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)

FOREWORD

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

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

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

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

Principal

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.

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(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.

Subject	**Semester Pattern**	
	Hours / Week	**Credits**
Theory	01	01
Practical	03	02

Drawing Practice	02	01
Project Work	--	**16**

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:

S. No	Examination	Marks%	Examination and Evaluation	Scheme of examination
		70	Semester-end examination (external Paper setting and external evaluation)	This Examination question paper in theory subjects will be for a maximum of 70 marks. The question paper shall consists of two parts **Part A:** 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. **Part B**: 5 Descriptive/ problematic questions shall be given for a maximum of 50

1	Theory				marks with one question from each unit with internal choice i.e either or type. All questions carry equal marks.
		30	20	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.	Two (02) mid-term exams, each for 20 marks are to be conducted. Better of the two shall be considered for awarding internal marks. **Mid-I:** After first spell of instructions(First 2 Units) **Mid-II:** After second spell of instructions (Last 3 Units.)
			10	Assignment (Internal evaluation)	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. **Assignment-I:** After first spell of instructions(First 2 Units) **Assignment-II:** After second spell of instructions (Last 3 Units.)
2	Laboratory	70	Semester-end Lab Examination (External evaluation)		70 marks are allotted for laboratory examination during semester-end.
		30	20	Continuous evaluation	Performance in laboratory experiments and Record are considered.
			10	Internal test	Practical Test at the end of the semester.
					➢ Marks scored in the

					continuous evaluation and internal test are considered for awarding internal marks.
3	Drawing	70	Semester-end drawing Examination (External evaluation)		70 marks are allotted for drawing examination during semester-end.
		30	20	Continuous evaluation	Performance in Drawing classes will be considered.
			10	Internal test	Two tests will be conducted. Better of the two will be taken.
					➢ Marks scored in the continuous evaluation and internal test are considered for awarding internal marks.
4	Project Work	300	200	External evaluation	Semester-end Project Viva-Voce Examination by a Committee as detailed under 8.2.
			100	Internal evaluation	Continuous evaluation by the Departmental Committee

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

of attendance to the College.

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

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

8.3.5 A student detained due to shortage of attendance, will have to repeat that 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.

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

- **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:

$$\textbf{GPA} = \frac{\sum(CXGP)}{\sum C}$$

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:

$$\textbf{CGPA} = \frac{\sum(CXGP)}{\sum C}$$

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

11.4 Grade Sheet: A grade sheet (Marks Memorandum) will be issued to each student Indicating his performance in all subjects registered in that 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.

Cumulative Grade Point Average	Class
≥7.0	First Class with Distinction
≥6.0 and<7.0	First Class
>5.0 and <6.0	Second Class
5.0	Pass Class

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.

SRI VENKATESWARA COLLEGE OF ENGINNERING & TECHNOLOGY

(AUTONOMOUS)

(AFFILIATED TO JNTUA, ANANTAPUR)

RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT IN EXAMINATIONS

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

		in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.
4.	*Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.*	*Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.*
5.	*Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.*	*Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.*

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.*	*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.*
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.*

10.	*Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.*	*Cancellation of the performance in that subject.*
11.	*Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.*	*Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.*
12.	*If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Examination committee for further action to award suitable punishment.*	

Malpractices identified by squad or special invigilators

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

Identification of Courses

B. Tech

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

No. of Digits	**Description**
First two digits	Year of regulations Ex:14
Next one letter	Type of program: A: B. Tech B: M. Tech C: M.B.A D: M.C.A
Next two letters	Code of department: HS/CE/CS/EE/EC/IT/ME/MB/MC
Last two digits	Indicate serial numbers: ≥ 01

Ex:

14AHS01
14AHS02
14AHS03
14AHS04
14ACS01
14AEE01
14AEC01
14ACE01
14AME01
14AHS05
14ACS02
14AME02
14AHS06

DEPARTMENT MISSION & VISION

Vision:

Providing excellent technical education in Mechanical Engineering with the help of state of art infrastructure and carve the youth to suit the global needs.

Mission

Provide excellent Teaching-Learning process using state of art facilities to help a holistic growth in the disciplines of Thermal, Design, Manufacturing, Management and Quality areas with an emphasis on practical applications. Stimulate innovative thinking leading to higher learning.

Programme Educational Objectives(PEO's) of UG

PEO1: Acquire basic knowledge in the fields of Design and Manufacture of various Mechanical components to meet challenges in Product Design and Manufacturing industries.

PEO2 : To enable, to understand and analyze the problems related to Thermal Engineering Systems and Industrial Engineering problems of industries in general

PEO3: Usage of modern computer software tools to solve Mechanical Engineering problems, explain/ defend their solutions and communicate effectively using graphic, verbal, and written techniques to all audience

Programme Specific Outcomes (PSOs)

PSO1: Apply the knowledge of Basic Sciences, Mathematics, and Mechanical Engineering to industrial problems in real world.

PSO2: Demonstrate the expertise in academic and research activities relevant to Mechanical Engineering and other allied disciplines.

PSO3: Integrate major Mechanical Engineering fields with creative and entrepreneurial skills ensuring high standards of professional and environmental ethics.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

R.V.S NAGAR, CHITTOOR-517 127, ANDHRA PRADESH.

DEPARTMENT OF MECHANICAL ENGINEERING

Scheme of Instruction and Examination under R14 Regulation

I B.Tech., I Semester

S.No.	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P/D		Internal	External	Total
1	14AHS01	Technical English – I	3	…	…	3	30	70	100
2	14AHS02	Engineering Mathematics – I	3	1	…	3	30	70	100
3	14AHS03	Engineering Chemistry	3	1	…	3	30	70	100
4	14AME01	Engineering Drawing	2	…	4	4	30	70	100
5	14ACE02	Engineering Mechanics- I	3	1	…	3	30	70	100
6	14AHS07	Technical English Lab –I	…	…	3	2	30	70	100
7	14AHS08	Engineering Chemistry Lab	…	…	3	2	30	70	100
8	14AME02	Computer Aided Drafting Lab	…	…	3	2	30	70	100
		TOTAL	**14**	**3**	**13**	**22**	**240**	**560**	**800**

I B.Tech., II Semester

S.No.	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AHS04	Engineering Physics	3	1	…	3	30	70	100
2	14AHS05	Environmental Science	3	1	…	3	30	70	100
3	14AHS06	Engineering Mathematics -II	3	1	…	3	30	70	100
4	14ACS02	Programming In C and Data Structures	3	2	…	4	30	70	100
5	14ACE05	Engineering Mechanics- II	3	1	…	3	30	70	100
6	14AHS09	Engineering Physics Lab	…	…	3	2	30	70	100
7	14ACS04	C and Data Structures Lab	…	…	3	2	30	70	100
8	14AME03	Engineering Workshop	…	…	3	2	30	70	100
		TOTAL	**15**	**6**	**9**	**22**	**240**	**560**	**800**

II B.Tech., I Semester

S.No.	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P/D		Internal	External	Total
1	14ACE12	Strength of Materials	3	1	…	3	30	70	100
2	14AEE06	Electrical Engineering and Electronics Engineering	3	1	…	3	30	70	100
3	14AME04	Engineering Metallurgy	3	…	…	3	30	70	100
4	14AME05	Thermodynamics	3	1	…	3	30	70	100
5	14AME06	Production Technology	3	1	…	3	30	70	100
6	14AME07	Machine Drawing	1	…	4	3	30	70	100
7	14AEE09	Electrical Engineering and Electronics Engineering Lab	…	…	3	2	30	70	100
8	14AME08	Production Technology and Metallurgy Lab	…	…	3	2	30	70	100
		TOTAL	**16**	**4**	**10**	**22**	**240**	**560**	**800**

II B.Tech., II Semester

S.No.	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AHS12	Managerial Economics and Financial Analysis	3	1	…	3	30	70	100
2	14AME09	Kinematics of Machinery	3	1	…	3	30	70	100
3	14AME10	Thermal Engineering	3	1	…	3	30	70	100
4	14ACE11	Fluid Mechanics and Hydraulic Machinery	3	1	…	3	30	70	100
5	14AME11	Metrology	3	1	…	3	30	70	100
6	14AME12	Machine Tools	3	1	…	3	30	70	100
7	14ACE22	Strength of Materials and Fluid Mechanics, Hydraulic Machinery Lab	…	…	3	2	30	70	100
8	14AME15	Metrology and Machine Tools Lab	…	…	3	2	30	70	100
		TOTAL	**18**	**6**	**6**	**22**	**240**	**560**	**800**

III B.Tech., I Semester

S. No.	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AHS13	Technical English –II	3	1	…	3	30	70	100
2	14AME17	Industrial Management	3	1	…	3	30	70	100
3	14AME18	Dynamics of Machinery	3	1	…	3	30	70	100
4	14AME19	Internal Combustion Engines and Gas Turbines	3	1	…	3	30	70	100
5	14AME20	Design of Machine Elements - I	3	1	…	3	30	70	100
6	14AAT03	Automobile Engineering	3	1	…	3	30	70	100
7	14AHS14	Technical English Lab –II	…	…	4	2	30	70	100
8	14AME24	Thermal Engineering Lab	…	…	4	2	30	70	100
9	14AME55	Comprehensive Online Examination	-	-	-	1	-	100	100
		TOTAL	**18**	**6**	**8**	**23**	**240**	**660**	**900**
10	14AHS16	Quantitative Aptitude and Reasoning-II (Audit Course)	3	…	…	f…	…	…	…

III B.Tech., II Semester

S.No.	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AME25	CAD/CAM/CIM	3	1	…	3	30	70	100
2	14AME26	Design of Machine Elements-II	3	1	…	3	30	70	100
3	14AME27	Renewable Energy Sources	3	1	…	3	30	70	100
4	14AME28	Heat Transfer	3	1	…	3	30	70	100
5	14AME29	Operations Research	3	1	…	3	30	70	100
6	**CHOICE BASED CREDIT COURSE (INTERDEPARTMENTAL)**		3	1	…	3	30	70	100
	14ACS31	Computer Graphics (CSE)							
	14AEC31	MEMS (ECE)							
	14AEE41	Sensors & Actuators (EEE)							
7	14AME30	Heat Transfer Lab	…	…	4	2	30	70	100
8	14AME31	Computer Integrated Manufacturing Lab	…	…	4	2	30	70	100

9	*14AME56*	*Comprehensive Online Examination*	*-*	*-*	*-*	*1*	*-*	*100*	*100*
		TOTAL	***18***	***6***	***8***	***23***	***240***	***660***	***900***
10	*14AME32*	*Total Quality Management in Mechanical Engineering (Audit Course)*	*3*	*…*	*…*	*…*	*…*	*…*	*…*

IV B.Tech., I Semester

S. No.	***Course Code***	***Subject***	***Hours / Week***			***Credits***	***Maximum Marks***		
			L	***T***	***P***		***Internal***	***External***	***Total***
1	*14AME33*	*Finite Element Methods*	*3*	*1*	*…*	*3*	*30*	*70*	*100*
2	*14AME34*	*Instrumentation and Control Systems*	*3*	*1*	*…*	*3*	*30*	*70*	*100*
3	*14AME35*	*Refrigeration and Air Conditioning*	*3*	*1*	*…*	*3*	*30*	*70*	*100*
4	*14AME36*	*Automation and Robotics*	*3*	*1*	*…*	*3*	*30*	*70*	*100*
5	***CHOICE BASED CREDIT COURSE (DEPARTMENTAL)***		*3*	*1*	*…*	*3*	*30*	*70*	*100*
	14AME37	*Gas Turbines and Jet Propulsion*							
	14AME38	*Modern Manufacturing Methods*							
	14AME39	*Geometric Modeling*							
6	***CHOICE BASED CREDIT COURSE (DEPARTMENTAL)***		*3*	*1*	*…*	*3*	*30*	*70*	*100*
	14AME40	*Computational Fluid Dynamics*							
	14AME41	*Tool Design*							
	14AME42	*Power Plant Engineering*							
7	*14AME43*	*CAD and Analysis Lab*	*…*	*…*	*4*	*2*	*30*	*70*	*100*
8	*14AME44*	*Instrumentation and Control Systems and Dynamics of Machinery Lab*	*…*	*…*	*4*	*2*	*30*	*70*	*100*
		TOTAL	***18***	***6***	***8***	***22***	***240***	***560***	***800***
9	*14AMB02*	*Professional Ethics (Audit Course)*	*3*	*…*	*…*	*…*	*…*	*…*	*…*

IV B.Tech., II Semester

S. No.	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1		**MOOCS - I**	…	…	…	3	30	70	100
	14AME45	Subject - I							
	14AME46	Subject - II							
	14AME47	Subject - III							
	14AME48	Subject - IV							
2		**MOOCS - II**	…	…	…	3	30	70	100
	14AME49	Subject - I							
	14AME50	Subject - II							
	14AME51	Subject - III							
	14AME52	Subject - IV							
3	14AME53	Comprehensive Viva Voce	-	-	-	2	-	100	100
4	14AME54	Project Work	…	…	…	12	60	140	200
		TOTAL	**-**	**-**	**-**	**20**	**120**	**380**	**500**

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(AUTONOMOUS)

I B.Tech- I Semester

L	T	P	C
3	0	0	3

14AHS01 TECHNICAL ENGLISH-I

(Common to CE, ME & AE)

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

1. *Develop language skills by observing the rules of grammar, vocabulary and composition that are necessary.*
2. *Apply intelligent and innovative use of rules in order to be able to generatecreative output in tune with the demands of industry and the corporate world.*
3. *Develop skills in comprehension and the ability to express themselvesthrough listening, reading, speaking and writing.*
4. *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 TOURSIM:**
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:

(Prescribed Text book: Mindscapes-English for Technologies and Engineers, published by Orient Black Swan, 2012)

Reference Books:

1. M. Ashraf RizWi, **"Technical English Communication",** Tata Mc Graw Hill, Latest Edition.
2. V.R. Narayana Swamy, "Strengthen Your Writing", 1st edition, Orient longman, 2003.
3. Thomas Elliot Berry."The Most Common Mistakes in English Usuage", 1st Edition, Tata McGraw Hill, 2004.
4. Margaret M Maison,"Examine your English", 1st edition, Orient Longman, 1999.
5. Basic communication skills for Technology, Andrea J Rutherford, Pearson Education, Asia.
6. Technical communication by MeenakshiRaman Sangeetha Sharma, Oxford
7. Cambridge International of Phrasal Verbs, Cambridge.
8. Essential English Grammar by Martin Hewings, Cambridge
9. Oxford Practice Grammar by John Eastwood , Oxford.
10. English Pronouncing Dictionary by Daniel Jones Oxford.

