Polymers, Composites, Chemical sensors, insulators, Electro chemical cells, corrosion phenomenon, fuels, Nanomaterials and principles of Green Chemistry and Green Engineering.  
2. Develop analytical skills in:  
   a. Determination of hardness of water.  
   b. Determination of viscosity, flame and fire points, cloud and pour points.  
   c. Determination of calorific value of fuels.  
3. Develop skills in design of:  
   a. Methods for control of corrosion  
   b. Chemical methods for the synthesis of Nanomaterials.  
4. Develop skills for providing solutions through:  
   a. Mitigation of hardness of water.  
   b. Control of corrosion  
   c. Newer Nanomaterials for specific applications  
5. Acquire awareness to societal issues on:  
   a. Chemical materials utility and their impact.  
   b. Quality of water.  
   c. Phenomenon of corrosion.  
6. Imbibe attitude to practice engineering in compliance to environmentally benign techniques such as:  
   a. Green computing  
   b. Green construction  
   c. Green manufacturing systems
Detailed syllabus:

UNIT – I: CHEMISTRY OF ENGINEERING MATERIALS (18 periods)

Liquid Crystals – Introduction, chemical structure, classification, engineering applications.


UNIT – II: WATER TECHNOLOGY (15 periods)


UNIT – III: ELECTROCHEMICAL CELLS AND CORROSION (17 periods)

Electrode potential, Nernst’s equation, Electrochemical cells, EMF of an electrochemical cell. Reference electrodes- Standard Hydrogen Electrode (SHE), Calomel electrode.

Batteries: Introduction, types of Batteries. Ni-Cd battery, lithium – ion battery-applications.

Fuel Cells: Definition, $H_2 - O_2$ fuel cell, phosphoric acid fuel cells, proton exchange membrane fuel cells, solid oxide fuel cells. Applications of fuel cells.

Corrosion: Introduction, definition, types of corrosion, galvanic corrosion, concentration cell corrosion, control of corrosion – Electroplating method (Nickel electroplating).

UNIT – IV: LUBRICANTS AND FUEL TECHNOLOGY (18 periods)

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricants – viscosity, flash and fire points, cloud and pour points, aniline points, neutralization number and mechanical strength.

Fuel Technology: Introduction, classification, characteristics of a good fuel, calorific value, liquid fuels, petroleum, refining of petroleum, knocking, octane number, cetane number, power alcohol, synthetic petrol, gaseous fuels, important gaseous fuels.
UNIT–V: NANO CHEMISTRY AND GREEN CHEMISTRY  (17 periods)

**Nano Chemistry:** Introduction, classification of nanomaterials, properties of nanomaterials, methods of synthesis – sol-gel process, Chemical Vapour Deposition (CVD), Plasma Enhanced Chemical Vapour Deposition (PECVD). Applications of nanomaterials.

**Green Chemistry:** Introduction, tools of Green chemistry, principles of green chemistry, examples of Green chemistry, principles of Green Engineering, Green computing, Green construction, Green manufacturing systems.

**Total Periods : 85**

**TEXT BOOKS:**

**REFERENCE BOOKS:**
B.Tech. I Year
14BT1BS03 : ENGINEERING MATHEMATICS
(Common to All Branches of Engineering)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

PRE REQUISITE: Intermediate/ Senior Secondary Mathematics

COURSE DESCRIPTION: Engineering mathematics is an application oriented course for various fields of engineering. In this course, Differential equations, partial differentiation as applied to various engineering problems; Integration and its applications to find lengths, areas and volumes of objects, Laplace transforms and their applications, fundamentals of vector calculus are presented.

COURSE OUTCOMES:
After the completion of this course, a successful student is able to

1. Acquire knowledge in Differential equations, finding maximum and minimum values attained by functions of several variables, evaluating double and triple integrals, Laplace transforms and differentiation and integration of vector functions.
2. Develop analytical skills in solving problems involving
   (a) Non homogeneous linear differential equations
   (b) Flux and fluid mechanics by vector methods.
   (c) Complex integrations using Laplace transforms.
   (d) the length of curves, areas, surfaces and volumes of revolutions.
3 Develop skills in designing Mathematical models for
   (a) L-C and R-C circuits.
   (b) Newton’s Law of cooling and heat transfer.
4 Develop skills in providing solutions for
   (a) problems involving L-R-C oscillatory circuits
   (b) linear, surface and volume integrals by vector methods
   (c) work done, flux through vector integrations

Detailed syllabus:
UNIT-I : DIFFERENTIAL EQUATIONS- APPLICATIONS
(20 periods)

Ordinary differential equations – Linear and Bernoulli type – exact equations and reducible to exact. Orthogonal trajectories (both cartesian and polar forms). Newton’s Law of cooling, Law of natural growth and decay. Non-homogeneous linear differential equations of second and higher order with constant coefficients. Methods of finding the particular integrals for \( Q(x) = e^{ax}, \sin ax, \cos ax, x^n, e^{ax}V(x), x V(x) \). Method of variation of parameters. Applications to L-R-C circuits.
UNIT-II: PARTIAL DIFFERENTIATION & APPLICATIONS OF DERIVATIVES  (22 periods)

UNIT-III: APPLICATIONS OF INTEGRATION  (18 Periods)

UNIT-IV: LAPLACE TRANSFORMS- APPLICATIONS  (20 periods)

UNIT-V: VECTOR CALCULUS  (20 periods)

Total periods : 100

TEXT BOOK:

REFERENCE BOOKS:
B.Tech. I Year
14BT10301: Engineering Mechanics
(Common to CE and ME)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

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PREREQUISITE : Intermediate/Senior Secondary Mathematics and Physics

COURSE DESCRIPTION: Engineering Mechanics is a foundation course for all other courses belonging to the broad knowledge area Design Engineering as applied to Civil Engineering and Mechanical Engineering. Basic concepts of statics and dynamics are presented in this course. Several aspects such as resultant of a system of forces, couple, support reactions, moment of inertia, member forces in trusses and preliminaries of friction, virtual work are included in the “statics” part of the course. Similarly characteristics of motion, cylindrical / Cartesian coordinates, centripetal acceleration and Newton’s second law are included in the “dynamics” part of the course.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

1. Apply the knowledge of Mathematics, Science, Engineering fundamentals to the solutions of complex engineering problems.
2. Analyse:
   (a) multi-body systems under equilibrium and under dynamic conditions.
   (b) systems involving dry friction and computing the efficiency of the system forces in trusses under suitable assumptions.
3. Design solutions to complex engineering problems using first principles of engineering mechanics.
4. Exercise awareness to assess the safety of system and other ethical issues related to engineering mechanics.
5. Communicate effectively engineering and allied information through free body diagram.
Detailed Syllabus:

UNIT I - BASIC CONCEPTS (24 periods)

UNIT II - STRUCTURAL ANALYSIS (16 periods)
Types of Supports – Support reactions for beams with different types of loading, concentrated, uniformly distributed and uniformly varying loading Types of frames –perfect frames, Analysis of frames using method of joints and method of sections.

UNIT III - CENTROID, CENTER OF GRAVITY, MOMENTS OF INERTIA (18 periods)
Centroids of simple figures, Centroids of Composite figures, Centre of Gravity of bodies, Centre of Gravity of Composite figures. Parallel axis and perpendicular axis theorems, Theorems of Pappus and Guldinus, Moments of Inertia of Composite Figures, Mass Moment of Inertia of Simple solids, Moment of Inertia of composite masses.

UNIT IV - KINEMATICS (14 periods)
Rectilinear and Curvilinear motion – Velocity and Acceleration, motion of a projectile, Normal and tangential accelerations.

UNIT V - KINETICS (18 periods)

Total Periods: 90

TEXT BOOKS:

REFERENCE BOOKS:
B.Tech. I Year
14BT1ES01: PROGRAMMING IN C & DATA STRUCTURES
(Common to ECE, EEE, EIE, ME and CE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with fundamentals of programming in C language such as syntax of C, mechanisms of input and output processing, derived data types like arrays, strings and pointers. Also file in C and data structures are discussed.

COURSE OUTCOMES:
After the completion of this course, a successful student is able to
1. Gain knowledge on developing algorithms and programming techniques.
2. Gain analytical skills on
   a. Searching and sorting
   b. File management functions.
   c. Various Data Structures
3. Design various applications using basic data structures like linked list, stacks and queues
4. Gain competence to represent and solve real time problems using tree data structures.

DETAILED SYLLABUS

Unit-I (15 periods)
Programming Languages- Compiler, Interpreter, Loader, and Linker-
Program execution- Classification of programming-Algorithms and flowcharts .
Basics of C: Introduction, Standardizations of C language, Developing Programs in C, Structure of C program, Variables, Data Types, Declaration, Token, Operators and expressions, L values and R values, Type Conversion in C.

Unit-II (20 periods)
Input and Output: Basic screen and key board I/O in C, Non formatted input and output , Formatted Input and output. Control Statements: Specifying Test Condition for Selection and Iteration, Writing Test Expressions, Conditional Execution and Selection, Iterative and Repetitive Execution, GOTO Statement, Special Control statements, Nested loops.
Unit-III  (20 periods)
Arrays and Strings: One dimensional Array, Strings: One-Dimensional Character Arrays, Multidimensional Arrays, Arrays of Strings. Functions: Concept of function, Call by Value Mechanism, passing arrays to Functions, Scope and extent, Storage classes, Inline function, Recursion, Searching and sorting.

Unit-IV  (25 periods)
Pointers: Introduction, Understanding Memory Address, Address Operators, pointer, Void pointer, Null pointer, use of pointers, arrays and pointers, Pointer and strings, pointer arithmetic, pointers to pointers, pointer to arrays, Pointers to functions, Dynamic memory allocation, Pointer and const Qualifier. User-defined data types and variables: Structures, union, Enumerations types, Bitfields.
Files in C: Working with text files, Binary files, Random Access files, other file management functions, Command line arguments, C preprocessor, Type qualifier.

Unit-V  (20 periods)

Total periods: 100

TEXT BOOK:

REFERENCE BOOKS:
B.Tech. I Year
14BT1ES03: COMPUTER AIDED
ENGINEERING DRAWING
(Common to All Branches of Engineering)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

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PREREQUISITE: - - -

COURSE DESCRIPTION: This course deals with the concepts of
computer-aided sketching, and orthographic and isometric projections
of geometric entities (both 2D and 3D) through computer aided drafting
packages.

COURSE OUTCOMES: After completion of the course, a successful
student is able to:
1. Produce different views and projection in drawing.
2. Use modern CAD software for different designs.
3. Create multi-view drawings suitable for presentation to a general
   audience.

Detailed Syllabus:
UNIT I – INTRODUCTION TO COMPUTER AIDED SKETCHING
(20 periods)
Introduction, Drawing Instruments and their uses, BIS conventions,
Lettering, Dimensioning, Different types of lines, Material conventions
and free hand practicing, Definitions of Principle planes and other planes.
Computer screen, layout of the software, Creation of 2D/3D environment,
Selection of drawing size and scale, Standard tool bar/menus, Coordinate
system, and description of most commonly used toolbars, Navigational
tools, Commands and creation of Lines, Co-ordinate points, axes, poly-
lines, square, rectangle, polygons, splines, circles, ellipse, text, move,
copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves,
constraints viz. tangency, parallelism, inclination and perpendicularity.

UNIT II – ORTHOGRAPHIC PROJECTIONS
(20 periods)
Introduction, Definitions- Planes of projection, reference line and
conventions employed, Projections of points in all the four quadrants,
Projections of straight lines (located in First quadrant/first angle only),
Projection of lines inclined to one plane, inclined to both the planes,
finding true lengths and true inclinations (No application problems).
UNIT III – ORTHOGRAPHIC PROJECTIONS OF PLANE SURFACES
(20 periods)
Introduction, Definitions-projections of plane surfaces-triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (Simple problems inclined to any one plane only)

UNIT IV – PROJECTIONS OF SOLIDS
(20 periods)
Introduction, Projections of right regular prisms, pyramids, cylinders and cones in different positions. (Simple problems inclined to any one plane only). Isometric projections and isometric views.

UNIT V – SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS
(20 periods)
Introduction, Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone resting with base on HP. True shapes of the sections.
Development of Surfaces: Right regular solids – prisms, cylinder, pyramids, cone and their sectional parts.

Total Periods: 100

TEXT BOOKS:

REFERENCE BOOKS:
1. Sham Tickoo, AutoCAD 2013 For Engineers And Designers, Dreamtech Press, 2013
B.Tech I Year

14BT1BS05: ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LABORATORY
(Common to All Branches of Engineering)

Int. Marks: 25   Ext. Marks: 50   Total Marks: 75

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PREREQUISITE: Intermediate Physics & Chemistry

COURSE DESCRIPTION:

Engineering Physics: The course deals with experimental verification of characteristics of p-n junction diode, photodiode, LED, and semiconductor laser diode. It also covers experimental determination of energy gap and carrier concentration of a semiconductor material, wavelength of a laser source, rigidity modulus of a material, size of fine particle, dielectric constant, numerical aperture of optical fibre, frequency of electrically vibrating tuning fork and magnetic field along axial line of a current carrying coil. Verification of transverse laws of stretched string is also included.

Engineering Chemistry: This course deals with the estimation of hardness, alkalinity and dissolved oxygen of water samples by volumetric methods. It provides hands-on experience on different instrumental methods such as conductivity meter, potentiometer, pH meter, and colorimeter. This course also deals with the methods of synthesis of nano metal-oxides and novalac resin.

COURSE OUTCOMES:

Engineering Physics:
After completion of the course, a successful student will be able to:

1. Acquire analytical skills in the determination of
   a) Wave length of laser.
   b) Divergence angle for laser beam.
   c) Numerical aperture of an optical fibre.
   d) Hall coefficient for semiconductor material.
   e) Energy gap of semiconductor material.
   f) Verifying the laws of stretched string.
   g) Characteristics of p.n. junction diode, and light emitting diode.
Engineering Chemistry:

After completion of the course, a successful student is able to:

1. Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods.
2. Acquire analytical skills in the determination of $\mathrm{pH}$ of a solution, EMF of a solution, spectrophotometric determination of iron and estimation of iron in cement through instrumental methods of analysis.
3. Develop skills in the designing of synthetic methods for the preparation of polymers and Nanomaterials.

List of experiments:

Engineering Physics:

Conduct a minimum of any Ten of the following experiments.

1. Determination of wavelength of a laser source using diffraction grating
2. Determination of numerical aperture of an optical fiber
3. I-V Characteristics of a p-n junction diode
5. Hall effect
6. Photo diode – characteristics
7. Energy gap of a material of a p-n Junction
8. Magnetic field induction along the axis of a current carrying coil-Stewart and Gee’s method
9. Melde’s experiment - transverse & longitudinal modes
10. Verification of transverse laws of stretched string - Sonometer
11. Determination of dielectric constant
13. Determination of particle size by using a laser source
14. Determination of the rigidity modulus of the material of wire using torsional pendulum
Engineering Chemistry:
List of Experiments:
A minimum of any Ten experiments are to be conducted among the following:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of alkalinity of Water.
5. Conductometric titration of strong acid Vs strong base
6. Determination of pH of a given solution by pHmetry.
7. Estimation of Ferrous ion by Potentiometry.
8. Estimation of Ferric iron in cement by Colorimetric method.
9. Preparation of Novalac Resin.
11. Determination of the capacity of the given cation-exchange Resin.

Duration: 3 Periods for each experiment
Total periods: 30

TEXT BOOKS:
1. Physics Laboratory Manual
B.Tech I Year
14BT1ES04: PROGRAMMING IN C & DATA STRUCTURES LAB
(Common to ECE, EEE, EIE, ME and CE)

Int. Marks: 25   Ext. Marks: 50   Total Marks: 75

PREREQUISITE: - - -

COURSE DESCRIPTION: This course provides programming practice in C language specifically syntax of C, input-output processing, derived data types, file processing, and data structures.

COURSE OUTCOMES:
After the completion of this course, a successful student is able to
1. Design, code, test, debug and execute programs in C.
2. Implement and use common features found in C programs – arrays, pointers, strings, stacks and queues.
3. Select the appropriate data structure and algorithm design method for a specified problem.

Week 1:
a. Write a C program to print the string “SVEC” at four corners and center of the screen using single printf statement.
b. Mr. Gupta deposits Rs.1000 in a bank. The bank gives simple interest of 15% per annum. Write a program to determine the amount in Mr. Gupta’s account at the end of 5 years. (Use the formula I=PTR/100)
c. Write a program to exchange the values of two variables without using the third variable.

Week 2:
a. A cashier has currency notes of denominations Rs.10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.
b. In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.
c. Assume that any month is of 30 days. Input total days through keyboard. Find out the exact number of Years, Months & Days.
Week-3

a. Write a program that reads in a number, then reads in a single digit and determines whether the first number contains the digit. If it does, the program should display how many times the digit occurs in the number.

b. Write a program to print Pythagoras triplets \( a = m \times n \), \( b = (n^2 + m^2)/2 \), \( c = (n^2 - m^2)/2 \) where \( m = 1, 3, \ldots; n = m + 2, m + 4 \ldots \ldots.. \)

c. Write a program to produce the following pattern:

Week-4

a. Write a C program to generate Pascal's triangle.

b. Write a C program to construct a pyramid of numbers.

Week-5

a. The formula used to calculate the amount of interest on a bank account that compounds interest daily is

\[ i = p \left(1 + r\right)^d - p \]

where:
- \( i \) is the total interest earned,
- \( p \) is the principal (the amount originally deposited in the account),
- \( r \) is the rate of interest as a decimal less than 1 (for example, 15 percent is expressed as 0.15), and
- \( d \) is the number of days the money is earning interest.

Write a program that accepts values for \( p, r \) and \( d \) and calculates the interest earned.

b. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.

<table>
<thead>
<tr>
<th>Characters</th>
<th>ASCII values</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - Z</td>
<td>65 - 90</td>
</tr>
<tr>
<td>a - z</td>
<td>97 - 122</td>
</tr>
<tr>
<td>0 - 9</td>
<td>48 - 57</td>
</tr>
<tr>
<td>Special Symbols</td>
<td>0 - 47, 58 - 64, 91 - 96, 123 - 127</td>
</tr>
</tbody>
</table>

c. Write a C program to convert a given decimal number into its equivalent

i. Binary Number
ii. Octal Number
iii. Hexadecimal Number
iv. Quinary Number (base 5)
Week-6
a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %, use switch statement)
b. Write a program to find the sum of individual digits of a positive integer.
c. 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 program to generate the first N terms of the sequence.
d. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

Week 7:
a. Write a program to find the largest and smallest number in a list of integers.
b. Write a program to perform the following:
i) Addition of two matrices.
ii) Multiplication of two matrices.

