ACADEMIC REGULATIONS (R – 14)

COURSE STRUCTURE

AND

DETAILED SYLLABI

FOR

B. Tech Regular Four Year Degree Courses

(For the Batches Admitted From 2014-2015)

&

B. Tech (Lateral Entry Scheme)

(For the Batches Admitted From 2015-2016)

MECHANICAL ENGINEERING

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

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

R.V.S. NAGAR, CHITTOOR- 517 127 (AP)
The autonomy is conferred on Sri Venkateswara College of Engineering and technology by JNT University, Anantapur based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the affiliating University in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

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

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

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

Principal
VISION

Carving the youth as dynamic, competent, valued and knowledgeable professionals who shall lead the Nation to a better future.

MISSION

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

QUALITY POLICY

Sri Venkateswara College of Engineering and Technology strides towards excellence by adopting a system of quality policies and processes with continued improvements to enhance students’ skills and talent for their exemplary contribution to the society, the nation and the world.
ACADEMIC REGULATIONS (R – 14)
COURSE STRUCTURE
AND
DETAILED SYLLABI

FOR

B. Tech Regular Four Year Degree Courses
(For the Batches Admitted From 2014-2015)

&

B. Tech (Lateral Entry Scheme)
(For the Batches Admitted From 2015-2016)

MECHANICAL ENGINEERING
SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
(Affiliated to J.N.T. University Anantapur, Ananthapuramu).

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Program
(For the batches admitted from the academic year 2014-15)

and

B.Tech. (Lateral Entry Scheme)
(For the batches admitted from the academic year 2015-16)

1. Applicability : All the rules specified herein, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2014-2015 onwards. Any reference to “College” in these rules and regulations stands for Sri Venkateswara College of Engineering and Technology (Autonomous).

2. Extent : All the rules and regulations, specified herein after shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, Sri Venkateswara College of Engineering and Technology (A) shall be the Chairman of the Academic Council.

3. Admission :

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

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

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

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

3.2 Admission into the second year of four Year B.Tech., Degree Program in Engineering:

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

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

3.2.2 Admission Procedure: Lateral Entry seats are filled as per the norms prescribed by the Government of Andhra Pradesh from time to time.

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

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

5. Academic Year: The College shall follow semester pattern from first year onwards. I, II semesters of First Year of four Year B.Tech., Program shall have a minimum of 14 instructional weeks. From second year onwards each semester shall have a minimum of 16 instructional weeks.

6. Course Structure: Each Program of study shall consist of:

- General subjects comprise of the following courses: (5 to 10%)
i. English Language /Communication Skills /  Mind Skills
ii. Humanities and Social Sciences
iii. Principles of Management

The above courses are common to all Branches.

- **Basic science subjects comprise of the following courses: (15 to 25%)**
  i. Mathematics
  ii. Physics
  iii. Chemistry

The above courses are common to all branches.

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

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

- **Elective subjects: (10 to 15%)**
Electives will be offered to the students to diversify the spectrum of knowledge.

These electives can also be chosen based on the interest of the student to broaden his individual skill and knowledge in the specialized area.

**Main Project:** Main Project shall be carried out in the institution / industry during IV year II semester for a period of one semester. The project report shall be submitted to the department after successful completion.

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

<table>
<thead>
<tr>
<th>Subject</th>
<th>Semester Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory</td>
<td>01</td>
</tr>
<tr>
<td>Practical</td>
<td>03</td>
</tr>
</tbody>
</table>
i. As a norm, for the theory subjects, **one credit** for one contact period per week is assigned.

ii. As a norm, for practical courses **two credits** will be assigned for three contact periods per week.

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

iv. For Project work where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

- The four year curriculum of any B.Tech, Program of study shall have a total of **176 credits**.
- In the case of lateral entry students, B.Tech. program of study shall have a total of **132 credits**.
- The exact requirements of credits for each subject will be as recommended by the concerned Board of Studies and approved by the Academic Council.

8. **Examination System**

: All components in any Program of study will be evaluated continuously through internal evaluation and an external evaluation component conducted as semester-end examination.

8.1 **Distribution of Marks**:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Examination</th>
<th>Marks%</th>
<th>Examination and Evaluation</th>
<th>Scheme of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>70</td>
<td>Semester-end examination (external Paper setting and external evaluation)</td>
<td>This Examination question paper in theory subjects will be for a maximum of 70 marks. The question paper shall consists of two parts <strong>Part A</strong>: 5 short answer questions shall be given for a maximum 20 marks with one question from each unit. No choice will be given and all questions carry equal marks. <strong>Part B</strong>: 5 Descriptive/problematic questions shall be given for a maximum of 50</td>
</tr>
<tr>
<td></td>
<td>Theory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Theory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Mid-Examination of 120 Min. duration (Internal evaluation). The question paper shall be of descriptive type with 5 questions out of which 4 are to be answered and evaluated for 20 marks.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Assignment (Internal evaluation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Two assignments shall be given and each will be evaluated for 10 marks. Average of two Assignments shall be taken as internal marks for the assignments.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Semester-end Lab Examination (External evaluation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>70 marks are allotted for laboratory examination during semester-end.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Continuous evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Performance in laboratory experiments and Record are considered.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Internal test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Practical Test at the end of the semester.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>➢ Marks scored in the</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
continuous evaluation and internal test are considered for awarding internal marks.

<table>
<thead>
<tr>
<th>Term</th>
<th>Subject</th>
<th>Marks</th>
<th>Evaluation</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Drawing</td>
<td>70</td>
<td>Semester-end drawing Examination</td>
<td>70 marks are allotted for drawing examination during semester-end.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(External evaluation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>Continuous evaluation</td>
<td>Performance in Drawing classes will be considered.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>Internal test</td>
<td>Two tests will be conducted. Better of the two will be taken.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Marks scored in the continuous evaluation and internal test are considered for awarding internal marks.</td>
</tr>
<tr>
<td>4</td>
<td>Project Work</td>
<td>300</td>
<td>External evaluation</td>
<td>Semester-end Project Viva-Voce Examination by a Committee as detailed under 8.2.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
<td></td>
<td>Continuous evaluation by the Departmental Committee</td>
</tr>
</tbody>
</table>

Wherever the Question paper is different from the conventional pattern, the concerned pattern of question paper will be given at the end of the syllabus of that subject.

**8.2 Project Work Evaluation**

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

**8.3 Eligibility to appear for the Semester-End examination:**

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

**8.3.2** Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted on medical grounds by the College Academic Committee. A stipulated fee shall be payable towards condonation of shortage.
8.3.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned and the candidate will be detained.

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

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

8.4 Evaluation: Following procedure governs the evaluation.

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

8.4.2 Performance in all the subjects is tabulated program-wise and will be scrutinized by the Results Committee and subject-wise marks lists are finalized. Total marks obtained in each subject are converted into letter grades.

Results Committee comprises of Principal, Controller of Examinations, one Senior Professor nominated by the Principal and the University Nominee.

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

8.5 Revaluation / Recounting:

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

8.6 Supplementary Examination:

8.6.1 In addition to the regular Semester-End examinations conducted, the College may also schedule and conduct supplementary examinations for all the subjects of other 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.

9.1 For students admitted in B.Tech (Regular) Program:

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

ii. A student shall be promoted from second year to third year only if he fulfills the academic requirement of securing 44 credits from:
   a) Two regular and two supplementary examinations of I-year I semester.
   b) Two regular and one supplementary examinations of I-year II semester.
   c) One regular and one supplementary examination of second year I semester.
   d) One regular examination of II-year II Semester.
Irrespective of whether the candidates appear for Semester-End examination or not as per the normal course of study.

iii. A student shall be promoted from third year to fourth year Program of study only if he fulfills the academic requirements of securing 66 credits from:
   a) Three regular and three supplementary examinations of I-year I semester.
   b) Three regular and two supplementary examinations of I-year II Semester.
   c) Two regular and two supplementary examination of second year I semester.
   d) Two regular and one supplementary examinations second year II semester.
   e) One regular and one supplementary examination of third year I semester.
   f) One Regular Examination of Third year II semester.
Irrespective of whether the candidate appears for the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits by sections 9.1(ii) and 9.1 (iii) above, the student may make up the credits through supplementary examinations before the date of commencement of class work for III year I semester or IV year I semester as the case may be.

iv. A student shall register for all the 176 credits and earn all the 176 credits. Marks obtained in all the 176 credits shall be considered for the award of the class based on CGPA.

v. A student who fails to earn 176 credits as indicated in the course structure within eight academic years from the year of his admission shall forfeit his seat in B. Tech., Program and his admission stands cancelled.

9.2 For Lateral Entry Students (batches admitted from 2015-2016):

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

ii. A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing 44 credits from the following examinations.
   a) Two regular and two supplementary examinations of II year I semester.
   b) Two regular and one supplementary examination of II year II semester.
   c) One regular and one supplementary examination of III year I semester.
   d) One Regular Examination of Third year II semester.

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

i. A student shall register for all 132 credits and earn all the 132 credits. Marks obtained in all 132 credits shall be considered for the award of the class based on CGPA.
ii. A student who fails to earn 132 credits as indicated in the Course structure within six academic years from the year of his admission shall forfeit his seat in B.Tech., Program and his admission stands cancelled.

9.3 Audit Courses: Any student who wishes to pursue audit course can register for the same with the concerned teacher and attend to the classes regularly. No examination will be conducted, no grade will be given for the audit courses. However such of those students who have registered and got the requisite attendance of 75% in the audit course, it will be mentioned in their grade sheet.

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

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

<table>
<thead>
<tr>
<th>% of marks obtained</th>
<th>Grade</th>
<th>Grade Points(GP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 to 100</td>
<td>A+</td>
<td>10</td>
</tr>
<tr>
<td>80 to 89</td>
<td>A</td>
<td>9</td>
</tr>
<tr>
<td>70 to 79</td>
<td>B</td>
<td>8</td>
</tr>
<tr>
<td>60 to 69</td>
<td>C</td>
<td>7</td>
</tr>
<tr>
<td>50 to 59</td>
<td>D</td>
<td>6</td>
</tr>
<tr>
<td>40 to 49</td>
<td>E</td>
<td>5</td>
</tr>
<tr>
<td>Less than 40 in sum of Internal &amp; External (or) Less than 35 in External</td>
<td>F</td>
<td>0</td>
</tr>
<tr>
<td>Not Appeared</td>
<td>N</td>
<td>0</td>
</tr>
</tbody>
</table>

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

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

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

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

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

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

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

Where C denotes the credits assigned to subjects undertaken up to the end of the current year/semester and GP denotes the grade points earned by the student in the respective courses.
11.4 **Grade Sheet:** A grade sheet (Marks Memorandum) will be issued to each student indicating his performance in all subjects registered in that semester indicating the GPA and CGPA. GPA and CGPA will be rounded off to the second place of decimal.

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

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

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

- Registered and successfully completed all the components prescribed in the program of study for which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained CGPA greater than or equal to 5.0 (Minimum requirement for declaring as passed.)

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

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

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

15. **Additional academic regulations:**

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

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

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

iv. Any canvassing / impressing the administration, examiners, faculty or staff in any form, the candidate is liable for punishment as per the mal practice rules appended here with.

v. When a student is absent for any examination (internal or external) he is treated as to have appeared and obtained zero marks in that component (course) and grading is done accordingly.

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

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

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

**Note:** Failure to read and understand the regulations is not an excuse.
RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT IN EXAMINATIONS

Nature of Malpractices / Improper conduct

<table>
<thead>
<tr>
<th>If the candidate</th>
<th>Punishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (a) Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only.</td>
</tr>
<tr>
<td>(b) Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.</td>
</tr>
<tr>
<td>2. Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.</td>
</tr>
<tr>
<td>3. Comes in a drunken condition to the examination hall.</td>
<td>Expulsion from the examination hall and cancellation of the performance</td>
</tr>
</tbody>
</table>
4. **Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.**

Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

5. **Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.**

Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
6. **Possess any lethal weapon or firearm in the examination hall.**

   Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred and forfeits of seat.

7. **Impersonates any other candidate in connection with the examination.**

   The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he will be handed over to the police and a case is registered against him.
8. Refuses to obey the orders of the Chief Superintendent / Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction or property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.

9. If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8. Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

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

In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
10. Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks. Cancellation of the performance in that subject.

11. Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny. Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.

12. If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Examination committee for further action to award suitable punishment.

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
### I B.Tech., I Semester

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|       |             |                    |              |         | 120           |
|       |             |                    |              |         | 380           |
|       |             |                    |              |         | 500           |
14AHS01 TECHNICAL ENGLISH-I
(Common to CE, ME & AE)

Objectives:
1. To improve the language proficiency of the students in English with an emphasis on LSRW Skills.
2. To strengthen the students to study academic subjects through theoretical and practical components of the syllabus.
3. To comprehend the growing demand for English in the modern world.
4. To enumerate the aims of teaching English in India.

Outcomes:
1. The students will learn the language by observing the rules of grammar, vocabulary and composition that are necessary.
2. Students are made to appreciate the intelligent and innovative use of rules in order to be able to generate creative output in tune with the demands of industry and the corporate world.
3. After the course, the students will improve their power of comprehension and the ability to express themselves through listening, reading, speaking and writing.
4. The students will be able to distinguish between formal English and functional English.

UNIT-I EMERGING TECHNOLOGIES:
- Solar Thermal Power
- Cloud Computing

UNIT-II ENVIRONMENTAL CONSCIOUSNESS:
- Climate Change
- Green cover
- Pollution

UNIT-III ENERGY:
- Renewable and Non-Renewable sources
- Alternative sources
- Conservation
- Nuclear Energy

UNIT-IV ENGINEERING ETHICS:
- Challenger Disaster
- Biotechnology
- Genetic Engineering
- Protection From Natural Calamities

UNIT-V TRAVEL AND TOURISM:
- Advantages and Disadvantages of Travel
- Tourism
- Atithi Devo Bhava
- Tourism in India

- The teacher shall cover the following components which are given as exercises in the prescribed text book while teaching each of the five units listed above.

REMEDIAL GRAMMAR:
1. Articles
2. Prepositions
3. Time & Tense
4. Sentence Construction-Strategies (avoiding Repetition and ambiguity)
5. Sentence Transformation (Degrees, Voice, Speech & synthesis)
6. Common Errors in English

VOCABULARY:
1. Roots-Prefixes-Suffixes(RPS Method)
2. Synonyms
3. Antonyms
4. Phrasal Verbs
5. Idioms
6. One-word substitutes

WRITING PRACTICE (COMPOSITION):
1. Paragraph-Writing (Descriptive, Narrative, Persuasive, Expository and Creative)
2. Summarizing
3. Note-Making and Note taking
4. Letter-Writing (Formal & Informal)
5. Report writing

**Texts for classroom study:**

**Reference Books:**
6. Technical communication by MeenakshiRaman Sangeetha Sharma, Oxford
8. Essential English Grammar by Martin Hewings, Cambridge

**Question Paper Pattern:**
From the prescribed text book without leaving any lessons:
1. Three mark questions 4 x 3 = 12M
2. Ten Mark questions 2 x 10 = 20M

Based on the Grammar exercises given in the prescribed Text Book.

3. Reading Comprehension – I 5M
4. Synonyms & Antonyms 5M
5. Prefixes & Suffixes 5M
6. Tense Forms 4M
7. Compound words 2M
8. Prepositions & Articles 2M
9. Idioms 2M
10. Jumbled Sentences 5M
11. Letter writing 8M

Total 70M
Objectives:
The objectives of this course are to
1. Model a wide range of engineering and practical problems as ordinary differential equations.
2. Apply fundamental mathematical principles as well as computational techniques to the problems of engineering and scientific practice.
3. Formulate the engineering problems in vectorial form.

Outcomes:
After completion of the course the student will be able to
1. Comprehend the areas of application of differential equations.
2. Apply the principles of differential equations, functions of variables separable, integration, Laplace transforms and vector calculus to the engineering and scientific problems.
3. Obtain their solutions using various computational methods.

UNIT-I
DIFFERENTIAL EQUATION: Linear and Bernoulli’s Equations – Non - homogenous Linear Differential equation of second and higher order with constant co-efficients. Newton’s law of cooling-L-R-C circuits.

UNIT-II
FUNCTIONS OF SEVERAL VARIABLES: Maxima and Minima for functions of two variables – Lagrange’s method of multipliers of 3 variables only.
Curve Tracing: Cartesian and polar curves. Radius of Curvature: Cartesian and polar curves.

UNIT-III
APPLICATIONS OF INTEGRATION: Length of an arc and area using line integral.
Multiple Integrals: Double and Triple integrals-Change of variables-Change of Order of integration(Cartesian and polar forms). Surface are and Volume of solid of revolution.

UNIT-IV

UNIT-V
VECTOR CALCULUS: Gradient, Divergence, Curl and their properties (without identities).
Vector Integration: Line Integrals – Potential functions - Area, Surface and Volume integrals - Green’s theorem- Stoke’s theorem& Gauss Divergence theorems (without proof) - Verification of Green’s, Stoke’s and Gauss’s Theorem
Text Books:
3. Dr.B.S.Grewal, Higher Engineering Mathematics.

References:
OBJECTIVES:
1. To study the effect of hard water and its treatment for various purposes, corrosion and control of metallic materials,
2. To study the engineering materials such as high polymers namely plastics, rubbers and their preparation, properties and applications along with lubricants, refractories & cement with its applications.
3. To study the calorific value of fuels, combustion of fuels, working of batteries, recharging of batteries, application of different fuel cells.

