ANNA UNIVERSITY
CHENNAI - 600 025

UNIVERSITY DEPARTMENTS

REGULATIONS 2012

CURRICULA AND SYLLABI FOR
I TO VIII SEMESTERS

B. E. MECHANICAL ENGINEERING
(FULL TIME)
## SEMESTER I

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OBJECTIVES

- To enable all students of engineering and technology develop their basic communication skills in English.
- To give special emphasis to the development of speaking skills amongst the students of engineering and technology students.
- To ensure that students use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading for pleasure.

UNIT I

Listening - Introducing learners to GIE - Types of listening - Listening to audio (verbal & sounds); Speaking - Speaking about one’s place, important festivals etc. – Introducing oneself, one’s family / friend; Reading - Skimming a reading passage – Scanning for specific information - Note-making; Writing - Free writing on any given topic (My favourite place / Hobbies / School life, etc.) - Sentence completion - Autobiographical writing (writing about one’s leisure time activities, hometown, etc.); Grammar - Prepositions - Reference words - Wh-questions - Tenses (Simple); Vocabulary - Word formation - Word expansion (root words / etymology); E-materials - Interactive exercises for Grammar & Vocabulary - Reading comprehension exercises - Listening to audio files and answering questions.

UNIT II

Listening - Listening and responding to video lectures / talks; Speaking - Describing a simple process (filling a form, etc.) - Asking & answering questions - Telephone skills – Telephone etiquette; Reading – Critical reading - Finding key information in a given text - Sifting facts from opinions; Writing - Biographical writing (place, people) - Lab descriptions (general/specific description of laboratory experiments) - Definitions - Recommendations; Grammar - Use of imperatives - Subject-verb agreement; Vocabulary - Compound words - Word Association; E-materials - Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures – Picture-based activities.

UNIT III

Listening - Listening to specific task - focused audio tracks; Speaking - Role-play – Simulation - Group interaction - Speaking in formal situations (teachers, officials, foreigners); Reading - Reading and interpreting visual material; Writing - Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause
& effect / compare & contrast / narrative / analytical) - Informal writing (letter/e-mail/blogs) - Paraphrasing; **Grammar** - Tenses (Past) - Use of sequence words - Adjectives; **Vocabulary** - Different forms and uses of words, Cause and effect words; **E-materials** - Interactive exercises for Grammar and Vocabulary - Excerpts from films related to the theme and follow up exercises - Pictures of flow charts and tables for interpretations

**UNIT IV**

**Listening** - Watching videos / documentaries and responding to questions based on them; **Speaking** - Responding to questions - Different forms of interviews - Speaking at different types of interviews; **Reading** - Making inference from the reading passage - Predicting the content of a reading passage; **Writing** - Interpreting visual materials (line graphs, pie charts etc.) - Essay writing – Different types of essays; **Grammar** - Adverbs – Tenses – future time reference; **Vocabulary** - Single word substitutes - Use of abbreviations & acronyms; **E-materials** - Interactive exercises for Grammar and Vocabulary - Sample interviews - film scenes - dialogue writing.

**UNIT V**

**Listening** - Listening to different accents, Listening to Speeches / Presentations, Listening to broadcast & telecast from Radio & TV; **Speaking** - Giving impromptu talks, Making presentations on given topics; **Reading** - Email communication - Reading the attachment files having a poem/joke/proverb - Sending their responses through email **Writing** - Creative writing, Poster making; **Grammar** - Direct and indirect speech; **Vocabulary** - Lexical items (fixed / semi fixed expressions); **E-materials** - Interactive exercises for Grammar & Vocabulary - Sending emails with attachment – Audio / video excerpts of different accents, - Interpreting posters

**OUTCOMES:**
Learners should be able to
- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Read different genres of texts adopting various reading strategies.
- Listen/view and comprehend different spoken discourses/excerpts in different accents

**TEXT BOOKS:**

**REFERENCE BOOKS:**


**EXTENSIVE READERS**


**WEBSITE RESOURCES**

1. www.uefap.com

2. www.eslcafe.com

3. www.listen-to-english.com

4. www.owl.english.purdue.edu

5. www.chompchomp.com

**MA8151 MATHEMATICS – I**

(Common to all branches of B.E. / B.Tech. Programmes in I Semester) 3 1 0 4

**OBJECTIVES:**

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.

- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling.

- To familiarize the student with functions of several variables. This is needed in many branches of engineering.

- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.

- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.
UNIT I MATRICES

UNIT II INFINITE SERIES

UNIT III FUNCTIONS OF SEVERAL VARIABLES

UNIT IV IMPROPER INTEGRALS

UNIT V MULTIPLE INTEGRALS

TOTAL : 60 PERIODS

OUTCOMES:
- This course equips students to have basic knowledge and understanding in one field of materials, integral and differential calculus

TEXT BOOKS:

REFERENCES:
PH8151 ENGINEERING PHYSICS L T P C
(Common to ALL Branches of B.E./B.Tech. Programmes) 3 0 0 3

OBJECTIVE:
• To introduce the basic physics concepts relevant to different branches of Engineering and Technology.

UNIT I PROPERTIES OF MATTER 9

UNIT II ACOUSTICS AND ULTRASONICS 9

UNIT III THERMAL PHYSICS 9

UNIT IV APPLIED OPTICS 9
Interference - Michelson interferometer: construction, working, determination of wave length and thickness - anti-reflection coating - air wedge and its application - Lasers - Einstein’s coefficients - CO₂, Nd:YAG and semiconductor lasers - homo junction and hetro junction -
construction and working - applications - Optical fibres - classification (index & mode based) - principle and propagation of light in optical fibres - acceptance angle and numerical aperture - fibre optic communication system - active and passive sensors.

UNIT V SOLID STATE PHYSICS
Nature of bonding - growth of single crystals (qualitative) - crystal systems - crystal planes and directions - expressions for interplanar distance - coordination number and packing factor for simple structures: SC, BCC, FCC and HCP - structure and significance of NaCl, ZnS, diamond and graphite - crystal imperfections: point defects, dislocations and stacking faults - unit cell, Bravais space lattices - miller indices.

TOTAL: 45 Periods

OUTCOMES:
- The students will have knowledge on the basics of physics related to properties of matter, optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications.

TEXT BOOKS:

REFERENCES:

CY8151 ENGINEERING CHEMISTRY L T P C
(Common to all branches of Engineering and Technology) 3 0 0 3

OBJECTIVES:
- To make the students conversant with basics of polymer chemistry.
- To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines.
- To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
- To acquaint the students with the basics of nano materials, their properties and applications.

UNIT I CHEMICAL THERMODYNAMICS
Second law: Entropy - entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Clausius inequality. Free energy and workfunction: Helmholtz and Gibbs free energy functions; Criteria of spontaneity; Gibbs- Helmholtz equation; Clausius-Clapeyron equation; Maxwell relations – Van’t Hoff isotherm and isochore. Chemical potential; Gibbs-Duhem equation – variation of chemical potential with temperature and pressure.
UNIT II POLYMER CHEMISTRY

Introduction: Classification of polymers – Natural and Synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerisation. Types and mechanism of polymerisation: Addition (Free Radical, cationic, anionic and living); condensation and copolymerisation. Properties of polymers: Tg, Tacticity, Molecular weight – weight average, number average and polydispersity index. Techniques of polymerisation: Bulk, emulsion, solution and suspension.

UNIT III KINETICS AND CATALYSIS


UNIT IV PHOTOCHEMISTRY AND SPECTROSCOPY


UNIT V NANOCHEMISTRY


TOTAL : 45 PERIODS

OUTCOMES:
- The knowledge gained on polymer chemistry, thermodynamics, spectroscopy, phase rule and nano materials will provide a strong platform to understand the concepts on these subjects for further learning.