Week-8
a. Write a C program that uses functions to perform the following operations:
i) To insert a sub-string in to 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

c. Write a C Program to implement all string operations.
   1. Find the length of string       2. Reverse the string.
   3. Comparing the two strings.     4. Copy the string.

Week -9:
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 10:
a. Write a C program to count the lines, words and characters in a given text.
b. Write a program that simulates a password entry.
c. Write a program to read a five letter word and generate all possible combinations of two-letter words using those five letters.

Week 11:
Write a program to perform the following:
i) Linear search      ii) Binary search

Week 12:
Write a program to perform the following:
i) Selection sort      ii) Insertion sort
iii) merge Sort        iv) Quick sort
Week 13:
Write programs to perform the following using recursion
i) To find the factorial of a given integer.
ii) To solve Towers of Hanoi problem

Week 14
a. Write a C Program to return a substring from a main string using pointers.
b. Write a C program to return character frequency count in a text using pointers

Week 15
a. Write a C program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers
   (Note: represent complex number using a structure.)
b. Write a Program to enter records of students display in sorted order according to ID number.
c. Define a structure to store employee’s data with the following specifications:
   Employee-Number, Employee-Name, Basic pay, Date of Joining
   i) Write a function to store 10 employee details.
   ii) Write a function to implement the following rules while revising the basic pay.
      If Basic pay <= Rs.5000 then increase it by 15%.
      If Basic pay > Rs.5000 and <= Rs.25000 then it increase by 10%.
      If Basic pay > Rs.25000 then there is no change in basic pay.
   iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

Week 16
a. Write a program which copies one text file to another.
b. Write a program to reverse the first N characters of a given text file.
   Note: The file name and N are specified through command line.
c. Consider the following text file:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Customer_ID</th>
<th>Item No.</th>
<th>Qty.</th>
<th>Price Per Item (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>C01</td>
<td>I1</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>C02</td>
<td>I2</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>3.</td>
<td>C03</td>
<td>I2</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>4.</td>
<td>C04</td>
<td>I4</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>
Write a program to print the output in following format by giving the Customer_ID as an input.

**Output:**

<table>
<thead>
<tr>
<th>S.V. PROVISION STORES</th>
<th>TIRUPATI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer_ID: C01</td>
<td>Date: 12-08-2010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>2</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

**Week - 17:**
Write a program to implement the following operations on Singly Linked List
a. List Creation   b. Insertion   c. Deletion   d. Display

**Week - 18:**
Write a program to implement the following operations on Circular Linked List
a. List Creation   b. Insertion   c. Deletion   d. Display

**Week - 19:**
Write a program to implement the following operations on Doubly Linked List
a. List Creation   b. Insertion   c. Deletion   d. Display

**Week - 20:**
Write a program to implement stack operations using:
  i) Arrays   ii) Pointers

**Week - 21:**
Write a program to implement linear queue operations using:
  i) Arrays   ii) Pointers

**Week - 22:**
 a) Write a program to implement circular queue operations using arrays
 b) Write a program to implement traversals of a Binary tree
    i. Preorder   ii. Post order   iii. Inorder

**Week - 23:**
Write a program to implement insertion and deletion in a binary search tree.

**REFERENCE BOOKS:**
B.Tech. I Year
14BT1ES06: ENGINEERING & IT WORKSHOP
(Common to All Branches of Engineering)

Int. Marks: 25   Ext. Marks: 50   Total Marks: 75
L   T   P   C
-   -   3   3

PREREQUISITE: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:
After completion of the course, a successful student is able to:

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:
After the completion of the course the student will be able to:

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.
DETAILED SYLLABUS:

ENGINEERING WORKSHOP:

1. Trades for Exercise:
   Any TWO jobs from each trade should be performed.
   a) Carpentry Shop: Cross lap joint, mortise and tenon, T-joint, dove tail joint.
   b) Fitting Shop: Square fit and V-fit, semi circular fit, dove tail fit.
   c) Sheet Metal Shop: Trapezoidal tray, square tin, funnel, cylinder.
   d) House wiring: Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.
   e) Foundry: Preparation of casting using single piece pattern, Preparation of casting using split piece pattern

2. Trades for Demonstration:
   a) Welding
   b) Metal Cutting
   c) Plumbing
   In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

IT WORKSHOP:

a) PC Hardware
   Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.
   Week 2: Demonstrating assembling and disassembling of the Personal Computer.
   Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.
   Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.
b) MS-Office:

MS Word

**Week 6:** Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources. Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

**Week 7:** Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

**Week 8:** Create an invitation using Mail Merge in MS-Word

MS Power Point:

**Week 9:** Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views. Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

**Week 10:** Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

**Week 11:** Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources. Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

**Week 12:** Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

**Week 13:** Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts. Create a website using the features: Home page, About us, Department, Contact page.
Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

Total Periods: 48

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

IT WORKSHOP:
3. IT Workshop Laboratory Manual, Department of IT, SVEC, 2014.
B.Tech I Year

14BT1HS02: ENGLISH LANGUAGE

COMMUNICATION SKILLS LABORATORY

(Common to All Branches of Engineering)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

PREREQUISITE: Basic Speaking and Listening Skills.

COURSE DESCRIPTION: The course contains practice sessions which
are classified into software based learning, grammar and activities.
English Speech Sounds and Phonemic Transcription, Word Stress and
Sentence Stress, Accent, Rhythm and Intonation, Paralinguistic Features,
Vocabulary Building, are aided by software. Grammar sessions include
Functional Grammar: Tenses, Speech, Voice, Error Correction and Essay
Writing. Just a Minute, Impromptu Speech and Elocution, Role Plays,
Telephonic Etiquette, Listening Skills, Describing People, Places and
Objects, Presentation Skills and Information Transfer are activity oriented.

COURSE OUTCOMES:
On the successful completion of the course, the students will / should be
able to

1. Gain practical knowledge in
   • English Speech Sounds
   • Stress Patterns in word and sentence
   • Intonation Patterns
   • Paralinguistic Features
   • Vocabulary Enrichment

2. Analyse the functional part of the grammatical elements for
   writing grammatically correct English in various academic and
   personal practices.

3. Develop various language functions to fulfil the purpose of
   speaking and writing in academic, professional and personal
   contexts.

4. Apply the knowledge of the usage of various language software
   for enhancing the language skills more and more thereby
   acquiring unconsciously the language functions and elements
   that are commonly used in various contexts.

5. Communicate effectively with engineering community and society
   in various formal, informal and neutral situations.

6. Demonstrate various language functions by participating in
   • Just A Minute
   • Impromptu Speech
   • Elocution
   • Role Plays
   • Presentations

7. Engage in lifelong learning for the development of the
   communicative competence
   for meeting the global challenges.
Detailed list of experiments / Lab practice Sessions:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress and Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling
   b. Synonyms–Antonyms–Prefix–Suffixes–One Word Substitutes
6. Functional Grammar
   a. Parts of Speech
   b. Tenses
   c. Change of Speech
   d. Change of Voice
   e. Word Order and Error Correction
   f. Essay Writing
7. Just a Minute, Impromptu Speech and Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES:
1. Departmental Lab Manual

SUGGESTED SOFTWARE:
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in Use 1, 2 and 3
4. Learning to Speak English 8.1, the Learning Company – 4 CDs.
5. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
7. Speech Solutions
9. Centronix - Phonetics
10. Rosetta Stone
11. Let’s Talk English, Regional Institute of English South India.
II B.Tech I Semester
14BT3BS01: MATRICES AND NUMERICAL METHODS
(Common to CE and ME)

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<thead>
<tr>
<th>Internal Marks</th>
<th>External Marks</th>
<th>Total</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td>30</td>
<td>70</td>
<td>100</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>3</td>
</tr>
</tbody>
</table>

PREREQUISITES: Intermediate/Senior secondary Mathematics


COURSE OUTCOMES:
After the completion of this course, a successful student will be able to

1: Acquire knowledge in
   (a) Estimating ranks and solutions of linear equations through matrices.
   (b) Solutions of algebraic and transcendental equations
   (c) Fitting of different curves to discrete data.
   (d) Estimating the unknown values of different parameters through interpolation.
   (e) Estimating values of derivatives from the given data
   (f) Numerical differentiation and integration
   (g) Numerical solutions of differential equations
   (h) Fourier series, Fourier transforms and partial differential equations.

2: Develop analytical skills in providing solutions to the problems involving
   (a) Differential equations through numerical methods
   (b) Partial differential equations

3: Develop skills in analyzing
   (a) Properties of functions through Fourier series.
   (b) Numerical techniques in differentiation and integration of higher complexity

4: Develop skills in the design of mathematical equations and arrive at numerical solutions involving
   (a) Curves that best fits the given data
   (b) Integrations of higher complexity
   (c) Ordinary differential equations
   (d) Oscillatory motion and heat transformations.
DETAILED SYLLABUS:

UNIT I


UNIT II

NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION:

UNIT III

NUMERICAL DIFFERENTIATION, INTEGRATION AND SOLUTIONS OF O D E:

UNIT IV

FOURIER SERIES AND FOURIER INTEGRALS:
Fourier series of functions in (0, 2n), (-n, n), (0, 2l), (-l, l). Determination of Fourier coefficients by Euler’s formulae. Even and odd functions, Fourier series for periodic functions. Half – range Fourier sine and cosine expansions. Fourier integral theorem (statement only). Fourier sine and cosine integrals – Fourier sine and cosine transforms.

UNIT V

PARTIAL DIFFERENTIAL EQUATIONS:

TEXTBOOKS

Total Periods: 45

REFERENCE BOOKS

II B.Tech I Semester
14BT30101 : ENGINEERING GEOLOGY

<table>
<thead>
<tr>
<th>Internal Marks</th>
<th>External Marks</th>
<th>Total</th>
<th>L</th>
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<th>P</th>
<th>C</th>
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<td>100</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>3</td>
</tr>
</tbody>
</table>

**COURSE DESCRIPTION:** Importance of Geology in the Civil Engineering – Weathering – Mineralogy, Petrology – Structural Geology, Geophysical Studies – Ground Water, Earthquakes and Landslides – Geological Considerations for Dams, Reservoirs and Tunnels.

**COURSE OUTCOMES:**
After the completion of this course, a successful student will be able to:
1. Apply the knowledge of geological features, the properties of rocks and their suitability as building stones for various civil engineering constructions.
2. Analyze the failure of structures using geological studies.
3. Conduct investigations and give recommendations for the effective use of rocks, minerals for construction.
4. Use modern methods and apply suitable techniques for carrying out geophysical studies.
5. Explain causes of earthquakes and give remedial measures to the society for the safety.

**DETAILED SYLLABUS:**

**UNIT I**
**GENERAL GEOLOGY:** 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: Agents of weathering, Effects of weathering of rocks – Importance of weathering with reference to dams, reservoirs and tunnels.

**UNIT II**
UNIT III (10 Periods)

UNIT IV (8 Periods)
GROUNDWATER, EARTHQUAKE AND LANDSLIDES
Groundwater: Hydrological cycle, Water table, Common types of groundwater, Cone of depression, Geological controls of groundwater movement – Hydrological properties of rocks: porosity, permeability, storativity, specific yield and specific retention – Earthquakes: causes and effects – shield areas and seismic zones – Seismic waves – Richter scale – Precautions to be taken for building construction in seismic areas – Landslides: their causes and effect – Measures to be taken to prevent their occurrence.

UNIT V (8 Periods)
GEOLOGY OF DAMS, RESERVOIRS AND TUNNELS: Types of dams – Geological considerations in the selection of a dam site – Analysis of dam failures of the past – Factors contributing to the success of a reservoir – Purposes of tunneling – Effects of tunneling on the ground – Geological considerations (i.e., Lithological, structural and groundwater) in tunneling, over break and lining in tunnels.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
II B.Tech  I Semester
14BT30233: BASICS OF ELECTRICAL AND MECHANICAL TECHNOLOGY

<table>
<thead>
<tr>
<th>Int. Marks</th>
<th>Ext. Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
</tbody>
</table>

L T P C
3 1 -- 3

ELECTRICAL TECHNOLOGY (PART-A)

PRE-REQUISITES: Engineering Physics

COURSE DESCRIPTION:
Basics concepts of electrical circuits; layout for electrical wiring; construction and operating principle of single phase transformer, three phase induction motor, single phase induction motor and alternator; earthing & illumination.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Understand various circuit elements, the working of various electrical machines, filament & fluorescent lamps and types of earthing
2. Analyze the electrical circuits to know their response
3. Design layout for wiring circuit depending upon the requirement
4. Evaluate the electrical parameters
5. Apply IE rules while designing electrical wiring

DETAILED SYLLABUS:

UNIT I (11 Periods)
UNIT II (9 Periods)
EARTHING, ILLUMINATION AND BASICS OF AC MACHINES:
Earthing - rod earthing, pipe earthing and plate earthing.
Illumination - incandescent lamp, fluorescent lamp.
Construction and operating principle of single phase transformer, three
phase induction motor, single phase capacitor start induction motor and
alternator.

Total Periods : 20

TEXT BOOKS:
   Hill, 2012.
2. K. B. Raina, Electrical Design Estimating and Costing, New Age

REFERENCE BOOKS:
1. V.K. Mehta and Rohit Mehta, Principles of Electrical Engineering,
   S. Chand and Company Ltd., New Delhi, 2006.
2. M.S Naidu and S. Kamakshaiah, Introduction to Electrical
4. H.Parthab, Art and science of utilization of electrical energy,

MECHANICAL TECHNOLOGY (PART-B)

PRE-REQUISITES: Engineering physics, Engineering chemistry,
Engineering workshop.

COURSE DESCRIPTION:
Welding; Types of Welding techniques; IC engines and its
classifications; Types of Lubrication Systems; Refrigeration
Systems and its classifications; Types of Refrigerants; Types of
Air conditioning system; Types of Air compressors; Earth Moving
Machines and its Applications.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Employ the suitable welding technique in the joining of
   metals, working of IC engines, refrigeration, air conditioning
   systems, and air compressors.
2. Identify the manageable areas in welding processes, I.C engines for their effective utilization.
3. Analyze and apply the various types of earth moving machines for the operation of various projects in Civil Engineering.

DETAILED SYLLABUS:

UNIT III  
WELDING PROCESSES & INTERNAL COMBUSTION ENGINES:  
Introduction, Classification of Welding processes: Arc Welding processes, Gas Welding processes, and Equipments, Submerged arc welding, TIG processes, MIG processes; Soldering and Brazing processes, applications; I.C engines: Introduction, Classification, components of IC Engines; Working principle of S.I and C.I engines; Four stroke and Two stroke I.C engines; Comparison of Four stroke and Two stroke engines; Comparison of S.I and C.I engines – Lubrication, and cooling systems of S.I and C.I Engines.

UNIT IV  
REFRIGERATION & AIR–CONDITIONING SYSTEMS:  
Refrigerants and their Desirable properties; Vapor Compression and Vapor Absorption refrigeration Systems, comparison of Vapor Compression and Vapor Absorption refrigeration Systems; air conditioning: Need of Air conditioning, window air conditioning systems, summer, and winter air conditioning systems, and year round air conditioning system.

UNIT V  
AIR COMPRESSORS & EARTH MOVING MACHINERY:  
Introduction, classification, Working principle of reciprocating air compressor; Working principle of Single & Multi stage compressors, applications; Need of Earth Moving Machines: Mechanical handling equipment; Bull dozers; Power shovels; Excavators; Concrete mixer; Belt and bucket conveyors; applications.

Total Periods: 25

TEXT BOOKS:
REFERENCE BOOKS:
II B.Tech I Semester
14BT30102: MECHANICS OF SOLIDS

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PREREQUISITES: Engineering Mechanics

COURSE DESCRIPTION: Simple Stresses and Strains; Strain Energy – Shear Force and Bending Moment – Stresses in Beams – Combined Direct and Bending Stresses; Torsion – Springs and Shafts – Thin Cylinders and Thick Cylinders.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Understand the concepts on stresses, strains, and displacements in structures due to different types of loading conditions.
2. Analyze the stress distribution of simple structural elements such as bars, beams under specific external load.
3. Design simple bars, beams and circular shafts for various loading conditions.

DETAILED SYLLABUS:

UNIT I

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

UNIT III
STRESSES IN BEAMS: Theory of simple bending – Basic bending equation– Neutral axis – Bending stresses – Section modulus of rectangular, circular section, I, T, Angle and Channel sections – Design of simple beam sections – Strain energy due to bending. Basic shear stress
equation – Shear stress distribution; Rectangular, circular, triangular, I, T, Angle sections – Strain energy due to shear.

**COMBINED DIRECT AND BENDING STRESSES:** Stresses under the combined action of direct loading and bending moment – Core of a section – Stresses in chimneys, retaining walls and dams – Conditions for stability – Stresses due to direct loading and bending moment about both axes.

**UNIT IV**
*(09 Periods)*


**SPRINGS:** Deflection of close and open coiled helical springs under axial load and axial twist – Springs in series and in parallel.

**UNIT V**
*(07 Periods)*

**THIN CYLINDERS:** Thin cylindrical shells – Longitudinal and circumferential stresses – Hoop, longitudinal and volumetric strains – Changes in diameter and volume of thin cylinders

**THICK CYLINDERS:** Lame’s theory – Distribution of hoop and radial stresses across thickness – Design of thick cylinders – Compound cylinders – Difference of radii for shrinkage.

**Total Periods:** 45

**TEXT BOOKS**


**REFERENCE BOOKS**

II B. Tech I Semester
14BT30103: BUILDING MATERIALS AND CONCRETE TECHNOLOGY

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PREREQUISITES: Engineering Chemistry

COURSE DESCRIPTION: Bricks and Tiles – Timber – Lime and Other Materials for Construction – Cement and Concrete – Hardened Concrete and Tests on Hardened Concrete – Elasticity, Creep and Shrinkage, Mix Design.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:
1. Understand various types and properties of building materials and procedure for making mix design.
2. Analyze building materials
3. Design a concrete mix for the given construction materials
4. Assess the properties of concrete mixes for various construction activities and suggest proper building materials for construction purposes.

DETAILED SYLLABUS:

UNIT I (07 Periods)


UNIT II (07 Periods)

UNIT III (12 Periods)
CEMENT AND CEMENT CONCRETE: Ingredients of cement – Manufacture of OPC – Types of cement and their properties – Various field and laboratory tests on cement.