OUTCOMES:
After completion of the course students will be able to understand
2. Selection of suitable engineering materials for specific applications.
3. Selection of suitable fuels, calculation of air requirements for combustion of fuel, applications of different batteries and fuel cells.

UNIT – I: WATER TECHNOLOGY

UNIT – II: CHEMISTRY OF CORROSION

UNIT – III: MATERIALS CHEMISTRY
Organic (High Polymers & Lubricants)
Plastics: Thermosetting and thermoplastics – Engineering applications and properties of PE, PTFE, PVC, Nylon and Bakelite.
Lubricants: Definition – Function of Lubricants – Classification of Lubricants – Properties of Lubricants (Viscosity Index – Flash and Fire point – Cloud and Pour point – Aniline point – Neutralization number – Mechanical strength).
Inorganic (Refractories & Cement)

Refractories: Definition – Classification – Important properties of refractories (Refractoriness, RUL, Thermal stability, Porosity, Dimensional stability and Mechanical strength).

Cement: Definition – Composition – Classification of cements – Setting and Hardening of cement.

UNIT – IV: FUELS AND COMBUSTION


Combustion: Combustion products and calculation of air requirement (numerical problems) – Flue gas analysis by Orsat’s apparatus.

UNIT – V: ELECTROCHEMICAL CELLS


Text Books:

Reference Books:
SRI VENKATEWARA COLLEGE OF ENGINEERING AND TECHNOLOGY, CHITTOOR
(AUTONOMOUS)

I.B.Tech-I Semester

<table>
<thead>
<tr>
<th>Course Code: 14AME01</th>
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<tr>
<td>ENGINEERING DRAWING</td>
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<td>(Common to CE, ME &amp; AE Branches)</td>
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<td>(First Angle Projection)</td>
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**Objectives:**
To understand
1. The importance of Engineering Drawing and get enhanced imagination capacity.
2. The Use of Engineering Drawing instruments and improve free hand Lettering.
3. The principles of orthographic projections and Preparation of pictorial drawings.

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

**Introduction**
Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Geometrical constructions – construction of polygons – drawing tangents – dividing a line into number of equal divisions.

**Unit-I**
Principles of projection – both first and third angle – Projections of points – Projections of straight lines- lines inclined to both the principal planes, determination of true length and true inclinations.

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

**Unit-III**
Sections of solids such as prisms, pyramids, cylinders, tetrahedron and cones (solids in simple position) – True shape of the section.

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

**Unit-V**
Development of surfaces of simple solids such as prisms, pyramids, cylinders, tetrahedron, cones and part solids.

**Text Books:**

**REFERENCES:**
FINAL EXAMINATION QUESTION PAPER PATTERN
(External Evaluation & Paper setting)

**Paper Setting:**

1. Two questions to be set from each unit in either or choice (All Questions carries equal marks)
2. Student has to answer all questions.
SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY, CHITTOOR
(AUTONOMOUS)

I-B.Tech, I-Semester.

14ACE02 ENGINEERING MECHANICS-I
(Common to ME & AE)

Objectives:
1. To learn about forces and force systems and their applications.
2. To learn about friction and to use the concept to analyze power transmission in belt drives.
3. To learn how to find centroid and Moments of Inertia of different objects using mathematical formula.

Outcome:
Student will be able to
1. To construct free body diagrams and develop appropriate equilibrium equations.
2. To understand the concepts of friction and to apply in real life problems.
3. To determine the centroid and Moment of Inertia for composite sections.

UNIT – I Basic Concepts of Engineering Mechanics
Basics: Fundamental Principles - Resolution and Composition of forces and equilibrium of particles - Principle of transmissibility - Free body diagram - Equilibrium of rigid bodies.
Forces and Force Systems: Types of force systems - Resultant of coplanar, concurrent and non concurrent force systems - Concept of moment - Varignon’s theorem.
Equilibrium of Systems of Forces: Equilibrium concept in mechanics - Free body diagram - Equilibrium of coplanar force systems - Types of members and supports - Support reactions.

UNIT – II

UNIT– III

UNIT - IV
Centroid and Centre of Gravity: Introduction to centre of gravity and centroid – Centroids of simple figures – Centroids of composite figures- Centre of gravity of solid bodies – Theorems of Pappus and Guldinus

UNIT – V
Area and Mass moments of Inertia: Definition – Parallel axis and perpendicular theorems - Polar Moment of Inertia-Radius of gyration - Moments of Inertia of Basic Shapes, Composite Section and simple solids, Mass moment of inertia of composite bodies. (Simple problems only)

TEXT BOOKS :

REFERENCE BOOKS:
2. Engineering Mechanics by Timoshenko & Young
The Language Lab focuses on the production and practice of sounds of language and equips students with the use of English in everyday situations and contexts.

Objectives:
1. To train students to use language effectively in everyday conversations and to participate in group discussions to help them face interviews, and sharpen public speaking skills.
2. To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning.
3. To enable them to learn better pronunciation following the principles of stress, intonation and rhythm.
4. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such as GRE, TOEFL, GMAT etc.

Outcomes:
1. The students will be able to recognize English sounds- Monophthongs, diphthongs and consonant sounds.
2. The students will appreciate and use correct pronunciation in English.
3. The pupils will distinguish between Received Pronunciation and Indian variety.
4. The lab course will make the students use English with correct stress and intonation patterns because English is a rhythmic language.

SYLLABUS:
The following course content is prescribed for the English Language Laboratory sessions.

UNIT-I Organs of speech, speech mechanism, vowels, consonants, diphthongs, syllable division, word stress, intonation, phonetic transcription with support of speech solutions, dictionary practice with support of AHD & CALD software.

UNIT-II Speaking of past, present & Future, Role play-Graded exercise with support of exercises from English Mastery, TOEFL Mastery & CALD Software.

UNIT-III FUNCTIONAL ENGLISH-I Situational conversation-Grader exercises with support of Rosetta Stone Software

UNIT-IV FUNCTIONAL ENGLISH-II Situational conversation-Grader exercises with support of Rosetta Stone Software

- Greeting/Self-introduction
- Expressing the cause of something
- Describe a current situation
- Speaking traditions/customs/public issues
- Making plans for vacation
- Expressing of emotions
- Shopping –bargaining price and making purchases
- Making an appointment
- Naming foods and describing tastes
- Reporting other person’s messages
- Requesting
• Asking for directions and describing
• Making suggestions, agreements and refusals

UNIT-V

GROUP DISCUSSIONS:

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

Reference Books:

1. English Language lab manual prepared by the Department of English
SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY, CHITTOOR
(AUTONOMOUS)

I B.Tech- I Semester

14AHS08 ENGINEERING CHEMISTRY LAB
(Common to CE, ME & AE)

Objectives:

To make the student understand the

1. Process of estimation of metal ions like Iron, Copper and Calcium by titrometry; Evaluation of impurities like dissolved oxygen, oxidizable substances in water,
2. Process of determination of acidity and alkalinity of water sample, determination of lubricant properties like viscosity Index, Flash and Fire points,
3. Construction of simple phase diagram, determination of acid strength by conductometry and potentiometry.

Outcomes:

After completion of practical’s student will be able to

1. use volumetric analysis for the estimation of metal ions, hardness of water, dissolve oxygen in water, chlorides in water, oxygen demand for water, alkalinity and acidity of water,
2. the importance of viscosity index, flash point and fire point of lubricants,
3. evaluation of eutectic temperature of binary system, the use of conductometer and potentiometer.

Any TEN of the following experiments

1. Estimation of Hardness of water by EDTA method.
4. Determination of Chemical Oxygen Demand.
5. Determination of Acidity of Water sample.
7. Estimation of Copper by EDTA method.
8. Estimation of Ferrous Ion by Potassium Dichromate method.
10. Determination of viscosity of oils through Redwood viscometer No.1.
11. Determination of viscosity of oils through Redwood viscometer No.2.
12. Determination of Eutectic temperature of Binary system (Urea-Benzoic acid).
13. Acid- Base titration by Conductometric method.
14. Redox titrations by Potentiometry.
15. Titration of Strong acid vs Strong base by Potentiometry.
Text Books:

Equipment Required:
2. Analytical balance,
3. Reflux Condensers,
4. Pensky Marten's apparatus,
5. Redwood viscometer,
6. Bomb calorimeter,
7. Conductometer, Potentiometer.
14AME02 COMPUTER AIDED DRAFTING LAB
(Common to ME & AE Branches)

Objectives:
1. To understand the computer aided drafting software's such as Auto CAD and solid works.
2. Use of various commands like mirror, rotate etc. and draw simple mechanical components with dimensioning and hatching.
3. To draw 3D images applying material properties.

Outcomes:
After completion of the study of this lab a student will be able to:
1. Use Auto CAD screen, solid works software tool bars and menus, draw & modifying tools.
2. Draw the 2D & 3D simple mechanical components with dimensioning and hatching.
3. Draw the parts such as springs, Automobile wheel etc. applying material properties.

LIST OF EXPERMENTS:

AUTO CAD:
COURSE CONTENTS
1. Introduction to Auto cad screen, various toolbars and menus.
2. Exercise on usage of Draw and modify tool bar.
3. Exercise on mirror, rotate, Array and Move commands.
4. Exercise on Dimensioning and Hatching.
5. Render the 3D images already generated and apply materials and Lights.
6. Part drawing of simple components

SOLIDWORKS:
1. Introduction to solid works, save, exit, basic commands-draw, modify & translators etc.
2. 2D Sketcher practicing general components
3. Part Design
   i) Draw the 3D Model of Camera Body.
   ii) Draw the 3D Model of Helical Spring.
   iii) Draw the 3D Model of Automobile Wheel.
IV) Draw 3D Model of Three Layer Rope.
Objectives:
1. To introduce basic physics concepts relevant to different branches of Engineering and Technology
2. To prepare graduates in understanding the basic principles of Modern Optics, Solid State Physics and their possible applications.
3. They shall also understand the role of the physics in the development of newer innovations and technologies

Outcomes
1. Graduates will be able to apply the knowledge of Physics in the field of Communications, Electrodynamics, Solid State Physics and Optics.
2. The acquaintance of basic physics principles would help the engineers to develop or understand the working of different tools and devices.
3. It equips the students with the fundamental knowledge of physics together with the problem solving skills and understanding.

UNIT I

MODERN OPTICS

UNIT II
CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction – Space lattice – Basis – Unit cell – Lattice parameter – Crystal systems – Bravais lattices – Structure and packing fractions of Simple cubic, body centered cubic, face centered cubic crystals-Directions and planes in crystals – Miller Indices – Separation between successive \([ h k l ]\) planes – Bragg’s law-X-Ray Diffraction by Powder method

ULTRASONICS Introduction – Production of ultrasonics by piezoelectric method – Properties and detection of Ultrasonic waves – Applications in non-destructive testing.

UNIT III
PRINCIPLES OF QUANTUM MECHANICS: Wave and particles – de Broglie hypotheses – Matter waves – Schrödinger time independent wave equation – Physical significance of wave function – Particle in one dimensional box

FREE ELECTRON THEORY: Classical free electron theory – Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution –Kronig-Penny model (qualitative)
UNIT IV


**MAGNETIC PROPERTIES**

UNIT V


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

**NANOMATERIALS:** Introduction– Basic principles of nanomaterials – Growth of nanomaterials: Sol-Gel method-Chemical vapor deposition-Properties of nanomaterials-Carbon Nano Tubes -Application of carbon nano tubes and nanomaterials.

**Text Books:**
2. Gaur and Gupta: Engineering Physics, New Delhi, DhanpatRai Publishers, 2010

**Reference Books:**
Objectives:
1. To study about conservation of natural resources, environmental monitoring & remediation, Industrial waste management and public health.
2. To develop analytical skills, critical thinking & demonstrate problem solving skills using scientific and engineering techniques.
3. To motivate the students to participate in environment protection and make man free from all sorts of environmental problems.

Outcomes:
After completion of the course the student will be able to
1. develop critical thinking (or) observation skills and apply them in the analysis of a problem (or) question related to the environment.
2. analyse and interpret the complex relationships between natural and human systems.
3. analyse and interpret the fundamental physical, chemical and biological principles that govern natural process.

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

UNIT-II
TYPES OF ECOSYSTEMS:
a. Forest ecosystem  b. Grassland ecosystem c. Desert ecosystem
d. Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)
UNIT-III

BIODIVERSITY AND ITS CONSERVATION: Introduction, Definition, Types of biodiversity (genetic, species and ecosystem diversity)- Bio-geographical classification of India, Values of biodiversity(Consumptive use, Productive use, Social use, Ethical use, Aesthetic and Option values)- India as a mega diversity nation-Hot spots of India-Threats to biodiversity(habitat loss, Poaching of wildlife, man-wildlife conflicts)-Endangered and endemic species of India-Conservation of biodiversity(In-situ and Ex-situ conservation of biodiversity).

UNIT-IV

ENVIRONMENTAL POLLUTION AND ACT’S: Definition, causes, effects and control measures of:  
 a. Air Pollution  
 b. Water Pollution  
 c. Soil Pollution  
 d. Noise Pollution  
 e. Thermal Pollution  
 f. Nuclear hazards.  

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.  

ACT’S: Environment Protection Act-Air (Prevention and Control of Pollution) Act-Water (Prevention and control of Pollution) Act-Wildlife Protection Act-Forest Conservation Act-  

Disaster management: Floods, Earthquake, Cyclone and Landslides.

UNIT-V


Field Work: Visit to local polluted site-Urban/Industrial.

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

References:  
I B.Tech – II Semester

14AHS06 ENGINEERING MATHEMATICS-II
(Common to All Branches)

Objectives:
The objectives of this course are to
1. conceptualize the basics and applications of matrices, interpolation, partial differential equations and transforms.
2. model a wide range of engineering and practical problems into any of the above suitable forms.
3. apply fundamental mathematical principles as well as computational techniques to the problems of engineering and scientific practice.

Outcomes:
After completion of the course the student will be able to
1. comprehend the areas of application of matrices, interpolation, partial differential equations and transforms.
2. apply the principles of matrices, curve fitting, partial differential equations, transforms etc. to the engineering and scientific problems.
3. obtain their solutions using various computational methods.

UNIT-I
Eigen values and Eigen vectors - Cayley-Hamilton theorem - Linear Transformations - Orthogonal transformations -Diagonalization of a matrix. Quadratic forms- Reduction of Quadratic form to Canonical form and their nature.

UNIT-II
Curve Fitting: Fitting a straight line - Second degree curve- Exponential curve - Power curve by method of least squares.
Interpolation: Forward Differences - backward differences-Newton’s forward and backward differences formulae for interpolation - Lagrange’s interpolation formula - Inverse interpolation.

UNIT-III
UNIT-IV


UNIT-V

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


Text Books:


References:


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Course Objectives:
The objective of this course is to:

1. Enable the students to understand problem solving techniques.
2. Understand the syntax and semantics of C programming language and other features of the language.
3. Design and develop algorithms and flowcharts for solving a problem.
4. Be familiar with the importance of basic data structures, searching and sorting techniques.

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

1. Apply problem solving techniques in designing the solutions for a wide-range of problems.
2. Understand the basic concepts of pointers and structures.
3. Demonstrate the techniques for implementing applications using C programming.
4. Choose appropriate data structure and control statements depending on the problem to be solved.

UNIT – I
Introduction to Computer Problem Solving, Algorithm/ Pseudo code, Flowchart and C Fundamentals
Introduction to Computer problem solving: What is computer, Block diagram of Computer, Hardware Vs Software, Types of Programming Languages, The Problem Solving aspect, Top Down design, Implementation of algorithms.
Algorithm, Flowchart: Fundamental algorithms- Exchanging the values of two variables, Factorial computation, Sign function computation, Reversing the digits of an integer, Generating prime numbers.
C Fundamentals : Structure of a C program, A simple C program, C character set, Identifiers and keywords, Data types, Constants, Variables, Operators- Classification of operators, Expressions-Precedence and Associativity, Evaluation of expressions, Standard library functions, Statements - Input-Output statements (getchar, putchar, scanf, printf, gets and puts), Conditional statements (if, if-else, nested if, else-if ladder), Iterative Statements (for, while, do-while), Switch, Break, Continue, Goto statements with Simple C Programs , Compiling, Running and Debugging a C program.

UNIT – II
Functions, Arrays, and Strings
Functions: Defining a function, Accessing a function, Function prototypes, Passing arguments to a function, Parameter passing mechanisms - Call-by-value, Call-by-reference, Recursion, Storage classes (auto, static, register, extern), Macros.
Arrays: Declaration and Definition of an array, Processing an Array, Passing arrays to functions, Two-dimensional and Multi-dimensional arrays, Array techniques- Finding the k^{th} largest and Smallest element, Array order reversal, Removal of duplicates from an ordered array.

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

UNIT – III
Pointers, Structures and Unions

Pointers: Fundamentals, Pointer declarations, Passing pointer to a function, Pointers and One-dimensional array, Dynamic memory allocation, Operations on pointers, Arrays of pointers, Passing functions to other functions, More about pointer declarations.

Structures and Unions: Declaration, Definition and Initialization of structures, Accessing structures, User-defined data type (typedef), Nested structures, Structures and pointers, Passing structures to functions, Unions, Enumerated Data type (enum), Bit-fields.