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**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	3		-	1	1	2
CO2	3	2	-	-	-	-	-	-	-	3		-	2	1	2
CO3	3	3	-	-	-	3	-	-	-	3		-	1	2	2
CO4	2	2	-	-	-	1	-	-	-	3		-	1	2	2

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I B.Tech-I Semester

L	T	P	C
3	1	0	3

14AHS02 **ENGINEERING MATHEMATICS – I (Common to All Branches)**

Outcomes:

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

1. *Define the areas of application of differential equations.*
2. *Apply the principles of differential equations, functions of variables separable, integration, Laplace transforms andvector calculus to the engineering and scientific problems.*
3. *Solve problems 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

LAPLACE TRANSFORMS: Laplace transforms of standard functions - First Shifting Theorem - Transforms of derivatives and integrals- Unit step Function – Second Shifting Theorem –Laplace transforms of Periodic functions – Inverse Laplace transforms - Convolution theorem.

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

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Text Books:

1. B.V.Ramana, A Text book of Engineering Mathematics-I, Tata Mc Grawhill
2. T.K.V.Iyengar, B.Krishna Gandhi and others, A Text book of Engineering Mathematics –I, S.Chand and company.
3. Dr.B.S.Grewal, Higher Engineering Mathematics.
4. E.Rukmangadachari and Keshava Reddy, A Text book of Engineering Mathematics-I, Pearson Education

References:

1. C.Sankaraiah,A Text book of Engineering Mathematics, VGS book links
2. Thomson ,A Text book of Engineering Mathematics, Book Collection
3. N.Bail, M.Goyal & C.Walking, A Text book of Advanced Engineering Mathematics-A computer approach

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	-	-	-	-	-	-	1	1	2	3	2
CO2	3	2	1	2	-	-	-	-	-	-	1	1	3	2	2
CO3	2	2	1	2	-	-	-	-	-	-	1	1	3	2	2

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I B.Tech - I Semester	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

14AHS03 ENGINEERING CHEMISTRY

(Common to CE, ME & AE)

Outcomes:

After completion of the course students will be able to understand

1. *Relate impact of hard water and its removal, formation of corrosion, effect of corrosion and designing of corrosionresistance articles.*
2. *select suitable engineering materials for specific applications.*
3. *select suitable fuels, calculation of air requirements for combustion of fuel, applications of different batteriesand fuel cells.*

UNIT – I: WATER TECHNOLOGY

Hardness of Water and its unit of expression – Estimation of hardness in water by EDTA titration method – Numerical problems – Effect of different water impurities (Hardness, Dissolved Oxygen and Chlorides) on boiler troubles – Water softening methods – zeolite process – Ion Exchange process – Demineralization of Brakish Water – Electrodialysis and Reverse Osmosis.

UNIT – II: CHEMISTRY OF CORROSION

Dry and Wet corrosion – causes of corrosion – mechanism of corrosion – Galvanic series – Galvanic and Concentration cell corrosion – Factors influencing the corrosion – Control of corrosion – Cathodic protection – Sacrificial anodic and Impressed current cathodic protection – Electro Plating and Electroless plating (Copper and Nickel).

UNIT – III: MATERIALS CHEMISTRY

Organic (High Polymers & Lubricants)

Plastics: Thermosetting and thermoplastics – Engineering applications and properties of PE, PTFE, PVC, Nylon and Bakelite.

Rubbers: Processing of Natural Rubbers – Vulcanization – Compounding of Rubber – Synthetic Rubber – Buna S, Buna N, Silicone rubber properties and applications.

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

Fuels: Classification of Solid, Liquid and Gaseous fuels – Calorific value – HCV, LCV. Measurement of calorific value using Bomb calorimeter and Junkers gas calorimeter – Numerical problems – Fuel rating system – Octane and Cetane numbers and their influence on I.C. Engines.

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

UNIT – V: ELECTROCHEMICAL CELLS

Electrochemical Cells – Standard electrode potential – Working principles and applications of different batteries – Dry cell, Lithium-ion cell, Lead-acid cell and Nickel-cadmium cell. Recharging of Batteries – Battery rating (A-h rating) – Working principles and applications of hydrogen-oxygen and methanol-oxygen fuel cells – Principle of solar cells.

Text Books:

1. Chemistry for Engineers by Prof. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C. Ramachandraiah, McGraw Hill Higher Education Hyd., 3rd edition, 2009.
2. A text book of Engineering Chemistry by S.S. Dara and S.S. Umare: S. Chand & Co. Ltd., 12th edition, 2010.
3. A text book of Engineering Chemistry by Jain & Jain: Dhanpat Rai Publishing Company, 15th edition, New Delhi, 2008.

Reference Books:

1. Engineering Chemistry by Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra: ScitechPublications(India) Pvt. Limited, Hyderabad, 2009.
2. Chemistry of Engineering Materials by C.V. Agarwal, C. Parameswara Murthy and Andra Naidu: BS Publications, Hyderabad, 9th edition, 2006.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	2
CO2	3	3	-	-	-	-	-	-	-	-	-	-	1	-	2
CO3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	2

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I.B.Tech-I Semester

L	T	P	C
2	0	4	4

14AME01 **ENGINEERING DRAWING**

(Common to CE, ME & AE Branches)

(First Angle Projection)

OutComes:

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:

1. Narayana K L and Kannaiah P, Engineering Drawing, Scitech Publications, Chennai 2012.
2. Bhatt N D and Panchal V M, Engineering Drawing, Revised Edition, Charotar Publications, 2010.

REFERENCES:

1. Engineering Drawing, Johle, Tata McGraw-Hill, 2008.
2. Engineering Drawing, Shah and Rana, 2/e, Pearson Education, 2005.

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.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12	PSO1	PSO2	PSO3
CO 1	1		1		2					2		2	2	3	2
CO 2	1		2		2							2	2	3	2
CO 3	1		2		2							2	2	3	2

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I-B.Tech, I-Semester.

L	T	P	C
3	1	0	3

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

Outcome:

Student will be able to

1. Construct free body diagrams and develop appropriate equilibrium equations.
2. Define concepts of friction and to apply in real life problems.
3. 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

Friction: Introduction to friction - Classification of friction- Laws of Friction – Limiting Friction – Cone of limiting friction – Angle of friction – Coefficient of friction - Motion of Bodies – Wedge, Screw-jack and differential Screw-jack.

UNIT– III

Power transmission by Belts and Ropes: Introduction – Types of belt drives – Velocity ratios – Length of belt drive – Power transmitted by belt drive – Advantages and disadvantages of belt drive- Rope drive – Stepped pulley drive.

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 :

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

REFERENCE BOOKS:

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		3	2									2	3	2
CO2	1	3											2	3	2
CO3	1			3	1								2	3	2

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I B.Tech- I Semester	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

14AHS07 **TECHNICAL ENGLISH LAB-I**

(Common to CE, ME & AE)

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.

Outcomes:

1. *Recognize English sounds- Monophthongs, diphthongs and consonant sounds.*
2. *Use correct pronunciation in English.*
3. *Distinguish between Received Pronunciation and Indian variety.*
4. *Use English with correct stress and intonation patterns because English is arhythmic 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 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
2. A Text Book of English Phonetics for Indian students by T. Balasubramaniyam, Macmillan Ltd., 2000.
3. Sasikumar.V and P.V. Dhamija,. Spoken English: A Self-Learning Guide to Conversation Practice. 34th Reprint. Tata MCGraw Hill. New Delhi,1993.
4. English Pronouncing Dictionary, Daniel Jones Current Edition with CD.
5. Spoken English, R.K. Bansal and J.B. Harrison, Orient Longman 2006 Edn.
6. Speaking English Effectively, Krishna Mohan & NP Singh (Macmillan)
7. A Practical course in English Pronunciation, (with two Audio cassettes) by J. Sethi, Kamlesh Sadan and & D.V. Jindal, Prentice- Hall of India Pvt.Ltd., New Delhi.
8. English Dictionary For Advanced Learners, (with CD) international edn. Macmillan 2009.
9. A Handbook for English Language Laboratories, E. Suresh Kumar, P. Sreehari, Foundation Books, 2009.
10. Delta's Key to the Next Generation TOEFL Test, 6 audio CDs, New Age International Publishers, 2007.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	-	-	-	2	1	2	3	2
CO2	-	3	-	2	-	1	-	-	-	-	-	-	2	3	2
CO3	-	3	-	2	-	3	-	-	3	-	-	-	2	3	2
CO4	-	-	2	-	-	1	-	2	-	-	-	-	3	-	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

I B.Tech- I Semester	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

14AHS08 **ENGINEERING CHEMISTRY LAB**

(Common to CE, ME & AE)

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. Explain 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.
2. Estimation of Dissolved Oxygen in Water.
3. Estimation of Chlorides in Water sample.
4. Determination of Chemical Oxygen Demand.
5. Determination of Acidity of Water sample.
6. Determination of Alkalinity of Water sample.
7. Estimation of Copper by EDTA method.
8. Estimation of Ferrous Ion by Potassium Dichromate method.
9. Determination of Flash and Fire point by using Pensky Marten's apparatus.
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:

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

Equipment Required:

1. Glassware: Burettes, Pipettes, Standard Flasks, Beakers, Measuring jars, BOD bottles and Reagent bottles.
2. Analytical balance,
3. Reflux Condensers,
4. Pensky Marten's apparatus,
5. Redwood viscometer,
6. Bomb calorimeter,
7. Conductometer, Potentiometer.

	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PS0 1	PSO 2	PSO 3
CO1	**1**			**1**	**2**				**1**				**1**		**2**
CO2					**2**										**2**
CO3			**1**		**1**										**2**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY, CHITTOOR

(AUTONOMOUS)

I B.Tech- I Semester

L	T	P	C
0	0	3	2

14AME02 COMPUTER AIDED DRAFTING LAB

(Common to ME & AE Branches)

Outcomes:

After successful completion of the course, the 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.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12	PSO1	PSO2	PSO3
CO **1**	1		1		2					2		2	2	3	2
CO **2**	1		2		2							2	2	3	2
CO **3**	1		2		2							2	2	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY, CHITTOOR

(AUTONOMOUS)

I B.Tech - II Semester	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

14AHS04 **ENGINEERING PHYSICS**

(Common to CE, ME & AE)

Outcomes

1. *Apply the knowledge of Physics in the field of Communications, Electrodynamics, SolidState Physics and Optics.*
2. *Develop the working ofdifferent tools and devices*
3. *Develop problem solving skills andunderstanding.*

UNIT I

OPTICS: Interference- Interference in thin films by reflection – Newton Rings. Diffraction- Fraunhofer diffraction due to single slit-Diffraction Grating.

MODERN OPTICS

Introduction to lasers – Characteristics of lasers – Spontaneous and stimulated emission of radiation – Einstein's coefficients – population inversion–Ruby laser - He-Ne laser Applications of laser. Introduction to fiber optics – Principle of optical fiber – Acceptance angle and acceptance cone – Numerical aperture – Classification of Optical Fibers- Attenuation in optical fibers – Optical fiber communication system- Applications of optical fibers.

UNIT II

CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction – Space lattice – Basis – Unit cell – Lattice 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

DIELECTRIC PROPERTIES: Introduction – Dielectric constant – Electronic, Ionic and Oriental polarizations (qualitative) – Local Field- Clausius - Mossotti equation – Piezoelectricity - Ferroelctricty.

MAGNETIC PROPERTIES

Introduction – magnetic moment – Classification of magnetic materials – Hysteresis curve – Hard and Soft Magnetic Materials-Applications.

UNIT V

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

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:

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

Reference Books:

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	-	-	-	2	1	2
CO2	3	2	-	2	1	-	-	-	-	-	-	1	-	-	2
CO3	3	2	-	2	1	-	-	-	-	-	-	1	-	-	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

I-B.Tech – II Semester

L	T	P	C
3	1	0	3

14AHS05 **ENVIRONMENTAL SCIENCE**
(Common to CE, ME & AE)

Outcomes:

After successful 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) questionrelated 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 naturalprocess.

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

ECOSYSTEMS: Concept of an ecosystem, Structure and function of an ecosystem (Producers, Consumers and decomposers) – Energy flow in the ecosystem – Food chains, food webs and ecological pyramids – Ecological Succession.

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

SOCIAL ISSUES AND THE ENVIRONMENT: From unsustainable to sustainable development, Water conservation(rainwater harvesting, watershed management)-Resettlement and rehabilitation of people its problems and concerns, Environmental ethics, Global warming, Acid rain, Ozone layer depletion-Population growth, variation among nation, Population explosion-Family Welfare Programme-Environment and human health-Human Rights-Value Education-HIV/AIDS-Women and Child Welfare Programmes-Role of Information Technology in Environment and human health.

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

Text Books:

1. Erach Bharucha, Textbook of Environmental Studies for Undergraduate courses by from UGC.
2. Dr.Raghavan Nambiar.K, Text Book of Environmental Studies,Sitech publications,2010.
3. Benny Joseph, Environmental Studies by Mc.GrawHill Publications, 2010.