UNIT IV  
(10 Periods)

UNIT V  
(09 Periods)
Total Periods: 45

TEXT BOOKS

REFERENCES

NOTE. Booklet containing relevant extracts from Standards and Codes, should be made available to Students during examinations
II B. Tech I Semester
14BT30104: FLUID MECHANICS – I

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PREREQUISITES: Engineering Physics and Engineering Mathematics


COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

1. Demonstrate the knowledge of Fluid properties, buoyancy, hydrostatic pressure, fluid flow and solve problems using fundamentals of Physics and mathematics.
2. Analyze various types of flows and interpret the data.
3. Evaluate losses in pipes and design a piping system as per requirement.
4. Address the fault in the prototype preparation using the model analysis and provide suitable solutions.

DETAILED SYLLABUS:
UNIT I (10 Periods)
PROPERTIES OF FLUIDS AND PRESSURE MEASUREMENTS:

UNIT II (10 Periods)

UNIT III (09 Periods)
UNIT IV  
(08 Periods)
LAMINAR AND TURBULENT FLOW: Reynolds’s experiment – Hagen Posieullie equation – Characteristics of laminar and turbulent flows – Laminar flow through circular pipes – Flow between parallel plates – Hydro dynamically smooth and rough boundaries.

UNIT V  
(08 Periods)
HYDRAULIC SIMILITUDE: Dimensional analysis – Rayleigh’s method and Buckingham’s δ theorem – Model studies – Geometric, kinematic and dynamic similarities – Dimensionless numbers – Model laws – Scale effects.

TEXT BOOKS

REFERENCE BOOKS
II B.Tech I Semester

14BT30121: ENGINEERING GEOLOGY LAB

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PREREQUISITES: –


COURSE OUTCOMES:
After the completion of this course, a successful student will be able to:

1. Apply the knowledge of physical properties of minerals and rocks to the suitability of the construction materials.
2. Analyze the structural geology problems; and geological map for a given area
3. Conduct investigations on the availability ground water using resistivity meter
4. Function effectively as an individual, and as a member or leader in teams to solve engineering geology problems
5. Communicate effectively on geological information in written, oral and graphical forms

LIST OF EXPERIMENTS:
1. Study of physical properties and identification of rock forming minerals
2. Study of physical properties and identification of ore forming minerals
3. Study of physical properties and identification of common igneous rocks
4. Study of physical properties and identification of common sedimentary rocks
5. Study of physical properties and identification of common metamorphic rocks
6. Study of geological maps, drawing and interpretation of geological sections
7. Simple structural geology problems
8. Norm form calculations
II B.Tech I Semester
14BT30122: STRENGTH OF MATERIALS LAB

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PREREQUISITES: Engineering Mechanics

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:

1. Acquire the knowledge on conducting experiments for testing strength of materials
2. Determine the strength of structural elements under different loading conditions
3. Function effectively as an individually and as a team member in construction material testing
4. Present report on the strength properties of the materials in written and oral form

LIST OF EXPERIMENTS:

1. Tension test on mild steel / HYSD bar
2. Compression test on wood
3. Compression test on coiled spring
4. Tension test on coiled spring
5. Bending test on carriage spring
6. Brinell and Rockwell hardness tests
7. Charpy and Izod impact tests
8. Shear test on mild steel
9. Bending test on simply supported beam
10. Bending test on cantilever beam
11. Bending test on fixed beam
12. Bending test on continuous beam
13. Verification of Maxwell’s reciprocal theorem
14. Torsion test on mild steel
II B.Tech II Semester
14BT3BS03: PROBABILITY AND STATISTICS
(Common to Mechanical and Civil Engineering)

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PRE REQUISITE: Engineering Mathematics

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

CO 1  Acquire basic knowledge in
(a) probability distributions, correlation and regressions, 
(b) statistical quality control and testing of hypotheses. 
(c) finding regression coefficients , elucidating relationships in bivariate data 
(d) tests of significance for small and large samples

CO 2  (i) Develop analytical skills for the problems involving
(a) means, probability distributions and standard deviations
(b) sampling techniques for decision making in uncertain environments
(ii) Develop skills for analyzing the data with
(a) suitable tests of significance for practical situations.
(b) through probability distributions for practical situations.

CO 3  Develop skills in applying
(a) statistical techniques employed for quality control and maintenance of uniform quality in the manufacturing processes.

DETAILED SYLLABUS:
UNIT – I  (9 periods)


UNIT - II  (9 periods)

PROBABILITY DISTRIBUTIONS:
Discrete Distributions: Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and Standard Deviations of Poisson Distribution.
Continuous Distributions: Normal Distribution, Mean, Variance and area properties.

SVEC14 - B.TECH - Civil Engineering
UNIT-III  (9 periods)

UNIT-IV  (9 periods)
SAMPLING DISTRIBUTIONS AND TESTS OF SIGNIFICANCE FOR LARGE SAMPLES: Population and Sample, Parameter and Statistic, Sampling Distribution of Statistic, Standard Error of Statistic, Null and Alternative Hypothesis, Type I and II errors, Level of Significance, Critical region, Degrees of freedom. Test of Significance for Single Proportion, Difference of Proportions, Single Mean, Difference of Means.

UNIT-V  (9 periods)
TESTS OF SIGNIFICANCE FOR SMALL SAMPLES
Student's t-test: single mean, difference of means, F-test for equality of population variance, Chi-Square Test for Goodness of fit, contingency table, Chi-Square Test for Independence of Attributes.

Total Periods : 45

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech II semester:
14BT3HS01: ENVIRONMENTAL SCIENCES
(Common to CE, ME, CSSE, IT & CSE)

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PRE-REQUISITES: Engineering Physics and Engineering Chemistry

COURSE DESCRIPTION:
Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:
1. Acquire knowledge in
   a) diverse components of environment and natural resources
   b) ecosystem and biodiversity & its conservation methods
   c) population growth and human health
   d) green technology
2. Identify and resolve the issues related to sources of different types of pollutions.
3. Provide solutions to individuals, industries and government for sustainable development of natural resources.
4. Create awareness on environmental degradation and to bring best management practices to protect environment.
5. Develop skills in analyzing reports on environment for sustainable development.
6. Apply environmental ethics in protection of diversified ecosystems.

DETAILED SYLLABUS:
UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND NATURAL RESOURCES
(11 periods)

Multidisciplinary nature of environment: Definition, scope and importance of multidisciplinary nature of environment, segments of environment-lithosphere, hydrosphere, atmosphere and biosphere, need for public awareness.

Natural Resources: Renewable and Non-renewable resources and associated problems- (a) forest resources: use and over exploitation, deforestation-causes, effects and remedies, case studies, (b) water resources-use and over utilization of surface & ground water, conflicts over water-benefits and problems of large dams, case studies, (c) mineral resources- mining, adverse effects, case studies,
(d) food resources—world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging and salinity, case studies, (e) energy resources—growing needs, renewable energy resources—solar, wind, hydropower, hydrogen fuel and non-renewable energy resources—coal, natural gas, nuclear energy, role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

**UNIT-II: ECOSYSTEMS AND BIODIVERSITY**

**Ecosystems:** Definition and concept of an ecosystem, structure and function of an ecosystem—producers, consumers and decomposers, food chains, food webs and ecological pyramids—introduction, types, characteristic features, structure and functions of forest ecosystem, desert ecosystem, aquatic ecosystem—ponds, lakes & oceans, energy flow in the ecosystem, ecological succession. **Biodiversity:** Definition, concept and value of biodiversity, role of biodiversity in addressing new millennium challenges, hot spots of biodiversity, threats to biodiversity—habitat loss, poaching of wildlife, man-wildlife conflicts, endemic, endangered and extinct species of India, conservation of biodiversity—in-situ and ex-situ.

**UNIT-III: ENVIRONMENTAL POLLUTION AND CONTROL**

Definition, causes, adverse effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) thermal pollution (f) nuclear pollution, solid waste management—causes, effects and control measures of urban and industrial wastes, hazards and disaster management—floods, earthquakes, tsunamis, case studies.

**UNIT-IV: SOCIAL ISSUES AND THE ENVIRONMENT**

From unsustainable to sustainable development, urban problems related to energy, environmental ethics—issues and possible solutions, global warming, acid rain, ozone layer depletion, nuclear accidents and case studies, wasteland reclamation, consumerism and waste products, environment protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public environmental awareness.

**UNIT-V: HUMAN POPULATION AND THE ENVIRONMENT**

Population growth, population characteristics and variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies. **Field work:** visit to a local area to document environmental assets—pond/forest/grassland/hill/mountain/Environment Impact Assessment procedures for local environmental issues or assignment/seminar.

**Total periods: 45**
TEXT BOOKS:

REFERENCE BOOKS:
II B. Tech. II Semester  
14BT4HS01: BUSINESS COMMUNICATION AND PRESENTATION SKILLS  
(Common to CSE, IT, CSSE, CE and ME)

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PRE REQUISITES: Basic grammar and fundamentals of Listening, Speaking, Reading and Writing skills.

COURSE DESCRIPTION:
Nature and Scope of Communication; Non-Verbal Communication; Writing Business Documents; Business Presentations and Public Speaking; Careers and Resume.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to

1: Acquire knowledge in  
a) Managerial Communication  
b) Corporate Communication  
c) Business Writing  
d) Presentation Skills  
e) Career Building

2: Analyze and judge the situation through non-verbal communication for effective organizational communication.

3: Achieve personal excellence and ability to work in groups.

4: Develop effective communication to meet professional needs.

DETAILED SYLLABUS:

UNIT – I: NATURE AND SCOPE OF COMMUNICATION(09 periods)
UNIT – II: NON-VERBAL COMMUNICATION (09 periods)

UNIT – III: WRITING BUSINESS DOCUMENTS (10 periods)

UNIT – IV: BUSINESS PRESENTATIONS AND PUBLIC SPEAKING (10 periods)

UNIT – V: CAREERS AND RESUME (07 periods)

Total periods: 45

TEXT BOOK:

REFERENCE BOOKS:
II B.Tech II Semester
14BT40101: STRUCTURAL ANALYSIS – I

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PREREQUISITES: Mechanics of solids

COURSE DESCRIPTION: Principal Stresses and Strains – Deflection of Beams; Macaulay’s Method and Double Integration Method – Columns and Struts – Intermediate Beams – Theories of Failure; Unsymmetrical Bending and Shear Centre.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain stresses and strains due to axial loading and fundamentals of columns and struts
2. Calculate stresses, moments and deflection of beams and columns using different methods

DETAILED SYLLABUS:

UNIT I (08 Periods)
PRINCIPAL STRESSES AND STRAINS: Stresses on an inclined plane 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 – Triaxial state of stresses – Principal stresses and strains.

UNIT II (11 Periods)

UNIT III (09 Periods)
UNIT IV  
(09 Periods)

INDETERMINATE BEAMS: Introduction to statically indeterminate beams
- Fixed end moment due to uniformly distributed load, 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
- Shear force and Bending moment diagrams of propped cantilever
- Continuous beams
- Clapeyron’s theorem of three moments
- Analysis of continuous beams with one or both ends fixed
- Continuous beams with overhang.

UNIT V  
(08 Periods)

THEORIES OF FAILURE: Maximum principal stress theory
- Maximum principal strain theory
- Maximum shear stress theory
- Maximum strain energy theory
- Maximum shear strain energy theory.

UNSYMmetrical BENDING AND SHEAR CENTRE: Centroidal principal axes of section
- Stress in beams due to unsymmetrical bending
- Principal axes
- Location of neutral axis
- Shear centre of channel section and unequal section.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
II B. Tech II Semester
14BT40102: CONSTRUCTION, PLANNING AND PROJECT MANAGEMENT

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PREREQUISITES: Building Materials and Concrete Technology


COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

1. Demonstrate the knowledge of building components, resource and project management in the construction
2. Identify Critical Activities and Critical Paths in a Construction Project and prepare network for analysis.
3. Monitor and Control the activities in the Civil Engineering Projects in the view of Safety and Cost of the Project
4. Use engineering and project management skills for better construction management

DETAILED SYLLABUS:

UNIT I (08 Periods)

BUILDING COMPONENTS: Lintels, arches, vaults, stair cases – Different types of floors – Concrete, mosaic, terrazzo 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 II (09 Periods)

SHORING, SCAFFOLDING AND FORM WORK: Types, Erection methodology, Latest equipment, Safety precautions.
UNIT III  
(11 Periods)


UNIT IV  
(07 Periods)
PROJECT MANAGEMENT, BAR CHARTS AND MILESTONE CHARTS: 
ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK: 

UNIT V  
(10 Periods)

Total Periods: 45

TEXT BOOKS

**REFERENCE BOOKS**


**NOTE:** Booklet containing relevant extracts from Standards and Codes, prepared by the Department, should be made available to Students during examinations
II B.Tech II Semester
14BT40103: SURVEYING

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COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Apply the principles of mathematics, sciences in the field for evaluating heights, areas and volumes in surveying engineering
2. Analyze and interpret the survey techniques in calculating areas and volumes
3. Perform a survey and prepare a plot using appropriate methods

DETAILED SYLLABUS:
UNIT I (08 Periods)

COMPUTATION OF AREAS AND VOLUMES: Areas: Areas dividing into number of triangles – By offsets to a base line – By latitudes and departures (D.M.D. and D.P.D) – By coordinates – Areas from maps – Determination of the capacity of reservoir.

UNIT II (10 Periods)
COMPASS SURVEYING: Types of compass – Bearings – Included angles– Errors and Adjustments.

LEVELLING AND CONTOURING: Types of levels – Auto Level – Temporary and permanent adjustments – Height of instrument and rise and fall methods – Effect of curvature and refraction – Characteristics of contours – Uses of contour maps.

UNIT III (09 Periods)
UNIT IV (10 Periods)
CURVES: Basic definitions – Different types and their characteristics – Geometry – Setting out – Filed problem of Circular curve, Transition curve, Combined curve and Vertical curve by using Tacheometry.

UNIT V (08 Periods)
ELECTRONIC DISTANCE MEASUREMENT: Modern surveying electronic equipments: digital levels, digital theodolites, EDMs.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
II B.Tech II Semester
14BT40104: FLUID MECHANICS – II

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PREREQUISITES: Fluid Mechanics–I


COURSE OUTCOMES:
After completion of this course, a successful student will be able to:
1. Explain open channel flows, turbines and pumps and apply the fundamentals of mathematics in solving boundary layer problems
2. Analyze the forces on a body, formation of a jump in a channel and efficiency of pumps and turbines.
3. Design a channel for a given condition and a turbine for a specified site

DETAILED SYLLABUS:

UNIT I (09 Periods)
BOUNDARY LAYER THEORY: Boundary layer concepts – Thickness of boundary layer – Characteristics of boundary layer along a thin flat plate – Vonkarmen momentum integral equation – Laminar and turbulent boundary layers (no derivation) – Laminar sub-layer – Separation of boundary layer – Control of boundary layer – Flow around submerged bodies – Drag and lift – Magnus effect.

UNIT II (09 Periods)

UNIT III (8 Periods)
IMPACT OF JETS: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes – Series of vanes – Jet striking centrally and at tip – Velocity triangles at inlet and outlet – Expressions for work done and efficiency – Applications to radial flow turbines.
UNIT IV  (10 Periods)
HYDRAULIC TURBINES: Layout of a typical hydropower installation –
Heads and efficiencies – classification of turbines – Pelton wheel – Francis
turbine – Kaplan turbine – Working, working proportions – Velocity
diagrams – Work done and efficiency – Hydraulic design – Runaway speed
– Draft tube theory, function and efficiency – Governing of turbines –
Surge tanks – Unit quantities and specific speed – Performance
characteristics – Geometric similarity – Cavitation, causes, effects –
Classification of hydropower plants – Load factor – Utilization factor –
Capacity factor – Estimation of hydropower potential.

UNIT V  (09 Periods)
PUMPS: Pump installation details – Classification of centrifugal pumps –
Heads – Losses and efficiencies – Limitation of suction lift – Work done –
Minimum starting speed – Specific speed – Multistage pumps – Pumps in
parallel and series – Performance of pumps – Characteristic curves –
Net positive suction head – Priming devices – Cavitation – Working
procedure of Special pumps – Self priming pump – Gear pump – Jet
pump – Airlift pump.

Total Periods: 45

TEXT BOOKS
1. P.N. Modi and S.M. Seth, Hydraulics and Fluid Mechanics, 18th

REFERENCE BOOKS
1. R.K. Bansal, Fluid Mechanics and Hydraulic Machines, 9th
   2009.
4. Domkundwar and Domkundwar, A Textbook of Fluid Mechanics
II B.Tech II Semester
14BT40121: SURVEYING LAB

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PREREQUISITES: Engineering Mathematics and Engineering Physics

COURSE DESCRIPTION: Exercises on chain survey; compass survey; plane table survey; leveling, heights, distances and areas.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Implement the procedure for an accurate and through note taking in the field work to serve as a legal note
2. Identify the differences in elevation, draw and utilize contour plots and calculate volume for earth work using different instruments
3. Design simple curves
4. Function effectively as a team member in multi-disciplinary teams
5. Effectively communicate information in written, oral and graphical formats

LIST OF EXPERIMENTS:

CYCLE –I

1. CHAIN SURVEY:
   1. Cross staff survey and plotting
   2. Chain traversing and plotting

2. COMPASS SURVEY:
   3. Determination of area by radiation method and plotting
   4. Compass traversing and plotting

3. PLANE TABLE SURVEY
   5. Resection – Two point and three point problems

4. LEVELLING:
   6. Longitudinal and cross-sectioning of a road profile and plotting.
   7. Contouring exercise

CYCLE –II

5. THEODOLITE SURVEY:
9. Trigonometric leveling – Measurement of heights and distances
10. Setting out a simple curve by Rankine’s method

6. **TOTAL STATION SURVEY:**
   11. Determination of area using total station
   12. Determination of remote height using total station.
   13. Distance between two inaccessible points.
   14. Traversing using total station
II B.Tech II Semester
14BT40122: FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

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PREREQUISITES: Fluid Mechanics – I & II


COURSE OUTCOMES:
After completion of this course, a successful student will be able to:
1. Understand the working procedure of various flow measuring devices and hydraulic machines
2. Perform the test on flow measuring devices and hydraulic machines
3. Perform individually and in groups to find the flow rate and efficiency of pumps and turbines
4. Check the efficiency of hydraulic machines and write reports on the suitability of the machine

LIST OF EXPERIMENTS:
1. Calibration of Venturimeter
2. Calibration of Orificemeter
3. Determination of coefficient of discharge for a small orifice by a constant head method.
4. Calibration of rectangular notch
5. Determination of loss of head due to sudden contraction
6. Determination of friction factor for pipes
7. Verification of Bernoulli’s equation.
8. Impact of jet on vanes
10. Performance test on Pelton wheel turbine
11. Performance test on Francis turbine
12. Performance test on Kaplan turbine.
13. Performance test on single stage centrifugal pump
14. Performance test on multi stage centrifugal pump
15. Performance test on reciprocating pump
III B.Tech I Semester
14BT5HS02: MANAGEMENT SCIENCE
( Common to CSE, IT, CSSE, CE)

PRE-REQUISITES: -

COURSE DESCRIPTION:

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Employ fundamental knowledge on ‘Management Thought’ and ‘Management of a business organization’.
2. Apply various Managerial concepts & contexts to attain ‘Optimum Utilization of available organizational resources’.
3. Contribute to the group, as an individual, in accomplishing the stated objective of the business organization.
4. Apply gained knowledge on Management to establish and run his/her own organization, if he/she deserve to be an ‘Entrepreneur’.
5. Imbibe contemporary practices in applying Management and exercise discernment in implementing managerial decisions for ethical, safe, and sustainable operations of the business.