TEXT BOOKS:
REFERENCE BOOKS:

GE8151 COMPUTING TECHNIQUES

OBJECTIVES:
The students should be made to:
- Learn the organization of a digital computer.
- Be exposed to the number systems.
- Learn to think logically and write pseudo code or draw flow charts for problems.
- Be exposed to the syntax of C.
- Be familiar with programming in C.
- Learn to use arrays, strings, functions, pointers, structures and unions in C.

UNIT I INTRODUCTION

UNIT II C PROGRAMMING BASICS

UNIT III ARRAYS AND STRINGS

UNIT IV FUNCTIONS AND POINTERS
UNIT V STRUCTURES AND UNIONS

Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre-processor directives.

OUTCOMES:
At the end of the course, the student should be able to:

- Design C Programs for problems.
- Write and execute C programs for simple applications.

TEXTBOOKS:

REFERENCES:

GE8152 ENGINEERING GRAPHICS

OBJECTIVES
- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION)

UNIT I PLANE CURVES AND FREE HAND SKETCHING
Basic Geometrical constructions, Curves used in engineering practices
Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal
to the above curves.

**Visualization concepts and Free Hand sketching:** Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

**UNIT II**  
**PROJECTION OF POINTS, LINES AND PLANE SURFACES**  
Orthographic projection- principles-Principal planes-First angle projection-Projection of points. 
Projection of straight lines (only First angle projections) inclined to both the principal planes
- Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces 
Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

**UNIT III**  
**PROJECTION OF SOLIDS**  
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method.

**UNIT IV**  
**PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES**  
Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. 
Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes

**UNIT V**  
**ISOMETRIC AND PERSPECTIVE PROJECTIONS**  
Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method and vanishing point method.

**COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY)**  
Introduction to drafting packages and demonstration of their use.  
**TOTAL: 75 PERIODS**

**OUTCOMES:**
On Completion of the course the student will be able to
- perform free hand sketching of basic geometrical constructions and multiple views of objects.
- do orthographic projection of lines and plane surfaces.
- draw projections and solids and development of surfaces.
- prepare isometric and perspective sections of simple solids.
- demonstrate computer aided drafting.
REFERENCES:

Publication of Bureau of Indian Standards:

Special points applicable to University Examinations on Engineering Graphics:
1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day.
PH 8161  PHYSICS LABORATORY  L T P C  0 0 2 1
(Common to all branches of B.E. / B.Tech. Programmes)

OBJECTIVES:
- To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

1. Torsional pendulum  Determination of rigidity modulus of wire and moment of inertia of disc
2. Non–uniform bending  Determination of young’s modulus
3. Lee’s disc  Determination of thermal conductivity of a bad conductor
4. Potentiometer  Determination of thermo e.m.f. of thermocouple
5. Air wedge  Determination of thickness of a thin sheet of paper
6. i. Optical fibre  Determination of Numerical Aperture and acceptance angle
    ii. Compact disc  Determination of width of the groove using laser
7. Acoustic grating  Determination of velocity of ultrasonic waves in liquids
8. Post office box  Determination of Band gap of a semiconductor
9. Spectrometer  Determination of wavelength using grating
10. Viscosity of liquids  Determination of co-efficient of viscosity of a liquid by Poiseuille’s flow

TOTAL : 30 PERIODS

OUTCOMES:
- The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.

CY 8161  CHEMISTRY LABORATORY  L T P C  0 0 2 1
(Common to all branches of Engineering and Technology)

OBJECTIVES:
- To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
- To acquaint the students with the determination of molecular weight of a polymer by vacometry.

1. Estimation of HCl using Na2CO3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler’s method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1,10-phenanthroline / thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
14. Determination of CMC.
15. Phase change in a solid.

TOTAL : 30 PERIODS

OUTCOMES:
- The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters

REFERENCES:

GE8161 COMPUTER PRACTICES LABORATORY

OBJECTIVES:
The student should be made to:
- Be familiar with the use of Office software.
- Be exposed to presentation and visualization tools.
- Be exposed to problem solving techniques and flow charts.
- Be familiar with programming in C.
- Learn to use Arrays, strings, functions, structures and unions.