References:

1. Dr.Suresh.K.Dhameja, Environmental Studies, S.K. Kataria & Sons Publishers, 2012.
2. Sharma. J.P., Comprehensive Environmental Studies, Laxmi Publications, 2010.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	-	-	1	**3**	**2**	**2**
CO2	3	3	-	2	1	-	-	-	-	-	-	1	**3**	**2**	**2**
CO3	3	3	-	2	1	-	-	-	-	-	-	1	**3**	**2**	**2**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY,CHITTOOR

(AUTONOMOUS)

I B.Tech – II Semester

L	T	P	C
3	1	0	3

14AHS06 ENGINEERING MATHEMATICS-II

(Common to All Branches)

Outcomes:

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

1. *Explore 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 andscientific problems.*
3. *Provide solutions using various computational methods.*

UNIT-I

MATRICES: Rank of a matrix-Echelon form, Normal form -solution of linear system of homogeneous and non-homogeneous equations -Gauss elimination method.

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

UNIT-II

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction - The Bisection method - The method of false position - Newton - Raphson method.

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

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

UNIT-IV

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

UNIT-V

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

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

Text Books:

1. Iyengar T.K.V., Krishna Gandhi.B and others, Mathematical Methods, New Delhi, S.Chand & company,2012.
2. Sankar rao G.,Kesav Reddy.E, Mathematical Methods, International publishing house,Pvt.ltd
3. Sastry .S.S., Introduction to Numerical analysis.New Delhi,Prentice Hall of India,2003
4. Dr..Grewal .B.S, Higher Engineering Mathematics,New Delhi,Khanna Publishers,2004

References:

1. Erwin Kreyszig ,Advanced Engineering Mathematics. John Wiley & Sons.
2. Jain.M.K, IyengarT.K.V,.Jain.R.K. Numerical Methods for Scientific and Engineering Computation. Newage International publishers.
3. Pal, Mathematical Methods ,Oxford University Press,2009.
4. Ranganatham.S,Prasad M.S.S.N.,Ramesh Babu.V, Numerical Analysis, S.Chand & company
5. Sankaraiah .C, Mathematical Methods, Vijayawada,V.G.S Book links,2007.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	-	-	-	-	-	-	1	1	2	3	2
CO2	3	2	1	1	-	-	-	-	-	-	1	2	3	2	2
CO3	2	3	2	2	-	-	-	-	-	-	1	1	3	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY, CHITTOOR (AUTONOMOUS)

I B. Tech –II Semester

L	T	P	C
3	2	-	4

14ACS02 PROGRAMMING IN C AND DATASTRUCTURES
(Common to CE,ME & AE)

Course Outcomes:

After successful completion of the course, the student 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

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

REFERENCES

1. D.A.Godse, A.P.Godse, "C Programming and Data Structures", First Edtion, Technical Publications, 2007.
2. Hanly, "Programming in C and Data Structures (For Jntu)", First Impression, Pearson Education India, 2009.
3. E Balagurusamy, "C PROG & DATA STRUCTURES-JNTU", Fourth Edition, Tata McGraw-Hill Education, 2009.
4. Yashavant P Kanetkar, "Let Us C (Computer science series)", 12th Edition, BPB Publications, 2010.

	PO1	PO 2	PO3	PO 4	PO5	PO6	PO7	PO8	PO 9	PO10	PO1 1	PO12	PSO1	PSO2	PSO3
CO1	**2**	**3**							**1**		**2**		2	3	2
CO2	**2**	**2**									**2**		2	2	2
CO3	**2**	**2**											2	2	2
CO4	**2**	**3**		**2**							**2**		2	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY, CHITTOOR (AUTONOMOUS)

I-B.Tech, II-Semester

L	T	P	C
3	1	0	3

14ACE05 **ENGINEERING MECHANICS-II**

(Common to ME and AE)

Outcome:

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

1. Conduct dynamic analysis of rigid body motion
2. Develop work energy relations.
3. Analyse the oscillating motions assuming Simple Harmonic motion.
4. Explain basic relationship between elastic constants.
5. 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

Kinetics: Bodies in rectilinear translation – Curvilinear translation – Bodies rotating about fixed axis – D'Alemberts Principle - Principle of work energy – Principle of impulse and momentum.

UNIT – III

Mechanical Vibrations: Definitions - Concepts – Simple Harmonic motion – Free vibrations - Simple, Compound and Torsional pendulums – Simple Numerical Problems.

UNIT – IV

Simple Stresses and Strains: Introduction – Elasticity – Stress – Strain - Types of stresses and strains – Elastic limit – Hooke's law – Young's Modulus –Lateral Strain, Poisson's ratio and Volumetric Strain-Relationship between Elastic constants , Deformation of bodies – Principle of superposition – Stresses in bars of varying section - Stresses in composite bars.

UNIT – V

Analysis of Simple Pin Jointed Frames(Trusses): Definition **–** Perfect, Deficient and Redundant frames – Methods of Analysis - Analysis of simple trusses by method of joints and method of sections.

TEXT BOOKS :

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

REFERENCE BOOKS:

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		3	2									2	3	2
CO2	1	3											2	3	2
CO3	1			3	1								2	3	2
CO4		3		3									2	3	2
CO5					1	2	3						2	3	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY, CHITTOOR

(AUTONOMOUS)

I B.Tech – II Semester

L	T	P	C
0	0	3	2

14AHS09 **ENGINEERING PHYSICS LAB**
(Common to CE, ME & AE)

Outcomes:

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

1. *Analyze scientific data from different physics laboratory instruments.*
2. *Develop manipulative, observational and reporting skills.*
3. *Use 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
3. Determine the wavelength of given laser source – Diffraction grating.
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.
8. Numerical Aperture of an optical fiber.
9. Bending losses in Optical Fiber.
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
13. Energy gap of a given semiconductor.
14. Determine the Dielectric constant of Barium Titanate.

	PO1	PO 2	PO 3	PO 4	PO5	PO 6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	**2**	**2**	**2**
CO2	1	-	-	-	-	-	-	-	-	-	-	-	**2**	**2**	**2**
CO3	3	-	-	-	1	-	-	-	-	-	-	-	**2**	**2**	**2**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY, CHITTOOR
(AUTONOMOUS)

I B. Tech –II Semester

L	T	P	C
0	0	3	2

C AND DATASTRUCTURES LAB

14ACS04 **(Common to CE,ME & AE)**

Lab Outcomes:

After successful completion of the course, the student will 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 I

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: 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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3							1		2		2	3	2
CO2	2	2									2		2	2	2
CO3	2	2											2	2	2
CO4	2	3		2							2		2	3	2

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I B. Tech- II Semester

L	T	P	C
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14AME03 **ENGINEERING WORKSHOP**
(Common to CE, ME & AE Branches)

Outcomes:

After successful completion of the course, the 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. Use of carpentry & fitting joints such as lap, dovetail, mortise, tenon joint, various sheetmetal models in 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.

f. Welding – Preparation of two welds (exercises): single V butt joint, lap joint, Square butt Joint and fillet weld.

2. TRADES FOR DEMONSTRATION:

a. Plumbing

b. Machine Shop

c. Metal Cutting

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

REFERENCE BOOKS:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
2. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas
3. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1		1	1	1	2	1	1	2	1	1	1
CO2	1	1	1	1		1	1	1	2	1	1	2	1	1	1
CO3	1	1	1	1		1	1	1	2	1	1	1	1	1	1
CO4	1	1	1	1		1	1	1	2	1	1	2	1	1	1

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3	1	0	3

(14ACE12) STRENGTH OF MATERIALS

Outcomes:

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

1. Apply concepts and applications of stresses and strains
2. Determine the internal forces in the beams
3. Formulate expressions for deflection for different loading conditions
4. Formulate expressions for longitudinal and circumferential stresses in thin and thick cylinders

UNIT I

SIMPLE STRESSES AND STRAINS: *Elasticity and plasticity – Types of stresses and strains – Hooke's law – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses.*

STRAIN ENERGY*: Resilience – Gradual – sudden - impact and shock loadings- Simple Applications.*

UNIT II

SHEAR FORCE AND BENDING MOMENTS*: Types of supports – 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

THEORY OF SIMPLE BENDING*: Assumptions made in the theory of simple bending – Derivation of bending equation: M/I = f/y = E/R –Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I-T-Angle and Channel sections – Design of simple beam.*

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

UNIT IV

DEFLECTIONS OF BEAMS*: 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

THIN CYLINDERS: *Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop - longitudinal and volumetric strains – changes in diameter and volume of thin cylinders – Riveted boiler Shells - Thin spherical shells.*

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:

1. B.C. Punmia, Ashok Kumar Jain & Arun Kumar Jain, Mechanics of Materials, Mumbai, 1st Edition, Laxmi Publications, 2002.
2. R. Subramaniyan, Strength of Materials, Oxford University Press, New Delhi, Edition 2008.
3. A.R. Basu, Strength of materials, Dhanpat Rai & Company, New Delhi.

References:

1. Bhavikatti, Strength of materials, New Delhi, 4th Edition, S. Chand & Co., 2009
2. Timoshenko & Young, Elements of Strength of materials, New Delhi, 2nd Edition, Eastern Wiley Publications, 2011.
3. Engineering Mechanics, Irving H.Sharnes, Prentice Hall Of India.Ltd.,1998

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3												3	2	2
CO-2	3												3	2	2
CO-3	3	3											3	2	2
CO-4	3												3	2	2

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3	***1***	***0***	***3***

(14AEE06) ELECTRICAL ENGINEERING AND ELECTRONICS ENGINEERING

Outcomes:

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

1. *Develop knowledge of construction, operation and applications of different types of electrical machines.*
2. *Use instruments for measuring basic electrical quantities.*
3. *Develop applications of PN Junction diode, Transistor and SCR.*
4. *Demonstrate use of CRO, regulated power supplies and function generators.*

UNIT I

INTRODUCTION TO ELECTRIC CIRCUITS AND MEASURMENTS: *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.*

MEASURING INSTRUMENTS: *Principle of Operation Moving Coil and Moving Iron Types of Voltmeters and Ammeters - Multimeters –Measurements of resistance, inductance & capacitance. Wheat stone's bridge, Schering bridge & Anderson bridge.*

UNIT II

DC MACHINES & TRANSFORMER: *Construction - Principle of Operation and EMF Equation - Different Types of Generators - DC Motor Operation – Different Types – Torque Equation – Efficiency - Applications of DC Motors.*

TRANSFORMER: *Principle of Operation of Single Phase Transformer - EMF Equation – Losses – Efficiency and Regulation.*

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

DIODE AND TRANSISTOR CHARACTERISTICS: *PN Junction Diode, Zener Diode – V-I Characteristics – Applications – Rectifier – Half Wave – Full Wave and Bridge Rectifiers – Simple Problems – PNP and NPN Junction Transistor – Transistor as an Amplifier – Single stage CE Amplifier – Frequency response of CE Amplifier – Junction Field Effect Transistor (JFET) operation and characteristics, SCR - characteristics and its applications*

UNIT V

CATHODE RAY OSCILLOSCOPE: *Study of CRO – Principles of CRT (Cathode Ray Tube) – Deflection sensitivity – Electrostatic and Magnetic deflection – Applications of CRO – Voltage, Current and Frequency Measurements*

REGULATED POWER SUPPLIES*: Functional diagram - Principle of operation – Applications functional generators – functional diagram - principle of operation.*

Text Books:

1. J.P. Nagrath & D. P Kothari: Basic Electrical Engineering, PHI Publications
2. HUGHES: Electrical and Electronic Technology, Pearson Publications.
3. Mehta, V.K: Principles of Electrical & Electronics Engineering, S. Chandan & Company.

References:

1. Helfrick and Cooper: Modern Electronic Instrumentation and Measurement Techniques, PHI Publications.
2. R.L.Boylestad and Louis Nashelsky, Electronic Devices and Circuits, 9th Edition, Printice Hall International Publishers, 2006.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	-	3	-	-	1	-	-	1	1	3	2	2
CO2	1	2	-	-	3	-	-	1	-	-	1	1	3	2	2
CO3	1	-	-	-	2	-	-	-	1	-	-	1	3	2	2
C04	1	2	-	2	-	-	-	1	-	-	1	1	3	2	2

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

(14AME04) ENGINEERING METALLURGY

Outcomes:

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

1. *Select metal or alloy to suit the functional behavior of a product.*
2. *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.*

EQUILIBRIUM DIAGRAMS: *Definitions of terms, solid solutions–solubility and solutions, Types- Interstitial solid solutions, substitutional solid solutions, Fick's laws of diffusion, Hume Ruthery rules of solid solubility. Cooling curves, Construction of equilibrium diagrams, Phase rule, Types of phase diagrams, Lever rule, Invariant reactions, Coring and Miscibility.*

UNIT II

TRANSFORMATION IN SOLID STATE: Iron-Iron carbon equilibrium diagram, Relationship between equilibrium diagrams and properties of alloys, Effect of alloying elements on Iron-Iron carbon system, TTT diagrams.

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.

HEAT TREATMENT OF FERROUS AND NON-FERROUS ALLOYS: *Annealing, Normalizing, Hardening, Tempering, Hardenability, Surface hardening, Age hardening treatment.*

UNIT V

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

COMPOSITE MATERIALS: Classification of composites, various methods of component manufacture of composites, particle reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal-matrix composites, and Carbon-Carbon composites.