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION TO MANAGEMENT AND ORGANIZATION
(9 Periods)
UNIT – II: OPERATIONS MANAGEMENT (12 Periods)
Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling. Materials management objectives; Inventory - Types of inventory – Classical EOQ model - ABC analysis - Purchase procedure - Stores management. **Marketing:** Functions of marketing - Marketing mix - Channels of distribution.

UNIT – III: HUMAN RESOURCES MANAGEMENT (HRM) (6 Periods)
Nature and scope of HRM - Functions of HRM - Role of HR Manager in an organization, Job evaluation and merit rating - Maslow’s theory of human needs - McGregor’s theory X and theory Y - Herzberg’s two-factor theory.

UNIT – IV: PROJECT MANAGEMENT (PERT/CPM) AND ENTREPRENEURSHIP (9 Periods)
Network analysis - Program evaluation and review technique (PERT) - Critical path method (CPM) - Probability of completing the project within given time - Project cost analysis - Project crashing. Introduction to entrepreneurship - Entrepreneurial traits - Entrepreneur vs. manager - Role of entrepreneurship in economic development - Women as an entrepreneur.

UNIT – V: CONTEMPORARY MANAGEMENT PRACTICES (9 Periods)
Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) – Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making.

Total Periods: 45

**TEXT BOOKS:**

**REFERENCE BOOKS:**
III B. Tech I Semester
14BT4HS02: PROFESSIONAL ETHICS
(Common to CSE, IT, CSSE, CE & ME)

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COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Apply the principles of ethics to solve engineering problems
2. Analyze the problems in the implementation of moral autonomy and resolve through consensus
3. Responsible to follow the codes of ethics
4. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas
5. Function as a member, consultant, Manager, Advisor and Leader in multi-disciplinary teams
6. Write reports without bias and give instructions to follow ethics

DETAILED SYLLABUS:
UNIT I (8 Periods)
ENGINEERING ETHICS

UNIT II (10 Periods)
PROFESSIONAL IDEALS AND VIRTUES
Theories about Virtues, Professions, Professionalism – characteristics, expectations, Professional Responsibility, Integrity, Self-respect, Sense of “Responsibility”. Self-interest, Customs and Religion– Self-interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories– resolving moral dilemmas and moral leadership.

SVEC14 - B.TECH - Civil Engineering
UNIT III  
ENGINEERING AS SOCIAL EXPERIMENTATION  
(9 Periods)  
Engineering as experimentation– Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters–Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT IV  
RESPONSIBILITIES AND RIGHTS  
(9 Periods)  
Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers– Professional rights, whistle–blowing, the bart case, employee rights and discrimination.

UNIT V  
GLOBAL ISSUES  
(9 Periods)  
Multinational corporations–Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers – Managerial ethics applied to Engineering Profession, moral leadership.

Total Periods: 45

TEXT BOOKS  

REFERENCE BOOKS  
1. Dr. S. Kannan, K. Srilakshmi, Human Values and Professional Ethics, Taxmann Allied Services Pvt Ltd., 2009.  
III B.Tech I Semester
14BT50101: STRUCTURAL ANALYSIS – II

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PREREQUISITES: Structural analysis – I


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:

1. Understand the concepts of Moving loads, influence lines, slope deflection, moment distribution method, Kani’s method, energy methods

2. Analyse the beams and frames using different methods

DETAILED SYLLABUS:

UNIT I (10 Periods)
MOVING LOADS: Maximum SF and BM at a given section and absolute maximum SF and BM due to single concentrated load, UDL longer than the span, UDL shorter than the span, two point loads and several point loads – Equivalent uniformly distributed load – Focal length.
INFLUENCE LINES: Influence line for support reaction, shear force and bending moment – Load position for maximum SF and 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 II (10 Periods)
SLOPE–DEFLECTION METHOD: Basic concepts – Slope deflection equation – Application to continuous beams with and without settlement of supports.
MOMENT DISTRIBUTION METHOD: Basic concepts – Stiffness factor – Carry over factor – Application to continuous beams with and without settlement of supports.

UNIT III (10 Periods)
KANI’S METHOD: Analysis of continuous beams including settlement of supports – Single bay, single storey portal frames without side sway.
ENERGY METHOD: Strain 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 plane trusses.

UNIT IV (08 Periods)
MULTI STOREY FRAMES (Approximate Methods): Substitute frame method (Two cycle method) for gravity loads – Portal method and cantilever method for lateral loads.

UNIT V (07 Periods)
REDUNDANT PIN–JOINTED FRAMES: Introduction to indeterminate frames – Static and kinematic indeterminacies – Castigliano’s theorem – Analysis of pin–jointed frames with upto two degrees of internal and external indeterminacies.

Text Books

Reference Books
III B.Tech I Semester
14BT50102: REINFORCED CEMENT CONCRETE STRUCTURES – I

Internal Marks  External Marks  Total  L  T  P  C

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PREREQUISITES: Building Materials and Concrete Technology, Structural Analysis


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Demonstrate the knowledge concepts, techniques of design of reinforced cement concrete structural elements
2. Analyze reinforced cement concrete structural elements

DETAILED SYLLABUS:
UNIT I (08 Periods)
INTRODUCTION TO IS CODAL PROVISIONS: IS 456 recommendations– Reinforced cement concrete, Concrete (constituents, grades, setting time and its behavior under tension and compression), Steel (types, grades and its behavior under tension and compression), Characteristic loads – Characteristic strength – Partial safety factors, Bonding between concrete and steel, Design methods of various RCC elements of a structure (Working stress method and Limit state method). Design of beam using working stress method.

UNIT II (09 Periods)
BEAMS: Limit state design of singly reinforced and doubly reinforced beam in detail.

UNIT III (08 Periods)
COLUMNS: Short and long columns under axial loads – Slender columns.

UNIT IV (10 Periods)
FOOTINGS: Different types of footings – Design of isolated square, rectangular and circular footings – Design of combined footing.

UNIT V (10 Periods)
SLABS: Design of one way slab – Two-way slab – Continuous slab using IS Coefficients.

Total Periods: 45
TEXT BOOKS

REFERENCE BOOKS

Codes: IS 456–2000 code book is to be permitted into the examination hall.
III B.Tech I Semester
14BT50103: WATER SUPPLY ENGINEERING

PREREQUISITES: Environmental Sciences, Fluid Mechanics–I


COURSE OUTCOMES:
After completion of this course, a successful student will be able to:
1. Explain the concepts of water quality, water quantity and water distribution
2. Analyze the water samples for finding different impurities present in water.
3. Design a pipe network for supplying water from a main source.
4. Assess the reasons for ill health due to disinfected water consumption and provide necessary solutions to treatment for the benefit of the society.

DETAILED SYLLABUS:
UNIT I (08 Periods)
WATER QUALITY AND INTRODUCTION TO WATER SUPPLY:

UNIT II (10 Periods)
UNIT III  
(09 Periods)


UNIT IV  
(09 Periods)

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

UNIT V  
(09 Periods)

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

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
III B.Tech I Semester
14BT50104: SOIL MECHANICS

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PREREQUISITES: Engineering Mechanics, Engineering Geology

COURSE DESCRIPTION: Basic principles of soil mechanics and their application in engineering practice; Index properties; Engineering properties: Permeability; Seepage – Stress distribution; Compaction; Consolidation; Shear strength.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to
1. Understand the behaviour of soil as an engineering material
2. Provide the description and classification of soil and analyze stresses in soils under different loading conditions.
3. Address problems associated with flow through soils and suggest suitable methods.

DETAILED SYLLABUS:

UNIT I (09 Periods)

UNIT II (09 Periods)

UNIT III (09 Periods)
STRESS DISTRIBUTION IN SOILS: Boussinesq’s and Westergaard’s theories for point loads, circular and rectangular loaded areas – Newmark’s influence chart – Approximate methods – Contact pressure distribution.
**COMPACTATION:** Mechanism of compaction – Optimum moisture content and maximum dry density – Factors affecting compaction – Effects of compaction on soil properties – Laboratory determination of OMC and MDD – Field compaction methods – Compaction control.

**UNIT IV (09 Periods)**
**CONSOLIDATION OF SOILS:** Initial, primary and secondary consolidation – Spring analogy for primary consolidation – Consolidation test – e–p and e–log p curves – Terzaghi’s theory of one dimensional consolidation – Coefficient of consolidation – Preconsolidation pressure – Secondary consolidation.

**UNIT V (09 Periods)**
**SHEAR STRENGTH OF SOILS:** Mohr–Coulomb failure theories – Types of laboratory shear strength tests – Strength tests based on drainage conditions and their field applicability – Shear strength of cohesionless soils – Critical void ratio – Liquefaction – Shear strength of cohesive soils – Skempton’s pore pressure coefficients.

**TEXT BOOKS**

**REFERENCE BOOKS**
III B.Tech I Semester

14BT50105: ENGINEERING HYDROLOGY

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PREREQUISITES: Fluid Mechanics I and II


COURSE OUTCOMES: After completion of this course, a successful student will be able to:
1. Explain hydrological cycle, characteristics of runoff and principles of sedimentation.
2. Analyze and interpret the rainfall data and measure precipitation & runoff.

DETAILED SYLLABUS:
UNIT I (09Periods)
INTRODUCTION TO HYDROLOGY AND PRECIPITATION: Definition and scope of hydrology - Hydrologic cycle - Practical applications and historical development - Precipitation - Types and forms of precipitation - Weather and seasons in India - Measurement of rainfall - Recording and non-recording type of rain gauges - Errors in measurement - Analysis and interpretation of rainfall data - Methods of calculation of mean precipitation over an area

UNIT II (09Periods)

UNIT III (09Periods)
UNIT IV
HYDROGRAPH ANALYSIS AND FLOOD: Components of Hydrograph –
Unit Hydrograph – Derivation – Use and limitation of unit hydrograph –
– Unit hydrograph method – Frequency analysis – Flood routing.

UNIT V
EROSION AND RESERVOIR SEDIMENTATION
Introduction – Erosion process – Estimation of sheet erosion – Channel
erosion – Movement of sediment from Watersheds – Sediment yield from
Watersheds – Trap efficiency – Density of sediment deposits – Distribution
of sediment in the reservoir – Life of a reservoir – Reservoir sedimentation
control – Erosion and reservoir sedimentation problems in India.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
2009.
India Pvt. Ltd., 2010.
4. C.S.P. Ojah, R. Berndtsson, P. Bhunya, Engineering Hydrology,
III B. Tech I Semester
14BT50121: COMPUTER AIDED BUILDING PLANNING & DRAWING LAB

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PREREQUISITES: Building materials and Concrete Technology

COURSE DESCRIPTION: Loading bearing walls; RCC framed structures; Industrial buildings; views on one and two storey buildings.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

1. Explain knowledge on building planning and drawing; and AutoCAD drafting
2. Analyse the given data to draw plan, elevation and cross sectional views of a structure
3. Draft the civil engineering drawing using Auto CAD
4. Prepare drawings and provide report on the building plan, section and elevation.

SOFTWARE: AUTOCAD

LIST OF EXPERIMENTS:
1. Buildings with load bearing walls (Flat and pitched roof) – Including details of doors and windows
2. RCC framed structures
3. Industrial buildings – North light roof trusses
4. Perspective view of one and two storey buildings

TEXT BOOKS

REFERENCE BOOKS
III B.Tech I Semester
14BT50122:  GEOTECHNICAL ENGINEERING LAB

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PREREQUISITES: Soil Mechanics

COURSE DESCRIPTION: Determination of water content and specific gravity, Grain size analysis, Tests for Atterberg's limits, Determination of field density, Relative density, Compaction test, CBR test, Permeability tests, Consolidation test, Direct shear test, Unconfined compression test, Triaxial test, Vane shear test.

COURSE OUTCOMES
After completion of the course, a successful student will be able to:
1. Demonstrate knowledge on laboratory testing of soils
2. Analyze and interpret engineering behavior of soils.
3. Find suitability of soil for a civil engineering construction.
4. Recommend suitable ground improvement method based on soil type and application.
5. Give solutions to the problems of soil which are environmentally friendly and economically viable.
6. Work effectively as an individual or in a group to determine soil properties
7. Prepare a report on the properties of soil for a given site

LIST OF EXPERIMENTS:
1. Determination of water content
2. Determination of specific gravity
3. Grain size analysis
4. Tests for Atterberg's limits
5. Determination of field density – core cutter and sand replacement method
6. Relative density test
7. Standard Proctor's Compaction test
8. CBR test
9. Permeability of soil – constant head test and variable head test
10. Consolidation test
11. Direct shear test
12. Unconfined compression test
13. Triaxial compression test
14. Vane shear test
III B. Tech II semester
14BT5HS01: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY
(Common to CSE, IT, CSSE, CE & ME)

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PRE-REQUISITE: Nil

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Supply and supply function; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Basic concepts of Journal, Ledger and Trial balance; Trading Account, Profit and Loss Account and Balance sheet with simple adjustments; Computerized Accounting.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:

1: Acquire Knowledge in
   a) Tools and concepts of Micro Economics.
   b) Basic Principles and concepts of Accountancy.
   c) Provides life skills for effective utilization of scarce resources.
   d) Financial Accounting.
   e) Using advanced tools like tally and SAP.
   f) Significance of Economics and Accountancy

2: Develop skills in analyzing problems for
   a) Managerial decisions of an organization.
   b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.

3: Develop effective communication in Business and Accounting transactions.

DETAILED SYLLABUS:

UNIT – I
INTRODUCTION TO MANAGERIAL ECONOMICS, DEMAND & SUPPLY ANALYSIS:
UNIT – II
THEORY OF PRODUCTION AND COST ANALYSIS:  (09 Periods)

UNIT – III
INTRODUCTION TO MARKETS AND PRICING  (09 Periods)

UNIT – IV
INTRODUCTION AND PRINCIPLES OF ACCOUNTING:  (09 Periods)

UNIT – V
FINAL ACCOUNTS:  (09 Periods)

Total periods: 45

TEXT BOOKS:

REFERENCE BOOKS:
III B.Tech II Semester
14BT60101: REINFORCED CEMENT CONCRETE STRUCTURES – II

PREREQUISITES: RCCS I


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain the types of stair cases, foundations and water tanks
2. Design stair case, foundation, retaining walls, water tanks, silos and chimney using IS code.
3. Suggest suitable type of foundation based on loading and soil conditions.

DETAILED SYLLABUS:

UNIT I (08 Periods)
STAIRCASES: Types of staircases – Stairs spanning longitudinally and transversally

UNIT II (10 Periods)
FOUNDATIONS: Strap footing – Raft foundations–Design of piles and pile caps

UNIT III (09 Periods)
RETAINING WALLS: Lateral earth pressure – Design of cantilever and counter fort retaining walls.

UNIT IV (10 Periods)

UNIT V (08 Periods)
MISCELLANEOUS STRUCTURES: Design of Silos – design of chimneys

Total Periods: 45

TEXT BOOKS
REFERENCE BOOKS

III B.Tech II Semester
14BT60102: FOUNDATION ENGINEERING

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PREREQUISITES: Soil Mechanics

COURSE DESCRIPTION:
Subsurface sampling and characterization methods; Lateral earth pressure; Earth retaining structures; Stability of earth slopes; Bearing capacity of shallow foundations; Allowable bearing pressure; Pile foundations; Caissons and well foundations.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:
1. Explain the soil condition at a given location in order to suggest a suitable foundation.
2. Estimate bearing capacity, settlement of footings and analyze slopes using limit equilibrium methods.
3. Design foundations and retaining walls.

DETAILED SYLLABUS:

UNIT I (09 Periods)

UNIT II (09 Periods)
LATERAL EARTH PRESSURE: Types of earth pressures – Plastic equilibrium in soils – Rankine’s theory: Earth pressures in cohesionless and cohesive soils - Coulomb’s wedge theory – Earth pressure on retaining walls of simple configurations – Graphical methods (Rebhann and Culmann) - Types of earth retaining structures - Stability considerations of gravity and cantilever retaining walls.

UNIT III (8 Periods)
UNIT IV (10 Periods)
BEARING CAPACITY OF SHALLOW FOUNDATIONS: Types and choice of foundation - Depth of foundation - Types of shear failure - Safe bearing capacity - Bearing capacity theories: Terzaghi, Meyerhof, Skempton and IS methods - Effect of groundwater table on bearing capacity - Bearing capacity from SPT and CPT - Allowable bearing pressure - Safe bearing capacity and settlement from plate load test - Allowable settlements of structures - Settlement analysis.

UNIT V (09 Periods)
PILE FOUNDATIONS: Types of pile foundation – Factors influencing the selection of pile – Load carrying capacity of piles in granular and cohesive soils – Static and dynamic pile formulae – Pile load test – Negative skin friction – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

TEXT BOOKS

REFERENCE BOOKS
III B.Tech II Semester
14BT60103: TRANSPORTATION ENGINEERING – I

Internal Marks | External Marks | Total | L | T | P | C
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30 | 70 | 100 | 3 | 1 | - | 3

PREREQUISITES: Surveying, Soil Mechanics

COURSE DESCRIPTION: Highway development and planning – Highway geometric design – Highway alignment and Highway drainage – Pavement types and Design – Highway construction and equipment – Railway Engineering, Tracks, Curves, Alignment – Air Port Engineering, Runway & Lighting systems

COURSE OUTCOMES:
After the completion of this course, a successful student will be able to:
1. Understand the methodology of various tests on Highway materials and their significance
2. Assemble, analyze, and appropriately apply transportation engineering data from existing graphics, reports, and other documents
3. Design Highway Geometrics, Flexible and Rigid Pavements, Transportations systems and components

DETAILED SYLLABUS:

UNIT I (08 Periods)


UNIT II (07 Periods)
HIGHWAY MATERIALS: Aggregates and bitumen – Desirable properties – Laboratory tests on aggregate and bitumen, CBR test – Specifications – Aggregate bitumen mixes – Desirable properties – Mix design by Marshall method – Cement and cement concrete – Numerical Problems on all these methods of Testing
HIGHWAY DRAINAGE: Importance of highway drainage – Requirements – Surface drainage – Subsurface drainage – Drainage of slopes and erosion control – Road construction in water logged areas and black cotton soils – Numerical problems

UNIT III (12 Periods)

UNIT IV (09 Periods)
HIGHWAY CONSTRUCTION: Earth work – Construction of WBM Roads – Bituminous Pavements – Cement Concrete Pavements – Joints in Cement Concrete Pavements – RCC and PCC Pavements

UNIT V (09 Periods)
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.
GEOMETRIC DESIGN OF RAILWAY TRACK: Gradients – Grade compensation – Cant and negative super elevation – Cant deficiency – Degree of curve – Crossings and turn out.
AIRPORT ENGINEERING: Factors affecting selection of site for airport – Aircraft characteristics – Geometric design of runway – Computation of runway length – Correction for runway length – Orientation of runway – Wind rose diagram – Runway lighting system.