UNIT – IV
Searching & Sorting, Files

Searching & Sorting: Linear and Binary search methods, Bubble sort, Selection sort, Insertion sort, Quick sort.

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

UNIT – V
Data Structures

Data Structures: Introduction to Data structures, Linear and Non-Linear data structures, Data abstraction, Stacks, Stacks using dynamic arrays, Queues, Circular queues using dynamic arrays, Evaluation of expressions using Stacks - Evaluating postfix expressions, Infix to Postfix conversion, Linked List - Singly linked list and chains, Representing chains in C, Doubly linked list and Circular linked list.

TEXT BOOKS


REFERENCES

Objectives:
1. To learn about rectilinear and curvilinear motions of bodies
2. To learn about the motion of connected bodies.
3. To learn about Mechanical Vibrations.
4. To know about simple stresses and strains and analysis of frames.

Outcome:
1. To understand the dynamic analysis of rigid body motion
2. To understand the work energy relations.
3. To analyse the oscillating motions assuming Simple Harmonic motion.
4. To understand about basic relationship between elastic constants.
5. To analyse the simple frames by using different methods.

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

UNIT – II

UNIT – III

UNIT – IV

UNIT – V

TEXT BOOKS :

REFERENCE BOOKS:
2. Engineering Mechanics by Timoshenko & Young
SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY, CHITTOOR
(AUTONOMOUS)

I B.Tech – II Semester

14AHS09

ENGINEERING PHYSICS LAB
(Common to CE, ME & AE)

Objectives:

1. To educate students about the basics of instrumentation, measurement, interpretation, and analysis.
2. To promote equipment/machinery handling skills and also to train the students with proper laboratory discipline.
3. To teach the behaviour of magnetic, semiconductor and optical materials/instruments and explain its properties and applications.

Outcomes:

1. They shall able to obtain and analyze scientific data from different physics laboratory instruments.
2. They shall develop their manipulative, observational and reporting skills.
3. The student will be able to understand many modern devices and technologies based on optics, electrodynamics, semiconductors, lasers and optical fibers.

ENGINEERING PHYSICSLAB:

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

1. Determine the wavelengths of given light source - Spectrometer.
2. Dispersive power of prism
4. Determine the particle size by using laser source
5. Determine the thickness of thin wire by Interference.
6. Determine the radius of curvature of given plano convex lens by forming Newton Rings.
7. Magnetic field along the axis of a current carrying coil – Stewart and Gee’s method.
10. Determine the wavelength of Laser source by using optical fiber.
11. Determination of Hall Coefficient and Carrier concentration in the given Semiconductor.
12. Determine the energy loss of ferromagnetic sample by plotting B-H curve
14. Determine the Dielectric constant of Barium Titanate.
C AND DATASTRUCTURES LAB

14ACS04
(Common to CE, ME & AE)

Lab Objectives:
The main objective of conducting this lab is to enable the students to:

1. Understand the various concepts of C language such as branching, loops, functions, input/output, arithmetic rules, arrays, pointers and files.
2. Apply the syntaxes of control and loop statements.
3. Solve problems of repetitive nature using loop structures.
4. Distinguish user-defined data types like structures and unions.

Lab Outcomes:
After performing this lab, the students should be able to:

1. Confidently work on any C programming development environment.
2. Predict the behavior of variables using different types of storage classes.
3. Use file concept to read/write data in secondary storage area.
4. Develop programs in basic data structures such as linked lists, stacks and queues.

Week 1
a) Sum of the individual digits means adding all the digits of a number. Ex: 123, sum of digits is 1+2+3=6.
   Write a C program to find the sum of individual digits of a positive integer.

b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
   Write a C program to generate the first n terms of the sequence.

c) Prime number is a number which is exactly divisible by one and itself only
   Ex: 2, 3, 5, 7,.....
   Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 2
a) Write a C program to calculate the following:  \( \text{Sum}=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10! \)

b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement).

Week 3
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) In converting roman numeral to decimal number, we have to take the roman value as input. This value is converted into a it’s equivalent decimal number. Ex: X=10. Write a C program to convert a Roman numeral to its decimal equivalent.

**Week 4**

a) Write C programs that use both recursive and non-recursive functions
i) To find the factorial of a given integer. Factorial of a number is nothing but the multiplication of numbers from a given number to 1.

ii) To find the GCD (greatest common divisor) of two given integers. GCD means Greatest Common Divisor. i.e the highest number which divides the given number. Ex: GCD (12, 24) is 12.

Formula: GCD= product of numbers / LCM of numbers

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

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

**Week 5**

a) Write a C program to find both the largest and smallest number in a list of integers using Arrays.

b) Write a C program that uses functions to perform the following using Arrays:

   i) Addition of Two Matrices
   ii) Multiplication of Two Matrices

**Week 6**

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

   i) To insert a sub-string in to a given main string from a given position.
   ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not.

**Week 7**

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn’t contain T.

b) Write a C program to count the lines, words and characters in a given text.

**Week 8**

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

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

(Note: Represent complex number using a structure).

**Week 9**

Write C programs that use both recursive and non recursive functions to perform the
Following searching operations for a Key value in a given list of integers:
  i) Linear search          ii) Binary search

**Week 10**
Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
  i) Bubble sort          ii) Insertion Sort          iii) Quick Sort

**Week 11**
a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.
   (Note: The file name and n are specified on the command line).

**Week 12**
a) Write a C program to display the contents of a file.
b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

**Week 13**
Write C programs that implement Stack (its operations) using Arrays.

**Week 14**
Write C programs that implement Queue (its operations) using Arrays.

**Week 15**
Write a C program that uses functions to perform the following operations on singly linked list:  
  i) Creation          ii) Insertion          iii) Deletion          iv) Traversal
ENGINEERING WORKSHOP
(Common to CE, ME & AE Branches)

Objectives:
1. To understand the basic work shop tools and operations such as carpentry, fitting & sheet metal trades.
2. To understand the basic work tools of house wiring & house wiring connections etc.
3. To understand the basic joints and manufacturing processes such as foundry and welding.

Outcomes:
After completion of the study of this lab a student will be able to:
1. Distinguish between tools of various trades such as carpentry, fitting, sheet metal, welding, foundry & house wiring.
2. Explain the tools & connections pertaining to house wiring, stair case wiring etc.
3. To describe the use of carpentry & fitting joints such as lap, dovetail, mortise, tenon joint, various sheet metal models & manufacturing processes.

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

2. TRADES FOR DEMONSTRATION:
   a. Plumbing
   b. Machine Shop
   c. Metal Cutting

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

REFERENCE BOOKS:
2. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas
(14ACE12) STRENGTH OF MATERIALS

Objectives:
1. To study the internal effects produced and deformations of bodies caused by externally applied forces.
2. To understand the strength characteristics of different materials and structural members subjected to shear, torsion and bending.
3. To understand the basic concepts of torsion of circular shafts and springs.
4. To understand the concepts of circumferential and hoop stresses in thin and thick cylinders.

Outcomes:
After completion of the course the student will be able to:
1. Understand the concepts and applications of stresses and strains
2. Determine the internal forces in the beams
3. Formulate the expressions for deflection for different loading conditions
4. Formulate the expressions for longitudinal and circumferential stresses in thin and thick cylinders

UNIT I


UNIT II

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

UNIT III


UNIT IV

DEFLECTIONS OF BEAMS: Bending into a circular arc – slope - deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay’s methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads - U.D.L uniformly varying load.

TORSION OF CIRCULAR SHAFTS AND SPRINGS: Theory of pure torsion - Torsional theory applied to circular shafts – Power transmission - Close and open coiled helical springs under axial loads and axial twist – Carriage springs.

UNIT V

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

Text Books:

References:
II B.Tech- I Sem (ME)  

(14AEE06) ELECTRICAL ENGINEERING AND ELECTRONICS ENGINEERING

Objectives:
1. To understand the Fundamentals of Electrical Circuits and measurements.
2. To study the construction, principle of operation and performance of DC and AC Machines and also know Principle of Measuring Instruments.
3. To understand the characteristics and applications of diode, transistor and SCR.
4. To understand the operation of CRO and regulated power supplies and function generators.

Outcomes:
After completion of this course the students will be able to:
1. Acquire the knowledge of construction, operation and applications of different types of electrical machines.
2. Have knowledge of instruments for measuring basic electrical quantities.
3. Know applications of PN Junction diode, Transistor and SCR.
4. Gain the knowledge about CRO, regulated power supplies and function generators.

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

UNIT II

UNIT III
AC MACHINES: Concept of Three Phase Supply – Construction, Operation and types of Three Phase Induction Motors - Slip – Torque Characteristics and Application – Principle of Operation of Alternator – Concept of Regulation.
SINGLE PHASE MOTORS: Shaded pole type motor, Repulsion motors, stepper motor- construction and principles of operation only.

UNIT IV
UNIT V


Text Books:

References:
1. Helfrick and Cooper: Modern Electronic Instrumentation and Measurement Techniques, PHI Publications.
Objectives:
1. To understand the importance of various Engineering materials used in mechanical process/industries.
2. To understand the metallurgical behavior of metals and alloys in practical applications.
3. To choose appropriate metallurgical process to improve the properties of metals and alloys.
4. To understand the behavior and production of products using composite materials.

Outcomes:
After completion of course the student will be able to:
1. Make a right choice of metal or alloy to suit the functional behavior of a product.
2. Can modify the required properties of materials in easy way.
3. Identify problem areas in the production and usage of metals and alloy products and take corrective measures.
4. Predict the behavior of metals and alloys and suggest modifications to the designer, for increased life and low cost of products.

UNIT I
STRUCTURE OF MATERIALS: Mechanical properties of metals, Crystallization of metals, effect of grain size and grain boundaries on the properties of metals / alloys. Imperfections in crystals.

UNIT II

UNIT III
CAST IRONS AND STEELS: Structure and properties of white cast iron, malleable cast iron, grey cast iron, Spheroidal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steel, tool and die steels.

UNIT IV
NON-FERROUS METALS AND ALLOYS: Structure and properties of copper and its alloys, Aluminium and its alloys.

UNIT V
CERAMIC MATERIALS: Crystalline ceramics, glasses, ceramic tools, cermets.

Text Books:

**References:**

OBJECTIVES:
1. To understand the principles of thermodynamics and to be able to use it in accounting for the bulk behaviour of the simple physical systems.
2. To provide in-depth study of mixture of perfect gases, gas laws to find the partial pressures, enthalpy, entropy etc. at different states of gases.
3. To understand properties of pure substances, properties of steam, steam tables, mollier charts.
4. To enlighten the basic concepts of air standard cycles and vapour power cycles.

OUTCOMES:
After completion of the course, the student will be:
1. Familiar with principle of thermodynamics and can solve the problems related to various thermal engineering systems using the zeroth law, 1st and 2nd law of thermodynamics.
2. Able to understand the behavior of ideal and real gases at different states of the system and can find partial pressures, enthalpy and entropy.
3. Able to understand the properties of steam and can solve problem using steam tables and mollier charts.
4. Able to understand the working of different air standard cycles and vapour power cycles and can solve the related problems.

UNIT I
BASIC CONCEPTS AND FIRST LAW: Basic concepts, macroscopic and microscopic approach, Thermodynamic systems and control volume. Property, state, path, process and cycle, thermodynamic equilibrium, quasi-static process, concept of continuum, Zeroth law of thermodynamics – concept of temperature and its measurement, types. Work and heat, modes of work. Path and point function, pdv-work in various quasistatic process, First law of thermodynamics – application to closed and open systems, energy, specific heat capacities, enthalpy, PMM-1, steady flow energy equation, steady flow process with reference to nozzle, boiler and turbine.

UNIT II
SECOND LAW: Second law of thermodynamics – Kelvin’s and Clausius statements of second law. Refrigerator and Heat pump, equivalence of kelvin’s and Clausius statements, PMM2, Reversibility and irreversibility, causes of irreversibility, Carnot cycle, reversed carnot cycle, Carnot theorem, corollary of carnots theorem, efficiency, COP. Thermodynamic temperature scale, Clausius theorem. Entropy, inequality of Clausius, entropy change in irreversible process, Principle of entropy, first and second laws combined, reversible adiabatic work in steady flow system, Calculations of work done, internal energy, entropy and heat transfer in non-flow and flow processes, Introduction to availability and exergy.

UNIT III
IDEAL AND REAL GASES
Gas mixtures – properties ideal and real gases, equation state, Avagadro’s Law, Vander Waal’s equation, specific heats, internal energy, enthalpy and entropy of an ideal gas, reversible adiabatic process, isothermal process, polytropic process, simple problems, compressibility factor, compressibility chart – Dalton’s law of partial pressure, internal energy, enthalpy and entropy of gas mixtures.
UNIT IV
PROPERTIES OF PURE SUBSTANCES AND STEAM POWER CYCLES:

STEAM POWER CYCLE: Standard Rankine cycle, layout of steam power plant, Methods for increasing efficiency, reheat and regenerative cycle. related problems.

UNIT V
AIR STANDARD CYCLES

(Use of standard thermodynamic steam tables and Mollier diagram are permitted)

Text Books:

References:
Objective:
1. To understand the different types of competing Production processes at the disposal of Mechanical Engineer.
2. To understand the science and technology of casting, welding, forming and plastics processing.
3. To understand latest advancements in manufacturing technology and their practical importance.
4. To study the different non-destructive tests for different processes.

Outcomes:
After completion of the course, the student will be able to:
1. Choose the appropriate production process to suit the production of a product with specified surface topography.
2. Identify tooling requirements/constraints in production.
3. Suggest to the management new technologies at the disposal of modern engineer and plan for shop upgradation.
4. Upgrade their selves for the future updation of the production processes and technologies.

UNIT I
CASTING: Solidification of pure metal and alloys - Solidification of castings, Steps involved in making a casting– Types of patterns, Pattern making, Materials used for patterns, pattern allowances, Types of sand moulds and molding machines.

UNIT II
Soldering: Principle, procedure, classification and applications
Brazing: Principle, procedure, classification and applications
Cutting of Metals: Oxy Acetylene Gas cutting, plasma arc cutting, Cutting of ferrous and non-ferrous metals.

UNIT III
Hot working, cold working, warm working, strain hardening, recovery, recrystallisation and grain growth, Rolling – theory of rolling, types of Rolling mills and products, simple problems.

UNIT IV
FORGING PROCESSES: Principles of forging, Tools and Dies, Types of Forging, Drop Forging, Roll forging, simple problems, forging defects.
SHEET METAL AND OTHER COLD WORKING PROCESSES: Blanking and piercing, Bending and forming, Drawing and its types, wire drawing and tube drawing, coining, embossing, hot and cold spinning, HERF(High Energy Rate Forming) Methods.
UNIT V

PROCESSING OF PLASTICS: Molding methods-Compression & Transfer molding, Injection, Blow, Rotary and Vacuum forming methods, Calendering operations, applications to thermosets and thermo plastics- Introduction to fiber reinforced plastics.

POWDER METALLURGY: Introduction, preparation of powder, Fundamental properties of Metal Powder, different fabrication methods.

Text Books:

References:
II B.Tech – I Sem (ME)  

(14AME07) MACHINE DRAWING

Objectives:
1. Understand the importance of Machine drawing.
2. Understand representation of conventional materials and common machine elements.
3. Add a standard title box to the drawing.
4. Understand the principles of assembling a machine part.

Outcomes:
After completion of the course, the student will be able to:
1. Represent common machine elements conventionally.
2. Dimension following the general rules.
3. Prepare sectional and additional views for the machine elements in general.
4. Assemble typical machine parts.

PART-A

I. MACHINE DRAWING CONVENTIONS:
Need for drawing conventions – introduction to IS conventions
a) Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
b) Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
c) Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
d) Common abbreviations & their meaning

II. DRAWING OF MACHINE ELEMENTS AND SIMPLE PARTS:
Selection of Views, additional views for the following machine elements and parts with proportions.
a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
b) Keys, cotter joints and knuckle joint.
c) Rivetted joints for plates
d) Flanged coupling and claw coupling & cast iron pipe joints.
e) Bushed journal, foot step bearing.