Text Books:

1. *V. Raghavan, Material science and Engineering, 5th Edition, Prentice Hall of India, 2006.*

2. *Sidney H. Avner, Introduction to Physical Metallurgy, 2nd Edition, Tata McGraw Hill, New Delhi 6th reprint 2001.*
3. *William D.Callister, Materials Science & Engineering - An Introduction, Jr. Wiley India Pvt. Ltd. 6th Edition, New Delhi, 2006.*

References:

1. *V.D. Kodgire & S.V. Kodgire, Material Science and Metallurgy, Kolhapur, 4th Edition, Everest Edition, 2006.*
2. *R.K. Rajput, Engineering materials and metallurgy, Hyderabad, 5th Edition, S. Chand Publishers, 2006.*
3. Donald R. Askeland, Essential of Materials Science and Engineering, USA, 2nd Edition, Thomson Publisher 2008.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3											3	3	2
CO2	3	3											3	3	2
CO3	3	3											3	3	2
C04	3	3											3	3	2

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3	1	0	3

(14AME05) THERMODYNAMICS

Outcomes:

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

1. *Define principles of thermodynamics and can solve the problems related to various thermalengineering systems using the zeroth law, 1st and 2nd law of thermodynamics.*
2. *Interpret behavior of ideal and real gases at different states of the system and can findpartial pressures , enthalpy and entropy*
3. *Explain properties of steam and can solve problem using steam tables and mollier charts*
4. *Explain working of different air standard cycles and vapour power cycles and can solve therelated 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: Properties of pure substances – Thermodynamic properties of pure substances in solid, liquid and vapour phases, P-V, P-T, T-V, T-S, H-S diagrams, PVT surfaces, thermodynamic properties of steam, steam tables, mollier charts, simple problems.

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

POWER CYCLES: Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Ericsson Cycle, Lenoir Cycle. Description and representation on P–V and T-S diagram, thermal efficiency. Mean effective pressure, Related problems.

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

Text Books:

1. P.K. Nag., Engineering Thermodynamics, Tata McGraw Hill, New Delhi, 5th Edition, 2014.
2. Cengel, Thermodynamics – An Engineering Approach, 3rd Edition, Tata McGraw Hill, New Delhi, 2003.
3. Eastop T.D and A. McConkey, "Applied Thermodynamics", for engineering technologies 5th edition longman U.K 1993.

References:

1. J.P. Holman, Thermodynamics, 3rd Edition, Tata McGraw Hill, 1995.
2. C.P. Arora, Thermodynamics, Tata McGraw Hill, New Delhi,12th reprint 2007.
3. C. Merala, Pother, W. Craig & Somerton, Thermodynamics for Engineers, Schaum Outline Series, Tata McGraw Hill,3rd Edition, New Delhi, 2004.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2				1						3	3	2
CO2	3	2	2										3	3	2
CO3	3	2	2										3	3	2
C04	3	2	2										3	3	2

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3	*1*	*0*	*3*

(14AME06) PRODUCTION TECHNOLOGY

Outcomes:

After successful 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 up gradation.*
4. *Develop skills 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.*
DESIGN OF CASTINGS: *Principles of Gating, Gating ratio and design of Gating systems, Risers and Cores - Types, functions, and design, Introduction of foundry sands, sand properties and testing.*

UNIT II

WELDING: *Classification of welding processes. Types of welds, welded joints, and their characteristics. Gas welding, Arc welding, Forge welding, Resistance welding, Thermit welding, Plasma Arc welding, Inert Gas welding, TIG, MIG welding, and Friction welding, simple problems, Heat affected zones, welding defects – causes and remedies.*
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.
EXTRUSION OF METALS: *Basic extrusion process and its characteristics, Types of extrusion.*

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 Vaccum forming methods, Calendaring 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:

1. P.N. Rao, Manufacturing Technology, Noida, 2nd Edition, Tata McGraw Hill, 2008.
2. Kalpakjain, Manufacturing Technology, Chennai, 4th Edition, Pearson Edition, 2002.
3. B.S. Raghuwanshi, Workshop Technology, Volume-I, 2nd Edition Dhanpat Rai & Co Pvt. Ltd, 2014.

References:

1. R.K. Jain, Production Technology New Delhi, 2nd Edition, Kanna Publishers, 2001.
2. R.S. Parmar, Welding Process & Technology, New Delhi, 4th Edition, Kanna Publishers, 1997.
3. K.L Narayana, Production Technology, New Delhi, 2nd Edition, I.K. International Publications, 2010.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3											3	3	2
CO2	3	3											3	3	2
CO3	3	3											3	3	2
C04	3	3											3	3	2

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II B.Tech – I Sem (ME)

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1	*0*	*4*	*3*

(14AME07) MACHINE DRAWING

Outcomes:

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

1. *Represent common machine elements conventionally.*
2. *Enumerate Dimensions 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.*
b) *Other Machine Parts – Screw Jack, Machine Vices, Plummer Block, Lathe Tailstock, Milling Machine Tailstock and Square Tool Post.*
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:

1. K.L. Narayana, P. Kannaiah & K. Venkata Reddy, Machine Drawing, NewAge Publishers 4th Edition,2012.
2. R.K. Dhawan, Machine Drawing, 2nd Edition, S. Chand Publications, 1996.
3. P.S. Gill, Machine Drawing, Madhurai, 12th Edition, Sk Kataria & Sons, 2009.

References:

1. Luzzader, Machine Drawing, Anand, 4th Edition, Charotor Publishing House, 2003.
2. Rajput, Machine Drawing, Hyderabad, 4th Edition, S.Chand Publications, 2002.
3. K.C. John, Textbook of Machine Drawing, 5th Edition, Printice Hall International Publishers learning, 2009.

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).

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	2	2	3	-	-	-	3	-	-	-	3	3	2
CO2	-	3	2	2	3	-	-	-	3	-	-	-	3	3	2
CO3	2	-	2	3	3	-	-	-	3	-	-	-	3	3	2
C04	-	3	3	3	3	-	-	-	3	-	-	-	3	3	2

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L	***T***	***P***	***C***
0	***0***	***3***	***2***

(14AEE09) ELECTRICAL ENGINEERING AND ELECTRONICS ENGINEERING LAB

Outcomes:

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

1. *Find Efficiency of DC machines by different methods*
2. *Apply speed control of DC shunt machine*
3. *Define Diode, Transistor and SCR Characteristics*
4. *Explain principles and operations of Rectifiers and CRO*

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.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	--	--	1	--	--	--	--	--	3	3	2
CO2	3	3	2	3	--	--	2	--	--	--	--	--	3	3	2
CO3	3	2	3	1	--	--	2	--	--	--	--	--	3	3	2
C04	3	2	2	3	--	--	2	--	--	--	--	--	3	3	2

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L	T	P	C
0	0	3	2

(14AME08) PRODUCTION TECHNOLOGY AND METALLURGY LAB

Outcomes:

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

1. *Select suitable manufacturing process to produce the desired components.*
2. *Identify best practice to overcome the defects in manufacturing process.*
3. *Develop skills in using microscopes and different machinery used in metallurgy lab*
4. *Interpret 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
6. Blanking & Piercing operation and study of simple, compound and progressive dies.
7. Hydraulic Press: Deep drawing and extrusion operation.
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.
3. Study of the Microstructures of Cast Irons.
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.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3					3				3	3	2
CO2	3	3	3	3					3				3	3	2
CO3	3	3	3	3					3				3	3	2
C04	3	3	3	3					3				3	3	2

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L	***T***	***P***	***C***
3	***1***	***0***	***3***

(14AHS12) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common to Civil, ME & AE Branches)

Outcomes:

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

1. *Develop knowledge and skills 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. *Apply financial accounting in the field of Engineering.*

UNIT – I

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

UNIT – II

THEORY OF PRODUCTION AND COST ANALYSIS: *Firm and industry – Production function – Cobb Douglas Production function – Laws of Returns – Internal and External economies of scale* ***COST ANALYSIS:*** *Cost concepts, Fixed vs. Variable costs, Explicit vs. Implicit Costs, Out of Pocket costs Vs Imputed costs, Opportunity Cost and Sunk costs* ***BREAK EVEN ANALYSIS:*** *Concept of Break Even Point (BEP) – Break Even Chart – Assumptions underlying and Practical significance of BEP (Simple Problems).*

UNIT – III

INTRODUCTION TO MARKETS AND BUSINESS ORGANIZATIONS: *Market structures – Types of Competition – Features of perfect competition, Monopoly, Monopolistic competition – Price-Output Determination under perfect competition and Monopoly – Types of Business organization – Features, Merits and demerits of Sole proprietorship, Partnership and Joint stock companies – Types of companies – Public enterprises –Types and Features – Changing business environment in post – Liberalization scenario.*

UNIT – IV

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

UNIT –V

FINANCIAL ACCOUNTING AND FINANCIAL ANALYSIS THROUGH RATIOS: *Double entry book keeping – Journal – Ledger – Trial Balance –Trading Account and balance sheet with simple adjustments* ***Ratio analysis:*** *Computation of Liquidity Ratios (Current and Quick Ratio), Activity Ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt- Equity Ratio and Interest Coverage Ratio) and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratio and EPS).*

Text Books:

1. R.L. Varshney & K.L. Maheswari, Managerial Economics, 19th Edition, Sultan Chand &

Sons, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international, 2009.
3. A.R. Aryasri, Managerial Economics and Financial Analysis, 4th Edition, Tata McGraw Hill, 2009.

References:

1. R.L. Gupta, Financial Accounting, Volume-I, Sultan Chand & Sons, New Delhi, 2001.
2. James C. Van Horne, Financial Management policy, 12th Edition, Printice Hall International Publishers, 2001.
3. Joel Dean, Managerial Economics, Printice Hall International Publishers, 2001.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	2
CO2	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	2
CO3	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	2
C04	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	2

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L	T	P	C
3	1	0	3

(14AME09) KINEMATICS OF MACHINERY

Outcomes:

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

1. *Explain simple mechanisms, working principles there by to apply therequired mechanism depending upon the functional requirements in the product design.*
2. *Calculate velocity and acceleration of mechanisms.*
3. *Define basic principles and procedures to design the CAM mechanism, hook mechanism and steering mechanism.*
4. *Define 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

MECHANISM WITH LOWER PAIRS : *Introduction, Pantograph, Exact and approximate straight line motion mechanisms –Peaucellier, Hart and Scott Russell, Grasshopper, Watt, T Chebicheff and Robert Mechanisms STEERING MECHANISMS**:** Conditions for correct steering – Davis Steering gear, Ackermans steering gear, velocity ratio. HOOKE'S JOINT**:** Single and double Hooke's joint, Universal coupling.*

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:

1. *S.S. Rattan, Theory of Machines and Mechanisms, Noida, 3rd Edition, Tata McGraw Hill Publishers, 2004.*
2. *R.S. Khurmi & J.K. Gupta, Theory of Machines, Hyderabad, 2nd Edition, S. Chand, 2008.*
3. *P.L. Ballaney, Theory of machines, New Delhi, 3rd Edition, Khanna Publishers, 1980.*

References:

1. *Thomas Bevan, Theory of Machines, New Delhi, 1st Edition, hard back Edition, CBS, 1984.*
2. *R.K. Bansal, Theory of Machines, New Delhi, 3rd Edition, Firewall Media, 2004.*
3. *Sadhu Singh, Theory of Machines, New Delhi, 2nd Edition, Pearson Edition, 2012.*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	-	-	-	3	-	-	2	3	3	2
CO2	3	2	3	-	-	-	-	-	3	-	-	2	3	3	2
CO3	3	3	3	3	-	-	-	-	3	-	-	2	3	3	2
C04	3	3	-	3	-	-	-	-	3	-	-	3	3	3	2

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L	T	P	C
3	1	0	3

(14AME10) THERMAL ENGINEERING

Outcomes:

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

1. *Explain I.C. Engines, compressors, which are mostly used as prime movers in automobile andindustries respectively.*
2. *Define basic theory of boilers, nozzles, condensers used in the thermal power plants.*
3. *Construct the velocity diagrams for both impulse and reaction turbines which isprime requirement to design the steam turbines.*

UNIT I

I.C. ENGINES : *Definition of Engine And Heat Engine, I.C Engine Classification – Parts of I.C. Engines, Working of I.C. Engines, Two Stroke & Four Stroke I.C. Engines SI & CI Engines, Valve and Port Timing Diagrams.*
Testing and Performance : Parameters of Performance - Measurement of Cylinder Pressure, Fuel Consumption, Air Intake, Exhaust Gas Composition, Brake Power – Determination of Frictional Losses And Indicated Power – Performance Test – Heat Balance Sheet and Chart. Related problems

UNIT II

Air Compressors: *Reciprocating Compressors, Effect of Clearance volume in Compressors, Volumetric Efficiency, Isothermal efficiency and Isentropic efficiency of reciprocating compressors Single Stage and Multi Stage Compressors, Effect of Inter cooling and Pressure Drop in Multi - Stage Compressors, Problems Related to Reciprocating Compressors, Working principles of Roots blower, Vane type Blower, Centrifugal Compressor - Axial Flow Compressors.*

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 diagram efficiency, condition for maximum efficiency. De-Laval Turbine, its features. Related problems ,****Reaction Turbines****-Mechanical details, principle of operation, thermodynamic analysis of a stage, degree of reaction, velocity diagram, Parson's reaction turbine, condition for maximum efficiency. Related problems, difference between Impulse and reaction turbines.*

Text Books:

1. *R.K. Rajput, Thermal Engineering, Hyderabad, Lakshmi Publications Pvt. Ltd, 9th Edition, 2013.*

2. *R.S. Khurmi & J.K.Gupta, Thermal Engineering, 15th Edition, Hyderabad, S.Chand, 2013.*
3. *P.L. Balleny, Thermal Engineering, 20th Edition, Khanna Publishers, New Delhi, 1994.*

References:

1. *V. Ganesan, I.C. Engines, Noida, 4th Edition, Tata McGraw Hill, 2014.*
2. *Kothandaraman & Domkundwar, Thermal Engineering, Dhanpat Rai & Co, 2010.*
3. *R. Yadav, Steam & Gas Turbines and Power plant engineering, 7th revised Edition, Central Publishing House, Allahabad, 2009.*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-	-	3	3	2
CO2	3	3	2	-	-	-	1	-	-	-	-	-	3	3	2
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	3	2

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L	T	P	C
3	*1*	*0*	*3*

(14ACE11) FLUID MECHANICS AND HYDRALIC MACHINERY

Outcomes:

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

1. *Apply frictional losses in a pipe when there is a flow between two places.*
2. *Identify types of flow and its measurements and applications.*
3. *Identify the suitable pump required for different purposes.*
4. *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.*

Pascal's law – Pressure variation in a static fluid – Atmospheric, gauge and absolute pressures – Measurement of pressure – Piezometer – U–tube and inverted U–tube manometers – Bourdon's pressure gauge – Hydrostatic forces on plane and curved surfaces– Buoyancy-Buoyant Force and Centre of Buoyancy- Metacentre and Metacentric Height- Stability of Submerged and Floating Bodies- Determination of Metacentric Height.