Total Periods: 45

TEXT BOOKS
REFERENCE BOOKS

PREREQUISITES: Water Supply Engineering


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:

1. Explain the characteristics of wastewater and its treatment processes
2. Analyze characteristics, treatment and disposal methods of wastewater
3. Design waste water treatment plant
4. Understand the impact on the environment due to onsite disposal of waste
5. Follow ethical standards for wastewater treatment and disposal using relevant IS codes

DETAILED SYLLABUS:
UNIT I (06 Periods)
INTRODUCTION TO SEWERAGE SYSTEMS
Definition of terms – Sewage, sullage, refuse, garbage – Objectives of sewerage works systems– Sewage collection and disposal – Conservancy systems – Water carriage systems – Merits and demerits – Sewage systems – Combined, separate, partially separate and combined systems – Merits and demerits.

UNIT II (11 Periods)
QUANTITY AND CHARACTERISTICS OF SEWAGE
UNIT III  
(08 Periods)  
PRELIMINARY AND PRIMARY SEWAGE TREATMENT  
Concept of waste water treatment, primary, secondary and tertiary treatment – Conventional treatment process flow diagrams of municipal wastewater treatment plants – Functions of each unit– Principles and design of screens, grit chamber, and primary settling tanks.

UNIT IV  
(08 Periods)  
SECONDARY TREATMENT OF SEWAGE  

UNIT V  
(12 Periods)  
SLUDGE MANAGEMENT AND EFFLUENT DISPOSAL  

Total Periods:45

TEXT BOOKS  

REFERENCE BOOKS  
### III B.Tech II Semester

14BT60105: **ADVANCED STRUCTURAL ANALYSIS**

**(PROFESSIONAL ELECTIVE - I)**

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**PREREQUISITES:** Structural Analysis

**COURSE DESCRIPTION:** Arches: two and three hinged arches– Portal frames– Flexibility method– Stiffness method– Curved beams.

**COURSE OUTCOMES:**

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

1. Analyze and interpret the data using different methods for arches, frames and curved beams.
2. Apply modern techniques in analyzing arches, frames and curved beams.

**DETAILED SYLLABUS:**

#### UNIT I (10 Periods)
**ARCHES:**


**TWO HINGED ARCHES:** Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses – Tied arches – Fixed arches.

#### UNIT II (09 Periods)
**PORTAL FRAMES:** Analysis of single bay, single storey, portal frame including side sway – Shear force and bending moment diagrams by slope deflection and moment distribution methods.

#### UNIT III (09 Periods)
**FLEXIBILITY METHOD:** Flexibility coefficients – Flexibility matrices – Sign convention – Application to continuous beams – Temperature stresses – Lack of fit – Support settlements.

#### UNIT IV (09 Periods)
**STIFFNESS METHOD:** Stiffness coefficients – Stiffness matrices – Application to continuous beams – Effect of support displacements– Temperature stresses.
UNIT V
(08 Periods)
CURVED BEAMS: Circular beams loaded uniformly and supported on symmetrically placed columns – Semi-circular beams simply supported on three equally spaced supports.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
III B.Tech II Semester
14BT60106: GEOENVIRONMENTAL ENGINEERING
(PROFESSIONAL ELECTIVE – I)

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PREREQUISITES: Soil Mechanics, Environmental Engineering


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain the fundamental principles of science in Geo-environmental engineering
2. Analyse and identify the mechanical and hydraulic properties of soil, solid waste, and geosynthetics.
3. Quantify the mechanical and hydraulic properties needed to satisfy design criteria of projects involving clay barriers, unsaturated soil barriers, and geosynthetics barriers.
4. Apply stability, water balance, and contaminant transport concepts needed in the design of waste containment facilities.

DETAILED SYLLABUS:

UNIT I (9 Periods)

UNIT II (9 Periods)
UNIT III  (9 Periods)

UNIT IV  (9 Periods)

UNIT V  (9 Periods)
Advanced Soil Characterization: Contaminant analysis – water content and permeability measurements – electrical and thermal property evaluation – use of GPR for site evaluation – introduction to geotechnical centrifuge modeling.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
III B.Tech II Semester
14BT60107: GROUND WATER DEVELOPMENT AND MANAGEMENT
(PROFESSIONAL ELECTIVE I)

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PREREQUISITES: Engineering Hydrology, Engineering Geology, Water Resources Engineering

COURSE DESCRIPTION: Groundwater occurrence and movement – Analysis of pumping test data – Saline water intrusion into an aquifer – Artificial recharge of ground water – Surface and subsurface investigation – Groundwater basin management.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:
1. Describe about ground water occurrence, exploration, movement and pollution.
2. Analyze the capacity of a well using Theis, Jacob and Chow’s solution.
3. Use modern methods for recharging groundwater and reducing the ground water pollution.

DETAILED SYLLABUS:

UNIT I (10 Periods)

UNIT II (09 Periods)

UNIT III (08 Periods)
SALINE WATER INTRUSION IN AN AQUIFER: Saline water intrusion – Ghyben – Herzberg relation – Shape of interface – Control of seawater intrusion – Recognition of seawater in groundwater.

SVEC14 - B.TECH - Civil Engineering 122
UNIT IV  
(09 Periods)

UNIT V  
(09 Periods)

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
III B.TECH II SEMESTER
14BT60108: SOLID WASTE MANAGEMENT
(PROFESSIONAL ELECTIVE I)

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PREREQUISITES: Waste Water Technology

COURSE DESCRIPTION: Sources and types of municipal solid wastes – Onsite handling, storage and processing – collection and transfer – Offsites processing – Disposal

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Demonstrate knowledge on the sources, types of solid wastes, storage and disposal.
2. Identify and develop onsite and offsite processing techniques of solid waste.
3. Use modern techniques for collection and land filling of solid waste.
4. Address the public health problems due to waste disposal and collection.

DETAILED SYLLABUS:
UNIT I (11 Periods)
SOURCES AND TYPES OF MUNICIPAL SOLID WASTES

UNIT II (08 Periods)
ON–SITE STORAGE & PROCESSING

UNIT III (09 Periods)
COLLECTION AND TRANSFER
Methods of Collection – types of vehicles – Manpower requirement – Collection routes; transfer Stations – Selection of location, operation & maintenance– Collection options under Indian conditions.

SVEC14 - B.TECH - Civil Engineering 124
UNIT IV  
OFF-SITE PROCESSING  
(09 Periods)
Processing techniques and equipment; Resource recovery from solid wastes—Composting, Incineration, Pyrolysis.

UNIT V  
DISPOSAL  
(08 Periods)
Dumping of solid waste—sanitary landfills—Site selection, design and operation of sanitary landfills—Leachate collection & treatment

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
III B.Tech II Semester
14BT60121: CONCRETE AND HIGHWAY MATERIALS LAB

PREREQUISITES: Transportation Engineering – I

COURSE DESCRIPTION: Testing of Aggregates, Cement and Bituminous material; Testing of Concrete and Bituminous mixes

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:
1. Perform standard tests on Aggregates and Cements used in Buildings and Highway construction
2. Evaluate the quality and performance of Aggregates, Cement and Bituminous material and select suitable materials used in Buildings and Highway construction
3. Test and design Concrete and Bituminous mixes
4. Function effectively as an member or leader in teams to solve highway engineering problems
5. Communicate the properties of building and highway materials through a report after testing

LIST OF EXPERIMENTS:
I. AGGREGATES
1. Aggregate crushing value
2. Aggregate impact test
3. Specific gravity and water absorption
4. Attrition test
5. Abrasion test
6. Shape tests
7. Bulking of Sand

II. BITUMINOUS MATERIALS
1. Penetration test
2. Ductility test
3. Softening point test
4. Flash and fire point tests
III. CEMENT AND CONCRETE

1. Normal consistency and fineness of cement
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement
4. Compressive strength of cement
5. Workability test on concrete by Compaction factor, Slump and Vee–bee
6. Young’s modulus and compressive strength of concrete
7. Concrete Mix Design and Testing
III B.Tech II Semester
14BT60122: ENVIRONMENTAL
ENGINEERING LAB

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PREREQUISITES: Water Supply Engineering

COURSE DESCRIPTION: Physical and chemical analysis for water and waste water

COURSE OUTCOMES:
After completion of the course, a successful student will able to:
1. Demonstrate the knowledge on experimental analysis of water and wastewater
2. Test water quality and assess waste water characteristics using different treatment methods
3. Function effectively as a member or leader in teams to solve water and wastewater problems
4. Write a report after testing the water samples

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 optimum coagulant dose
7. Determination of chlorine demand
8. Determination of dissolved oxygen
9. Determination of B.O.D
10. Determination of C.O.D
11. Determination of iron
13. Determination of total phosphorous
14. Determination of sulphates
IV B. Tech I Semester
14BT70101: STEEL STRUCTURES

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PREREQUISITES: SA & RCCS

COURSE DESCRIPTION: Design concepts– connections: Bolts , rivets, welds– Tension and compression members – Beams and built-up compression members– Design of column foundations

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Attain the knowledge on various structural steel elements.
2. Analyze the steel structures and their elements.
3. Design elements of Steel Structures.

DETAILED SYLLABUS:

UNIT I (06 Periods)

UNIT II (11 Periods)
RIVETED, BOLTED AND WELDED CONNECTIONS: Failure of a joint – Strength and efficiency of a joint – Lap Joint – Butt joint – Eccentric connections. Strength of welds – Butt and fillet welds – Design of fillet welds subjected to axial load – Design of fillet welds 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 III (10 Periods)

UNIT IV (11 Periods)
UNIT V (07 Periods)
DESIGN OF COLUMN FOUNDATIONS: Design of slab base and gusseted bases – Column bases subjected moment

TEXT BOOKS
2. N. Subramanian, Design of Steel Structures, 1st Edition, Oxford University Press, 2010

REFERENCE BOOKS

IS Codes: IS 800–2007, IS–875– Part III and Steel Tables are to be permitted into the examination hall.
IV B.Tech I Semester
14BT70102: WATER RESOURCES ENGINEERING

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PREREQUISITES: Fluid Mechanics – I and II, Engineering Hydrology


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Demonstrate the knowledge of irrigation systems, water resources and storage works and apply the principle of mathematics in finding the irrigation water requirement.
2. Analyze the forces acting on a hydraulic structure.
3. Design hydraulic structures and regulation works using different methods.
4. Estimate the reservoir capacity using modern tools.
5. Give reasons for the failure of a dam and reservoir for the safety of the society.
6. Demonstrate the importance of canals and canal lining for reducing the seepage losses for sustainable use of water.
7. Responsible as a civil engineer for the construction of canal outlets and canal escapes in reducing the floods.

DETAILED SYLLABUS:

UNIT I (10 Periods)

UNIT II (09 Periods)
UNIT III (10 Periods)

UNIT IV (10 Periods)

UNIT V (6 Periods)
CROSS DRAINAGE WORKS: Types – Selection of site for aqueducts – Super passages – Level crossing – River training works.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech I Semester
14BT70103: GEOSPATIAL TECHNOLOGIES

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PREREQUISITES: Surveying


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Apply the knowledge of aerial photographs, satellite imagery to civil engineering Applications.
2. Analyze the availability of natural resources using RS and GIS.
3. Use modern tools to estimate the land use and land cover.
4. Demonstrate the knowledge of GIS and RS to predict and assess damages due to natural disasters for sustainable development.

DETAILED SYLLABUS:

UNIT I (9 Periods)

UNIT II (10 Periods)

UNIT III (10 Periods)
UNIT IV (7 Periods)
GIS SPATIAL ANALYSIS: Data storage – Vector data storage – Attribute data storage – Overview of the data manipulation and analysis – Integrated analysis of the spatial and attribute data – Basics of Global positioning system.

UNIT V (9 Periods)

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech I Semester
14BT70104: TRANSPORTATION ENGINEERING – II

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PREREQUISITES: Surveying, Soil Mechanics


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Demonstrate knowledge on the principles of mathematics and science to understand the problems related to transportation engineering projects
2. Assemble, analyze, and appropriately apply transportation engineering data from existing graphics, reports, and other documents.
3. Conduct Traffic studies and arrive at the parameters for design of Highway and design of Traffic Control systems.
4. Use modern technology to support the planning, design, operation and management of transportation facilities and projects.

DETAILED SYLLABUS:
UNIT I
(09 Periods)
INTRODUCTION TO TRAFFIC ENGINEERING: Significance and scope – Characteristics of vehicles and road users – Skid resistance and braking efficiency (Problems) – Components of traffic engineering – Road, traffic and land use characteristics.

TRAFFIC CHARACTERISTICS: Basic characteristics of traffic – Volume, speed and density – Relationship among traffic parameters.


UNIT II
(09 Periods)
of conducting Pedestrian studies – Basic principles of traffic flow speed studies – Data collection and presentation – Origin and Destination studies, Numerical Problems

HIGHWAY CAPACITY: Definition of capacity – Importance of capacity – Factors affecting capacity – Concept of level of service – Different levels of service – Concept of service volume – Peak hour factor– Numerical Problems.

UNIT III


TRAFFIC SIGNS AND ROAD MARKINGS: Types of traffic signs – Cautionary, regulatory and informative signs – Specifications – Pavement markings – Types of markings – Lane markings and object markings – Standards and specifications for road markings.

UNIT IV

UNIT V
ROAD SAFETY AUDIT: Road safety audit – Principles, Elements and Methodology of Road Safety Audit.

TRAFFIC AND ENVIRONMENT: Detrimental effect of traffic on environment – Air pollution – Pollutants due to traffic – Measures to reduce air pollution due to traffic – Noise pollution – Measures to reduce Noise pollution.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA): Importance – Aspects to be considered – Preparation of EIA for a Highway Project before construction, during construction, after construction.

Exclusive bus lanes – Introduction to Intelligent transportation system (ITS).

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
1. Indian Roads Congress (IRC) Specifications: Guidelines and Special Publications on Traffic Planning and Management.
2. Guidelines of Ministry of Road Transport and Highways, Government of India.

NOTE: Booklet containing relevant extracts from Standards and Codes, should be made available to students during examinations.
Pre Requisite: Managerial Economics and Principles of Accountancy

COURSE DESCRIPTION: Origin and growth of Banking, functions and importance, RBI; Debtor and Creditor relationship, Types of Accounts, Loans and Advances; e-payment, e-cash, NEFT, RTGS, Credit and Debit cards; Insurance elements and risk; LIC, GIC, IRDA.

COURSE OUTCOMES: After completion of the course a successful student is able to

1. Acquire Knowledge in
   a) Tools and concepts of Banking and Insurance.
   b) Basic Principles and concepts of Insurance and Banking.
   c) Provides life skills for effective utilization of Banking and Insurance facilities.
   d) e-fund transfers, e-payments and e-business models.

2. Develop analytical skills in understanding problems pertaining to
   a) Online banking and e-payments.
   b) Risk Management through insurance benefits the society at large.
   c) money management by leveraging on technology, banking and insurance services.

DETAILED SYLLABUS:

UNIT – I (09 Periods)
INTRODUCTION TO BANKING: Origin and growth of banking, meaning and functions of banking, importance of banking, Reserve Bank of India; functions, monetary policy, open market operations.

UNIT – II (09 Periods)
BANK-CUSTOMER RELATIONSHIP: Debtor-creditor relationship, anti money laundering, products or services, payment and collection of cheques and other negotiable instruments. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances-principles of lending, types of loans,
UNIT – III
(09 Periods)

UNIT – IV
(09 Periods)
INTRODUCTION TO INSURANCE: Introduction - Insurance definition, elements of insurance concept of risk, risk Vs uncertainty.

UNIT – V
(09 Periods)
INSURANCE OVERVIEW: Principles of insurance, insurance types, LIC & GIC insurance contract- nature, elements, functions, IRDA, Insurance Players in India.

Total periods : 45

TEXT BOOKS:

REFERENCE BOOKS:
IV. B.Tech I Semester
14BT6HS02: COST ACCOUNTING AND FINANCIAL MANAGEMENT
(OPEN ELECTIVE)
/Common to ECE, EEE, EIE & CE/

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Pre-Requisites: Nil

COURSE DESCRIPTION: Scope, Objectives and Elements of cost Accounting; Cost Sheet and Tender quotations; Variance Analysis: Material variances, Labor variances; Meaning and Scope, Liquidity, Profitability Ratios: concept of Risk and Returns on Investment..

COURSE OUTCOMES: After completion of the course a successful student is able to

1. Acquire Knowledge in
   a) Elements of Costing.
   b) Basic concepts of Financial Management.
   c) Risk and Return
   d) Financial Accounting.
   e) Using advanced tools like tally and SAP.
   f) Significance of Economics and Accountancy

2. Do cost, risk and return of investment analysis.
3. Develop skills in providing solutions for
   a) Material, Labor, Overheads control.
   b) Excellence and ability to minimize the cost of the organization
   c) Effective investment decisions
4. Prepare cost sheets pertaining to manufacturing of products.

DETAILED SYLLABUS:
 UNIT I (09 Periods)
INTRODUCTION TO COST ACCOUNTING: Cost and Cost Accounting, Scope, Objectives, Advantages and disadvantages – Cost Accounting Vs Management Accounting – Elements of Costing – Installation of costing system – Material Control, Labor Control, Overhead Control, Fixed and Variable, Direct and Indirect Costs.