PART-B

III. ASSEMBLY DRAWINGS:
Drawings of assembled views for the part drawings of the following using conventions and drawing proportions.
a) Engine Parts – Stuffing Box, Cross Head, Eccentrics, Petrol Engine Connecting Rod and Piston Assembly.
c) VALVES: Non Return Valve- Feed Check Valve and Air Cock.
NOTE: First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

Text Books:


References:


Note: THE END EXAM WILL BE FOR 3 HRS IN THE FOLLOWING PATTERN:

1. Four questions to be set from part-A and the student should answer any three with weightage of 10 marks each-30 marks.
2. One question to be set from part-B of assembly view of any component maximum of two views (Major view 30 marks Minor view 10 marks).
II B.Tech – I Sem (ME)  
(14AE09) ELECTRICAL ENGINEERING AND ELECTRONICS ENGINEERING LAB

Objectives:
1. To test different types of DC machines
2. To know the speed control of DC machines
3. To know the characteristics of Diode, Transistor and SCR
4. To understand the principles of CE amplifier and CRO

Outcomes:
After completion of this course the student will be able to:
1. Find Efficiency of DC machines by different methods
2. Understand the speed control of DC shunt machine
3. Gain the knowledge of Diode, Transistor and SCR Characteristics
4. Gain the knowledge about Rectifiers and CRO operation

The following experiments are required to be conducted as compulsory experiments:

1. Swinburne’s Test on DC shunt machine and Predetermination of efficiency as motor and generator
2. Brake test on DC shunt motor. Determination of performance characteristics
3. Speed control of dc shunt motor - Armature voltage control  
   - Field control
4. OC & SC tests on Single-phase transformer (Predetermination of efficiency and  
   Regulation at given power factors and determination of equivalent circuit)
5. Brake test on 3-phase Induction motor (performance characteristics)
6. Regulation of alternator by synchronous impedance method
7. Forward and Reverse bias characteristics of PN Junction diode
8. Full Wave Rectifier with and without filters
9. Input and Output characteristics of Transistor in CE configuration
10. Characteristics of SCR
11. Frequency response in CE Amplifier
12. VI Characteristics or Zener Diode.
(14AME08) PRODUCTION TECHNOLOGY AND METALLURGY LAB

Objectives:
1. To understand the various types of manufacturing processes to be used in real time.
2. To gain the practical exposure on casting, welding, forming and plastic processing.
3. To identify different materials and alloys structures
4. To understand the behavior of metals in heating and cooling

Outcomes:
After completion of this course the student will be able to:
1. Select the suitable manufacturing process to produce the desired components.
2. Understand the best practice to overcome the defects in manufacturing process.
3. Gain the knowledge of microscopes and different machinery used in metallurgy lab.
4. Gain the knowledge about behavior of metals and alloys in different heat treatments.

Group A: PRODUCTION TECHNOLOGY LAB
1. Pattern Design and making - for one casting drawing.
2. Sand properties testing - strength and permeability.
3. Molding Melting and Casting.
4. TIG/Plasma Welding Lap & Butt Joint.
5. Spot Welding.
8. Injection Molding and Blow Molding.

Group B: METALLURGY LAB
1. Preparation and study of the Microstructure of pure metals like Cu and Al.
2. Preparation and study of the Microstructure of Mild steels, low carbon steels, high Carbon steels.
4. Study of the Microstructures of Non-ferrous alloys.
5. Study of the Microstructures of High speed steels.
6. Hardenability of steels by Jominy End Quench Test.
7. Hardness measurement of various heats treated and non treated steels.
II B.Tech – II Sem (ME)

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(14AHS12) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to Civil, ME & AE Branches)

Objectives:
1. Comprehend the fundamental concepts and theoretical principles of the Economics
2. The course equips the students to develop an economic way of thinking in dealing with practical business problems and challenges
3. Identify the basic economic events most common in business operations
4. Also enable the students by providing the basic knowledge of book keeping, accounting and make analysis of financial statements of a business organization.

Outcomes:
After the completion of the course student will be able to
1. Gain knowledge on managerial economics
2. Develop an understanding of economic principles and to enhance skills in high-level problem solving and critical thinking
3. Evaluate the economic environment and the impact of governmental economic policies on consumers and financial institutions.
4. Know the application of financial accounting in the field of Engineering.

UNIT – I
INTRODUCTION TO MANAGERIAL ECONOMICS: Managerial Economics: Definition, Nature and Scope – Demand analysis: Law of demand, Demand determinants, Elasticity of Demand: Definition, Types, Measurement and Significance – Demand forecasting methods (Survey methods, Statistical methods, Expert opinion method, Test marketing, Controlled experiments, Judgmental approach)

UNIT – II

UNIT – III

UNIT – IV
CAPITAL AND CAPITAL BUDGETING: Capital and its Significance – Types of capital – Estimation of fixed and working capital requirements – Methods and sources of raising capital – Capital Budgeting Methods: Payback Method, Accounting Rate of Return (ARR), and Net Present Value (NPV) Method (Simple Problems).
UNIT –V

Text Books:


References:

Objectives:

To make the students to learn about the
1. Basic principles of mechanisms related to straight line motions and curved motions.
2. Velocity and acceleration calculations for the various mechanisms using theoretical & graphical methods.
4. Power transmission like gear and gear trains.

Outcomes:

After completion of the course, the student will be able to:
1. Gets the basic understanding about the simple mechanisms, working principles there by to apply the required mechanism depending upon the functional requirements in the product design.
2. Gets the familiarity to calculate the velocity and acceleration of mechanisms.
3. Gets the basic principles and procedures to design the CAM mechanism, hook mechanism and steering mechanism.
4. Gets the basic knowledge about gear and their applications.

UNIT I
MECHANISMS AND MACHINES: Elements or Links – Classification, Rigid Link, flexible and fluid link, Types of kinematic pairs – sliding, turning, rolling, screw and spherical pairs, lower and higher pairs, closed and open pairs, constrained motion – completely, partially or successfully constrained and incompletely constrained motions, machine, kinematic chain – inversion of mechanism, inversions of quadric cycle chain, single and double slider crank chains.

UNIT II

UNIT III
VELOCITY AND ACCELERATION IN MECHANISMS:
Analysis of simple mechanisms (Single slider crank mechanism and four bar mechanism) – Velocity by Instantaneous center method, Kennedy’s theorem, Velocity by relative velocity method, Acceleration diagrams, Coriolis acceleration – Klein’s construction.

UNIT IV
CAMS AND FOLLOWERS: Introduction, Types of followers and cams, Terminology, Types of follower motion - Uniform velocity, Simple harmonic motion and uniform acceleration and retardation, Maximum velocity and acceleration during outward and return strokes in the above 3 cases. Construction of cam profiles, Tangent cam with roller follower, Circular arc cam with flat surface follower.

UNIT V
GEARS: Introduction, types, terminology, law of gearing, velocity of sliding, Form of teeth - cycloidal and involute profiles, Length of path and arc of contact, contact ratio, phenomena of interferences, rack and pinion.
GEAR TRAINS: Introduction, Types, Train value, Simple and reverted wheel train, Epicyclic gear Train, Methods of finding train value or velocity ratio, Epicyclic gear trains, differential gear.

Text Books:

References:
Objectives:

To make the students to learn about the
1. Basic working principles of I.C. Engines and compressors and performance tests of C.I. and S.I. Engines.
2. Different types of boilers and basic principles and design calculations related to nozzles and condensers.
3. Basic principles and constructions of velocity diagrams for impulse and reaction turbines.

Outcomes:

After completion of the course, the student will be able to:
1. Learn about the I.C. Engines, compressors, which are mostly used as prime movers in automobile and industries respectively.
2. Learn about the basic theory of boilers, nozzles, condensers used in the thermal power plants.
3. Get the experience to construct the velocity diagrams for both impulse and reaction turbines which is prime requirement to design the steam turbines.

UNIT I

UNIT II

UNIT III
BOILERS: Classification based on Working principles & Pressures of operation, L.P & H.P. Boilers, Mountings and Accessories, Boiler efficiency, Principle of Draught, types, height and diameter of the chimney, Condition for maximum discharge through a chimney, Efficiency of a chimney, Artificial Draught.

UNIT IV
STEAM CONDENSERS: Requirements of steam condensing plant, Classification of condensers, working principle of different types, vacuum efficiency and condenser efficiency.

STEAM NOZZLES: Function of nozzle, applications, types, Flow through nozzles, thermodynamic analysis, assumptions, condition for maximum discharge, critical pressure ratio. Related problems, supersaturated flow,

UNIT V
STEAM TURBINES: Classification of Steam Turbines, Impulse Turbines – Mechanical details, Methods of reducing rotor speed, Velocity diagram, power developed, axial thrust, blade or

**Text Books:**

**References:**
(II B.Tech – II Sem (ME))

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(14ACE11) FLUID MECHANICS AND HYDRAULIC MACHINERY

Objectives:
1. The aim of this course is to introduce and explain basic fundamentals of Fluid Mechanics, which is used in various applications of Engineering.
2. To understand fluid properties, hydrostatic law, flow measurement and its applications in Industries and to obtain the loss of flow in a flow system.
3. To understand the dimensional analysis and boundary layer concepts.
4. To understand the working principles of hydraulic machinery.

Outcomes:
After completion of this course the student will be able to:
1. Apply how to find frictional losses in a pipe when there is a flow between two places.
2. Able to know types of flow and its measurements and applications.
3. Able to identify the suitable pump required for different purposes.
4. Able to Classify the turbines and design criteria based on water availability

UNIT I
FLUID PROPERTIES AND STATICS:: Dimensions and units - Definition of a fluid - Physical properties of fluids Density – Specific weight – Specific volume – Specific gravity – Compressibility –Vapour pressure – Surface tension and capillarity –Viscosity.

UNIT II
FLUID KINEMATICS AND FLUID DYNAMICS
Types of flow, velocity field, one and two-dimensional flow analysis, circulation and vorticity, stream function and velocity potential function, potential flow, standard flow patterns, combination of flow patterns, flow net.
Continuity equation, Euler’s equation of motion, Bernoulli’s equation and applications (Venturimeter and orifice meter). Impulse momentum equation and applications (pipe bend).

UNIT III


UNIT IV
Dimensional Analysis as a tool in design of experiments, identification of non dimensional numbers and their significance, dimensional analysis methods.
Boundary Layer Theory – Formation, growth and separation of boundary layer – Integral momentum principles to compute drag and lift forces- Mathematical models for boundary layer flows.

UNIT V
HYDRAULIC TURBINES: Elements of hydroelectric power plants- Heads and efficiencies of turbines – Classification of turbines –Pelton wheel-Moder Francis turbine – Kaplan turbine. Main components and working principle- Expressions for work done and efficiency – Working proportions and design of each.

**Text Books:**

**References:**
Objectives:
1. To understand the different types of linear and angular measuring instruments.
2. To understand concept of tolerance system for machine components.
3. To understand the importance of thread measurement.
4. To understand the requirement of alignment tests on machine tools.

Outcomes:
After completion of the course, the student will be able to:
1. Gain the basic knowledge of measuring instruments.
2. Design inspection procedure in manufacturing systems.
3. Supervise the inspectors in the shop floor.
4. Use of appropriate machine tool alignment test and trends in measuring machines.

UNIT I
SYSTEMS OF LIMITS AND FITS: Introduction, Definitions, fits and their types – unilateral and bilateral tolerance system, hole and shaft basis systems – interchangeability and selective assembly. Systems of limits and fits as per BIS System for plain work.

UNIT II
LENGTH STANDARDS: Line and end standards, wavelength standards, slip gauges.
MEASUREMENT OF ANGLES AND TAPERS: Bevel protractor, Angle gauges, spirit level, sine bar, sine centers, sine table: use of rollers and spheres to determine tapers.
OPTICAL MEASURING INSTRUMENTS: Tool maker’s microscope and its application, optical flat and interferometers.
STRAIGHTNESS, FLATNESS AND SQUARENESS MEASUREMENT: Autocollimator, Use of spirit level –engineer’s square-square block level.

UNIT III
MEASUREMENT THROUGH COMPARATORS: Mechanical, Optical, Electrical, Electronic, Pneumatic comparators and their uses.
SURFACE ROUGHNESS MEASUREMENT: Difference between surface roughness and surface waviness, Numerical assessment of surface finish – $R_t$, $R_z$, $R_a$ and RMS values, Methods of measurement of surface finish-profilograph, Talyurf, BIS symbols for indication of surface finish.

UNIT IV
SCREW THREAD MEASUREMENT: Elements of screw threads, errors in screw threads, measurement of major, minor and effective diameter(Two wire method and Three wire method, Screw thread micro meter), angle and pitch measurement.
GEAR MEASUREMENT: Gear measuring instruments, Parkinson’s Rolling Gear tester, Gear tooth profile checking, Measurement of diameter, pitch, pressure angle and tooth thickness.

UNIT V
MACHINE TOOL ALIGNMENT TESTS: Requirements of Machine Tool Alignment Tests, Alignment tests on lathe, milling, drilling machines.
MEASURING MACHINES: End Bar Measuring Machine, Coordinate measuring machines (CMM) - Various types, applications, advantages, possible errors in CMM. Computer controlled coordinate measuring machines and universal measuring machines- a brief outline only.
Text Books:

References:
Objectives:
1. To understand the features and types of machine tools used in production floors.
2. To understand the capabilities of machine tools in meeting the product requirements.
3. To understand the functional capabilities and involved economics of using the production machines.
4. To understand the tool movement under different operation conditions.

Outcomes:
After completion of the course, the student will be able to:
1. Select the appropriate machining process to meet desired shape.
2. Select the suitable machining parameters to attain the dimension requirements.
3. Identify the economic machining parameters to meet the productivity requirement.
4. Develop the sequence of operations to attain the required shape.

UNIT I
ELEMENTS OF METAL CUTTING: Cutting process, Geometry of single point tools as per ASA, types of chips – built up edge and its effects, chip breakers, Merchant’s circle diagram, cutting forces – effect of cutting speed, feed, depth of cut, Taylor’s tool life equation, simple problems, and coolants on machinability, Tool materials.

UNIT II

UNIT III
DRILLING AND BORING: Specifications, types, operations performed, tool holding devices, twist drill and types. Boring machines – Fine boring machines, Jig Boring machines.
SHAPING, SLOTTING AND PLANING: Their Principles of working, Principal parts, specification, classification, Operations performed, Kinematic schemes of the shaping slotting and planning machines, machining time calculations.
Broaching: Basic principles of broaching, Nomenclature of tool/construction and Operation of Broaching, Different Types of Broaches and Their Applications, Broaching Machines

UNIT IV
MILLING: Specifications, classifications of milling machines, Principal features of horizontal, vertical and universal milling machines, machining operations, Types and geometry of milling cutters, methods of indexing.
GEAR MANUFACTURING: Methods of manufacturing gears, formed tooth process, template process, generating process, bevel gear generator and gear finishing.

UNIT V
GRINDING: Theory of grinding, classification of grinding machines, cylindrical and surface grinding machines, Tool and cutter grinding machines, Grinding wheel- Different types of abrasives, bonds, specification, selection of a grinding wheel.
LAPPING, HONING AND BROACHING: Constructional features, comparison of grinding, lapping and honing, machining time calculations.
Non-traditional machining processes – Introduction to Abrasive jet machining, USM, EDM.

Text Books:

References:
(14ACE22) STRENGTH OF MATERIALS AND FLUID MECHANICS, HYDRAULIC
MACHINERY LAB

Objectives:
1. To understand testing procedures of mild steel by tension, direct shear, torsion, hardness tests.
2. To understand the concept of modulus elasticity, and to know how to measure deflection of beams.
3. To understand the calibration of ventrimer, orificemeter and determination of closed conduit pipe losses.
4. To understand the performance of pelton, Francis turbines and centrifugal pumps.

Outcomes:
After completion of the course the student will be able to
1. Find Young’s modulus, torsional rigidity of mild steel rods.
2. Know the hardness of mild steel and HYSD specimens.
3. Find the co-efficient of venture meter, orifice meter and friction factor.
4. Find efficiency of pelton, francis turbines, centrifugal pumps.

PART A
STRENGTH OF MATERIALS LAB

1. To study the stress-strain characteristics of mild steel rod using universal testing machine.
2. To find the direct shear strength of rod using compressive testing machine.
3. To find the modulus of elasticity of given material by measuring deflection in beams.
4. To find the modulus of rigidity of given material using torsion testing machine.
5. To find the modulus of rigidity of given material using spring testing machine.
6. To find Brinnell’s hardness and Rock well hardness numbers of given material.

PART B
FLUID MECHANICSLAB

1. Calibration of Venturi meter.
2. Calibration of Orifice meter
3. Determination of friction factor for a given pipe
4. Determination of loss of head due to sudden contraction in a pipe line.

PART C
HYDRAULIC MACHINERY LAB

1. Performance test on Pelton Wheel Turbine
2. Performance test on Francis Turbine
3. Performance test on Single stage Centrifugal Pump
4. Performance test on Multi stage Centrifugal Pump.

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Objectives:
1. To understand the requirement of alignment tests on machine tools
2. To understand concept of tolerance system for machine components.
3. To understand the features and types of machine tools used in production floors.
4. To understand the tool movement under different operation conditions.

Outcomes:
After completion of the course, the student will be able to:
1. Use appropriate machine tool alignment test and trends in measuring machines.
2. Design inspection procedure in manufacturing systems.
3. Select the appropriate machining process to meet desired shape.
4. Develop the sequence of operations to attain the required shape.

1. Measurement of lengths, heights, diameters and bores by vernier calipers, micrometers and dial bore indicators etc.
2. Use of gear tooth vernier and checking the chordal addendum and chordal height of spur gear.
3. Alignment test on the lathe and milling machine, Finding the flatness of surface plate using spirit level.
4. Angle and taper measurements by Bevel protractor, Sine bars, etc.
5. Thread measurement by Two wire/ Three wire method.
6. Surface roughness measurement by Talysurf instrument.
7. Job on Step turning and taper turning on lathe machine.
8. Job on Thread cutting and knurling on -lathe machine.
10. Job on Shaping and Planning.
11. Job on Slotting.
12. Job on Milling
(14AHS15) QUANTITATIVE APTITUDE AND REASONING - I

Objectives:
The main objectives of this course are
1. To learn the concepts of coding and decoding of letters and numbers.
2. To interpretation data using the graphs.
3. To understand the basic concepts of probability.
4. To Comprehend the relation between time and distance in real life problems.

Outcomes:
After completion of the course the student will be able to
1. Strengthen their ability to meet the challenges in solving Time and distance problems.
2. Apply Data interpretation to solve the problems on Line, Bar, Pie graphs.
3. Develop the thinking ability and apply Venn diagram and binary logic.
4. Apply the number series and letter analogies in problems on verbal analogy.