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

Equations of motion for laminar flow of a Newtonian fluid – Viscous flow – Navier – Stoke's equations, simple exact solutions for Hydrodynamic lubrication.

PIPE FLOW: *Reynold's experiment – Reynold's number - Minor losses in pipe flow - Darcy–Weisbach equation – Variation of friction Factor – Moody's chart – Pipes in series – Pipes in parallel.*

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-Modern Francis turbine – Kaplan turbine. Main components and working principle- Expressions for work done and efficiency – Working proportions and design of each.*

CENTRIFUGAL PUMPS: *Classification and types of pumps – Components and working of a centrifugal pump – Work done by the impeller– Heads and efficiencies – Net positive suction head(NPSH)- Priming – Priming devices – Minimum starting speed – Multistage pumps – Pumps in series and parallel – Submersible pumps – Limiting suction head – Cavitation – Expression for specific speed.*

Text Books:

1. P.N. Modi & S.M. Seth, Hydraulics and Fluid Mechanics including Hydraulic Machines, New Delhi, Standard Book House, Delhi,14th Edition 2002.
2. R.K. Bansal, A text book of Fluid Mechanics and Hydraulic machinery, 9th Edition, Laxmi Publications (P) Ltd, 2010.
3. Jagadish Lal, Hydraulic Machines, 9th Edition, Metropolitan Book Company Pvt. Ltd, 2003.

References:

1. Nachleba, Hydraulic Turbines, New Delhi, 1st Edition, Tata McGraw Hill Publishing Co. Ltd, 2012.
2. Streeter & Wylie, Fluid Mechanics, 10th Edition, Tata McGraw Hills Publications, 1997.
3. C.M. White, Fluid Mechanics, 4th Edition, Tata McGraw Hills Publications, 2008.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	3	2	2
CO2	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2
CO3	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2
CO4	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2

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L	T	P	C
3	1	0	3

(14AME11) METROLOGY

Outcomes:

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

1. *Develop skills for use 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.*
LIMIT GAUGES: *Plug, Ring, Snap, Gap, Taper, Profile and Position gauges. Taylor's principle-Design of Go and No Go gauges.*

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, Talysurf, 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 out line only.*

Text Books:

1. *K.L. Narayana, Engineering Metrology, Hyderabad, 1st Edition, SciTech Publication, 2010.*
2. *Mahajan, Engineering Metrology, New Delhi, 4th Edition, Dhanpat Rai, 2009.*
3. *R.K. Jain, Engineering Metrology, New Delhi, 3rd Edition, Khanna Publication, 2012.*

References:

1. *Connie Dotson, Fundamentals of Dimensional Metrology, Florence USA, 4th Edition, Thomson, 2006.*
2. *Bharat Bhushan & B.K. Gupta, Handbook of Tribology, Florida USA, 2nd Edition, Krieger Publishing Co, 2001.*
3. *I.C. Gupta, A Text Book of Engineering Metrology, New Delhi, 4th Edition, Dhanpat Rai, 2009.*

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	-	-	-	-	-	-	-	-	-	-	3	2	2
CO2	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2
CO3	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2
CO4	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2

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L	T	P	C
3	1	0	3

(14AME12) MACHINE TOOLS

Outcomes:

After successful 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

ENGINE LATHE: *Specification of lathe, types of lathes, work holders, tool holders, Taper turning, thread turning and attachments for Lathes.*
Turret and capstan lathes – work holding devices and tool holding devices, Automatic lathes – classification, Single spindle and multi-spindle automatic lathes.

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:

1. R.K. Jain & S.C. Gupta Production Technology, New Delhi, 5th Edition, Khanna Publishers, 2010.
2. B.S. Raghuwanshi, Workshop Technology, Volume - II, New Delhi, 10th Edition, Dhanpath Rai & Co., 2010.
3. P.N. Rao, Manufacturing Technology (Machine Tools), Volume - II, Noida, 4th Edition, Tata McGraw Hill, 2013.

References:

1. Kalpakjian, Manufacturing Engineering Technology, New Jersey, USA, 2nd Edition, Pearson Stores, Prentice Hall Publication, 2010
2. H.M.T. Production Technology, Noida, India, 2nd Edition, Tata McGraw Hill, 1986.
3. Prashant T. Data, Introduction to Manufacturing Technology, Mumbai, 2nd Edition, Jaico Publication House, 2010.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	-	-	-	-	-	-	-	-	-	-	3	2	2
CO2	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2
CO3	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2
CO4	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2

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0	0	3	2

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

Outcomes:

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

1. *Find Young's modulus, torsional rigidity of mild steel rods.*
2. *Enumerate hardness of mild steel and HYSD specimens.*
3. *Estimate 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.

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

II B.Tech – II Sem (ME)

L	T	P	C
0	0	3	2

(14AME15) METROLOGY & MACHINE TOOLS LAB

Outcomes:

After successful 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.*
9. *Job on Drilling and Tapping.*
10. *Job on Shaping and Planning.*
11. *Job on Slotting.*
12. *Job on Milling*

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

II B.Tech – II Sem (ME)

L	T	P	C
3	0	0	0

(14AHS15) QUANTITATIVE APTITUDE AND REASONING - I

Outcomes:

After successful 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:

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

References:

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

III B.Tech - I Sem (ME)

L	T	P	C
3	1	0	3

(14AHS13) TECHNICAL ENGLISH – II
(Common to all Branches)

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.

Outcomes:

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

UNIT – I

Chapter entitled 'Humour' from "Using English"

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

UNIT –II

Chapter entitled 'Inspiration' from "Using English"

L- Listening to details

S- Apologizing, Interrupting, Requesting and Making polite conversations
R- Note making strategies
W- Paragraph-types- topic sentences, unity, coherence, length, linking devices
G-Auxiliary 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
W- Technical Report writing-strategies, formats-types-technical report writing
G- Voice and Subject – Verb Agreement
V- Idioms and prepositional Phrases

UNIT –V

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

L- Listening to speeches

S- Making Presentations and Group Discussions

R- Reading for Information
W- E-mail drafting
G- Conditional clauses and conjunctions
V- Collocations and Technical Vocabulary and using words appropriately

Remedial Grammar:

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

5. Common errors in English.

Vocabulary:

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

Writing practice (composition):

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

Question Paper pattern: **Max Marks: 70**

PART – I

From the prescribed text book without leaving any lesson

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

PART – II

3. General essay – 1	(Any one out of three)	1 x 8 = 8.M
4. Report Writing – 1	(Any one out of two)	1 x 8 = 8.M
5. Resume Writing – 1	(No choice)	1 x 8 = 8.M
6. Idioms – 5	(Any five out of eight)	5 x 1 = 5.M
7. Vocabulary - 5	(Any five out of eight)	5 x 1 = 5.M
8. Correction of sentences - 10	(Any ten out of fifteen)	10 x1 = 10.M

Total = 70Marks

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

Reference Books:

1. Raymond Murphy's English Grammar with CD, Murphy, Cambridge UniversityPress, 2012.
2. English Conversation Practice –Grant Taylor, Tata McGraw Hill, 2009.
3. Communication SKILLS, Sanjay Kumar & Pushpalatha Oxford University y Press, 2012.
4. A Course in Communication Skills- Kiranmai Dutt & co. Foundation Books, 2012.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	-	-	3	-	-	3	3	-	-	-	-	-	**3**	**2**	**2**
CO2	-	2	3	-	-	-	-	-	-	-	-	2	**3**	**2**	**2**
CO3	3	3	3	-	-	-	3	-	-	-	-	2	**3**	**2**	**2**
CO4	-	3	-	3	-	-	2	-	-	-	-	-	**3**	**2**	**2**
CO5	-	3	-	3	-	-	2	-	-	-	-	-	**3**	**2**	**2**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

III B.Tech - I Sem (ME)

L	T	P	C
3	1	0	3

(14AME17) INDUSTRIAL MANAGEMENT

(Common to ME & AE)

Outcomes:

After successful 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

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.

HUMAN RESOURCE MANAGEMENT: Functions of HRM, Job description, Job Evaluation and methods of evaluation, Merit Rating- Methods of merit ratings, wage incentives, types of wage incentive plans, Introduction to Industrial labor laws.

UNIT II

Plant Location-Location 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

Production Planning and Control-Objectives, Salient features and functions of PPC, a brief note on aggregate planning.

Sales forecasting-need, Techniques – Moving Average, Exponential series and simple problems on linear regression technique, Time series.

Materials Management-Objectives, Inventory – classification, functions, costs associated with inventory, inventory classification techniques. Stores Management and Stores Records. Purchase management, duties of purchase department, purchase procedure.

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.

Text Books:

1. O.P.Khanna, Industrial Engineering and Management, 7th Edition, Dhanpat Rai& Sons, 2002.
2. Mortand Telsang, Production and Operating Management, 2nd Edition, S.Chand,2006.

References:

1. E.S.Buffa, Modern Production/Operation Management, 8th Edition, Wiley India, 2007.
2. Joseph G Monks, Operation Management, 3rd Edition, Tata McGraw Hill, 1987.
3. Ralph Barnes, Principles of Motion and time study, 2nd Edition, Tata McGraw Hill, 1956.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1												3	2	2
CO2	1												3	2	2
CO3		2	3			2	2					2	3	2	2
CO4		2	3							2		2	3	2	2
CO5				2	3	2	3	2	2		2		3	2	2
CO6				2				3	3	3		3	3	2	2

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)

L	T	P	C
3	1	0	3

Outcomes:

After successful 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. Develop experimental skills and continuous learning

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 ANDFLY 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

GOVERNORS: Types - Watt, Porter and Proell governors – Hartnellgovernors - Stability, sensitiveness, isochronism and hunting - effort, power and controlling force of a governor, simple problems.

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, Dunkerly’s method, Raleigh’s method, Whirling speeds, damping vibration, isolation, resonance, torsional vibrations of two and three rotor systems, Torsional equivalent shaft.

Text Books:

1. R.S. Khurmi & J.K. Gupta, Theory of Machines, Hyderabad, 14th Edition, S. Chand, 2005.
2. S.S. Rattan, Theory of Machines and Mechanisms, New Delhi, 4th Edition, Tata McGraw Hill Publishers, 2014.

References:

1. R.K. Bansal, Theory of Machines, New Delhi, 5th Edition, laxmi publications, 2012.
2. Sadhu Singh, Theory of Machines, New Delhi, 2nd Edition, Pearson Edition, 2012.
3. P L Ballaney, Theory of Machines and Mechanisms, New Delhi, Khanna Publishers, 2003.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1												3	2	2
CO2	1	2											3	2	2
CO3		3	3	2	2	2	2	2	2				3	2	2
CO4					2						2		3	2	2
CO5									3	3	2	2	3	2	2
CO6												3	3	2	2

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

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

INTERNAL COMBUSTION ENGINES AND GAS TURBINES (14AME19)
III B.Tech – I Sem (ME)

L	T	P	C
3	1	0	3

Outcomes:

After successful 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 socialobligations 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.

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.

ACTUAL CYCLES AND THEIR ANALYSIS: Introduction, Comparison of Thermodynamic, Fuel-Air and Actual Cycles, Time Loss Factor, Heat Loss Factor, Exhaust Blow down, Loss due to Rubbing Friction.

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.

ALTERNATE FUELS: Alcohols, Vegetable oils and bio-diesel, Bio-gas, Natural Gas , Liquefied Petroleum Gas,Hydrogen, Properties, Suitability, Engine Modifications, Performance, Combustion and Emission Characteristics of SI and CI Engines using these alternate fuels.

UNIT IV

RECENT TRENDS: Homogeneous Charge Compression Ignition Engine, Lean Burn Engine, Stratified Charge Engine, Surface Ignition Engine, Four Valve and Overhead cam Engines, Common Rail Direct Injection Diesel Engine, Gasoline Direct Injection Engine, Electronic Engine Management.

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.

Text Books:

1. V. Ganesan, I.C. Engines, Tata McGraw Hill.
2. M.L. Mathur & R.P. Sharma, Internal Combustion Engine, Dhanpat Rai Publications.

References:

1. John B. Heywood, Internal Combustion Engine Fundamentals,Tata McGraw Hill.
2. V.M. Domkundwar, Gas Turbines and Jet Rocket Propulsion, Dhanpat Rai&Co.
3. H. Cohen and G.F.C. Rogers , Gas Turbine Theory, Longmans, Green, 1951.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3	2	2
CO2	3												3	2	2
CO3		2		1		1	3	3					3	2	2
CO4		3	2		1								3	2	2
CO5									3	2	1	2	3	2	2

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

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

DESIGN OF MACHINE ELEMENTS – I (14AME20)
III B.Tech - I Sem (ME)

L	T	P	C
3	1	0	3

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. Select 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

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.
POWER 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

COTTER AND KNUCKLE JOINTS: Design of Cotter joints- spigot and socket, sleeve and cotter, jib and cotter joints, and Knuckle joints.
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.