UNIT II (09 Periods)
COST ANALYSIS: Analysis of Cost – Preparation of cost sheet, estimate, tender and quotation (Simple problems) – Importance of Costing while pricing the products.
UNIT III (09 Periods)

UNIT IV (09 Periods)

UNIT V (09 Periods)

Total periods: 45

TEXT BOOKS:

REFERENCE BOOKS:
1. The Institute of Company Secretaries of India, Cost and Management Study Material, New Delhi.
IV B.Tech I Semester
14BT7HS03: ENTREPRENEURSHIP FOR MICRO SMALL AND MEDIUM ENTERPRISES
(OPEN ELECTIVE)
(Common to ECE, EEE, EIE & CE)

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Pre requisites: Nil

COURSE DESCRIPTION: Introduction to Entrepreneur Development; Idea generation and formation of Business Plan; Micro and Small Enterprises; Institutional Finance and Support to Entrepreneur; Woman Entrepreneurship.

COURSE OUTCOMES: After completion of the course a successful student is able to

1. Acquire Knowledge in KNOWLEDGE
   a) Schemes and institutions encouraging entrepreneurship.
   b) Basic Principles and concepts of Accountancy.
   c) Significance of entrepreneurship.

2. (i) Develop analytical skills in understanding problems pertaining to
   a) Personal excellence through financial and professional freedom.
   b) Women entrepreneurship acts as contrivance in the societal development

(ii) Develop Critical thinking and evaluation ability.

3. Generate ideas for formulating business plans.

DETAILED SYLLABUS

UNIT – I (09 Periods)

UNIT – II (09 Periods)
IDEA GENERATION AND FORMULATION OF BUSINESS PLANS:

SVEC14 - B.TECH - Civil Engineering 142
UNIT – III


UNIT – IV


UNIT – V

WOMEN ENTREPRENEURSHIP: Concept of Women entrepreneur - Functions of Women entrepreneurs - Growth of women entrepreneurship in India - Challenges of Women entrepreneurs- Programmes supporting women entrepreneurship – Rural Entrepreneurship – Meaning, Need for Rural entrepreneurship, Problems of rural entrepreneurship, Role of NGOs.

Total periods : 45

TEXT BOOKS:


REFERENCE BOOKS:

IV B.Tech I Semester
DISASTER MITIGATION AND MANAGEMENT
(OPEN ELECTIVE)
(Common to ECE, EEE, EIE & CE)

Internal Marks External Marks Total
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PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Natural disasters and hazards – Earthquakes – Floods and cyclones, droughts – Landslides – Disaster management

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain various types of disasters and mitigation strategies
2. Analyze and interpret the Guidelines for hazard assessment and vulnerability analysis
3. Use historical data of disaster losses and inform the people over preparedness
4. Address the issues due to disasters and provide conclusions over post disaster events for the benefit of the society
5. Function in multidisciplinary teams for the effective displacement of people during disasters

DETAILED SYLLABUS:
UNIT I (08 Periods)
INTRODUCTION: Types of disasters – Natural disasters – Impact of disasters on environment – Infrastructure and development – Concepts of hazards and vulnerability analysis – Hazard Assessment – Guidelines for hazard assessment and vulnerability analysis – Basic principles and elements of disaster mitigation

UNIT II (11 Periods)
UNIT III (11 Periods)

DROUGHTS: Onset, types and warning – Kinds of droughts – Causes of droughts – Impact of droughts – Early warning and response mechanisms – Mitigation strategies – Droughts in India

UNIT IV (07 Periods)
LANDSLIDES: Onset, types and warning – Causes of landslides – Elements at risk – Indian landslides – Hazards zones – Typical effects – Mitigation strategies and community based mitigation

UNIT V (08 Periods)
DISASTER MANAGEMENT: Disaster management organization and methodology – Disaster management cycle – Disaster management in India – Typical cases – Cost–benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Total Periods:45

TEXT BOOKS
1. V.K. Sharma, Disaster Management, National Centre for Disaster Management, IIPE, 1999.

REFERENCE BOOKS
IV B.Tech I Semester
ENVIRONMENTAL POLLUTION AND CONTROL
(Open Elective)
(Common to ECE, EEE, EIE & CE)

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PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Introduction, Sources and Effects of Air Pollution
– Dispersion of Pollutants and their control – Surface and Ground Water
Pollution and control–Soil Pollution and remediation–Management of
Municipal Solid Wastes.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain various pollutants, characteristics and their dispersion
2. Analyze the major pollutants that causes environmental
   pollution.
3. Conduct research and select suitable techniques to control
   pollution.
4. Understand the effects of environmental pollutions on human
   beings and vegetation
5. Communicate the methods of management and control of
   environmental pollution

DETAILED SYLLABUS:
UNIT I (08 Periods)
INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS:
Scope – Air Pollutants – Classifications – Natural and
Artificial – Primary and Secondary, Point and Non– Point, Line and Area
Sources of Air Pollution – Stationary and Mobile Sources – Dispersion of
Pollutants – Dispersion Models – Applications.

UNIT II (09 Periods)
EFFECTS AND CONTROL OF PARTICULATES: Effects of Air Pollutants
on Man, Material and Vegetation – Global Effects of Air Pollution – Green
House Effect, Heat Island, Acid Rains, Ozone Holes – Control of Particulates
– Control at Sources – Process Changes – Equipment Modifications –
Design and Operation of Control Equipment – Settling Chambers –
Centrifugal Separators – Bag Filters, Dry and Wet Scrubbers – Electrostatic
Precipitators.
UNIT III  (10 Periods)

UNIT IV  (09 Periods)

UNIT V  (09 Periods)

Total Periods:45

TEXT BOOKS

REFERENCE BOOKS

SVEC14 - B.TECH - Civil Engineering
IV B.Tech I Semester

CONTRACT LAWS AND REGULATIONS
(OPEN ELECTIVE)
(Common to ECE, EEE, EIE & CE)

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PREREQUISITES: —


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:

1. Explain contract documents and tendering processes.
2. Analyze the legal issues in arbitration and in contracts documents.
3. Address the legal issues in collecting taxes.
4. Follow ethics while bidding, sale and purchase of property.
5. Develop and Prepare tender documents as per the standards.

DETAILED SYLLABUS:

UNIT I (09 Periods)

UNIT II (09 Periods)

UNIT III (09 Periods)
UNIT IV (09 Periods)

UNIT V (09 Periods)

Total Periods:45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech I Semester
PLANNING FOR SUSTAINABLE DEVELOPMENT
(OPEN ELECTIVE)
(Common to ECE, EEE, EIE & CE)

**PREREQUISITES:** —

**COURSE DESCRIPTION:** Introduction to Sustainable Development – Environment, Sciences and Sustainability – Sustainable Development Politics and Governance – Tools, Systems and Innovations for Sustainability – Communication and Learning for Sustainability.

**COURSE OUTCOMES:**
After completion of the course, a successful student will be able to:
1. Demonstrate the knowledge of planning, environment, tools and systems for sustainable development
2. Analyze the current challenges to sustainability
3. Use theoretical frameworks and provide solutions to the real world sustainability issues
4. Conduct awareness of contemporary issues on globalization in terms of sustainability
5. Give recommendations for the sustainability issues and solutions using a holistic approach
6. Explain a sense of civic responsibility, including reflection on the student’s own role in developing and nurturing sustainable communities
7. Participate in decision making as individual and responsible for collective decision

**DETAILED SYLLABUS:**

**UNIT I** (08 Periods)
**INTRODUCTION TO SUSTAINABLE DEVELOPMENT:** Definition and Concepts of Sustainable Development – Capitalization of Sustainability – National and Global Context – The Millennium Development Goals – Emergence and Evolution of Sustainability and Sustainable Development – Theories of Sustainability – Case Studies

**UNIT II** (08 Periods)
**ENVIRONMENT, SCIENCES AND SUSTAINABILITY:** Climate Change – Science, Knowledge and Sustainability – Unforeseen Environmental Impacts on Development – Challenges of Sustainable Development – Centrality of Resources in Sustainable Development – Case Studies
UNIT III  
SUSTAINABLE DEVELOPMENT POLITICS AND GOVERNANCE:  

UNIT IV  
TOOLS, SYSTEMS AND INNOVATION FOR SUSTAINABILITY:  

UNIT V  
COMMUNICATION AND LEARNING FOR SUSTAINABILITY:  
Role of Emerging Media – Remarkable Design and Communication Art, Activism and the Public Interest – Education for Sustainability – Participation in Decision Making – Critical Thinking and Reflection – Case Studies

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech I Semester
RURAL TECHNOLOGY
(OPEN ELECTIVE)
(Common to ECE, EEE, EIE & CE)

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PREREQUISITES:

COURSE DESCRIPTION: Research & Development – Non Conventional Energy – Community Development – IT Management

COURSE OUTCOMES:

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

1. Acquire the knowledge of various nonconventional energy systems and technologies for rural development.
2. Apply the principles of IT for the rural development.
3. Responsible for the development of technologies in rural areas.
4. Understand the impact of technologies in societal and environmental aspects.

DETAILED SYLLABUS:

UNIT I (09 Periods)

UNIT II (09 Periods)

UNIT III (09 Periods)
TECHNOLOGIES FOR RURAL DEVELOPMENT: Food & Agro based technologies – Tissue culture – Building and Construction technologies – Cultivation and processing of economic plants – Cottage and social Industries.

UNIT IV (09 Periods)

SVEC14 - B.TECH - Civil Engineering
UNIT V (09 Periods)

IT IN RURAL DEVELOPMENT: The Role of Information Technology in Rural Areas – Impact of Information Technology in Rural development – Need and Necessity of Technology – Corporate Social Responsibilities – Private sector participation (Activities in different spheres: Employment, Education, Health, Agriculture and Service Sectors) and Saansad Adarsh Gram Yojana (SAGY) – village adoptions schemes.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech I Semester

14BT60305: Artificial Intelligence and Robotics
(Open Elective)
(Common to ECE, EEE, EIE & CE)

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COURSE DESCRIPTION:
Artificial Intelligence; Problem solving strategies; Heuristic search, Production systems; Simple facts in logic, Forward and Backward Reasoning; Fuzzy logic and Neural Nets; Concept of learning; Classification and specification of robots; Different Sensing and Vision techniques; Direct and Inverse Kinematics; Dynamics; Programming Languages, VAL-II programming; Applications of Artificial Intelligence in Robotics, Task Planning;

COURSE OUTCOMES:
On completion of the program, a successful student will be able to:

1. Impart knowledge on forward, backward and plausible reasoning inherent in them for developing Artificial intelligence and expert systems.
2. Employ effective methods to analyze a robot motion control while executing a specific task.
3. Design and implement appropriate solutions for search problems such as playing two person games and for planning problems which involve defining a sequence of actions of a robot.
4. Apply various AI techniques to different robotic sub-problems involving task planning and obstacle avoidance.

UNIT-I
ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING: The Underlying assumption of AI; AI Technique: simple Tic-Tac-Toe program; Problem solving: State space search; Production systems: control strategies, search space control: depth-first, breadth-first search; Heuristic search: Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT-II
KNOWLEDGE REPRESENTATION & LEARNING: Knowledge Representation; Predicate Logic: Simple facts in logic, resolution, Natural deduction; Procedural versus Declarative Knowledge; Forward reasoning versus Backward reasoning; Semantic Nets; Frames; slots; conceptual dependency; scripts; Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic systems & Neural nets: Basic concepts; Concept of learning.
UNIT-III  (08 periods)

UNIT-IV  (10 periods)
ROBOT PROGRAMMING & CONTROL: Direct and Inverse Kinematics: Co-ordinate reference Frames, Rotations, Homogeneous Coordinates; Introduction to arm dynamics; Control: Types of control schemes: Resolved motion control, Adoptive control; Programming: Robot level languages: characteristics, specifications; Task level languages; Language structure: VAL II.

UNIT-V  (08 periods)
ROBOT INTELLIGENCE & TASK PLANNING: Artificial intelligence in Robotics: Goals of AI research; Applications of state space search in robotics; graph search technique; Problem solving and problem reduction; robot learning; Task planning: Modelling, task specification, obstacle avoidance, grasp planning; Expert system.

Total Periods: 45

Text Books:

Reference Books:
IV B.Tech I Semester
14BT60306: Global Strategy and Technology
(Open Elective)
(Common to ECE, EEE, EIE & CE)

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PRE-REQUISITES: -Nil-

COURSE DESCRIPTION:
Introduction to strategic management, strategic management process, principles of good strategy, globalisation, globalisation strategies, research & development strategies, technology management and transfer, significance, elements of transfer process, corporate governance: the Indian scenario.

COURSE OUTCOMES:
On completion of the program, a successful student will be able to:

1. Decide upon a macroscopic management strategy to optimize the impact of decisions with limited resources.
2. Identify the impact of globalization in a given engineering scenario. Participate in elementary discussions on corporate governance.
3. Analyse an industrial Engineering problem and layout research plan to meet the needs. Identify the crucial stages needed to ensure smooth transfer of technology from concept stage.

DETAILED SYLLABUS:

UNIT-I
INTRODUCTION TO STRATEGIC MANAGEMENT: Definitions; Classes of decisions; Levels of strategy; Core competence; Strategic intent and stretch; Approaches to strategy making; Roles of different strategists; strategic management process; Benefits and relevance of strategic management; limitations and misgivings; Principles of good strategy growing relevance of strategic management in India, TQM and strategic management.

UNIT II
GLOBALISATION: Meaning and dimensions; Stages of globalisation; Essential conditions for globalisation; Competitive advantage of Nations; Globalisation of Indian business; Factors favouring Globalisation; Globalisation strategies.
UNIT III

UNIT IV
Technology Management and Transfer
Technology Management: Introduction, Definition of Technology, Components, Features, Classification of technology, Concept of technology management, Nature of technology management, Drivers of MOT, Significance, Scope of MOT, Responding to technology challenge.
Technology Transfer: Introduction, Definition, Classification, Significance, Elements of transfer process, Types of technology transfer, package, Modes of transfer, Channels of technology flow, Routes of technology transfer, Effectiveness of technology transfer.

UNIT V
Corporate Governance: The Indian Scenario: Emergence of corporate governance in India and the landmarks, corporate governance models, Codes and status in India, Indian corporate governance – Role and Responsibilities of Regulators and the Board of Directors, Corporate Governance: Specific issues in India, Corporate Governance issues in Family – owned business in India, Corporate Governance and the Indian ethos,

Total Periods: 45
Text Books:

Reference Books:
IV B.Tech – I Semester
14BT60307: Intellectual Property Rights & Management
(Open Elective)
(Common to ECE, EEE, EIE & CE)

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PREREQUISITES: Nil

COURSE DESCRIPTION:
Protection of ideas, innovation and artistic endeavors; Acts and procedure related to patents, trademarks, passing off, copyright, design registration, trade secrets and cyber laws, case studies in each.

COURSE OUTCOMES:
After the completion of course, a successful student will be able to:
1. Prepare documents and fill applications needed for filing a patent, design, copyright and trade mark
2. Ensure smooth transition from concept to final product.
3. Exercise discretion in following ethical aspects in dealing with intellectual property rights.

UNIT I
OVERVIEW OF INTELLECTUAL PROPERTY RIGHTS: Introduction and importance of intellectual property rights (IPRs), types of intellectual property, International scenario in IPR: WIPO, WTO, TRIPS, international and national patent acts: United States of America patent act, United Kingdom patent act, India patent act, recent amendments in India patent act 1972.

UNIT II
PATENTS: Introduction, Basic concepts, object and value of patent law, advantages of patent to inventor, patentable inventions, Not patentable inventions, overview of patent procedure, Bio technology patents, patents on computer program, patent rights on micro organism, plant breeding and breeders right, protection of bio diversity, protection of traditional knowledge, infringement of patents and remedy for infringement.

UNIT III
TRADEMARKS: Trade Marks: Basic concepts, definition, functions, kinds of trademarks: service trademarks, collective trademarks, certification trademarks, textile trade marks, registrable and non registrable trademarks, registration of trademarks, examination process,
establishing trade mark right, good will, infringement and action for trademarks, passing off, trade mark and eco label, comparison with patents industrial design and copy right.

UNIT IV  
(09 periods)
INDUSTRIAL DESIGN, TRADE SECRETS, CYBER LAWS:

Industrial Design: Basic concepts, scope and nature of rights, process of registration rights, rights after registration, transfer of interest or rights, reliefs and remedies and action for infringement of rights, appeals..

Trade Secrets: Definition, significance, tools to protect trade secrets in India

Cyber laws: Co relation to intellectual property

UNIT V  
(09 periods)
COPY RIGHTS:

Copy Rights: Introduction, nature and scope, subject matter, related or allied rights, works in which copy rights subsists, registration of copy rights, conferred by copy right, copy right protection in India, transfer of copy rights, right of broad casing organizations and of performer, computer software.

Total Periods: 45

TEXT BOOKS:

REFERENCE BOOKS:
IV B.Tech – I Semester
14BT60308: Managing Innovation and Entrepreneurship
(Open Elective)
(Common to ECE, EEE, EIE & CE)

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PRE-REQUISITES: Nil

Course Description:
Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies; Concepts; Shifting Composition of the Economy; Purposeful Innovation & 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving; Innovation and Diversification.

Course Outcomes:
After successful completion of this course, students will be able to:
1. Define, explain and illustrate theories of business innovation and entrepreneurship, the evolution of industries and economies, and the roles of Entrepreneurs.
2. Develop a comprehensive and well structured business plan for a new venture.
3. Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan; and,
4. Work effectively in multidisciplinary, cross-cultural teams, towards the development of a Team Project.

DETAILED SYLLABUS:

UNIT I (07 Periods)
Entrepreneurship: Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, entrepreneurial growth and development.

UNIT II (11 Periods)
Creativity and Innovation: Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies: Strategies that aim at introducing an innovation, innovation & entrepreneurship, planning -incompatible with Innovation & entrepreneurship.

SVEC14 - B.TECH - Civil Engineering
UNIT III (07 Periods)
The Individual Entrepreneur: Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation. Entrepreneurial motivation (nAch story); Achievement Motivation in Real life- Case Study. Entrepreneurs versus inventors.

UNIT IV (11 Periods)

UNIT V (09 Periods)

Total Periods: 45

Text Books:

Reference Books:
IV B.Tech – I Semester
14BT60309: Materials Science
(Open Elective)
(Common to ECE, EEE, EIE & CE)

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PRE-REQUISITES:
Engineering Chemistry, Engineering Physics.

COURSE DESCRIPTION
Structure and Bonding in metals; Steels, Cast Irons and Non Ferrous alloys; Material Selection for conductors, Insulators and semi conductors; Strengthening mechanisms of metals; Plastics and Ceramics as Insulators; AC and DC properties of Insulators; Semiconductors and Magnetic materials; Composite materials in Electrical and Electronics engineering, Material Selection and manufacturing of Optical fibers

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Understand how materials are formed and their classification based on atomic arrangement.
2. Illustrate how the design of the various types of steels, cast irons and Non ferrous alloys influence various engineering applications.
3. Understand the basic difference in properties of various conductors, Insulators and Semiconductors and application of various advanced materials for different branches of Engineering.