Syllabus for Quantitative Aptitude

Competency 1:

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

1.2 Decimal Fractions
1.3 Simplification
1.4 Square Roots & Cube Roots

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

1.6 Problems on Numbers
1.7 Problems on Ages
1.8 Surds & Indices

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

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

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

Competency 2:

2.1 Partnership
Introduction - Relation between capitals, Period of Investments and Shares

2.2 Chain Rule

2.3 Time & work
Problems on Unitary method - Relation between Men, Days, Hours and Work - Problems on Man-Day-Hours method – Problems on alternate days - Problems on Pipes and Cisterns.
2.4 **Time & Distance**
Relation between speed, distance and time – Converting kmph into m/s and vice versa - Problems on average speed - Problems on relative speed – Problems on trains - Problems on boats and streams - Problems on circular tracks – Problems on races.

2.5 **Mixtures and Allegations**
Problems on mixtures - Allegation rule - Problems on Allegation

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

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

2.8 **Logarithms**

**Syllabus For Reasoning**

**Competency 3:**

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

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

3.3 **Binary Logic**
Definition of a truth-teller - Definition of a liar - Definition of an alternator – Solving problems using method of assumptions - Solving analytical puzzles using binary logic.

**Competency 4:**

4.1 **Number and letter series**
Difference series - Product series - Squares series - Cubes series - Alternate series - Combination series - Miscellaneous series - Place values of letters.

4.2 **Number and Letter Analogies**
Definition of Analogy - Problems on number analogy - Problems on letter analogy - Problems on verbal analogy.

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

**Competency 5:**

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

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

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

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

Text Books:

References:
Preamble:

English is an international language as well as a living and vibrant one. People have found that knowledge of English is a passport for better career and for communication with the entire world. As it is a language of opportunities in this global age, English is bound to expand its domain of use everywhere. The syllabus has been designed to enhance communication skills of the students of Engineering and Technology. The prescribed book serve the purpose of preparing them for everyday communication and to face global competitions in future.

The prescribed text focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and student-centered. They should be encouraged to participate in the classroom activities keenly.

Objectives:

- To enable the students to communicate in English for academic and social purpose.
- To make the students to master LSRW skills to meet the challenges in the society.
- To strengthen the students to have good command of English Language and thereby to have good command of subject.
- To develop the skills in students for societal service and the love for work.
- To make the students to be humane.

UNIT – I

Chapter entitled ‘Humour’ from “Using English”

Listening - Techniques - Importance of phonetics
L- Meet & Greet and Leave taking, Introducing Oneself and Others (Formal and Informal situations)
R- Reading Strategies -Skimming and Scanning
W- Writing strategies- sentence structures
G-Parts of Speech –Noun-number, pronoun-personal pronoun, verb- analysis
V-Affixes-prefix and suffix, root words, derivatives

UNIT –II
Chapter entitled ‘Inspiration’ from “Using English”

L- Listening to details
S- Apologizing, Interrupting, Requesting and Making polite conversations
R- Note making strategies
W- Paragraph-types- topic sentences, unity, coherence, length, linking devices
G-Auxiliary verbs and question tags
V- synonyms-antonyms, homonyms, homophones, homographs, words often confused

UNIT –III

Chapter entitled ‘Sustainable Development’ from “Using English”

L- Listening to themes and note taking
S- Giving instructions and Directions, making suggestions, Accepting ideas, fixing a time and Advising
R- Reading for details -1
W- Resume and cover letter
G- Tenses – Present tense, Past tense and Future tense
V-Word formation and One-Word Substitutes

UNIT –IV

Chapter entitled ‘Relationships’ from “Using English”

L- Listening to news
S- Narrating stories, Expressing ideas and opinions and telephone skills
R- Reading for specific details and Information
G- Voice and Subject – Verb Agreement
V- Idioms and prepositional Phrases

UNIT –V

Chapter entitled ‘Science and Humanism’ from “Using English”

L- Listening to speeches
S- Making Presentations and Group Discussions
R- Reading for Information
W- E-mail drafting
G- Conditional clauses and conjunctions
V- Collocations and Technical Vocabulary and using words appropriately
Remedial Grammar:

1. Adjectives and Adverbs.
2. Use of Articles.
3. Review of prepositions and conjunctions.
4. Transformation of sentences
   (a) Active and Positive Voice.
   (b) Synthesis and analysis.
   (C) Direct and indirect speech.
5. Common errors in English.

Vocabulary:

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

Writing practice (composition):

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

Outcomes:

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

Question Paper pattern: Max Marks: 70
From the prescribed text book without leaving any lesson

1. 2 marks questions – 5  (Any five out of eight)  \(5 \times 2 = 10M\)
2. 8 marks questions – 2  (Any two out of four)  \(2 \times 8 = 16M\)

**PART – II**

3. General essay – 1  (Any one out of three)  \(1 \times 8 = 8.M\)
4. Report Writing – 1  (Any one out of two)  \(1 \times 8 = 8.M\)
5. Resume Writing – 1  (No choice)  \(1 \times 8 = 8.M\)
6. Idioms – 5  (Any five out of eight)  \(5 \times 1 = 5.M\)
7. Vocabulary - 5  (Any five out of eight)  \(5 \times 1 = 5.M\)
8. Correction of sentences - 10  (Any ten out of fifteen)  \(10 \times 1 = 10.M\)

___________

**Total = 70Marks**

**Text Book:**  “Using English; A Coursebook for Undergraduate Learners” published by Orient Black Swan, 2013.

**Reference Books:**

Objectives:

To make the students learn:
2. The plant location, plant layout and material handling.
3. Thoroughly forecasting methods and material management.
4. The concept of work study and quality control.
5. The techniques of project management.

UNIT I
Administration, management and organization. Scientific management, functions of management. Contributions by Taylor and Fayol to management. Organization-types of organization, Principles of organizations, designing an organization structure.


UNIT II
Plant Location-Locatio factors, concept of Weber theory, Choice of Rural, Suburban and Urban locations. Plant Layout-Definition, Objectives, and Salient features of product, process and fixed position layouts. Material Handling-Definition, Relation between plant layout& material handling, principles of material handling.

UNIT III

UNIT IV
Work Study-Method study, Operation process charts, flow process charts, Man-machine charts, Principles of Motion Economy. Time study: steps in making time study, Performance Rating, Computation of standard time, Work sampling.

INSPECTION AND QUALITY CONTROL: Difference between inspection & quality control. Statistical Quality Control charts. Acceptance sampling plan- single sampling and double sampling plans-OC curves.
UNIT V
PERT & CPM : Project management, network modeling-probabilistic model, program evaluation and review technique, Critical Path computation, Calculation of probability of project completion time, deterministic model – Critical Path Method, crashing of simple networks.

Outcomes:
After completion of the course, the student will be able to:
1. Identify the fundamentals of Administration, management, plant location & layout and operations planning & control.
2. Interpret basics of material handling, work-study, quality concept and project management.
3. Judge best suitable organization structure, HR model, plant design, mH system, manufacturing process and inventory system.
4. Infer the best work-study techniques, quality techniques and project management models.
5. Solve industry problems with available sources and latest software tools with society concern.
6. Organize a team and play a key role in decision making with interpretation skills besides continuous learning.

Text Books:

References:

Mapping Of COs with POs:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially

Sri Venkateswara College of Engineering & Technology
(Autonomous), Chittoor
DYNAMICS OF MACHINERY (14AME18)
III B.Tech - I Sem (ME)

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Objectives:
To make the students learn:
1. Fundamentals of friction, clutches, brakes and dynamometers in application to automobile.
2. Fundamentals required in Gyroscope, Turning moment diagrams and designing the flywheels in application to the I.C. Engines and other machines.
3. Fundamentals required in designing of governors in application to the I.C. Engines and other machines.
4. Theory related to balancing of rotatory and reciprocating masses.
5. Effect of vibrations on machines.

UNIT I
FRICTION: Theories of Inclined plane, screw jack, pivots and collars, uniform pressure and wear, simple problems;
CLUTCHES: single and multi-plate clutches, cone clutch and centrifugal clutch, simple problems.
BRAKES and DYNAMOMETERS: Block brake, internal expanding brake, band brake; absorption and transmission type dynamometers, and problems on band brakes.

UNIT II
GYROSCOPE AND FLY WHEELS: Gyroscopic couple, Gyroscopic Stabilization, Gyroscopic effects in Automobiles, aero planes and ships. Turning moment diagrams, Fly wheels and their design, simple problems.

UNIT III

UNIT IV
BALANCING: Balancing of rotating masses - single and multiple, single and different planes, analytical and graphical methods. Balancing of reciprocating masses – Primary and Secondary unbalanced forces, partial balancing and its effects, balancing of primary and secondary forces in V and multi cylinder engines.

UNIT V
VIBRATION: Introduction, Types, Free and forced vibrations of single degree of freedom systems, Dunkerley’s method, Raleigh’s method, Whirling speeds, damping vibration, isolation, resonance, torsional vibrations of two and three rotor systems, Torsional equivalent shaft.
Outcomes:
After completion of the course, the student will be able to:
1. Describe various components of clutches, brakes and other devices related to automobiles.
2. Summarize model development on friction, clutches, brakes, dynamometers, gyroscope, flywheel, governors, balancing of rotating and reciprocating masses and vibrations.
3. Solve industry problems with advanced technologies in the domain of automobile systems with optimal resources for minimum total cost and environment friendly.
4. Judge the best solution to the various forces acting on automobile system involving attainment of industry long term goals with system integration and synergy.
5. Organize a team for best automobile system design with managerial skills and knowledge to satisfy social obligations and customer.
6. Enrichment of knowledge with experimental skills and continuous learning

Text Books:

References:

Mapping of COs with POs:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially

Sri Venkateswara College of Engineering & Technology
(Autonomous), Chittoor
Objectives:
To make the students learn:
1. Air standard cycles, fuel air cycles and actual cycles.
2. Combustion processes in SI & CI Engines.
3. Pollutant formation, emission control & alternate fuels for IC Engines.
4. Recent trends in IC Engines.
5. About Gas Turbines and Jet propulsion.

UNIT I
INTRODUCTION TO IC ENGINE CYCLES:
FUEL-AIR CYCLE: Introduction, Fuel-Air Cycles and Their Significance, Composition of Cylinder Gases, Variable Specific Heats, Dissociation, Effect of Number of Moles, Comparison of Air-Standard and Fuel-Air Cycles.

UNIT II
COMBUSTION IN SI ENGINES: Air-fuel ratio requirements, Stages of combustion-normal and abnormal combustion, Factors affecting knock, Combustion chambers.
COMBUSTION IN CI ENGINES: Stages of combustion-normal and abnormal combustion – Factors affecting knock, Direct and Indirect injection Combustion chambers.

UNIT III
ENGINE EXHAUST & EMISSION CONTROL: Formation of NO_x, HC/CO mechanism, Smoke and Particulate emissions, Green House Effect, Methods of controlling emissions, Three way catalytic converter and Particulate Trap, Emission (HC, CO, NO & NO_x) measuring equipments, Smoke and Particulate measurement.


UNIT IV

UNIT V
GAS TURBINES: Simple gas turbine plant, Ideal cycle, essential components, parameters of performance, open cycle, actual cycle, regeneration, inter cooling and reheating, closed and hybrid or combined cycles.
JET PROPULSION: Principle of Operation, Classification of jet propulsion engines, Working Principles with schematic diagrams and representation on T-S diagram of Turbo jet engines, Turbo prop, Ram jet, Pulse jet.

Outcomes:
   After completion of the course, the student will be able to:
   1. Interpret fuel air cycles and actual cycles, emissions from IC Engines, recent trends in IC Engines, Alternate fuels, Gas Turbines and Jet propulsion.
   2. Compare air standard, fuel air and actual cycles and differentiate between normal and abnormal combustion in SI & CI Engines.
   3. Select alternate fuels that are eco friendly for industrial applications to fulfill the social obligations considering the customer satisfaction.
   4. Solve the real life problems by system approach with optimal sources by latest software techniques.
   5. Formulate a team to promote thermal system integration and synergy to attain industry long term goals and all around development by continuous learning.

Text Books:
1. V. Ganesan, I.C. Engines, Tata McGraw Hill.

References:
2. V.M. Domkundwar, Gas Turbines and Jet Rocket Propulsion, Dhanpat Rai & Co.

Mapping of COs with POs:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:

To make the students learn:
1. Basics of strength and stresses in machine elements and manufacturing considerations in the design.
2. Fundamentals required in designing the machine elements, types of belts used for various purposes.
3. Types of shafts, keys and coupling joints and their suitability.
4. Design principles in the cotter and bolted joints.
5. Design of riveted and welded joints of machine components.

UNIT I
INTRODUCTION: General considerations of design, design process, Selection of Engineering Materials and properties, Manufacturing considerations in the design.
STRESSES IN MACHINE ELEMENTS: Simple stresses, Torsional and bending Stresses, Combined stresses, impact stresses, stress-strain relation, theories of failure, factor of safety.

UNIT II
STRENGTH OF MACHINE ELEMENTS: Stress concentration, notch sensitivity, Design for fluctuating stresses, Fatigue strength and S-N Diagrams, Endurance limit and strength, Goodman’s line, Soderberg’s line.
PPOWER TRANSMISSION:Design of Flat belt drives, V-belt drives & rope drives. Selection of wire ropes, design of chain drives.

UNIT III
SHAFTS, KEYS AND COUPLINGS: Design of solid and hollow shafts for strength and rigidity, Design of shafts for combined bending and axial loads. Design of keys, Design of Muff, Split muff, Flange and Flexible couplings.

UNIT IV
BOLTED JOINTS: Forms of Screw threads, Stresses in Screw fasteners, Design of bolts with pre-stresses, Bolts of uniform strength, Eccentric loading of bolted joints.

UNIT V
RIVETED JOINTS: Types of riveted joints, design of riveted joints, boiler shell riveting, Eccentric loading of riveted joints.
WELDED JOINTS: Design of transverse and parallel fillet welded joints. Eccentric loading of welded joints.

Outcomes:

After completion of the course, the student will be able to:
1. Summarize concepts of mechanics of materials to estimate the stresses in a machine element like shafts, keys, couplings, cotters, bolted, riveted, welded joints and power transmission elements.
2. Choose suitable machine elements for different industry applications with model development and system approach.
3. Develop simple machine elements and analyze the impact of those on industry growth and customer satisfaction.
4. Design various machine elements with available resources, social concern and advanced technologies to attain quality standards and sustain in market.
5. Organize a project team to achieve goals and to promote higher learning & Research

Text Books:

References:

Mapping of COs with POs:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially

Sri Venkateswara College of Engineering & Technology
(Autonomous), Chittoor
Objectives:
To make the students learn:
1. About the components related to various types of automobiles.
2. Various types of fuel injection systems in SI and CI Engines.
3. Various types of Ignition systems and electrical systems installed in automobiles.
4. The transmission system in automobiles.
5. About the steering, suspension, and braking systems in automobiles.

UNIT I
INTRODUCTION: Components of a four wheeler automobile, types of automobiles, Chassis-types, power unit, power transmission, rear wheel drive, front wheel drive, Four wheel drive, Advantages and disadvantages, types of automobile engines, cylinder liners-dry and wet, naturally aspirated engines, turbo charging and super charging.
LUBRICATION SYSTEM: Necessity, functions of lubrication, properties of lubricants and grading, lubrication systems and types, oil filters, oil pumps, crankcase ventilation.

UNIT II
S.I. ENGINE FUEL SYSTEM: Fuel supply systems, Mechanical and electrical fuel pump, filters, simple carburetor and its functions, modern carburetors – Zenith & Solex, Air Filters, gasoline injection (GDI), multipoint fuel injection system (MPFI).
C.I. ENGINE FUEL SYSTEM: Requirements of diesel injection systems, types of injection systems, fuel pump- types, fuel injectors-types, Common Rail Direct Injection System (CRDI).
COOLING SYSTEM: Cooling Requirements, Air Cooling, Liquid Cooling, Types, Cooling Thermo, and Forced Circulation System, Radiators-Types, Cooling Fan, water pump, thermostat, antifreeze solutions.

UNIT III
IGNITION SYSTEM: Function of an ignition system, battery ignition system, auto transformer, contact breaker points, condenser and spark plug, Magneto coil ignition system, electronic ignition system (CDIS & TACIS), Ignition Timings- Ignition Advance and its necessity, Centrifugal Spark Advance Mechanism, Vacuum Advance Mechanism.
ELECTRICAL SYSTEM: Charging system, cut-off relay, starting system, Bendixdrive, Horn, wiper, Fuel gauge, oil pressure gauge, and Engine temperature indicator electrical circuit of automobile.

UNIT IV
TRANSMISSION SYSTEM: Types of clutches -single plate, multi plate, and centrifugal clutches, fluid fly wheel, gear box- types, sliding mesh, constant mesh, synchromesh, over drive, torque converter, Propeller shaft – Hotchkiss drive, Torque tube drive, universal joint, differential, rear axles.

UNIT V
STEERING SYSTEM: Steering geometry – camber, castor, king pin rake, combined angle toe-in, toe out, center point steering. Steering gears – types, steering linkages, Stub axle, power steering.

SUSPENSION SYSTEM: Elements of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension systems (Wishbone, MacPherson Strut).