LIST OF EXPERIMENTS:
1. Search, generate, manipulate data using MS office/ Open Office
2. Presentation and Visualization – graphs, charts, 2D, 3D
3. Problem formulation, Problem Solving and Flowcharts
4. C Programming using Simple statements and expressions
5. Scientific problem solving using decision making and looping.
6. Simple programming for one dimensional and two dimensional arrays.
7. Solving problems using String functions
8. Programs with user defined functions
9. Program using Recursive Function and conversion from given program to flow chart.
10. Program using structures and unions.

TOTAL : 45 PERIODS
OUTCOMES:
At the end of the course, the student should be able to:
- Apply good programming design methods for program development.
- Design and implement C programs for simple applications.
- Develop recursive programs.

GE 8162  ENGINEERING PRACTICES LABORATORY  L T P C
(Common to all Branches of B.E. / B.Tech. Programmes)  0 0 3 2

OBJECTIVE
- To provide exposure to the students with hands-on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICE

PLUMBING
- Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.
- Laying pipe connection to the suction side of a pump – inlet.
- Laying pipe connection to the delivery side of a pump – outlet.
- Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK
- Sawing, planning and making common joints: T-Joint, Mortise and Tennon joint, Dovetail joint.

STUDY
- Study of joints in door panels, wooden furniture
- Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICE

- Basic household wiring using switches, fuse, indicator – lamp etc.,
- Preparation of wiring diagrams
- Stair case light wiring
- Tube – light wiring
- Study of iron-box, fan with regulator, emergency lamp

GROUP – B (MECHANICAL AND ELECTRONICS)
3. MECHANICAL ENGINEERING PRACTICE
WELDING
- Arc welding of butt joints, lap joints, tee joints
- Gas welding Practice.
- Basic Machining
- Simple turning, drilling and tapping operations.
- Machine assembly Practice.
- Study and assembling the following:
  - Centrifugal pump, mixies and air conditioners.
  - Demonstration on
    (a) Smithy operations like the production of hexagonal bolt.
    (b) Foundry operation like mould preparation for grooved pulley.

4. ELECTRONIC ENGINEERING PRACTICE
- Soldering simple electronic circuits and checking continuity.
- Assembling electronic components on a small PCB and testing.
- Study of Telephone, FM radio, low-voltage power supplies.

TOTAL: 45 PERIODS

OUTCOMES:
- Ability to fabricate carpentry components and pipe connections including plumbing works.
- Ability to use welding equipments to join the structures
- Ability to fabricate electrical and electronics circuits

HS8251  TECHNICAL ENGLISH II  L T P C
(For all branches of B.E / B.Tech programmes)  3 1 0 4

OBJECTIVE
- To make the students acquire listening and speaking skills meant for both formal and informal contexts
- To help them develop their reading skills by exposing them to different types of reading strategies
- To equip them with writing skills needed for academic as well as workplace situations
- To make them acquire language skills at their own pace by using e-materials and language lab component

UNIT I
Listening - Listening to informal conversations and participating; Speaking - Opening a conversation (greetings, comments on something, weather) - Turn taking - Closing a conversation (excuses, general wish, positive comment, thanks); Reading - Developing analytical skills, Deductive and inductive reasoning - Extensive reading; Writing - Effective use of SMS for sending short notes and messages - Using emoticons as symbols in email messages; Grammar - Regular & irregular verbs - Active and passive
voice; **Vocabulary** - Homonyms (e.g. ‘can’) - Homophones (e.g. ‘some’, ‘sum’); **E-materials** - Interactive exercise on Grammar and vocabulary – blogging; **Language Lab** - Listening to different types of conversation and answering questions.

**UNIT II**

**Listening** - Listening to situation based dialogues; **Speaking** - Conversation practice in real life situations, asking for directions (using polite expressions), giving directions (using imperative sentences), Purchasing goods from a shop, Discussing various aspects of a film (they have already seen) or a book (they have already read); **Reading** - Reading a short story or an article from newspaper, Critical reading, Comprehension skills; **Writing** - Writing a review / summary of a story / article, Personal letter (Inviting your friend to a function, congratulating someone for his success, thanking one’s friend / relatives); **Grammar** - modal verbs, Purpose expressions; **Vocabulary** - Phrasal verbs and their meanings, Using phrasal verbs in sentences; **E-materials** - Interactive exercise on Grammar and vocabulary, Extensive reading activity (reading stories / novels from links), Posting reviews in blogs - **Language Lab** - Dialogues (Fill up exercises), Recording students’ dialogues.