Text Books:

1. V.B. Bhandari, Machine Design, 3rd edition, Tata McGraw Hill, 2010.

2. R.S. Khurmi and J. K. Gupta, Machine design, Hyderabad, 25th edition, S.Chand Publishers, 2014.

References:

1. J. E. Shigley and C. R. Mischke, Mechanical Engineering Design, 6th ed., McGraw-Hill, New York, 2001. 5D.
2. T.V. Sundaramoorthy&N.Shanmugam, Machine Design, 6th edition, Scitech Publishers, 2010.
3. P.Kannaiah, , Machine Design, 2nd edition, Scitech Publishers.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2											3	2	2
CO2		2	2	1						1			3	2	2
CO3					1	3		2		1			3	2	2
CO4					1		2	2			2		3	2	2
CO5									2	1	2	3	3	2	2

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

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

AUTOMOBILE ENGINEERING (14AAT03)

III B.Tech- I Sem (ME)

L	T	P	C
3	1	0	3

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

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. ENGINEFUEL 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.II.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.

Text Books:

1. V.M Domkundwar, Automobile Engineering, 1st Edition, Dhanpatrai & Co, New Delhi, 2008.
2. Kirpal Singh, Automotive Mechanics, Volume-I &Volume-II, 13thEdition, Tata McGraw Hill, New Delhi, 2012.

References:

1. N. K. Giri, Automobile Mechanics, Khanna Publications.
2. Heitner J, Automotive Mechanics, 2nd Edition, CBS Publications.
3. William H Crouse, Automotive Mechanics, 10th Edition, McGraw Hill Education (India) Private Limited.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1												3	2	2
CO2	1								2				3	2	2
CO3		2	2	2		2	2		3	2	3		3	2	2
CO4			2		3	2		2		2		2	3	2	2
CO5		2		2			3	3		2	2		3	2	2
CO6												3	3	2	2

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)

Outcomes:

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

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

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

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

3. Speaking Activities:

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

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

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

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

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

MINIMUM REQUIREMENT FOR ELCS LAB:

2) Computer aided language lab for 70 students, 70 systems – one master console software for self-study.

3) T.V, digital stereo – audio – visual system.

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

a) Intel Pentium® D 3.00GHZ

b) RAM-1GB minimum

c) Hard disk – 160GB

d) Headphones of durable quality.

Prescribed Software – Globarena

Suggested Software:

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

Reference Books:

1 Meenakshi Raman – Technical Communication,2/e, Oxford University Press, New Delhi.
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.
6 Koneru, Professional Communication by McGraw Hill.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	3	-	-	3	3	-	-	-	-	-	3	2	2
CO2	-	2	3	-	-	-	-	-	-	-	-	2	3	2	2
CO3	3	3	3	-	-	-	3	-	-	-	-	2	3	2	2
CO4	-	3	-	3	-	-	2	-	-	-	-	-	3	2	2
CO5	-	-	3	-	-	3	3	-	-	-	-	-	3	2	2

Sri Venkateswara College of Engineering & Technology
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THERMAL ENGINEERING LAB (14AME24)

III B.Tech-I Sem (ME)

L	T	P	C
0	0	4	2

Outcomes:

After successful 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

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.
4. Study of the constructional details & working principles of two-stroke/ four stroke petrol/diesel engine and to draw Port and Valve Timing Diagram of an I.C. Engine
5. Performance test and Preparation of Heat balance sheet on 4-stroke, single cylinder diesel engine.
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.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3											3	2	2
CO2					2		3						3	2	2
CO3												3	3	2	2
CO4									3				3	2	2

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

Sri Venkateswara College of Engineering & Technology
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Quantitative Aptitude and Reasoning-II (14AHS16)

III B.Tech I SEMESTER **L T P C**
3 0 0 0

(Common to all Branches)

Outcomes:

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

1. After successful 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

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 Comparisions

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

Analyze the blood relation puzzles in a family tree.

Text Books:

1. GL Barrons,TataMcGraw Hills, 'Thorpe's Verbal reasoning', LSAT Materials.

2. R S Agarwal, 'A Modern approach to Logical reasoning' , S chand Company Ltd 2002.

Reference Books:

1. AbhjitGuha'Quantitative Aptitude' Tata McGraw Hill, 4th Edition, 2011.

2. R S Agarwal, 'Quantitative Aptitude' S.Chand Company Ltd 2008.

3. G.L BARRONS 'Quantitative Aptitude'.TataMcGraw Hill.

Sri Venkateswara College of Engineering & Technology
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(14AME25) CAD / CAM/CIM (Computer Aided Design/Computer Aided Manufacturing/Computer Integrated Manufacturing)

III B.Tech- IISem (ME)

L	T	P	C
3	1	0	3

Outcomes:

After successful 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.
3. Solve industrial problems with advanced technologies, eco- friendly, and utilization of resources at minimum total cost.
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 recourses.
6. Develop a continuous learning methodology for knowledge and skills enrichment.

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 controlunit, 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

FLEXIBLE MANUFACTURING SYSTEMS: Flexibility, Types Of FMS-A Dedicated FMS, A Random Order FMS, FMS Components-Workstations, Material Handling and Storage Systems, Computer Control System, Human Recourses, FMS Applications and Benefits

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

Text Books:

1. P.N. Rao, CAD/CAM-Principles and applications, 2nd Edition, Tata McGraw Hill, 2002.
2. M.P.Groover, Automation, Production systems & Computer integrated Manufacturing,Hyderabad, 2nd Edition, PHI - 2007.

References:

1. Radhakrishnan&Subramaniah, CAD/CAM/CIM, 3rd Edition, New Age Publications 2009.
2. A.Zimmers & P.Groover, CAD/CAM, Oxford, Black Scientific Publication,2010.
3. Ibrahim Zeid, R Sivasubramanian, CAD/CAM - Theory & Practice, 2nd Edition, McGraw Hill Education.

MAPPING OF COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1					2				1		3	2	2
CO2	2		3										3	2	2
CO3		2	2	2	3	2		2	2	2			3	2	2
CO4					2	2						2	3	2	2
CO5							2		2	2	2		3	2	2
CO6												3	3	2	2

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

Sri Venkateswara College of Engineering & Technology
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DESIGN OF MACHINE ELEMENTS – II *(*14AME26*)*

III- B.Tech II Sem*(*ME*)*

L	T	P	C
3	1	0	3

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.

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

INTERNAL COMBUSTION ENGINE PARTS*:*Introduction, Principal parts of an I. C. Engine, Cylinder and Cylinder liner, *Design of a cylinder. P*iston - Design Considerations for a piston, Design of a Piston – Piston Head or Crown, Piston rings, Piston Skirt, Piston Pin. Connecting rod - Design of Connecting rod. Crankshaft – Design of Centre crank shaft.

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 stressesin 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.

Text Books*:*

1. R.S. Khurmi and J. K. Gupta, Machine design, Hyderabad, 25th edition, S.Chand Publishers, 2014.
2. V.B. Bhandari, Machine Design, 3rd edition, Tata Mc Graw Hill, 2010.

References*:*

1. N. C. Pandya and C. S. Shah, Machine design, 8th edition, India Charotar Publications, 2006.
2. T.V. Sundaramoorthy & N.Shanmugam, Machine Design, 6th edition, SciTech Publishers, 2010.

Data book*:*

1. K. Mahadevan, K. Balaveera Reddy, Design Data Hand Book, Third Edition, CBS Publishers & Distributors.
2. P.S.G. College of Technology, Design Data Books, P.S.G. College of Technology, Coimbatore.

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

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1										3	2	2
CO2	2	2	1										3	2	2
CO3			2	2	3	1							3	2	2
CO4			2				3	1			2		3	2	2
CO5									2	2	1	3	3	2	2

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

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

RENEWABLE ENERGY SOURCES (14AME27)
III B.Tech - II Sem(ME)

L	T	P	C
3	1	0	3

(Common to CE & ME)

Outcomes:

After successful 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.

Unit – I

SOLAR RADIATION AND COLLECTION: Introduction To Energy Sources -Solar energy – Physics of the Sun – Transfer of solar energy – Solar Constant - Sun-Earth angles – Hour angle - Availability and limitations of solar energy - Terrestrial and extra terrestrial radiation - Direct and Diffuse Radiation - Solar radiation on tilted surface - instruments for measuring solar radiation – Sun shine recorder - Solar thermal collectors – Flat plate and concentrating collectors

Unit – II

SOLAR ENERGY STORAGE AND APPLICATION: Solar water heating system - Solar distillation - Solar cookers - solar dryers – Solar heating and cooling- Solar energy storage – Sensible and latent heat storage – solar Ponds — photovoltaic conversion - Solar Cell - High concentrator solar cells – Losses in solar cells - Emerging solar cell technologies. Solar Power Plant – Central tower receiving system.

Unit III

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

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

Unit IV

OCEAN, WIND and TIDAL ENERGY: - OTEC Principle –- Open and closed cycle of OTEC –Wind Energy – Horizontal and Vertical axis windmills – Performance characteristics – Betz criteria – Wave and tidal Energy – Potential and conversion techniques.

Unit V

DIRECT ENERGY CONVERSION: Need for DEC - Principle of DEC - Electron gas dynamic conversion - Thermo Electric Generators - Seebeck, Peltier and Joule Thomson effects – MHD generators - Principles – dissociation and ionization – hall effect – MHD accelerator – MHD Engine – Power generating systems

Fuel Cells – Principle of fuel cell - Types of fuel cells, comparison of battery Vs fuel cell - merits and demerits – applications of fuel cells.

Text Books:

1. G.D. Rai, Non-Conventional Energy Source, Khanna Publishers, 2011.
2. ER. R.K. Rajput, Non-Conventional Energy Sources and Utilisation, S.Chand Publishers, 2012.

References:

1. B.S.Magal, Frank Kreith&J.F.Kreith, Solar Power Engineering, Tata McGraw Hill, 2000.
2. J P Navani & Sonal Sapra, Non-Conventional Energy Resources, S Chand Publishers, 2013.
3. S.P. Sukhatme, Solar Energy: Principles of Thermal Collection and Storage, 3rd Edition, Tata McGraw Hill.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3			2		1							3	2	2
CO2		2	3	1				2			2		3	2	2
CO3			1		2	3	2	1	2				3	2	2
CO4							2		3	2	2		3	2	2
CO5						2					1	3	3	2	2

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

Sri Venkateswara College of Engineering & Technology
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HEAT TRANSFER (14AME28)
III B.Tech- II Sem (ME)

L	T	P	C
3	1	0	3

Outcomes:

After successful 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. Create a team for decision making in thermal systems with managerial skills and knowledge to fulfill social obligations and customer satisfaction
6. Developing skills for lifelong learning

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.

Text Books:

1. R.C. Sachdeva, Heat and Mass Transfer, New age Publication.
2. P.K. Nag, HEAT AND MASS TRANSFER, 3rd Edition, Tata McGraw-Hill Education.

References:

1. Theodore L. Bergman, Frank P. Incropera, David P. DeWitt, Adrienne S. Lavine, Fundamentals of Heat and Mass Transfer, 7th Edition, John Wiley & Sons.
2. J.P. Holman, Heat transfer, Tata McGraw Hill.
3. R.K.Rajput, Heat and mass transfer, S Chand publications.

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

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2											3	2	2
CO2	1	3		2									3	2	2
CO3		3	3	2	2	2	2	2	2				3	2	2
CO4					2				2		2		3	2	2
CO5									3	3	2	2	3	2	2
CO6												3	3	2	2

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

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

14AME29 OPERATIONS RESEARCH

III B.Tech - II Sem (ME)

L	T	P	C
3	1	0	3

(Common to ME & AE)

Outcomes:

After successful 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.

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.

Sequencing: Flow shop sequencing - N jobs 2 machines, N jobs 3 machines, job shop sequencing - 2 jobs M machines, Traveling salesmen problem.

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 , 2×n 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

Text Books:

1. Taha, Introduction to Operations Research, New Delhi, 8thEdition, Printice Hall International Publisher.
2. Prem Kumar Gupta & D. S. Hira, Operations Research, S Chand publishes.

References:

1. R.Panneerselvam, Operations Research, New Delhi, 2nd Edition, Printice Hall International Publisher, 2006.
2. S. D. Sharma, Himanshu Sharma, Operations Research: Theory, Methods and Applications, Kedarnath Ramnath Publishers.
3. Hiller & Libermann, Introduction to Operations Research, Noida RC, 7th Edition, Tata McGraw Hill, 2009.

MAPPING OF COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1								2				3	2	2
CO2	1	2	2	2					2				3	2	2
CO3			3	3	2	2	2	2		2			3	2	2
CO4					3	2	2						3	2	2
CO5									3	3	2	2	3	2	2
CO6												3	3	2	2

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

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

14ACS31 BASIC COMPUTER GRAPHICS

III B.Tech II Sem ME

L	T	P	C
3	1	-	3

(Common to ME & AE)
(Choice Based Credit Course, Inter-Departmental)

Outcomes:

After successful completion 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.

UNIT I

Introduction: Basic concepts, Application areas of Computer Graphics, overview of graphics systems - video-display devices, raster-scan systems, random scan systems, input devices, Hard copy devices.

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-E 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.

TEXT BOOKS:

1. Donald Hearn and M.Pauline Baker, “Computer Graphics C version”, Pearson Education.
2. Foley, VanDam, Feiner and Hughes, “Computer Graphics Principles & practice”, second edition in C, Pearson Education.

REFERENCEBOOKS:

1. Steven Harrington,”Computer Graphics” , TMH.
2. Zhigandxiang, Roy Plastock, Schaum’s outlines, “Computer Graphics Second edition”, Tata Mc- Graw hill edition.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2											3	2	2
CO2	3	2											3	2	2
CO3	3	2											3	2	2
CO4	3	2											3	2	2
CO5	3	2											3	2	2

Sri Venkateswara College of Engineering and Technology, Chittoor.