BRAKING SYSTEM: Types - Mechanical, Hydraulic, Pneumatic & vacuum suspended servo brake system, Brake fluids and properties.

Outcomes:
After completion of the course, the student will be able to:
1. Describe various components related to Automobiles.
2. Summarize lubrication system, Ignition system, Cooling system, Transmission system, Steering system, Suspension system and Braking system for Automobiles.
3. Apply system approach to optimize various systems for automobiles.
4. Appraise eco-friendly automobile design with advanced technology and society requirements
5. Judge a suitable process with optimal resources utilization for industrial growth and customer satisfaction.
6. Formulate a technical team to solve industrial problems, decision making and enrichment of knowledge by continuous learning

Text Books:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

III B.Tech - I Sem (ME)  
L  T  P  C  
-  -  4  2

(14AHS14) TECHNICAL ENGLISH LAB-II  
(Common to all Branches)

Objectives:

1. To inculcate the confidence of using correct pronunciation (recollecting the sounds of Monophthongs, diphthongs, consonants and identifying the rules of accent/stress and intonation).
2. To enable the students to improve the proficiency in English (based on the previous learning) at all levels.
3. To train the students to use English effectively in participating group discussions, interviews & in public speaking.
4. To enhance the confidence in problem solving while facing the career.
5. To train the students to face job interviews with confidence.

1. **Listening comprehension:** Listening to passage – Understanding the passage – answering the questions – personal and professional situations.
2. **Resume writing:** Structure – format style – defining career objective – projecting the strengths – preparing covering letter.
3. **Speaking Activities:**
   - **Debates** – importance – rules - beginning – taking a stand – supporting & defending.
   - **Describing objects/people/situations:** how to describe – physical properties – material-functions – features - complexion - Attire - situation – place – time – theme.


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

**MINIMUM REQUIREMENT FOR ELCS LAB:**
1) Computer aided language lab for 70 students, 70 systems – one master console software for self-study.
2) T.V, digital stereo – audio – visual system.
3) Computer laboratory with LAN Connectivity of minimum 70 multimedia systems with the following configuration.
   a) Intel Pentium® D 3.00GHZ
   b) RAM-1GB minimum
   c) Hard disk – 160GB
d) Headphones of durable quality.

Outcomes:

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

Prescribed Software – Globarena

Suggested Software:

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

Reference Books:

2. Krishna Mohan & Meera Benerji Developing Communication Skills by (Macmillan)
3. English Skills for Technical Students, WBSCTE with British Council, OL
4. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
5. Robert J Dixson, Everyday Dialogues in English by Prentice – Hall of India Ltd.
Objectives:
To make the students learn:
1. The properties of fuels which are used in I.C. engines.
2. The working principle, components of different types of engines, compressors, refrigeration and air conditioning systems.
3. The frictional power of an I.C. engine and experimental procedures to determine the frictional power.
4. Evaluation of the various performance parameters of an engine and compressor.
5. Experimental procedures to determine the COP of refrigeration and air conditioning systems.

List of Experiments:
1. Determination of Flash point and Fire point of petrol/diesel using Abel’s/Pensky Marten’s apparatus.
2. Determination of Viscosity of lubricating oil using Redwood Viscometer and Say bolt Viscometer.
3. Study of Bomb and Junker’s gas calorimeter to determine the Calorific value of fuels.
6. Retardation test on 4-stroke, single cylinder diesel engine.
7. Morse test on 4-stroke, 4- cylinder petrol engine.
8. Performance and emission test on 2- stroke, single cylinder petrol engine.
9. Economical speed test on 4-stroke, single cylinder petrol engine
10. Performance test on refrigeration test rig.
11. Performance test on computerized air conditioner test rig.
12. Performance test on two stage reciprocating Air compressor.
13. Determination of air fuel ratio & volumetric efficiency with variable compression ratio engine on 4-stroke, single cylinder petrol engine.
14. Performance, combustion and Emission test on computerized 4-stroke, single cylinder diesel engine.

Note: Minimum of 12 Experiments need to be performed.

Outcomes:
After completion of the course, the student will be able to:
1. Demonstrate the working with different equipment to test the properties of fuels like flash point, fire point and calorific values and components of different types of engines, compressors, refrigeration and air conditioning systems to analyze industry related problems.
2. Conduct experiments on flash point, fire point apparatus, calorimeters, different types of engines, compressors, refrigeration & air-conditioning systems to develop innovative solutions and produce quality products.

3. Operate flash point, fire point apparatus, calorimeters, different types of engines, compressors, refrigeration & air-conditioning systems to enhance research.

4. Construct flash point, fire point apparatus, calorimeters, different types of engines, compressors, refrigeration & air-conditioning systems to promote system integration & synergy in order to execute small & large scale projects

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:

The main objectives of this course are:

1. To evaluate various real life situations by resorting to analysis of key issues and factors.
2. To understand various languages structures.
3. To demonstrate different principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
4. To explore the possibilities of utilization of concepts of reasoning.
5. To interpret the given data graphically.

Syllabus for Quantitative Aptitude

Competency 1:

1. **Area**
   - Formulas for Areas
   - Problems on Areas

2. **Volumes & Surface Areas**
   - Problems on Volumes
   - Problems on Surface Areas

3. **Races & Games of Skill**

4. **Calendars**
   - Definition of a Leap Year
   - Finding the number of Odd days
   - Framing the year code for centuries
   - Finding the day of any random calendar date

5. **Clocks**
   - Finding the angle when the time is given
   - Finding the time when the angle is known
   - Relation between Angle, Minutes and Hours
   - Exceptional cases in clocks

6. **Stocks & Shares**
7. **Permutation and Combinations**
   - Definition of permutation
   - Problems on Permutations
   - Definition of Combinations
   - Problems on Combinations

**Competency 2:**

8. **Probability**
   - Definition of Probability
   - Problems on coins
   - Problems on dice
   - Problems on Deck of cards
   - Problems on Years

9. True Discount

10. Banker's Discount

11. Heights & Distances

12. Odd man out & Series
   - Problems on number Odd man out
   - Problems on letter Odd man out
   - Problems on verbal Odd man out

13. **Data Interpretation**
   - Problems on tabular form
   - Problems on Line Graphs
   - Problems on Bar Graphs
   - Problems on Pie Charts

**Syllabus for Reasoning**

**Competency 3:**

**Deductions**

- Finding the conclusions using Venn diagram method
- Finding the conclusions using syllogism method

**Connectives**

- Definition of a simple statement
- Definition of compound statement
- Finding the Implications for compound statements
- Finding the Negations for compound statements

**Competency 4:**

**Analytical Reasoning puzzles**

- Problems on Linear arrangement
• Problems on Circular arrangement
• Problems on Double line-up
• Problems on Selections
• Problems on Comparisons

**Competency 5:**

**Blood relations**

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

**Outcomes:**

1. After completion of the course the student will be able to
2. Strengthen their ability to meet the challenges in solving real life problems.
3. The student will preserve maturity of the mind in solving linguistic problems.
4. Develop the thinking ability and apply Quadratic equations.
5. Apply the Analytical Reasoning puzzles to solve linear and circular arrangements

Analyze the blood relation puzzles in a family tree.

**Text Books:**


**Reference Books:**

Sri Venkateswara College of Engineering & Technology
(Autonomous), Chittoor

III B.Tech- IISem (ME) L T P C
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Objectives:
To make the students learn:
1. The Elementary concepts of CAD/CAM.
2. The principles of Geometric modeling and Group technology.
3. The doctrines of CAQC and CNC technologies.
4. The programming concepts of CNC machines.
5. The basic concepts of Flexible manufacturing systems and computer integrated manufacturing.

UNIT I
INTRODUCTION: Computers in Industrial Manufacturing, Product cycle, CAD / CAM
Hardware, Basic structure, CPU, Memory types, input devices, display devices, hard copy
devices, storage devices. Computer Graphics—Raster scan graphics, Coordinate systems,
database structures for Geometric modeling, transformation of geometry, 3D transformations,
mathematics of projection, clipping, hidden line/surface removal, shading.

UNIT II
GEOMETRIC MODELING: Requirements, geometric models, geometric construction
models, curve representation methods, surface representation methods, modeling facilities
desired.
GROUP TECHNOLOGY: Part Families, Parts Classification and Coding, Features of Parts
Classification and Coding Systems, Production Flow Analysis, cellular manufacturing. Computer
Aided Processes Planning—Benefits of CAPP-Approaches of CAPP- Retrieval type and
Generative type, Implementation techniques.

UNIT III
COMPUTER AIDED QUALITY CONTROL: Inspection and Testing, Coordinate measuring
machine, non-contact inspection methods, integration of CAQC with CAD/CAM.
COMPUTER NUMERICAL CONTROL: Fundamentals of NC—Basic Components of NC
System, Motion Control systems, NC Positioning systems, advantages and disadvantages of NC.
CNC-Features of CNC, machine tool control unit, CNC software. DNC-Distinguish from CNC,
Direct and Distributed NC.

UNIT IV
CNC PROGRAMING: Part program fundamentals, Manual part program methods, Preparatory
Functions, Miscellaneous functions, Tool length compensation, canned cycles, cutter radius
compensation, tool noseradius compensation. Manual part programming for CNC turning and
machining centre for popular controllers like Fanuc. Advanced part programming methods-
looping and jumping, subroutines, Mirror Imaging. Fundamentals of computer aided part
programming.
UNIT V

COMPUTER INTEGRATED MANUFACTURING: Historical background, Integration, CIM Implementation, Benefits of CIM, Lean manufacturing.

Outcomes:
After completion of the course, the student will be able to:
1. Summarize various computer aided tools utilized in a manufacturing process.
2. Distinguish in application various tools like CAD, CAM, CIM, CAPP modeling and problem solving with system approach.
4. Acquire knowledge and skills to promote system integration and synergy for industry growth, and attainment of goals.
5. Compose a team for effective decision making for integration of manufacturing system with optimal resources.
6. Develop a continuous learning methodology for knowledge and skills enrichment.

Text Books:

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Objectives:
To make the students learn:
1. Design of curved beams.
2. Design and selection of journal and ball bearings to suit requirements.
3. Design of the engine components like piston, connecting rod, and cylinder.
4. Design of the various springs and screws.
5. Design of the various types of gears.

UNIT I
DESIGN OF CURVED BEAMS: Introduction, Bending Stresses in curved beams, Expression for radius of neutral axis for rectangular, circular, trapezoidal and T-section, Design of crane hooks, C-clamps.

UNIT II
SLIDING CONTACT BEARINGS: Introduction, Classification of Bearings, Types of sliding contact bearings, Hydrodynamic lubricated bearings, Terms used in Hydrodynamic journal bearings, Bearing Characteristic Number and Bearing modulus for journal bearings, Design procedure for Journal bearings.
ROLLING CONTACT BEARINGS: Introduction, Advantages and Disadvantages of rolling contact bearings over sliding contact bearings, Types of Roller bearings, Basic static load rating of rolling contact bearings, Static Equivalent load for Rolling contact bearings, Life of a bearing, Basic dynamic load rating of rolling contact bearings, Dynamic Equivalent load, Dynamic load rating for Rolling contact bearings under variable loads, Reliability of a bearing.

UNIT III

UNIT IV
SPRINGS: Introduction, Types of Springs, Terms used in Compression springs, Stresses and deflections of helical springs of circular wire, Helical Torsion springs, Concentric or Composite springs, Leaf springs – Construction of leaf springs, Equalised stresses in spring leaves, Length of spring leaves.
POWER SCREWS: Introduction, Types of screw threads used for power screws, Stresses in power screws, Design of screw jack, Differential and compound screws.

UNIT V
SPUR GEARS: Introduction, Advantages and Disadvantages of Gear drives, Classification of gears, Design considerations of gear drive, Beam strength of gear teeth-Lewis equation, dynamic tooth load, static tooth load, wear tooth load, Causes of gear tooth failure, Design procedure for spur gears.

HELICAL GEARS: Introduction, Formative or Equivalent number of teeth for helical gears, Strength of Helical gears.

Outcomes:
After completion of the course, the student will be able to:
1. Describe the concept of basic mechanical elements used in various automobiles.
2. Choose the type of bearings, springs, power screws and gears to develop a mechanical system.
3. Analyze the mechanical elements using advanced computer aided technologies to find innovative solutions for the complex design problems.
4. Design eco-friendly mechanical systems with available resources at minimum total cost.
5. Construct a team to Enrich knowledge, Analyzing and computational skills to achieve goals of industry with continuous learning.

Text Books:

References:

Data book:

Note: Design data books by any author are permitted in all examinations.

Mapping of COs with POs:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
RENEWABLE ENERGY SOURCES (14AME27)
III B.Tech - II Sem(ME)

L  T  P  C
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(Common to CE & ME)

Objectives:
To make the students learn:
1. The solar radiation and its collectors.
2. The solar energy storage systems and solar cells with applications.
3. The conversion of bio mass and geothermal energy into useful energy.
4. The Ocean, Wind and Tidal Energy conversion systems.
5. The direct energy conversion systems

Unit I

Unit II

Unit III

GEOTHERMAL ENERGY: Fundamental of Geophysics - Classification of Geothermal sources —Extraction techniques – Utilization of Geothermal energy

Unit IV

Unit V

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

Text Books:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
To make the students learn:
1. Basic modes of heat transfer and concepts of electrical analogy.
2. Steady state and transient heat conduction.
5. Basic concepts of radiation heat transfer.

UNIT – I
Introduction: Basic modes and laws of heat transfer, thermal conductivity, steady state heat conduction, General conduction equation in Cartesian, Cylindrical and Spherical co-ordinates, initial and boundary conditions.

One-dimensional heat conduction: Heat flow through plane wall, cylinder and sphere with constant thermal conductivity, heat flow through composite slab and Cylinders, thermal resistance, electrical analogy and critical insulation thickness.

Heat source systems: Simple systems with uniform heat generation in slabs and cylinders.

UNIT – II
Extended surfaces: Types, applications, fin materials, heat transfer from fins with uniform cross section, Fin efficiency and Effectiveness.

Transient heat conduction: Lumped parameter systems – Significance of Biot and Fourier Numbers - Chart solutions of transient conduction systems-Heisler’s charts, simple Problems.

UNIT – III
Forced convection: Dimensional analysis–Buckingham π Theorem and its application for developing semi – empirical non- dimensional correlations for convective heat transfer – Significance of non-dimensional numbers.

External Flows: Concepts of hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer for flow over-flat plates, cylinders.

Internal Flows: Division of internal flow through concepts of hydrodynamic and thermal entry lengths – Use of empirical relations for convective heat transfer in horizontal pipe flow, annular flow.

Free Convection: Development of hydrodynamic and thermal boundary layer along a vertical plate – Use of empirical relations for convective heat transfer on plates and cylinders in horizontal and vertical orientation.

UNIT – IV
**Phase Change:** Introduction – Film wise & Drop wise Condensation, Boiling Curve, simple problems.

**Heat exchangers:** Classification and type of heat exchangers, Temperature distribution, and overall heat transfer coefficient, fouling factor, LMTD method of heat exchanger analysis, multi pass and cross flow heat exchanger, Effectiveness - NTU method for Heat Exchanger analysis, simple problems.

**UNIT – V**

**Radiation:** Fundamentals of Radiation: Basic Concepts and definitions, Absorptivity, Reflectivity, Transmissivity, concept of Black body, Laws of Radiation, Kirchhoff’s law, Planck’s & Wien’s law, Stefan Boltzmann’s law.

**Radiant heat transfer:** Heat exchange by radiation between two finite parallel surfaces, electrical analogy, heat exchange by radiation between two finite black and gray surfaces, shape factor, Radiation shields.

**Outcomes:**

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

1. Distinguish between basic modes of heat transfer, steady and unsteady state heat transfer, forced and free convection, phase change processes, types of heat exchangers, and basic laws of radiation.
2. Infer expressions for heat transfer systems and Illustrate the application of heat transfer systems for real life problems related to industry.
3. Solve industry problems with advanced technologies in the domain of thermal systems with optimal resources for minimum total cost and environment friendly.
4. Judge the best solution for heat transfer system involving attainment of long term goals with system integration and synergy.
5. Organize a team for decision making in thermal systems with managerial skills and knowledge to fulfill social obligations and customer satisfaction

**Text Books:**


**References:**


**Note:** Heat transfer Data book by any author is allowed for all examinations.

**Mapping of COs with POs:**

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
To make the students learn:
1. Mathematical modeling for real life situations.
2. A variety of qualitative and quantitative methods to solve industrial problems.
3. The concept of replacement and game theory.
4. The deterministic and stochastic behavior of systems and apply appropriate solution methodology.
5. Waiting line models and its application to industrial problems.

UNIT – I
Introduction to Operation Research: Development, definition, characteristics and phases, types of Operation Research models, applications.
Allocation methods: Linear Programming problems formulation, graphical solution, simplex method, Big – M method, two phase technique, Duality principle.

UNIT – II
Transportation and Assignment Models: Formulation, Optimality, unbalanced transportation problems, Applications and assignment models.

UNIT – III
Replacement models: Introduction, Replacement of items that deteriorate with time when money value is not considered and considered, Replacement of items that fail completely, group replacement.
Theory of games: Minimax and maxmini criteria, evolving strategies, pure and mixed strategy, game with saddle point, dominance principle, 2xn and m×2 games with graphical methods.