UNIT I (07 periods)
INTRODUCTION TO MATERIALS SCIENCE: Structure of metals:
Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size.
Constitution of alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT II (12 periods)
UNIT III  
(12 periods)

ELECTRIC CONDUCTORS & INSULATORS: Type of materials selected for conductors, Insulators and semi conductors. Introduction to ceramics- Bonding and microstructure-DC properties of ceramic materials–AC properties- mechanical properties - Ceramics as Conductors, Insulators and capacitors, introduction to Plastics-DC properties-AC properties- mechanical properties.

UNIT IV  
(09 periods)

SEMICONDUCTORS AND MAGNETIC MATERIALS: Fabrication of Semiconductors-Producing a silicon wafer-Lithography and Deposition- Packaging of semiconductors materials-Types of magnetic materials- Measuring magnetic properties-Application of soft magnetic materials in Electromagnets and relays, AC transformers, Generators and motors.

UNIT V  
(05 periods)


Total periods : 45 Periods

TEXT BOOKS:

REFERENCE BOOKS:
IV B. Tech. – I Semester
14BT60502: ENGINEERING SYSTEMS
ANALYSIS AND DESIGN
(Open-Elective)
(Common to ECE, EEE, EIE & CE)

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PRE-REQUISITES: NIL

COURSE DESCRIPTION:

COURSE OUTCOMES:
After successful completion of this course, a student will be able to:
1. Gain knowledge on:
   - Systems Process and System Design
   - Systems Analysis and Modeling
   - System Development Life Cycle
   - Design Management and Maintenance Tools.
2. Apply the CASE Tools for System Process and estimation the given models.
3. Design, Develop and implement new Techniques for modeling the systems.
4. Work effectively as team member on projects
5. Manage and Maintain the System Process.

UNIT I (09 periods)
INTRODUCTION: Introduction- Systems, Types of systems, integrating technologies for systems, Need for system analysis and design, Roll of the systems analyst, the system development life cycle, CASE tools for analysis and design.

UNIT II (09 periods)
ANALYSIS AND MODELING ORGANIZATIONAL SYSTEMS:
Organization as system, System Analysis, Depicting systems graphically, Use case Modeling, levels of management, organizational culture.

UNIT III – PROJECT MANAGEMENT (9 periods)
Project initiation, Problem in organization, Determining feasibilities, ascertaining hardware and software needs, identifying, forecasting, comparing costs and benefits, activity planning and control, managing the project.
UNIT IV (09 periods)
OBJECT ORIENTED ANALYSIS AND DESIGN USING UML:
Object oriented analysis and design- Introduction, Object modeling, Dynamic modeling, functional modeling, packages and other UML artifacts, the importance of using UML for modeling.

UNIT V (09 periods)
DESIGNING EFFECTIVE OUTPUT: Output design objectives, relating output content to output method, realizing how output bias affects users, designing output for display, Case studies- Designing a web site management, online exam management.

Total Periods: 45

TEXT BOOKS:

REFERENCE BOOKS:
IV B. Tech. I Semester
14BT71005: MICROELECTROMECHANICAL SYSTEMS
(Open Elective)
(Common to ECE, EEE, EIE & CE)

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Pre-requisites: Basic knowledge in Physics.

Course Description: Overview of Micro Electro Mechanical Systems (MEMS), scaling laws, working principles of microsensors and microactuators, materials, microfabrication processes, packaging of Microsystems.

Course Outcomes:
After completion of the course the student is able to
1. Demonstrate knowledge on MEMS devices, scaling laws, microsensors and microactuators.
2. Identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.

DETAILED SYLLABUS:
UNIT I (09 Periods)
Overview of MEMS and Scaling Laws: Introduction, MEMS and microelectronics, miniaturization, applications of MEMS in the automotive industry and in other industries.
Scaling laws of miniaturization: Introduction to scaling, scaling in: geometry, rigid-body dynamics, electrostatic forces, electromagnetic forces, Electricity, Fluid mechanics, Heat transfer.

UNIT II (09 Periods)

UNIT III (09 Periods)
Materials for MEMS and Microsystems: Substrate and wafers, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, carbon nano tube (CNT), development of CNTs, application of CNTs.

UNIT IV (09 Periods)
MEMS Fabrication Process and Micromanufacturing: Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching, bulk micromanufacturing, surface micromanufacturing, LIGA process.
UNIT V

MEMS Packaging: Introduction to microsystem packaging, objectives and general considerations in packaging design, three levels of microsystem packaging, interfaces in microsystem packaging, packaging technologies, three-dimensional packaging, selection of packaging materials, signal mapping and transduction, Design case: Pressure sensor packaging.

Text Books:

References:
2. G.K.Ananthasuresh, K.J.Vinoy, Micro and Smart Systems, Wiley India, 1st edition, 2010

Total: 45 Periods
**IV B.Tech – I Semester**

**14BT61205: BIO INFORMATICS**
(Open Elective)

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**PREREQUISITES:** Nil

**COURSE DESCRIPTION:** Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

**COURSE OUTCOMES:**

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

1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.

2. Analyze biological database management system.

3. Create, select and apply appropriate techniques and tools to manage the biological data.

**DETAILED SYLLABUS:**

**UNIT I**
(08 Periods)

**INTRODUCTION TO BIOINFORMATICS:** Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

**UNIT II**
(07 Periods)

**BIOLOGY AND INFORMATION:** Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

**UNIT III**
(10 Periods)

**SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING:** Heuristic alignment algorithms, global sequence alignments- Needleman-Wunsch algorithm, local sequence alignments- smith-waterman algorithm, amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.
UNIT IV

PRIMARY DATABASES AND THEIR USE: Introduction to biological databases- organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT V

SECONDARY DATABASES: Introduction to secondary databases- organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-organization and Management of databases, KEGG, ExPASy, BRENDA.

(Total Periods: 45)

TEXT BOOKS:


REFERENCE BOOKS:


IV B.Tech - I Semester
14BT61206: CYBER SECURITY AND LAWS
(Open Elective)

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PREREQUISITES: Nil

COURSE DESCRIPTION: Cyber Crimes and Indian IT Act; Cyber Offenses; Tools and Methods used in Cyber Crime; Phishing and Identity Theft; Indian and Global Perspective on Cyber Crimes and Cyber Security; Organizational Implications on Cyber Security; IPR Issues; Cyber Crime and Terrorism; Cyber Crime Illustrations.

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

2. Analyze the legal perspectives and laws related to cyber crimes in Indian context.
3. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.

DETAILED SYLLABUS:

UNIT I (09 Periods)

Cyber Offenses: Introduction, Criminals Planning on Attacks, Social Engineering, Cyber Stalking, Cyber Café and Crimes, Botnets.

UNIT II (09 Periods)
TOOLS AND METHODS USED IN CYBER CRIME: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan horses and Backdoors, Steganography, DoS and DDoS attacks.

Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).
UNIT III (08 Periods)

CYBER CRIMES AND CYBER SECURITY-LEGAL PERSPECTIVES: Introduction, Cyber Crime and the legal landscape around the world. Cyber Laws in Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Consequences of not addressing the weakness in IT Act, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyberlaw, Technology and Students in India Scenario.

UNIT IV (10 Periods)


UNIT V (09 Periods)

CYBER TERRORISM AND INFORMATION WARFARE: Introduction, Intellectual Property in the Cyber Space, the Ethical Dimension of Cyber Crimes, the Psychology, Mindset and Skills of Hackers and Cyber Criminals, Sociology of Cyber Criminals, Information Warfare.


(Total Periods: 45)

TEXT BOOK:


REFERENCE BOOKS:

IV B.Tech I Semester

14BT70110: STRUCTURAL DYNAMICS
(PROFESSIONAL ELECTIVE-II)

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COURSE DESCRIPTION: Introduction to principle of vibration analysis, single degree of freedom Two degree of freedom and Multi–degree of freedom systems–Vibration Analysis– Dynamic analysis of continuous systems.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:

1. Evaluate the structural properties, mode shapes for the different structures under the different loading conditions.
2. Analyse the problems on the single degree of freedom and multi degrees of freedom.

DETAILED SYLLABUS:

UNIT I (10 Periods)
INTRODUCTION TO STRUCTURAL DYNAMICS AND SINGLE DEGREE OF FREEDOM (SDOF) SYSTEM:

UNIT II (09 Periods)

UNIT III (09 Periods)

UNIT IV (09 Periods)
UNIT V

DYNAMIC ANALYSIS OF CONTINUOUS SYSTEMS: Differential equation of motion–Transverse vibration of linearly elastic beams–Analysis of undamped free vibration of simply supported and cantilever beams.

Total Periods:45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech I Semester
14BT70111: ADVANCED FOUNDATION ENGINEERING
[PROFESSIONAL ELECTIVE – II]

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PREREQUISITES: Soil Mechanics, Foundation Engineering

COURSE DESCRIPTION:
Advanced bearing capacity theories; Analysis and design of shallow foundations; Pile foundations; Well foundations; Sheet pile walls; Foundations in problematic soils; Underreamed pile foundations; Marine substructures.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Demonstrate knowledge on advanced theories of bearing capacity and settlements of shallow and deep foundations
2. Analyze different types of foundations and sheet piles based on different ground conditions
3. Design foundations, sheet piles and breakwaters
4. Ensure stability and safety in the design of foundations, sheet piles and marine substructures

DETAILED SYLLABUS:
UNIT I (09 Periods)
SHALLOW FOUNDATIONS: Theories of bearing capacity – Effects of size, depth and shape of footings, tilt and eccentricity of applied loads, water table, compressibility, non-homogeneity and anisotropy of soil – Bearing capacity of footings resting on stratified soils, on slope and on top of the slopes – Settlement of foundation – Bearing pressure using SPT, CPT, Dilatometer and Pressuremeter – Types of foundation – Design principles of isolated, combined footing and mat foundation (conventional rigid method only).

UNIT II (10 Periods)
UNIT III (09 Periods)

UNIT IV (08 Periods)

UNIT V (09 Periods)

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech I Semester
14BT70112: WATER RESOURCES SYSTEMS PLANNING AND MANAGEMENT
(Professional Elective – II)

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**PREREQUISITES:** Surveying, Engineering Hydrology, Water Resources Engineering.

**COURSE DESCRIPTION:** Concepts of water resources system planning and management – Linear programming – Dynamic programming – Non-linear optimization techniques – Simulation – Water resources economics – Water resources management.

**COURSE OUTCOMES:**

1. Apply mathematics and optimization techniques for effective water resources planning.
2. Analyze availability of water resources for sustainable development.
3. Develop simulation techniques for water resources, planning and management.
4. Address the importance of water resources planning and management.
5. Carryout cost benefit analysis and give insights for the benefit of society.

**DETAILED SYLLABUS:**

**UNIT I**

**WATER RESOURCE SYSTEMS:** Concepts of systems analysis – Systems approach to water resources planning and management – Role of optimization models – Objective function and constraints – Types of optimization techniques.

**UNIT II**


**UNIT III**

**DYNAMIC PROGRAMMING:** Belman’s principles of optimality – Forward and backward recursive dynamic programming – Case of dimensionality – Application of dynamic programming for resource allocation.
UNIT – IV
(09 Periods)
NON–LINEAR OPTIMIZATION TECHNIQUES AND SIMULATION:
Classical method of optimization – Kun–Tucker – Gradient based techniques for simple unconstrained optimization – Application of simulation techniques in water resources planning.

UNIT – V
(09 Periods)

Total Periods:45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech I Semester
14BT70113: TRANSPORTATION MANAGEMENT
(PROFESSIONAL ELECTIVE – II)

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PREREQUISITES: Transportation Engineering – I


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Acquire the knowledge on the transportation planning and management.
2. Assemble, analyze, and appropriately apply transportation engineering data from existing graphs, reports, and other documents.
3. Use Statistical methods and Electronic technology to support the planning, design, operation and management of transportation facilities and projects.
4. Apply latest techniques in Planning and Controlling of Transportation Projects.

DETAILED SYLLABUS:
UNIT I (09 Periods)

UNIT II (09 Periods)
TRAFFIC ASSIGNMENT: Purpose of traffic assignment- Assignment techniques - All or nothing assignment - Capacity restraint assignment - Diversion curves - Route building algorithms.
THEORY OF TRAFFIC FLOW: Scope, definitions and basic relationship, review of flow density speed studies, hydrodynamic analogies, Application of hydrodynamic analogy, Car following theory and its application to traffic engineering, probabilistic description of traffic flow, an introduction to queuing theory as applied to traffic flow problems for study state conditions, simulation studies.

UNIT III (08 Periods)
TRANSPORT ECONOMICS: Economic evaluation of highway schemes - need for economic evaluation - cost and benefits of transportation projects - basic principles of economic evaluation - Net present value method, benefit/cost ratio method - internal rate of return method - Vehicle operating costs - Value of travel time saving - Accident costs.
PUBLIC TRANSPORTATION–MASS TRANSIT SYSTEMS: Bus and rail transit, characteristic capacities – Introduction to advanced computational techniques for transportation planning.

UNIT IV (08 Periods)
CONSTRUCTION PLANT, MACHINERY, TOOLS AND VEHICLES USED IN TRANSPORTATION PROJECTS (HIGHWAY, RAILWAY, AIRPORT, NAVAL DOCKYARD) : Dewatering, Blasting, Excavation, Grading, Haulage; Dredging; Concreting – RMC Plant, Batching Plant, Concrete Pumps, Transit Mixers; Piling – Pile Driving in equipment; Air Compressors and Pneumatic tools; Equipment for Flexible Pavements – Hot Mix Plant, Paver; Railway Track-laying equipment; Time, Cost, Output and FOL calculation; Numerical Problems
SCHEDULING AND CONTROLLING OF PLANT, MACHINERY, TOOLS AND VEHICLES: Grouping of Plant and Machinery; Incorporating in Project Planning; Preparation of Plant Schedule, Numerical Problems.

UNIT V (11 Periods)
PLANNING AND CONTROLLING OF TRANSPORTATION PROJECTS: WBS, Network Development, Resource allocation, Planning and Controlling
INTRODUCTION TO SOFTWARE PACKAGES LIKE PRIMAVERA AND MS PROJECT

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
PREREQUISITES: Environmental Science


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain the parameters of EIA and its methods and Environmental audit.
2. Analyze and interpret the parameters that affect the study area.
3. Address the issue related to the impact of parameters on the environment and society.
4. Conduct audit and write EIA report without bias and give recommendations.

DETAILED SYLLABUS:

UNIT I
INTRODUCTION TO ENVIRONMENTAL IMPACT ASSESSMENT
Basic concept of EIA – Initial environmental examination – Elements of EIA – Factors affecting EIA – Impact evaluation and analysis – Preparation of environmental base map – Classification of environmental parameters.

UNIT II
EIA METHODOLOGIES

UNIT III
ENVIRONMENTAL IMPACT ON SOIL, GROUND WATER AND SURFACE WATER
UNIT IV  
ENVIRONMENTAL IMPACT ASSESSMENT OF AIR, VEGETATION AND WILDLIFE

UNIT V  
ENVIRONMENTAL AUDIT AND ACTS

Total Periods:45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech I Semester
14BT70121: REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEMS LAB

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PREREQUISITES: –

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:

1. Apply the knowledge of aerial photographs, satellite imagery to civil engineering applications.
2. Analyze the Remote sensing and GIS data to generate the geographical information for natural resources.
3. Prepare thematic maps using Remote Sensing and GIS data for different applications.
4. Interpret the feature classes in RS and GIS applications using appropriate methods.
5. Use RS & GIS tools for various applications of civil engineering.
6. Communicate effectively on the geospatial data to the engineering community and society in written, oral and graphical forms.

LIST OF EXPERIMENTS:
1. Creation of geo–database
2. Digitization of Toposheet/Map
3. Drainage analysis
4. Developing digital elevation model
5. Preparation of thematic maps
6. Landuse and Landcover analysis
7. Study of feature estimation
8. Rainfall –Runoff analysis
9. Road network analysis
10. Watershed analysis
11. Site suitability analysis
12. Natural hazard zones map
IV B.Tech I Semester
14BT70122: COMPUTER AIDED DESIGN AND DETAILING LAB

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Prerequisites: Engineering Graphics, RCCS–I & II

Course Description: Simple Beams and 2-D, 3D Frame Analysis.

Course Outcomes:
After completion of the course, a successful student will be able to:
1. Acquire knowledge on the theoretical concepts of analysis, design and use of software.
2. Analyze structure under different loading conditions.
3. Estimate the reinforcement required and sizes of different members using Stadd–Pro.
4. Use Stadd-Pro for the analysis and design of structures.
5. Prepare drawings with detailed report of a building for the necessary approvals.

List of Experiments:
1. Analysis of simple beams
2. 2-D Frame Analysis and design
3. Steel tabular truss analysis and design
4. 3-D Frame Analysis and design
5. Retaining wall analysis and design
6. Simple tower analysis and design
7. Analysis and design of INTZ type water tank, circular and rectangular water tanks
8. Analysis and design plate girder bridge

Reference:
1. IS 456 – 2000
2. IS 800 – 2007
IV B. Tech I Semester
14BT70123: SEMINAR

PREREQUISITES: All the courses of the program up to III B. Tech. – I Semester.

COURSE DESCRIPTION:
Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Demonstrate in-depth knowledge on the seminar topic.
2. Analyze critically, chosen seminar topic for substantiated conclusions.
3. Undertake investigation of issues related to seminar topic providing valid conclusions.
4. Function effectively as individual on the chosen seminar topic.
5. Develop communication skills, both oral and written for preparing and presenting seminar report.
6. Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.
IV B.Tech II Semester
14BT80101: PRESTRESSED CONCRETE

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PREREQUISITES: Structural Analysis, Reinforced Concrete constructions

COURSE DESCRIPTION: Introduction to prestressing, methods and materials – Analysis of sections for flexure – Design of section for flexure and shear – Analysis of end blocks – Deflection of prestressed concrete sections

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Demonstrate knowledge on the preparation of prestressed concrete and members
2. Analyze prestressed members under flexure and shear
3. Design the prestressed members using elastic design method

DETAILED SYLLABUS:

UNIT I (08 Periods)
INTRODUCTION: Introduction to prestressing – Materials – Types of prestressing – Loss of prestress – Methods of Pretensioning and post tensioning

UNIT II (10 Periods)
ANALYSIS OF SECTIONS FOR FLEXURE: Analysis of sections for flexure – Prestressed with straight, concentric, eccentric tendons, bent and parabolic tendons.