(Autonomous)

III B.Tech-II Semester ME	**L**	**T**	**P**	**C**
	3	**1**	**-**	**3**

14AEC31 MEMS & MICROSYSTEMS
(Inter departmental Elective)

Outcomes:

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

1. Identify various MEMS and Microsystem products.
2. Define construction and functionality of various Microsensors.
3. Identify materials used for the construction of MEMS and Microsystems.
4. Design entire Microsystems fabrication processes.
5. Apply Micro manufacturing and Microsystems packaging technologies.

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, Difffusion, 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.

TEXT BOOKS:

1. Tai-Ran Hsu, "MEMS & Microsystems Design and Manufacture", Tata McGraw Hill edition, 2008.
2. Chang Liu, "Foundations of MEMS" Pearson Education India Limited, 2009.

REFERENCE BOOKS:

1. Marc Madou, "Fundamentals of Microfabrication" CRC press 2002.
2. Stephen D. Senturia, "RF Microelectronics", Kluwer Academic Publishers, 2001.

MAPPING OF COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		2	3									3	2	2
CO2	3		2	3									3	2	2
CO3	3			3			2						3	2	2
CO4	3	2			2							2	3	2	2
CO5	3		2		2		2					2	3	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

L	T	P	C
3	1	-	3

14AEE41 SENSORS AND ACTUATORS

(Common to ME & AE)

(Choice Based Credit Course, Inter-Departmental)

Outcomes:

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

1. Apply the principles and applications of Sensors and actuators use Pneumatic and Hydraulic actuator systems
2. Select chemical and radiation sensors for various applications.
3. Design different types of Magnetic and Electromagnetic sensors and Actuators
4. Apply various Micro sensors and Actuators for different applications.

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

Pneumatic and Hydraulic systems: Actuators- Definition, Example, types, selection, Pneumatic Actuator. Electro- Pneumatic Actuator, Hydraulic actuators, Control Values, Valve Sizing, valve selection. Piezoelectric Actuator, Characterization, operation and fabrication, shape memory alloys.

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

Micro Sensors and Actuators: Principles and examples , Force and Pressure Micro Sensors , Position and Speed Micro Sensors, Acceleration Micro sensors, Bio Sensors, Temperature Micro Sensors and Flow Micro Sensors. Micro Actuators : Actuation Principle , Shape memory Effects-One way, Two way and Pseudo Elasticity. Types of Micro Actuators , Electrostatic , Magnetic , Fluidic,Inverse Piezo Effect.

TEXT BOOK:

1.D.Patranabis " Sensors and Transducers " 2nd Edition, PHI publications, Newdelhi,2004

2. Mechanical Measurements: Shomar G.Beckwith,Nelsons Lewis Buck, Roy D.Marangoni,Addison-Wesley Publications Co 1982-Technology and Engineering

REFERENCE BOOK:

1. A.k.Sawhney "Electrical and Electronic Measurements and Instrumentation" Danapat Rai and Co, 19th Revised Edition-2011.
2. H.Meixnev,R.Kobler " Introduction to Pneumatics: Text book for Festo Basic Training course"

MAPPING OF COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2		3			2		3			2	3	2	2
CO2		2		3		2	2		3	2		2	3	2	2
CO3				3			2					2	3	2	2
CO4		2		3	2		2	2	3			2	3	2	2
CO5				3	2		2	2	3			2	3	2	2

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

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

L	T	P	C
0	0	4	2

Outcomes*:*

After successful 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 tofulfill social obligations and customer satisfaction
6. Develop academic skills for lifelong learning.

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).
6. Heat transfer in pin-fin.
7. Experiment on Transient Heat Conduction.
8. Heat transfer coefficient in forced convection.
9. Heat transfer coefficient in natural convection.
10. Experiment on Parallel and counter flow heat exchanger.
11. Heat transfer in drop and film wise condensation.
12. Experiment on Critical Heat flux apparatus.
13. Study of heat pipe and its demonstration.
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.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2											3	2	2
CO2	1	3		2									3	2	2
CO3		3	3	2	2	2	2	2	2				3	2	2
CO4					2				2		2		3	2	2
CO5									3	3	2	2	3	2	2
CO6												3	3	2	2

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

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

14AME31 COMPUTER INTEGRATED MANUFACTURING LAB

III B.Tech-II Sem (ME)

L	T	P	C
0	0	4	2

Outcomes:

After successful 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.

EXPTNO.	Name of the Experiment
	CNC LATHE
1	Facing cycle and Step Turning cycle
2	Threading cycle
3	Drilling cycle
4	Grooving cycle
5	Taper turning cycle
	CNC MILLING
6	Linear & circular interpolation
7	Mirroring
8.	Rotation
9.	Circular pocketing
10.	Rectangular pocketing
	ROBOT
11.	Single Pick and Place
12.	Cyclic Pick and Place

NOTE: Minimum of 10 Exercises need to be performed

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2							3				3	2	2
CO2					3				3				3	2	2
CO3					2	3	2	2	2				3	2	2
CO4					1				2				3	2	2
CO5									3				3	2	2

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

14AME32 TOTAL QUALITY MANAGEMENT

III B.Tech - II Sem (ME)

L	T	P	C
3	-	-	-

(COMMON TO AE & ME)
(Audit course)

Outcomes:

After successful 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.

UNIT I

TQM: Overview, concepts, elements, History-Quality management philosophies-Juran, Deming, Crosby ,Feigenbaum, Ishikawa, Stages of Evolution, continuous improvement, objectives, internal and external customers.

QUALITY STANDARDS: Need of standardization, Institutions, bodies of standardization, ISO 9000 series – ISO 14000 series, ISO certification process, Third party audit.

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.

Text Books:

1. Dale H. Besterfield, C.BestefieldMichno&et.al., Total Quality Management, New Jercy, 3rdEdition, Pearson Edition, 2010.
2. SenthilArasu& J. Praveen Paul, Total Quality Management, Chennai, 4thEdition, SciTech Publishers, 2007.

References:

1. Hand Book, John Hradesky, Total Quality Management, 1stEdition, Tata McGraw Hill Professional, 1994.
2. Joseph & Susan Berg, Total Quality Management, Bangalore, 5th Edition, Cande nast publications, 2008.
3. A Road map to quality,WWW.unido.org. Australia, 2012.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												3	2	2
CO2	1	2										2	3	2	2
CO3		2	2		2	2	3			2	2	2	3	2	2
CO4		3	2		2	3		2			2		3	2	2
CO5				2				2	3	2		3	3	2	2

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

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

14AME33 FINITE ELEMENT METHODS

IV B.Tech - I Sem (ME)

L	T	P	C
3	1	0	3

(Common to ME & AE)

Outcomes:

After successful 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.

UNIT – I

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

UNIT – II

ONE-DIMENSIONAL PROBLEMS: The Potential-Energy Approach, Gelerkin approach. Assemble of the Global Stiffness Matrix and Load Vector, Properties of K, The Finite Element Equations; Treatment of Boundary Conditions, Types of Boundary Conditions, Elimination Approach, quadratic shape functions, Temperature effect, problems for bar element.

UNIT – III

TRUSSES & BEAMS, FRAMES: Introduction, Plane Trusses, Local and Global Coordinate Systems, Formulas for Calculating Element stiffness matrix, Stress Calculations. Introduction of Beam, potential-Energy Approach, Gelerkin Approach, Finite element formulation, load vector, Boundary conditions simple problems. Plane frames simple problems.

UNIT –IV

TWO-DIMENSIONAL PROBLEMS USING CONSTANT STRAIN TRIANGLES: Introduction, Finite Element Modeling, Constant-Strain Triangle (CST), Problem Modeling and Boundary Conditions. Ax symmetric solids subjected to ax symmetric loading. Ax symmetric formulation, Triangular element.,

ISOPARAMETRIC REPRESENTATION: 4 noded quadrilateral element, numerical integration.

UNIT – V

DYNAMIC, HEAT AND FLUID PROBLEMS: Introduction, Element mass matrices equation of eigen values and eigenvectors. Derivation of the Basic Differential Equation, Heat Transfer with Convection, One-Dimensional Finite Element Formulation Using a Variational Method.

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

Text Books:

1. Tirpupahi R. Chandrupatla, Introduction to Finite Elements in Engineering, Prentice Hall of India Pvt. Ltd, New Delhi-1, 2011.
2. Daryl L Logan, A first course in Finite Element Method, Stanford, US, 5th Edition, Cengage Learning, Publication, 2007.

References:

1. O.C. Zienkiewicz, Finite Element Method, its basis and fundamentals, 6th Edition, ELSCVIER, 2005.
2. Kenneth H. Huebner, Donald L. Dewhirst, Douglas E. Smith & Ted G. Byrom, The Finite Element Method for Engineers, New York, 4th Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2001.
3. J.N. Reddy's, An Introduction to the Finite Element Method, third edition, McGraw-Hill, 2006.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2		2									3	2	2
CO2			1		2	2	2				1		3	2	2
CO3		1	2			1			2				3	2	2
CO4		2		1	1	2							3	2	2
CO5					3			3				1	3	2	2
CO6	1	2				1			1	3	2	3	3	2	2

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

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

14AME34 INSTRUMENTATION AND CONTROL SYSTEMS

IVB.Tech-I Sem (ME)

L	T	P	C
3	1	0	3

(Common to ME & AE)

Outcomes:

After successful 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 theorganization.
5. Classify elements of control systems in real life service industries to promote research.

UNIT I

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

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

UNIT II

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

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

UNIT III

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

Torsion meters, Dynamometers.

UNIT V

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

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

Text Books:

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

References:

1. R.K. Jain, Mechanical and Industrial Measurements, New Delhi, 11thEdition, Khanna Publishers, 2011.
2. Beckwith, Marangoni&Linehard, Mechanical Measurements, 6th Edition, Printice Hall International Publishers, 2006.
3. Jack Philip Holman, Experimental Methods for Engineers, McGraw-Hill, 1994.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1								1			3	2	2
CO2		3			2	2							3	2	2
CO3							2	1			3		3	2	2
CO4			2				3		2	1			3	2	2
CO5		3		2								1	3	2	2

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

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

14AME35 REFRIGERATION AND AIR CONDITIONING

IV B.Tech- I Sem *(ME)*

L	T	P	C
3	1	0	3

Outcomes*:*

After successful 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 equipment of Refrigeration and air conditioning systems.
3. Judge appropriate eco-friendly refrigeration and air conditioning methods for domestic and industrial applications**.**
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.

UNIT-I

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

Introduction: Air Refrigeration, Vapour Compression Refrigeration and vapour absorption refrigeration system – Refrigeration cycle on T-S and P-H charts – *Simple* Problems.

UNIT- II

Refrigerants: Desirable properties – classification of refrigerants – nomenclature – secondary refrigerants – lubricants.

Refrigeration Equipment: Compressors- Types of compressors. Condensers – Types of condensers. Evaporators – Types of Evaporators. Expansion Devices – Types of expansion devices. Leak detection– VCR Vaccumization *and* recharging the refrigerant.

UNIT – III

Introduction to Air- Conditioning*:* Psychometric Properties & Processes– *Relations*– Characterization of Sensible heat and latent heat loads – Heat load concepts*:* RSHF, GSHF – Problems.

A/C Systems*:* Summer A/C –Winter A/C –Year round A/C–Central A/C– Unitary A/C systems.

UNIT – IV

Fundamentals of Air-Conditioning: Requirement of the human comfort – Concept of Effective Temperature – Comfort Chart – Comfort Air-Conditioning, Need for ventilation, Consideration of Infiltrated air.

Air-Conditioning Equipment and Applications*:* Humidifiers–Dehumidifiers – Air filters–fans and blowers, grills and registers, ducts–supply ducts–outlets–return outlets.

UNIT V

Introduction to Cryogenics*:* Introduction, cascade refrigeration system, liquefaction of gases, linde system and claude system, liquefaction of hydrogen and helium, adiabatic demagnetization.

Text Books*:*

1. S.C. Arora &Domkudwar, A Corse in Refrigeration and Air Conditioning, Dhanapat Rai Publications, New Delhi.
2. C.P. Arora, Refrigeration and Air Conditioning, Tata McGraw Hill.

References*:*

1. Manohar Prasad, Refrigeration and Air Conditioning, New Age Publishers.
2. A Text book of Refrigeration and air Conditioning by R S Khurmi, S C Chand *Publications.*
3. Wilbert F. Stoecker, Jerold W. Jones, Refrigeration and Air Conditioning, McGraw-Hill, 1982.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		1									3	2	2
CO2	3	2		1									3	2	2
CO3							2	2					3	2	2
CO4		1	2		1	2				1			3	2	2
CO5			2				2						3	2	2

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

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

14AME36 AUTOMATION & ROBOTICS
IV B.Tech- I Sem (ME)

L	T	P	C
3	1	0	3

Outcomes:

After successful 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.
3. Select the type of automation, flow lines, line balancing method and robot eco-friendly for typical manufacturing industry and service sector.
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.

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

INTRODUCTION TO ROBOTICS: Laws of robot, Progressive advancements in Robots, Robot Anatomy, Classification of robot, Robot configurations, types of End Effectors. Robot Actuators- Pneumatic, Hydraulic and electric actuators, its comparison.Robotic Sensors:Meaning of sensing, selection of sensor for a robot, types of sensors─ Position sensors, potentiometers, encoders, Velocity sensors, tactile sensors, Proximity sensors.

UNIT IV

MANIPULATOR KINEMATICS: Homogeneous transformations, D-H notation, Forward and inverse kinematics. Manipulator Dynamics - Differential transformations, Jacobians.

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.

Text Books:

1. M.P. Groover, Automation, Production systems and CIM, New Delhi, Pearson Education, 2008.
2. Richard D.Klafter, Robotics Engineering, Bangalore, New Delhi, Prentice Hall, Eastern Economy Edition, 1989.