UNIT – IV
Inventory models: Elements of inventory costs, Basic EOQ model single stage static and deterministic models, infinite production rate and uniform demand with and without shortage, and finite production rate uniform demand with and without shortages, price break models.
Stochastic and single period models with no setup costs, demand random variable, both continuous and discrete, Multi period deterministic models using Dynamic Programming, simulation of inventory system

UNIT – V
**Queuing system:** Basic elements of queuing – Kendall Lee notation, single channel Poisson arrivals, exponential service times infinite queuing models. Multichannel, Poisson queues and exponential service time, infinite queues, simulation of queuing systems

**Outcomes:**
After completion of the course, the student will be able to:
1. Summarize various LPP, TPP, AP, sequencing, replacement, game theory, inventory models, queuing models of operations Research.
2. Illustrate the application of OR models to identify solutions to industry.
3. Identify the optimum solutions with system approach to both industry and service sector.
4. Judge the advanced software tools for decision making with available sources for cost reduction and profit maximization with society concern.
5. Develop a team and play a key role in decision making with interpretation skills for all round development of organization.
6. Enrich managerial skills & knowledge to achieve goals of industry with continuous learning.

**Text Books:**

**References:**

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
The objective of this course is to make students to:
1. Understand basic concepts and applications of Computer graphics
2. Understand the design of algorithms for generating geometric shapes.
3. Be able to acquire the 2D geometric transformations.
4. Apply the 3D geometric transformations.
5. Understand and demonstrate computer graphics animations.

UNIT I

UNIT II
Output primitives: Points and lines, line drawing algorithms – DDA, Bresenham’s, mid-point circle algorithms, Filled area primitives - Scan line polygon fill algorithm, inside-outside tests, boundary-fill and flood-fill algorithms.

UNIT III
2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.
2-D viewing: The viewing pipeline, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland line clipping algorithms, Sutherland–Hodgeman polygon clipping algorithm.

UNIT IV:
Three Dimensional Concepts: 3-D object representation: Polygon surfaces, Curved lines and surfaces, quadric surfaces, spline representation, Bezier curve and surfaces.
3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

UNIT V
Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.
Outcomes:
At the end of the course the student will be able to:
1. Understand the functions and operations of display hardware and associated devices.
2. Design an algorithms to render different geometric shapes like line, circle.
3. Perform transformations (rotation, scaling, translation, and shearing) on geometric 2D.
4. Design 3D transformations.
5. Implement animation technique using micro and media flash.

TEXT BOOKS:

REFERENCE BOOKS:
Objectives:
The course will provide the student:
1. To know about various MEMS and Microsystems products.
2. To understand the construction and working principle of various Microsensors.
3. To know about the different materials used for the construction of MEMS and Microsystems.
4. To know about the steps involved in Microsystems fabrication processes.
5. To Know about Micromanufacturing and Microsystems packaging.

UNIT – I
OVERVIEW OF MEMS AND MICROSYSTEMS:
MEMS and Microsystems, Typical MEMS and Microsystems products, Evolution of Microfabrication, Microsystems and Microelectronics, The Multidisciplinary nature of Microsystem design and manufacture, Microsystems and Miniaturization, Applications of Microsystems in the Automotive industry and Applications of Microsystems in other industries.

UNIT-II
WORKING PRINCIPLES OF MICROSYSTEMS:
Introduction, Various Microsensors, Microactuation, MEMS with Microactuators, Micro-accelerometers, and Microfluidics.

UNIT-III
MATERIAL FOR MEMS AND MICROSYSTEMS:
Introduction, Substrates and Wafers, Active Substrate Materials, Silicon as a Substrate material, Silicon Compounds, Silicon Piezoresistors, Gallium Arsenide, Quartz, Piezoelectric crystals, Polymers and Packaging materials

UNIT-IV
MICROSYSTEM FABRICATION PROCESSES:
Introduction, Photolithography, Ion Implantation, Diffusion, Oxidation, Chemical Vapor Deposition, Physical Vapor Deposition-Sputtering, Deposition by Epitaxy, and Etching.

UNIT-V
MICROMANUFACTURING AND MICROSYSTEM PACKAGING:
Micromanufacturing: Introduction, Bulk Micromanufacturing, Surface Micromachining and The LIGA process.
Microsystem Packaging: Introduction, Overview of Mechanical Packaging of Microelectronics, Various Microsystem Packaging techniques, Interfaces in Microsystem Packaging and Essential Packaging Technologies.
Outcomes:
After the completion of the course, the student will be able to:
1. Understand about various MEMS and Microsystem products.
2. Understand about the construction and functionality of various Microsensors.
3. Know about the materials used for the construction of MEMS and Microsystems.
4. Understand the entire Microsystems fabrication processes.
5. Understand Micro manufacturing and Microsystems packaging technologies.

TEXT BOOKS:

REFERENCE BOOKS:

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Objectives:

4. To understand the fundamentals of sensors and actuators.
5. To develop the knowledge in detail about the Pneumatic and Hydraulic Systems.
6. To know about the various schemes of chemical and radiation sensors.
7. To study the schemes suitable for Magnetic and Electromagnetic sensors and actuators.
8. To study the principle of micro level sensors and actuators with examples.

UNIT I

Introduction: Classification of sensors and actuators, sensing and actuating strategies, general requirements for interfacing and actuation. Amplifiers: Operational amplifiers, power amplifier, Bridge circuits, Interfacing to microprocessors, data transmission, Excitation methods and circuits, Power requirements, signal translation, Isolation, Interference & compensation.

UNIT II


UNIT III

Chemical and Radiation sensors: Chemical sensors- Electrochemical, Thermo actuators, Radiation Sensors: Ionization detectors, scintillation detectors, microwave sensors (resonant, reflection, transmission), Antennas as sensors.

UNIT IV

Magnetic and Electromagnetic sensors and Actuators: Motors as actuators (Linear, Rotational, stepping Motors), Magnetic values, inductive sensors (Eddy current, LVDT, RVDT, Proximity), Magneto resistive sensors, magnetostrictive sensors and actuators, Magnetometers (Flux gate, search coil, squid), Bolometers (Microwaves).

UNIT V

**Outcomes:**
1. After completion of the course the student will be able to
2. Apply the principles and applications of Sensors and actuators use Pneumatic and Hydraulic actuator systems
3. Select chemical and radiation sensors for various applications.
4. Design different types of Magnetic and Electromagnetic sensors and Actuators
5. Apply various Micro sensors and Actuators for different applications.

**TEXT BOOK:**

**REFERENCE BOOK:**

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HEAT TRANSFER LAB (14AME30)  
III B.Tech - II Sem (ME)  

Objectives:  
To make the students learn:  
1. Experimental approaches in heat transfer applications.  
2. Conductive and convective heat transfer coefficient in solids and liquids.  
3. Necessary skills to conduct experiments in extended surfaces and heat exchangers.  
4. Necessary skills to conduct experiments in transient heat conduction.  
5. Awareness of heat transfer by radiation.  

List of Experiments:  
1. Study of Two – Phase flow.  
2. Thermal conductivity of insulating powder material through Concentric Sphere apparatus.  
3. Thermal conductivity of insulating material through lagged pipe apparatus.  
4. Overall heat transfer co-efficient through Composite Slab Apparatus.  
5. Thermal Conductivity of metal (conductor).  
7. Experiment on Transient Heat Conduction.  
8. Heat transfer coefficient in forced convection.  
10. Experiment on Parallel and counter flow heat exchanger.  
14. Experiment on Stefan Boltzman Apparatus.  
15. Emissivity of a gray body through Emissivity apparatus.  

NOTE:  
1. Heat transfer data books are permitted in the examination.  
2. Minimum of 12 Experiments need to be performed.  

Outcomes:  
After completion of the course, the student will be able to:  
1. Distinguish between basic modes of heat transfer, steady and unsteady state heat transfer, forced and free convection, phase change processes, types of heat exchangers, and basic laws of radiation.
2. Infer expressions for heat transfer systems and illustrate the application of heat transfer systems for real life problems related to industry.

3. Solve industry problems with advanced technologies in the domain of thermal systems with optimal resources for minimum total cost and environment friendly.

4. Judge the best solution for heat transfer system involving attainment of long term goals with system integration and synergy.

5. Organize a team for decision making in thermal systems with managerial skills and knowledge to fulfill social obligations and customer satisfaction.

6. Enrichment of knowledge with academic skills and lifelong learning.

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:

To make the students learn:
1. CNC part programming skills for turning applications.
2. CNC Programming skills for milling applications.
3. CAM software in order to perform Simulation and to generate CL data.
4. Functions and components of 5 Axis pick and place robot.
5. To operate the pick and place robot using program.

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**NOTE:** Minimum of 10 Exercises need to be performed

Outcomes:

After the completion of the course, the student will be able to:
1. Demonstrate the working with different equipment to test the basic concepts in NC technology for applications in industry.
2. Apply the concepts in NC technology for milling and turning operations to solve complex industrial problems.
3. Use CAE and CAM advanced software to serve mankind.
4. Design the different types of critical programs as a group to execute the projects related to CIM.
5. Construct the simple robotic components to promote research.

Mapping of COs with POs:

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Objectives:
To make the students learn:
1. The developments in tools of quality and their impact on production.
3. Recognize the use of non statistical and statistical tools in real life situations.
4. The application of value improvement elements and six sigma.
5. The reliability concepts associated with the quality management system

UNIT I

UNIT II
PROCESS MANAGEMENT: Quality Measurement Systems (QMS), developing and implementing QMS, TQM tools & techniques- 7 QC tools, 7 New QC tools.
PROBLEM SOLVING TECHNIQUES: Problem Solving process, corrective action, order of precedence, fault tree analysis, failure mode assessment and assignment matrix.

UNIT III
QUALITY CIRCLES: Organization, statistical process control, process chart, Ishikawa diagram, preparing and using control charts.
QUALITY FUNCTION DEPLOYMENT (QFD): Elements of QFD, benchmarking- Types, Advantages & limitations of benchmarking, loss function, Taguchi design of experiments, Poka-yoke, Kaizen, Deming cycle.

UNIT IV
VALUE IMPROVEMENT ELEMENTS: Value improvement assault, supplier teaming, Business process reengineering, elements of supply chain management.
SIX SIGMA APPROACH: Application of six sigma approach to various industrial situations.

UNIT V
Fundamental concepts of Reliability: Reliability definitions, failure, failure density, failure Rate, hazard rate, Mean Time To Failure (MTTF), Mean Time Between Failure (MTBF), maintainability, availability, pdf, cdf, safety and reliability, quality, cost and system
effectiveness, life characteristic phases, modes of failure, areas of reliability, quality and reliability assurance rules, product liability, importance of reliability.

Outcomes:
After completion of the course, the student will be able to
1. Summarize TQM concepts with quality standards, tools, value addition and reliability concept.
2. Select the best solution for problem solving in QC tools, QFD model and in reliability.
3. Solve industry problems with available sources, software tools, modern TQM techniques with system approach.
4. Judge the solutions to sustain customer trust-worth-ship besides industry growth.
5. Organize a team and play a key role in decision making with interpretation skills besides continuous learning.

Text Books:

References:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
FINITE ELEMENT METHODS (14AME33)
IV B.Tech - I Sem (ME)  
L    T    P    C  
3     1    0     3

(Common to ME & AE)

Objectives:
To make the students learn:
1. General steps of finite element methods.
2. Fundamental concepts of the theory of the finite element methods.
3. Finite element formulation of beam and truss.
4. Importance of numerical methods and how it will helpful to solve engineering problems
5. Application of the finite element method (heat, fluid and dynamic) to realistic engineering problems.

UNIT – I
FUNDAMENTAL CONCEPTS: Introduction, Stresses and Equilibrium, Boundary Conditions, strain-Displacement Relations, Stress-Strain Finite element modeling, Coordinates and shape functions.

UNIT – II

UNIT – III

UNIT – IV

ISOPARAMETRIC REPRESENTATION: 4 noded quadrilateral element, numerical integration.

UNIT – V
Fluid Derivation of the Basic Differential Equations. One-Dimensional Finite Element Formulation.

Outcomes:
After completion of the course, the student will be able to:
1. Express equations in finite element methods for 1D, 2D and 3D problems
2. Develop element matrix equation by different methods with available resources.
3. Solve ordinary and partial differential equations using the Galerkin method by system approach.
4. Formulate and solve basic problems in heat transfer, solid mechanics and fluid mechanics.
5. Use FEM software’s for the practical problems related to industries.
6. Construct a Team to Enrich knowledge, Analyzing and computational skills to achieve goals of industry with continuous learning.

Text Books:

References:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
To make the students learn:
1. Various mechanical and electrical measuring systems used in the research labs and manufacturing industries.
2. Basic principles of various types of temperature and humidity measuring systems.
3. Fundamentals of pressure and flow measuring systems.
4. Basic principles of force, torque, stress and strain measuring systems.
5. Different dynamic bodies' measurement such as speed, acceleration, vibration and control system.

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

UNIT II
MEASUREMENT OF TEMPERATURE: Classification - Ranges - Various Principles of measurement - Expansion, Electrical Resistance - Thermistor - Thermocouple - Pyrometers - Temperature Indicators.
MEASUREMENT OF HUMIDITY: Moisture content in the gases, sling psychrometer, Absorption psychrometer, Dew point meter.

UNIT III
MEASUREMENT OF LEVEL: Direct method, Indirect methods, capacitative, ultrasonic, magnetic, cryogenic fuel level indicators, Bubler level indicators.
MEASUREMENT OF PRESSURE: Units - classification - different principles used - Manometers, Piston, Bourdon pressure gauges, Low pressure measurement, Thermal conductivity gauges, ionization pressure gauges, Mcleod pressure gauge.
FLOW MEASUREMENT: Rotameter, magnetic, Ultrasonic, Turbine flow meter, Hot - wire anemometer Laser Doppler Anemometer (LDA).

UNIT IV
STRESS & STRAIN MEASUREMENTS: Various types - electrical strain gauge - gauge factor - method of usage of resistance strain gauge for bending, compressive and tensile strains - usage for measuring torque, Strain gauge Rosettes.
MEASUREMENT OF FORCE, TORQUE AND POWER: Elastic force meters, load cells,
UNIT V
MEASUREMENT OF SPEED, ACCELERATION AND VIBRATION: Mechanical Tachometers - Electrical tachometers - Stroboscope, Non contact type of tachometer, Different simple instruments, Principles of Seismic instruments, Vibrometer and accelerometer.
ELEMENTS OF CONTROL SYSTEMS: Introduction, Importance – Classification, Open and closed systems Servomechanisms-Examples with block diagrams, Temperature, speed & position control systems

Outcomes:
After completion of the course, the student will be able to:
1. Explain mechanical, electrical and electronic measuring systems for various applications in the industry.
2. Analyze mechanical, electrical and electronic instruments to promote advanced technologies to find innovative solutions.
3. Compare measuring systems to utilize resources like machines and materials to achieve short & long term objectives.
4. Produce simple eco friendly measuring systems as a group and capable to work in the organization.
5. Classify elements of control systems in real life service industries to promote research.

Text Books:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
REFRIGERATION AND AIR CONDITIONING (14AME35)
IV B.Tech- I Sem (ME)  
L T P C 
3 1 0 3

Objectives:
To make the students learn:
1. Various refrigeration systems.
2. The refrigerants and refrigerant equipments.
3. Various Psychometric properties & processes
4. Requirement of the human comfort Air Conditioning and Air Conditioning Equipments.
5. Fundamentals of Cryogenics.

UNIT-I
Introduction to Refrigeration: Necessity and applications – Unit of refrigeration and C.O.P. Different refrigeration methods.

UNIT- II

UNIT – III

UNIT – IV

UNIT V
Introduction to Cryogenics: Introduction, cascade refrigeration system, liquefaction of gases, linde system and claude system, liquefaction of hydrogen and helium, adiabatic demagnetization.
Outcomes:
After completion of the course the student will be able to
1. Describe the basic working of refrigeration and air conditioning systems.
2. Summarize the various equipments of Refrigeration and air conditioning systems.
4. Analyze the performance of R&AC systems with the usage of advanced technologies on industrial growth.
5. Design R&AC system with available resources as cost effective.
6. Formulate the team to resolve the problem in R&AC systems and enrichment of the knowledge for lifelong learning.

**Text Books:**
2. C.P. Arora, Refrigeration and Air Conditioning, Tata McGraw Hill.

**References:**

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:

To make the students learn:
1. The need of automation and its basic elements.
2. The concepts of automated flow lines and assembly balancing systems.
3. The fundamental concepts of robotics.
4. The manipulator kinematics and trajectory planning techniques.
5. The robot programming and applications of robots in manufacturing industries.

UNIT I
INTRODUCTION TO AUTOMATION: Need, Types-Fixed, Flexible and Programmable automation, Basic elements of an automated system, levels of automation, hardware components for automation and process control, mechanical feeders, hoppers, orienters.

UNIT II
AUTOMATED FLOW LINES: Automated production lines — Types of flow lines — work part transfer mechanism — Transfer lines with and without storage buffer.
ASSEMBLY LINE BALANCING: Assembly process and systems, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT III

UNIT IV
TRAJECTORY PLANNING: Definitions and planning tasks, Joint space techniques, Cartesian space techniques.