**UNIT III**

**Listening** - Listening to the conversation - Understanding the structure of conversations; **Speaking** - Conversation skills with a sense of stress, intonation, pronunciation and meaning - Seeking information – expressing feelings (affection, anger, regret etc.); **Reading** - Speed reading – reading passages with the time limit - Skimming; **Writing** - Minutes of meeting – format and practice in the preparation of minutes - Writing summary after reading the articles from the journals - Format for the journal articles – elements of technical articles (abstract, introduction, methodology, results, discussion, conclusion, appendices, references) - Writing strategies; **Grammar** - Conditional clauses - Cause and effect expressions; **Vocabulary** - Words used as nouns and verbs without any change in the spelling (e.g. ‘rock’, ‘train’, ‘ring’); **E-materials** - Interactive exercise on Grammar & vocabulary - Speed Reading practice exercises; **Language Lab** - Intonation practice using EFLU materials – Attending a meeting and writing minutes.

**UNIT IV**

**Listening** - Listening to a telephone conversation, Viewing a model interview (face-to-face, telephonic and video conferencing) and observing the practices; **Speaking** - Role play practice in telephone skills - listening and responding, -asking questions, -note taking – passing on messages, Role play and mock interview for grasping the interview skills; **Reading** - Reading the job advertisements and the profile of the company concerned – scanning; **Writing** - Applying for a job – cover letter - résumé preparation – vision, mission and goals of the candidate; **Grammar** - Numerical expressions - Connectives (discourse markers); **Vocabulary** - Idioms and their meanings – using idioms in sentences; **E-materials** - Interactive exercises on Grammar & Vocabulary - Different forms of résumés- Filling up a résumé / cover letter; **Language Lab** - Telephonic interview – recording the responses - e-résumé writing.
UNIT V

Listening - Viewing a model group discussion and reviewing the performance of each participant; Speaking - Group discussion skills – initiating the discussion – exchanging suggestions and proposals – expressing dissent/agreement – assertiveness in expressing opinions – mind mapping technique; Reading - Note making skills – making notes from books, or any form of written materials; Intensive reading Writing - Types of reports – Feasibility / Project report – report format – recommendations / suggestions – interpretation of data (using charts for effective presentation); Grammar - Use of clauses; Vocabulary – Collocation; E-materials - Interactive grammar and vocabulary exercises - Sample GD - Pictures for discussion; Language Lab - Different models of group discussion

TOTAL: 45 PERIODS

OUTCOMES:
Learners should be able to
• Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
• Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
• Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
• Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.

TEXT BOOKS:

REFERENCE BOOKS:

EXTENSIVE READERS

WEB RESOURCES
1. www.esl-lab.com
2. www.englishgrammar.org
3. www.englishclub.com
4. www.mindtools.com
5. www.esl.about.com

MA8251 MATHEMATICS II L T P C
(Common to all branches of B.E. / B.Tech. Programmes in II Semester) 3 1 0 4

OBJECTIVES:
• To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
• To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
• To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of electric current.
• To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I DIFFERENTIAL EQUATIONS 9+3
Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler’s and Legendre’s type – System of simultaneous linear differential equations with constant coefficients.

UNIT II VECTOR CALCULUS 9+3
Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral and volume integral - Green’s, Gauss divergence and Stoke’s theorems – Verification and application in evaluating line, surface and volume integrals.

UNIT III ANALYTIC FUNCTION 9+3
Analytic functions – Necessary and sufficient conditions for analyticity - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping – Mapping by functions \( w = z + c, az, 1/z, z^2 \) - Bilinear transformation.
UNIT IV  COMPLEX INTEGRATION
9+3

UNIT V  LAPLACE TRANSFORMS
9+3

TOTAL : 60 PERIODS

OUTCOMES:
• The subject helps the students to develop the fundamentals and basic concepts in vector calculus, ODE, Laplace transform and complex functions. Students will be able to solve problems related to engineering applications by using these techniques.