References:

1. R.K. Mittal & I.J. Nagrath, Robotics and Control, New Delhi, 3rdEdition, Tata McGraw Hill, 2007.
2. M. Rama Narasimha Raddy, Automation & Robitics, New Delhi, 3rdEdition ,Dhanpat Rai & Co. (Pvt) Ltd., 2014.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2											3	2	2
CO2	3	2											3	2	2
CO3			1	1				1					3	2	2
CO4					2	2	2						3	2	2
CO5			1								1		3	2	2
CO6									2	1		2	3	2	2

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

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

14AME37 GAS TURBINES AND JET PROPULSION

IV B.Tech -I Sem (ME)

L	T	P	C
3	1	0	3

(Choice Based Credit Course, Departmental)

Outcomes:

After successful 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.

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

Jet Propulsion Cycles and their analysis: Introduction, Thrust, propulsive power and propulsive efficiency - Classification of gas turbine engines. Need for thermal jet engines and applications.

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.

Pulse jet Engines-Thermodynamic cycle, essential components – Principle of operation – Performance –advantages and disadvantages, comparison of various propulsion devices.

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.

Text Books:

1. V. Ganesan, Gas Turbines, New Delhi, 2nd Edition, Tata McGraw Hill Publishers
2. V.M.Domakundwar,Gas Turbines and jet& rocket propulsion, DhanpatRai& Co.

References:

1. R.K.Rajput, Thermal engineering, Lakshmi Publications.
2. Jack D Mattingly,Element of Gas Turbines Propulsion, Tata McGraw Hill.
3. K Ramamurthi, Rocket Propulsion, Macmillan Publications.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2			2									3	2	2
CO2	2	1		2									3	2	2
CO3		2		2	2	2	3						3	2	2
CO4		2	3	2				2			2		3	2	2
CO5	2								2	2	2	3	3	2	2
CO6	2			2									3	2	2

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

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

14AME38 MODERN MANUFACTURING METHODS

IVB.Tech-I Sem (ME)

L	T	P	C
3	1	0	3

(Choice Based Credit Course, Departmental)

Outcomes:

After successful 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

UNIT I

Need of unconventional machining methods, advantages, Classification.

MECHANICAL PROCESSES: Ultrasonic Machining − Introduction, Ultrasonic machining system, Mechanics of cutting, Process capabilities, applications. Abrasive jet machining, Water jet machining and abrasive water jet machining−Working principles, Equipments, process variables, process capabilities, application and limitations.

UNIT II

ELECTRO–CHEMICAL MACHINING: Introduction**,** ECM Machine Tool, Theory of ECM-Faraday's Laws of Electrolysis-Electrochemical Equivalent of Alloys, Material removal rate, Inter-Electrode Gap, Electrolyte conductivity, Advantages and Disadvantages, Applications, Mechanical Properties of ECM's Parts. Electrochemical grinding−Introduction, ECG Machine tool, process characteristics, applications. Electro chemical honing and Deburring process− Basic working principle ─ Applications.

UNIT III

ELECTRIC DISCHARGE MACHINING: Introduction, Working principle of EDM, RC Pulse generator, EDM Machine-power supply, Dielectric system, Electrodes, Servo system, Electrode Refeeding. CNC-EDM, Analysis, Process Variables, Process characteristics, Applications. Wire cut EDM ─ working principle, wire EDM machine, process variables, Process characteristics, Applications. Electric Discharge Grinding─ working principle, Applications.

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

CHEMICAL MACHINING: Fundamentals of chemical machining ─ Principle ─ maskants ─ etchants- advantages and applications.

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.

Text Books:

1. V.K. Jain, Advanced machining processes, Mumbai, 9th Edition, Allied publishers Pvt. Limited, 2014.
2. M.P. Groover, Fundamentals of Modern manufacturing, 4th Edition, John Wiley & sons Ltd, 2010.

References:

1. P.C. Pandey & H.S. Shah, Modern Machining Process, New Delhi, 2nd Edition, Tata McGraw Hill, 2008.
2. Kalpakjain, Manufacturing Technology, New Delhi, 3rd Edition, Pearson Publishers, 2012.
3. El-Hofy, Hassan Abdel-Gawad, "Advanced Machining Processes: Nontraditional And Hybrid Machining Processes", McGraw-Hill, 2005.

MAPPING OF COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2			2				1					3	2	2
CO2	2		3									2	3	2	2
CO3		2	2	2	2	3							3	2	2
CO4		2			2	2	3		2	2	2		3	2	2
CO5							2	3	3	3			3	2	2
CO6											2	3	3	2	2

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

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

14AME39 GEOMETRIC MODELLING

IV B.Tech-I Sem (ME)

L	T	P	C
3	1	0	3

(Choice Based Credit Course, Departmental)

Outcomes:

After successful 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.

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 –beck 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-E geometric transformations: Translation, rotation, scaling, reflection and shear transformation and composite transformations.

UNIT- IV

Visible surface detection methods: Classification, back-face detection, depth- buffer, scan-line, 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.

Text Books:

1. Donald Hearn & M.Pauline Baker, Computer Graphics C version, Pearson/ Printice Hall International Publishers, 1996.
2. David F Rogers, Mathematical Elements for computer graphics, Tata McGraw Hill, 1990.

References:

1. Ibrahim Zeid, CAD/CAM Theory, Tata McGraw Hill, 2010.
2. Zhigand xiang &Roy Plastock, Computer Graphics,2nd Edition, Schaum's outlines, Tata McGraw Hill, 1986.
3. Shalini Govil, Principles of computer Graphics, Printice Hall International Publishers, Springer, 2005.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3	2	2
CO2		3		2									3	2	2
CO3			3		1		1				1		3	2	2
CO4		2							2				3	2	2
CO5												3	3	2	2

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

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

14AME40 COMPUTATIONAL FLUID DYNAMICS

IV B.Tech - I Sem (ME)

L	T	P	C
3	1	0	3

(Choice Based Credit Course, Departmental)

Outcomes:

After successful 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 assimulate the same for serving mankind.
5. Develop algorithms for various attributes to promote the higher learning and research

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

BASICS ASPECTS OF DISCRETIZATION: Introduction, Introduction of Finite Differences, Difference Equations, Explicit and Implicit Approaches, Errors and Stability Analysis, Grid Generation Incompressible Fluid Flow: Introduction, Implicit Crank-Nicholson Technique, Pressure Correction Method, SIMPLE and SIMPLER algorithms, Computation of Boundary Layer Flow.

UNIT – IV

HEAT TRANSFER: Finite Difference Applications in Heat conduction and Convention – Heat conduction, steady heat conduction, in a rectangular geometry, transient heat conduction, Finite difference application in convective heat transfer.

UNIT- V

TURBULENCE MODELS: Algebraic Models – One equation model, K – ϵ Models, Standard and High and Low Reynolds number models, Prediction of fluid flow and heat transfer using standard.

Text Books:

1. John D. Anderson, Computational Fluid Dynamics - Basics with Applications, Tata McGraw Hill, 1995.
2. Suhas V. Patankar, Numerical Heat Transfer and Fluid Flow, Butter worth Publishers, 1980.

References:

1. Frank Chorlton, Text Book of Fluid Dynamics, CBS Publishers, 2005.
2. T.K. Sengupta, Fundamentals of Computational Fluid Dynamics, University Press, 2012.
3. Anil W. Date, Introduction to Computational Fluid Dynamics, Cambridge University Press - 2005.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3	2	2
CO2				3									3	2	2
CO3		2		2									3	2	2
CO4						3							3	2	2
CO5												3	3	2	2

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

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

14AME41 TOOL DESIGN
IV B.Tech-I Sem (ME)

L	T	P	C
3	1	0	3

(Choice Based Credit Course Departmental)

Outcomes:

After successful 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.

UNIT I

TOOL MATERIALS AND HEAT TREATMENT: Properties of tool materials - ferrous, nonferrous, non metallic materials, heat treatment. Coated tools, ceramic tools. Limits, fits and tolerances, Gauges and gauge design.

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 BLANKING AND PIERCING: Fundamentals of die cutting operating, power press types, General press information, cutting action in punch and die operation. Die clearance, and types of Die construction. Die design fundamentals-

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.

Text Books:

1. Cyrill Donaldson, George H. LeCain, Joyjeet Ghose & V.C. Goold, Tool Design, New Delhi, 4th Edition, Tata McGraw Hill, 2012.
2. A. Bhattacharya, Principles of Metal cutting, Calcutta, 2nd Edition,New Central Book Agency, 1969.

References:

1. Surendra Kenav, Umesh Chandra & Satyaprakashan, Production Engineering Design (Tool Design), New Delhi, 7th Edition, 1994.
2. R K Singal, Mridual Singal& Rishi Singal, Fundamentals of Machining and Machine Tools, 1st Edition, I.K. International, 2008.
3. Wilson F.W., "Fundamentals of Tool Design", ASTME, Prentice Hall, India, 2010.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1			1									3	2	2
CO2	2	2	3	2	2	2		2		2		2	3	2	2
CO3	2	2	2		2	2	3	2	2		2		3	2	2
CO4									3	2	3		3	2	2
CO5												3	3	2	2

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

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

14AME42 POWER PLANT ENGINEERING

IV B.Tech- I Sem (ME)

L	T	P	C
3	1	0	3

(Choice Based Credit Course, Departmental)

Outcomes:

After successful 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.

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

Internal Combustion Engine Plant: Diesel Power Plant: Introduction – IC Engines, types, construction– Plant layout with auxiliaries – Different systems of diesel power plant, Fuel injection system-types

Gas Turbine Plant: Introduction – classification - construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines. Advantages and disadvantages, Combined Cycle Power Plants.

UNIT – IV

Hydrology: Introduction, hydrological cycle, rainfall and its measurement – runoff and its measurement – Hydrographs – Classification of dams and spill ways.

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.

Nuclear Reactors: Introduction –Components of nuclear reactor, Types of Reactors-Pressurized water reactor, Boiling water reactor, Sodium-Graphite reactor, Fast Breeder Reactor, Homogeneous Reactor, Gas cooled Reactor, Selection of materials for reactor components.

Text Books:

1. R.K. Rajput, A Text Book of Power Plant Engineering, Laxmi Publication.
2. Arora & S. Domkundwar, A Course in Power Plant Engineering, Dhanpat Rai & Co.

References:

1. P.C. Sharma, Power Plant Engineering, S.K. Kataria Publishers.
2. P.K. Nag, Power Plant Engineering, Tata McGraw Hill.
3. M.M. El-Wakil, Power Plant Technology, Tata McGraw-Hill Education.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1											3	2	2
CO2		3	2	1				1					3	2	2
CO3					1	3	1		2		1		3	2	2
CO4							3	2			1		3	2	2
CO5						2				2		3	3	2	2

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

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

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

L	T	P	C
0	0	4	2

(Common to ME & AE)

Outcomes:

After successful 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.

List of Experiments

MODELING AND DETAILING

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

ANALYSIS

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

NOTE:

Minimum of 10 Exercises need to be performed

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3	2	2
CO2		2			3								3	2	2
CO3					1	3	2				1		3	2	2
CO4									3				3	2	2
CO5												3	3	2	2

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

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

14AME44 Instrumentation & Dynamics Lab

IV B.Tech - I Sem (ME)

L	T	P	C
0	0	4	2

(Common to ME & AE)

Outcomes:

After successful 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.

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.
6. Calibration of Rotameter using rotameter setup.
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.
9. To determine gyroscopic couple acting on a rotating disc by Motorized Gyroscope.
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.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												3	2	2
CO2	1												3	2	2
CO3		1		1							1	2	3	2	2
CO4		2	2					1					3	2	2
CO5			2			1	2						3	2	2

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

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

14AMB02 PROFESSIONAL ETHICS

(Audit Course)

L	T	P	C
3	-	-	-

Outcomes:

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

1. Apply human values and ethical standards to lead career accordingly.
2. Apply 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. Apply safety measures in engineering and product design aspects.

Unit-I Introduction 7

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 12

Human Values – morals-integrity-work ethics-Respect for others-respect for authority-conflicts of interests-moral dilemmas-honesty- courage-cooperation-valuing time-commitment-collegiality-loyalty-self -interest-Professional accountability-royalty-Problem of bribery, extortion and grease payments-problem of nepotism, excessive gifts-confidentiality-uses of ethical theories-Kohlberg's Theory- Gilligan`s Theory-Ethical codes of IEEE and Institution of Engineers –

Unit III Engineers Role in Safety 10

Safety and risks-risk and costs-risk benefit analysis-Testing methods for safety-The promise of technology-Computer Technology Privacy-Social policy-Engineering standards-the standards care-Social and value dimensions of technology-communicating risk and public policy-occupational crime-professional rights and employee rights-whistle blowing`

Unit IV Roles of Engineers 10

Engineers asmanagers, 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 11

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

Text Books

1. Subramanian R, Professional Ethics,1st Edition, Oxford University Press. 2013.
2. Naagarazan , R.S., A Textbook on Professional Ethics and Human Values,1st edition, New Age International (P) Limited, Publishers New Delhi..2014

Reference Books

1. Fundamentals of Ethics for scientists and Engineers, Edmond G Seebauer and Robert L. Barry, 1st edition Oxford University Press, 2008.
2. R. R. Gaur, R. Sangal and G. P. Bagaria, Human Values and Professional Ethics:,Eecel Books,New Delhi.2010.
3. Professional Ethics and Human Values – M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi.
4. Professional Ethics and Human Values: Prof. D.R. Kiran, TATA McGraw Hill Education.2007
5. Charles D Fleddermann, “Engineering Ethics”, Prentice Hall.
6. Charles E Harris, Micheal J Rabins, “Engineering Ethics, Cengage Learning

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