UNIT III (09 Periods)
DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: Kern Zone, cable zone – Allowable stresses – Design criteria as per I.S.Code – Design of section for flexure and shear.

UNIT IV (10 Periods)
ANALYSIS OF END BLOCKS: Anchorage zone stresses: Guyon’s method and Mugneil method – Anchorage zone reinforcement – Transfer of prestress pre-tensioned members.

UNIT V (08 Periods)
DEFLECTION OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections – Factors influencing deflections – Short term deflections of uncracked members – prediction of long term deflections.

Total Periods: 45
TEXT BOOKS

REFERENCE BOOKS

IS Codes
IS 1343– is to be permitted into the examination hall.
IV B.Tech II Semester
14BT80102: ESTIMATION, COSTING & VALUATION

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PREREQUISITES: Building Materials, Surveying

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain estimation, specifications of materials and valuation
2. Calculate various quantities required for a structure.

DETAILED SYLLABUS:

UNIT  I
ESTIMATE OF BUILDINGS  (10 Periods)
Load bearing and framed structures – Calculation of quantities of brick work, RCC, PCC, Plastering, white washing, colour washing and painting / varnishing for shops, rooms, residential building with flat and pitched roof – Various types of arches – Calculation of brick work and RCC works in arches – Estimate of joineries for panelled and glazed doors, windows, ventilators, handrails etc.

UNIT  II
ESTIMATE OF OTHER STRUCTURES  (13 Periods)

UNIT  III
SPECIFICATION AND RATE ANALYSIS  (08 Periods)

UNIT  IV
CONTRACTS AND TENDERS  (08 Periods)
UNIT V
VALUATION (06 Periods)
Necessity – Basics of value engineering – Capitalised value – Depreciation
– Escalation – Value of building – Calculation of Standard rent – Mortgage
– Lease

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech II Semester
14BT80103: ADVANCED STEEL STRUCTURES
(PROFESSIONAL ELECTIVE III)

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PREREQUISITES: Steel Structures

COURSE DESCRIPTION:
Riveted plate girders and welded plate girders–Roof and Tubular trusses–Gantry Girder–steel water tanks–plastic analysis and composite construction

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain plate girders, roof trusses and water tanks due to various loading conditions.
2. Design roof trusses, plate girders and composite construction.

DETAILED SYLLABUS:

UNIT I (10 Periods)
RIVETED PLATE GIRDERS AND WELDED PLATE GIRDERS:

RIVETED PLATE GIRDERS: Design of cross section–Curtailment of flange plates–connection of flange angles to web and flange angles to flange plates.

WELDED PLATE GIRDERS: Design of cross section of plate girders–Design of vertical, horizontal and bearing stiffeners.

UNIT II (09 Periods)

TUBULAR TRUSSES: Design of tension members, compression members and–Tubular trusses–Connections.

UNIT III (09 Periods)
GANTRY GIRDER: Gantry girder impact factors–Longitudinal forces–Design of gantry girders.

UNIT IV (09 Periods)
STEEL WATER TANKS: Specifications–Design of rectangular steel tank.

UNIT V (08 Periods)
PLASTIC ANALYSIS AND COMPOSITE CONSTRUCTION: Introduction to plastic analysis–Shape factor, plastic hinge, collapse loads for simply supported beams, propped cantilevers, and two span continuous beams–Design simple beams.

Total Periods: 45
TEXT BOOKS

REFERENCE BOOKS

IS Codes: IS 800–2007, IS 875– Part III, IS 1161–1979 and Steel Tables are to be permitted into the examination hall.
IV B.Tech II Semester
14BT80104: **SOIL DYNAMICS AND MACHINE FOUNDATIONS**
(PROFESSIONAL ELECTIVE – III)

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**PREREQUISITES:** Soil Mechanics

**COURSE DESCRIPTION:** Knowledge of vibration; wave propagation through soil deposits; vibration isolation; Determination of dynamic soil properties; Analysis and design of machine foundations.

**COURSE OUTCOMES:**

After completion of the course, a successful student will be able to:
1. Understand causes and characteristics of vibration
2. Analyse soil properties due to dynamic loading
3. Design machine foundations.

**DETAILED SYLLABUS:**

**UNIT I**

(Fundamentals of Vibration: 9 Periods)


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

**UNIT II**

(Wave Propagation: 9 Periods)

**WAVE PROPAGATION:** Propagation of seismic waves in soil deposits – Attenuation of stress waves – Stress-strain behavior of cyclically loaded soils – Strength of cyclically loaded soils.

**DYNAMIC SOIL PROPERTIES:** Dynamic soil properties – Laboratory and field testing techniques – Elastic constants of soils – Correlations for shear modulus and damping ratio in sands, gravels, clays and lightly cemented sand – Liquefaction of soils.

**UNIT III**

(Vibration Analyses: 9 Periods)

UNIT IV (9 Periods)

UNIT V (9 Periods)

VIBRATION ISOLATION: Types and methods of isolation – Active isolation and passive isolation – Dynamic properties of isolation materials.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech II Semester
14BT80105: WATERSHED MANAGEMENT
(PROFESSIONAL ELECTIVE – II)

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PREREQUISITES: Surveying and Hydrology.


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain the principles of watershed and its management
2. Assess water availability and suggest different water harvesting techniques.
3. Develop and strengthen community based watershed management for sustainable growth.

DETAILED SYLLABUS:
UNIT I (10 Periods)

UNIT II (08 Periods)

UNIT III (10 Periods)
UNIT IV  

UNIT V  

Total Periods:45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech II Semester
14BT80106: INDUSTRIAL WASTE WATER TREATMENT
(PROFESSIONAL ELECTIVE – III)

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PREREQUISITES: Wastewater Technology


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Apply the principles of science in the treatment of water.
2. Analyses various pollutant present in industrial waste water.

DETAILED SYLLABUS:
UNIT I                    (10 Periods )

UNIT II                   (09 Periods )

UNIT III                  (09 Periods )

UNIT IV                   (08 Periods )

UNIT V                    (09 Periods )

Total Periods: 45
TEXT BOOKS

REFERENCE BOOKS
IV B.Tech II Semester
14BT80107: INFRASTRUCTURE DEVELOPMENT AND MANAGEMENT
(PROFESSIONAL ELECTIVE – III)

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**PREREQUISITES:** Construction Planning and Project Management

**COURSE DESCRIPTION:** Introduction – Overview of Indian Infrastructure – Tenders, Contracts and Specifications – Policies on Infrastructure Development – Construction and Infrastructure – Infrastructure Management.

**COURSE OUTCOMES:**
After completion of the course, a successful student will be able to:

1. Understand contract, tendering and infrastructure development scenario in India
2. Give suggestions as per the policies of Infrastructure development and issues
3. Prepare a tender document for an infrastructure project (PO 10)
4. Forecast future development in Infrastructure project development and management.

**DETAILED SYLLABUS:**

**UNIT I**
---
(06 Periods)
**INTRODUCTION:** Impact of Infrastructure development on economic development, standard of living and environment – Reasons for rise of public sector and government in infrastructural activities – Changed socio-economic scenario and current problems and related issues.

**UNIT II**
---
(09 Periods)


SVEC14 - B.TECH - Civil Engineering
197
UNIT III

UNIT IV

UNIT V
INFRASTRUCTURE MANAGEMENT: Importance, scope and role in different sectors of construction.
- Airports: Requisites of domestic & International airports & cargo & military airports, facilities available – Terminal management, ATC.

Total Periods: 42

TEXTBOOKS
REFERENCE BOOKS

IV B.Tech II Semester
14BT80108: EARTHQUAKE RESISTANT DESIGN OF STRUCTURES
(PROFESSIONAL ELECTIVE–III)

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PREREQUISITES: Structural Dynamics, Engineering Geology.


COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain the principles of seismic resistant design of structures.
2. Analyze structure subjected to natural vibrations and estimate frequencies.
3. Design of an earthquake resistant building using IS codes.

DETAILED SYLLABUS:

UNIT I (10 Periods)

UNIT II (09 Periods)

UNIT III (08 Periods)
UNIT IV  (08 Periods)

UNIT V  (10 Periods)
SHEAR WALLS: Types – Design of shear walls as per IS: 13920 – Detailing of reinforcements.

Total Periods:45

TEXT BOOKS

REFERENCE BOOKS

Codes/Tables
IV B.Tech II Semester
14BT80109: BRIDGE ENGINEERING
(PROFESSIONAL ELECTIVE – IV)

PREREQUISITES: Reinforced concrete structures, Foundation Engineering.

COURSE DESCRIPTION: Bridge loading standards– Box culvert and Deck slab bridge– Beam and Slab bridge– Bridge beams– Piers and Abutments.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Understand the concept of loading and their pattern on the bridges
2. Carryout stability analysis of bridge piers and bridge slab.
3. Design box culvert and deck slabs for different classes of vehicles .

DETAILED SYLLABUS:
UNIT I (06 Periods)

UNIT II (08 Periods)
BOX CULVERT AND DECK SLAB BRIDGE: General aspects – Design loads – Design of box culvert subjected to class AA tracked vehicle only.

DECK SLAB BRIDGE: Effective width method of analysis and design of deck Slab Bridge (simply supported) subjected to class AA tracked vehicle only.

UNIT III (10 Periods)
BEAM AND 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 IV (10 Periods)
UNIT V

(11 Periods)

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
5. Relevant IRC & Railway Bridge Codes
IV B.Tech II Semester
14BT80110: GROUND IMPROVEMENT TECHNIQUES
[PROFESSIONAL ELECTIVE – IV]

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PREREQUISITES: Soil Mechanics and Foundation Engineering

COURSE DESCRIPTION: Scope of ground improvement; Methods of ground improvement – Drainage and dewatering – In-situ treatment of cohesionless and cohesive soils – Stabilisation – Earth reinforcement

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Explain various methods available for ground improvement
2. Use both mechanical and chemical methods/geosynthetics for improvement of soils.

DETAILED SYLLABUS:
UNIT I  
GROUND IMPROVEMENT
Role of ground improvement in foundation engineering – methods of ground improvement – Geotechnical problems in alluvial, laterite and black cotton soils – Selection of suitable ground improvement techniques based on soil condition.

UNIT II  
DRAINAGE AND DEWATERING
Drainage techniques – Well points – Vacuum and electroosmotic methods – Seepage analysis for two dimensional flow–fully and partially penetrating slots in homogenous deposits [Simple cases only].

UNIT III  
INSITU DENSIFICATION
UNIT IV (09 Periods)
STABILISATION
Types of grouts – Grouting equipment and machinery – Injection methods
– Grout monitoring – Shotcreting and Gunting Technology – Stabilisation
with mechanical bituminous cement, lime and chemicals – Stabilisation
of expansive soils.

UNIT V (09 Periods)
GEOSYNTHETICS AND EARTH REINFORCEMENT
Concept of reinforcement – Types of reinforcement material – Applications
of reinforced earth – Types of Geosynthetics – Functions and applications
of Geosynthetics.

(Total 45 Periods)

TEXT BOOKS

REFERENCE BOOKS
2. Xanthakos P.P, Abramson, L.W and Bruce, D.A, *Ground Control
   Hall Inc., 2012.
   Special Publication, 1996.
IV B.Tech II Semester
14BT80111: REHABILITATION AND RETROFITTING OF STRUCTURES
(PROFESSIONAL ELECTIVE – IV)

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PREREQUISITES: CPPM

COURSE DESCRIPTION: Maintenance and Repair strategies–Serviceability and Durability of concrete– Materials and Technology for repair– Repairs, Rehabilitation and Retrofitting of structures– Demolition techniques

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Describe various types of materials used for retrofitting .
2. Suggest proper materials for the repair of structure.
3. Understand the importance of safety of structure and provide solutions for the rehabilitation of structure.

DETAILED SYLLABUS:

UNIT I (8 Periods)
MAINTENANCE AND REPAIR STRATEGIES: Maintenance, repair and rehabilitation, Facets of Maintenance, importance of Maintenance various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration.

UNIT II (10 Periods)

UNIT III (15 Periods)
UNIT IV (8 Periods)
REPAIRS, REHABILITATION AND RETROFITTING OF STRUCTURES:
Repairs to overcome low member strength, Deflection, Cracking, Chemical disruption, weathering corrosion, wear, fire, leakage and marine exposure.

UNIT V (4 Periods)
DEMOLITION TECHNIQUES: Engineered demolition techniques for Dilapidated structures – case studies

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
PREREQUISITES: Water Resources Engineering

COURSE DESCRIPTION: Design and drawing of surplus weir – Tank sluice with tower head – Trapezoidal notch fall – Canal regulator – Type III siphon aqueduct – sloping glacis weir.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Design and develop an irrigation structure as per the suitability of a site.

DETAILED SYLLABUS:
Design and drawing of the following irrigation structures:
1. Surplus weir
2. Tank sluice with tower head
3. Trapezoidal notch fall
4. Canal regulator
5. Type III Siphon aqueduct.
6. Direct Sluice

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

REFERENCE BOOKS
IV B.Tech II Semester
14BT80113: ARCHITECTURE AND TOWN PLANNING
(PROFESSIONAL ELECTIVE – IV)

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PREREQUISITES: CPPM

COURSE DESCRIPTION: Architectural design and site planning – Building Architecture and Services – Town Planning and Structure – Land Use Planning – Regional Planning and Standards

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Apply the principles of light and sound for the best architectural design of a building
2. Assess the importance of land use pattern and design landscape
3. Plan, design and develop town using various models of urban structure
4. Use modern techniques and methods in the construction of the building for sustainable development.

DETAILED SYLLABUS:
UNIT I (09 Periods)
ARCHITECTURAL DESIGN AND SITE PLANNING: Architectural design – Analysis – Integration of function and aesthetics – Introduction to basic elements and principles of design – Surveys – Site analysis – Development control – Layout regulations – Layout design concepts – Integration of building services – Interior design.

UNIT II (09 Periods)

UNIT III (09 Periods)
TOWN PLANNING AND STRUCTURE: Planning – Definition, concepts and processes – Aims and objectives of planning – Levels of planning in India and their interrelationship – Planning administration – Models of
planning processes – Components of Settlement structures – Models of urban structure – Demand and supply of land for urban use – Means and mechanism – Impact on urban structure – Goals of land policy.

UNIT IV
LAND USE PLANNING: Concept of land use – Locational attributes of land use – Land use planning information system – Activity system and choice of space qualities – System approach and physical planning – Approach to land use planning – Introduction to spatial planning at regional level – Choice theory and advocacy planning and their application action plan and its relevance – Development plan types – Scope and objectives – Principles of landscape design

UNIT V
REGIONAL PLANNING AND STANDARDS: Planning practices in India – Method of identifying urban and regional problem – Setting of goals objectives and priorities – Performance standards – Spatial standards and standard for utilities – Classification of regions – Regionalization and delineation techniques for various types of regions – Cluster and factor analysis method.

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
IV B.Tech II Semester
14BT80114: RAILWAY, HARBOUR AND AIRPORT ENGINEERING
[PROFESSIONAL ELECTIVE – IV]

PREREQUISITES: Surveying, Soil Mechanics


COURSE OUTCOMES:
After the completion of the course, a successful student will be able to:
1. Acquire knowledge on railway engineering, airport and harbor engineering.
2. Assemble, analyze, and appropriately apply transportation engineering data from existing graphics, reports, and other documents.
3. Design of Railway Tracks, airport runway and layout of harbor, tunnels and Geometrics and other components & maintenance and safety aspects.
4. Understand the safety and maintenance aspects of railway tracks, runway, harbours and tunnels.

DETAILED SYLLABUS:
UNIT I
(08 Periods)

UNIT II
(09 Periods)
GEOMETRIC DESIGN OF RAILWAY TRACK: Necessity of design of a railway track – Gradient and grade compensation: ruling gradient, momentum gradient, Pusher or Helper gradient, Gradient in station yards, Grade compensation on curves – speed of the train, safe speed on curves – Radius of degree of curve – Super elevation or cant: Objects of providing super elevation, relationships of super elevation, gauge, speed and radius of curve, average speed, limits of super elevation, cant deficiency, negative super elevation – Curves: Necessity, effects of curvature, types of curves, necessity of providing transition curve, types of transition curves, length of transition curves – Realignment of curves by string line.
method: procedure for string lining the curves, computation of slews or shifts, slewing curve to the adjustment – widening of gauge on curves, shift

UNIT III (10 Periods)
AIRPORT ENGINEERING: Airport planning – Airport characteristics – airport obstructions – airport capacity and configuration – taxiway design – structural design of airport pavements – maintenance and rehabilitation of airfield pavements – visual aids – airport grading and drainage – environmental guidelines for air port projects

UNIT IV (09 Periods)

UNIT V (09 Periods)
TUNNELING: Tunnels – Tunnel Surveying – Methods of Tunneling in soft strata, Pneumatic process or compressed air methods – Tunneling in rock – safety precautions in tunneling work – tunnel lining – shafts and caissons in tunneling – tunnel drainage – tunnel ventilation, dust prevention and lighting – tunneling for underground railway and tube railway – tunnels conveying water

Total Periods: 45

TEXT BOOKS

REFERENCE BOOKS
1. KK Chitkara, Construction Project Management: Planning, Scheduling and Controlling, Tata McGraw Hill Education Pvt. Ltd., 2010
2. SP Chandola, A Text book of Transportation Engineering, S Chand & Co Ltd, 2011

NOTE. Booklet containing relevant extracts from Standards and Codes, should be made available to Students during examinations
IV B.Tech II Semester
14BT80121: COMPREHENSIVE VIVA-VOCE

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PREREQUISITES: —

COURSE DESCRIPTION:
Assessment of student learning outcomes.

COURSE OUTCOMES:

Comprehensive Viva-Voce enables a successful student to

1. Demonstrate knowledge in the program domain.
2. Exhibit professional etiquette suitable for career progression.
3. Present views cogently and precisely.
IV B.Tech. II Semester
14BT80122: PROJECT WORK

PREREQUISITES: —

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES: On completion of project work the student will be able to

1. Demonstrate in-depth knowledge on the project topic.
2. Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.
3. Design solutions to the chosen project problem.
4. Undertake investigation of project problem to provide valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for project work.
6. Address the issues related to health and safety of the society
7. Provide solutions for sustainability through society and environmental related projects
8. Understand professional and ethical responsibilities while executing the project work.
9. Function effectively as individual and a member in the project team.
10. Develop communication skills, both oral and written for preparing and presenting project report.
11. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.
12. Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.