UNIT V
ROBOT PROGRAMMING: Types of Robot programming, Languages-AL, AML, RPL, and VAL. Robot software features.
ROBOT APPLICATION IN MANUFACTURING: Material Transfer, Material handling, loading and unloading, Processing, spot and continuous arc welding & spray painting, Assembly and Inspection.

Outcomes:

After completion of the course, the student will be able to:
1. Describe the basic concept of automation and robotics.
2. Summarize the perception about the automated flow lines, line balancing and usage of robotics in industry.
4. Analyze the manipulator kinematics, dynamics and trajectory planning for typical robot with the usage of computer aided technology.
5. Choose and program the robot to integrate with the manufacturing system to produce quality produce with minimum cost with optimum usage of resources.
6. Formulate a project team to promote the system integration and enrichment of knowledge with continuous learning.

Text Books:

References:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
To make the students learn:
1. Gas turbine power cycles & techniques used in gas turbine power plant.
2. Fundamentals required in combustion systems for gas turbine.
3. Various types of jet propulsion cycles used in high speed air crafts.
4. About Ram jet, pulse jet and their analysis.
5. Fuels used in rocket engines & advanced methods used in Rocket propulsion systems

UNIT-I
Gas Turbines: Introduction, closed cycle and open cycle Gas turbine systems-comparison, Gas turbines-advantages &disadvantages.
Ideal cycles and their analysis: Assumptions, simple gas turbine cycle, means of improving the efficiency and the specific output of simple cycle gas turbine with regeneration, Thermal efficiency of gas turbine with & without regenerator, Inter- cooling &Reheating, Related problems.

UNIT-II
Combustion systems for Gas Turbines: Introduction, basic requirements of gas turbine combustion system, gas turbine ignition system, combustion process in gas turbines, flame stability and different techniques used for flame stabilization, combustion intensity and combustion efficiency, pressure loss in combustion chamber, requirements of gas turbine combustion chamber, types of combustion chambers, fuel injection and ignition in combustion chambers, factors affecting the performance of the combustion chambers.

UNIT-III
Turbojet Engines :Thermodynamic cycle, specific thrust, different efficiencies, Methods of thrust augmentation, Performance, advantages and disadvantages
Turboprop Engines: Thermodynamic cycle, cycle analysis, Performance, advantages and disadvantages

UNIT-IV
Ram jet Engines Thermodynamic cycle, essential components – Principle of operation – Performance –advantages and disadvantages, basic characteristics and applications.
UNIT-V

Rocket Propulsion: Introduction, classification of Rockets, principle of rocket propulsion, the chemical rocket-Classification, solid propellant rocket engines, liquid propellant rocket engines-gas pressurization system, pump pressurization system, propellants and their desirable characteristics, solid propellants, liquid propellants, requirements of a liquid propellant, Advantages.

Advanced Propulsion systems: Free radical propulsion, nuclear propulsion, electro dynamic propulsion, ion rocket propulsion engines, plasma rocket propulsion–types, photon propulsion, and applications of rockets.

Outcomes:
After completion of the course, the student will be able to
1. Interpret the gas turbines including combustion systems, and turbojet engines, turboprop engines, ramjet engines, pulsejet engines and rocket propulsion.
2. Differentiate open cycle and closed cycle gas turbines, different combustion systems and various jet propulsion cycles with their analysis.
3. Select suitable eco-friendly fuels used in the rockets and apply the advanced methods used in rocket propulsion systems related to the industry.
4. Develop thermal system models with optimized resources to solve industry problems with system approach to achieve organization goals for fulfilling the customer needs.
5. Construct a Team to update the technical skills & knowledge to achieve goals to survive in the competitive world for promoting for higher leaning and research.

Text Books:
2. V.M.Domakundwar,Gas Turbines and jet& rocket propulsion, DhanpatRai& Co.

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
To make the students learn about:
1. The need of MMM and principles of various unconventional machining processes.
2. The principles and process parameters of Electro-chemical machining.
3. The principle of Electric discharge machining.
4. The principles of EBM, LBM and PAM with various applications.
5. The importance of rapid prototyping technologies.

UNIT I
Need of unconventional machining methods, advantages, Classification.

UNIT II

UNIT III

UNIT IV
EBM&LBM: EBM – working principle, electron beam machining system, characteristics of the process, applications and limitations. LBM – Production of lasers, working principle of Laser Beam Machining, types of lasers, process characteristics, applications, advantages and limitations.
PLASMA ARC MACHINING: working principle, plasma arc cutting system, elements of plasma arc cutting system, process performance, applications.

UNIT V
RAPID PROTOTYPING: Need of prototypes, Steps involved in rapid prototyping, Major RP technologies — Stereo lithography, Selective Laser Sintering, Laminated Object Manufacturing, Fused Deposition Modeling — Basic working principles, applications and Limitations.3D printing.

Outcomes:

After completion of the course, the student will be able to:
1. Summarize various unconventional machines utilized in a manufacturing industry.
2. Select the various processes like AJM, USM, EBM, EDM, ECM, LBM and others for solving machining processes with system approach.
3. Solve industry problems with advanced technologies and analyze the best method eco friendly minimum total cost.
4. Identify a manufacturing system with optimal recourse utilization to promote system integration
5. Formulate a project team with defined role play for customer satisfaction and industry growth.
6. Plan for continuous up dation of knowledge and skills in manufacturing processes to achieve long term goals

Text Books:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
To make the students learn:
1. Computer graphics and the algorithms of simple geometries.
2. Concepts of geometric transformations and the principles of 2D viewing.
4. Methods of clipping of objects and algorithms for filling polygons.
5. Process of computer animation and useful techniques.

UNIT- I
Introduction, Application area of Computer graphics, overview of graphic system, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.

Output primitives: Points and lines, line drawing algorithms, mid-point circle algorithm, Filled area primitives: scan-line polygon fill algorithm, boundary-fill and flood-fill algorithm.

UNIT- II
2-D geometrical transformations: Translation, scaling, rotation, reflection and shear transformation matrix representations and homogeneous co-ordinates, composite transformations, transformations between coordinates.
2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port-co-ordinate transformations, viewing function, Cohen-Sutherland and Cyrus–beek line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm.

UNIT- III
3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curve, Bezier and B-spline surfaces.
3-D geometric transformations: Translation, rotation, scaling, reflection and shear transformation and composite transformations.

UNIT- IV
Visible surface detection methods: Classification, back-face detection, depth-buffer, scanline, depth sorting.
Basic illumination models, shading algorithms.

UNIT- V
Computer animation: Design of animation sequence, general computer animation functions, raster animation. Computer animation language, key frame system, motion specification.
Outcomes:
- After the completion of the course, the student will be able to:
  1. Explain the basic concepts of geometric modeling
  2. Sketch the working mechanism of various display devices to analyze industrial problems.
  3. Design element matrix equation by different methods with available simple programs.
  4. Device transformations of objects for real time applications in groups.
  5. Compare and contrast available animation techniques to enrich higher learning and research.

Text Books:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
To Make the students learn:
1. Basics of computational fluid dynamics (CFD).
2. Differentiate between finite difference and finite volume methods applied in CFD.
4. Capabilities and limitations of various numerical and mathematical models of fluid flow.
5. Turbulence models in various systems.

UNIT – I
INTRODUCTION: Computational Fluid Dynamics as a Research and Design Tool, Applications of Computational Fluid Dynamics Governing Equations of Fluid Dynamics: Introduction, Control Volume, Substantial Derivative, Divergence of Velocity, Continuity Equation, Momentum Equation and Energy Equation

UNIT – II
MATHEMATICAL BEHAVIOR OF PARTIAL DIFFERENTIAL EQUATIONS: Introduction, Classification of Quasi-Linear Partial Differential Equations, Eigen Value Method, Hyperbolic Equations, Parabolic Equations, Elliptic Equations

UNIT – III

UNIT – IV

UNIT – V
TURBULENCE MODELS: Algebraic Models – One equation model, \(K – \varepsilon\) Models, Standard and High and Low Reynolds number models, Prediction of fluid flow and heat transfer using standard.
Outcomes:
   After the completion of the course, the student will be able to:
   1. Demonstrate the basic governing equations applied for fluid flow problems.
   2. Apply the differential equations to fluid flow complex problems.
   3. Use the mathematical modeling techniques to solve real life industry problems.
   4. Compare the grid generations in different types of applications and assimilate the same for serving mankind.
   5. Develop algorithms for various attributes to promote the higher learning and research

Text Books:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
To make the students learn:
1. Comprehend the design and working of a variety of tools used in practical applications and their properties.
2. Understand the cutting parameters and machining times required for machining with tools.
3. Recognize the different types jigs and fixtures used for machining.
4. Understand the various dies used for the sheet metal operations.
5. Know the importance of the plastic tooling.

UNIT I
TOOL LIFE AND TOOL WEAR: Theories of tool wear-adhesion, abrasive and diffusion wear mechanisms, forms of wear, tool life criteria and Machinability index, tool wear criterion, measurement of tool wear.

UNIT II
DESIGN OF CUTTING TOOLS: Single point cutting tools-various systems of specifications of tool geometry and their interrelation, theories of formation of chip and their effect.
Design of multipoint cutting tools: Drill geometry, Design of Drills-Rake & Relief angles of twist drill.
MILLING cutters, cutting speeds and feeds, machining times, design of form cutters, combination tools, reamers, Boring tools, Design of broaches.

UNIT III
DESIGN OF JIGS AND FIXTURES: Basic principles of location and clamping, locating methods and devices, Jigs- definitions, types, general consideration in the design of jigs. Types of Drill bushes, methods of construction, Fixtures- vice fixtures, milling, boring, lathe, and grinding fixtures.

UNIT IV
DESIGN OF SHEET METAL WORKING TOOLS: Design of Bending dies, drawing dies, forming dies, drawing operations, variables that effect metal flow during drawing- shallow and deep drawing. Determination of blank size, drawing force, single and double action draw dies.
UNIT V
PLASTICS AS TOOLING MATERIALS: Introduction, plastics commonly used as tooling materials, application of epoxy plastic tools, construction methods of plastic tooling, metal forming operations with Urethane dies. Calculating of forces for urethane pressure pads, economics of tooling.

Outcomes:
After completion of the course, the student will be able to:
1. Describe the design and behavior tools, jigs & fixtures, dies and equipment for a production operation.
2. Select a suitable tools and equipment to solve industry problems with system approach and with optimized materials and eco-friendly.
3. Judge the application of advanced techniques of tool design with optimum resources for accuracy of product and process design for industry growth and customer satisfaction with economic production cost.
4. Formulate a team to promote system integration with managerial skills for all round development of organization.
5. Enrich the material knowledge and tool selection to attain industry goals with continuous up-dation of concept.

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Sri Venkateswara College of Engineering & Technology
(Autonomous), Chittoor

POWER PLANT ENGINEERING (14AME42)
IV B.Tech- I Sem (ME)  

Objectives:
To make the students learn:
1. The economics power generation.
2. The operation of various systems in the steam plant.
3. The need for diesel and gas turbine power plants.
4. The importance of the hydrology and hydroelectric power plant
5. The necessity of the nuclear power plant and non-conventional energy sources.

UNIT – I
Introduction to the Sources of Energy – Sources of Energy and Development of Power in India.
Economics of Power Generation: Introduction-Terms and Definitions-connected load, demand, maximum demand, demand factor, load factor, diversity factor, utilization factor, Plant capacity factor, Plant use factor, Load curve-its significance, and load duration curve, Location of Power Plant, Cost analysis-capital cost, operational costs, Factors affecting economics of generation and distribution of power, Tariff for electrical energy- Problems on load curves only.

UNIT II
Steam Power Plant: Introduction, Classification of steam power plants, Layout of a Modern Steam Power Plant, Selection of site for steam power station - Fuel handling-introduction, lay out of fuel handling equipment, out plant handling of coal, coal storage at plant site, inplant handling of coal, and Ash handling systems.
Combustion Process: Coal- Classification of coal- Properties of coal –Coal Burning methods, Stoker Firing-classification, Overfeed stokers-travelling grate stokers, spreader stokers, Underfeed stokers- retort stokers, Pulverized fuel firing, pulverized fuel handling systems, Fluidized bed combustion, Cyclone furnace-design and construction, Dust collectors, Cooling ponds and cooling towers

UNIT – III

UNIT – IV
Hydro Electric Power Plants: Introduction, Site selection, Classification – Typical layouts – plant operation, Pumped storage plants, General arrangement of storage type hydro-electric power plant and its operation.

UNIT V
Nuclear Power: Nuclear fuels – Release of energy by Nuclear reaction, Types of Nuclear reactions, Initiation of nuclear reactions, Nuclear fission, fertile materials and breeding.

Outcomes:
After completion of the course, the student will be able to:
1. Identify and classify various power plants like steam, Gas turbine, hydro-electric and nuclear based on requirement.
2. Illustrate and develop with system approach to solve industry problems and social obligations
3. Select the best solution with application of advanced technology and to promote system integration and synergy for organization development with cost effectiveness.
4. Survey and decide about resources available to install a power plant in a location with environmental concern to attain long term goals.
5. Organize a team to promote Research and higher learning to serve mankind.

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Sri Venkateswara College of Engineering & Technology
(Autonomous), Chittoor

CAD AND ANALYSIS LAB (14AME43)
IV B.Tech- I Sem (ME)

(Common to ME & AE)

Objectives:
To make the students learn:
1. Skill to use software to create 2D models
2. Skill to use software to create and 3D models.
3. The importance of Geometric Tolerances.
4. Finite Element methods using Ansys Software & CFD.
5. To understand the structural, Thermal and Fluid flow Analysis.

List of Experiments

MODELING AND DETAILING
1. Details and modeling of Internal and External thread of bolt and nut using solid works
2. Details and assembly of Eccentric using solidworks software
3. Details and assembly of Screw jack using solidworks software
4. Details and assembly of Stuffing Box using solidworks software.
5. Details and modeling of Tail stock using solidwork

ANALYSIS
7. Structural Analysis of Truss Using in ANSYS Workbench and APDL Using 1D,3D Method
8. Thermal Analysis using ANSYS Workbench in ANSYS Workbench and APDL Using 1D,3D Method.
9. Coupled Field Analysis using ANSYS APDL.
10. Modal Analysis using ANSYS APDL
11. Fluid Flow Analysis using ANSYS CFD.

NOTE:
Minimum of 10 Exercises need to be performed

Outcomes:
After the completion of the course, the student will be able to:
1. Demonstrate the working with different 2D and 3D models of Engineering Components.
2. Apply the concepts of FEM to solve complex of industrial problems.
3. Use Advanced versions of software like Catia V5, Ansys 14, Solidworks to create typical models to utilize resources available effectively.
4. Design the different types of geometry models as a team to take up projects.
5. Combine the Structural, Thermal & Fluid flow Analysis problems to promote the higher learning and research.
### Mapping of COs with POs:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
To make the students learn:
1. The calibration of various measurement systems.
2. Transducers of different measurement systems.
3. Temperature measuring systems.
4. Speed control using different governors.
5. The principle of gyroscope, dynamic balancing and braking systems.

List of Experiments:
1. Calibration of LVDT transducer for displacement measurement.
2. Study and calibration of force cell with Force Indicator.
3. Digital Speed Measurement by using Photo/Magnetic Pickup.
4. Temperature measurement by Thermocouple, RTD and Thermistor.
5. Capacitive transducer for angular displacement.
7. To perform experiment on watt and Porter Governors to prepare the performance characteristic Curves.
8. To perform experiment on Proell Governors to prepare the performance characteristic Curves.
10. To determine the angular orientation of given masses for dynamic balancing by dynamic balancing machine.
11. To determine the radius of gyration of connecting rod by compound pendulum method and
12. Determine the moment of inertia of disc & ring by tri-flair suspension method.
13. To determine the power using rope brake dynamometer.

Outcomes:
After completion of the course, the student will be able to
1. Calibrate different measurement systems in the industry.
2. Use different types of transducers for signal conversions.
3. Construct various types of measuring systems to promote research
4. Experiment speed controllers in the engine, gyroscope, dynamic balancing & braking systems to solve industry problems.
5. Infer speed controllers in the engine, gyroscope, dynamic balancing & braking systems to solve various societal and environmental issues.

Mapping of COs with POs:

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Competency addresses outcome: - 1 = slightly; 2 = moderately; 3 = substantially
Objectives:
1. To understand the fundamental concepts of professional ethics.
2. To impart and inculcate ethical decision making.
3. To apply ethical and human values in engineering profession.
4. To prepare engineering students to meet global demands on human values.
5. To explain the importance of environmental protection in engineering activities.

Unit-I Introduction
Professionalism-models of professionalism-Ethics-Types of ethics and morality-Engineering ethics-Positive and negative faces of ethics-Responsibility for safety-Technology pessimism and perils of technological optimism.

Unit-II Ethical Concepts

Unit III Engineers Role in Safety

Unit IV Roles of Engineers
Engineers as managers, Advisors, Consultants, Experts and witnesses- Engineers role in industry and society- models of professional roles-Theories about right action-paternalism-different business practices-Moral leadership- Cases - Bhopal gas tragedy, Nuclear power plant disasters-

Unit V Environmental Ethics
Global Issues-Multinational corporations-Living in harmony with NATURE-Holistic technology-Eco friendly production system-sustainable technology and development-weapon development-Four orders of living, their interconnectedness-Eco system-Ozone depletion, pollution

**Text Books**


**Outcomes:**

After the completion of the course the students shall be able to

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

**Reference Books**


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