TEXT BOOKS:

REFERENCES:
OBJECTIVE:

- To introduce the essential principles of materials science for mechanical and related Engineering applications.

UNIT I  MECHANICAL PROPERTIES


UNIT II  PHASE DIAGRAMS

Solid solutions - Hume Rothery’s rules - free energy of solid solution - intermediate phases - The phase rule - single component system - one-component system of iron - binary phase diagrams - isomorphous systems - the tie-line rule - the level rule - application to isomorphous system - eutectic phase diagram - peritectic phase diagram - other invariant reactions - microstructural change during cooling.

UNIT III  FERROUS ALLOYS AND HEAT TREATMENT


UNIT IV  ELECTRONIC MATERIALS

Classification of solids - energy bands - concept of Fermi level - conductor, semiconductor, insulator - Semiconductors: intrinsic, extrinsic - carrier concentration expression (qualitative) - compound semiconductors (qualitative) - dielectric materials - polarization mechanisms - dielectric breakdown - magnetic materials - ferromagnetic materials & hysterisis - ferrites - superconducting materials, properties, types and applications.

UNIT V  NEW MATERIALS AND APPLICATIONS

Introduction to Ceramics and its applications - Ceramic Fibres - Fibre reinforced Plastics - Fibre reinforced Metal - Metallic glasses - Shape memory alloys - Copper base alloys -

TOTAL : 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to apply the different materials, their processing, and heat treatments in suitable application in mechanical engineering fields.

TEXT BOOKS:

REFERENCE BOOKS:

GE8251  ENGINEERING MECHANICS            L T P C
                                         3 1 0 4

OBJECTIVE
- To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering

UNIT I      BASICS AND STATIC OF PARTICLES  12

UNIT II     EQUILIBRUM OF RIGID BODIES       12
Free body diagram – Types of supports –Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon’s theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions

UNIT III    PROPERTIES OF SURFACES AND SOLIDS 12
Centroids and centre of mass– Centroids of lines and areas - Rectangular, circular, triangular areas by integration – T section, I section, - Angle section, Hollow section by using standard formula –Theorems of Pappus - Area moments of inertia of plane areas –

UNIT IV    DYNAMICS OF PARTICLES


UNIT V    FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction –wedge friction-. Rolling resistance -Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder, disc/wheel and sphere.

OUTCOMES:

- ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration.
- ability to analyse the forces in any structures.
- ability to solve rigid body subjected to dynamic forces.

TOTAL: 60 PERIODS

TEXT BOOKS:


REFERENCES:

OBJECTIVES:

- To impart the importance of design in today’s context of global competition, environmental awareness and customer oriented market.
- To impart the basic concepts and various aspects of design using simple examples and case studies.

UNIT I   DESIGN TERMINOLOGY  
Definition-various methods and forms of design-importance of product design-static and dynamic products-various design projects-morphology of design-requirements of a good design-concurrent engineering-computer aided engineering-codes and standards-product and process cycles-bench marking.

UNIT II   DESIGN PROCESS  
Basic module in design process-scientific method and design method-Need identification, importance of definition of problem-structured problem, real life problem-gathering information-customer requirements-Quality Function Deployment (QFD)- product design specifications-generation of alternative solutions- Analysis and selection-Detail design and drawings-Prototype, modeling, simulation, testing and evaluation (Basics only)

UNIT III   CREATIVITY IN DESIGN  
Creativity and problem solving-vertical and lateral thinking-invention-psychological view, mental blocks-Creativity methods-brainstorming, synectics, force fitting methods, mind map, concept map-Theory of innovative problem solving (TRIZ) - conceptual decomposition-creating design concepts.

UNIT IV   HUMAN AND SOCIETAL ASPECTS  
Human factors in design, ergonomics, user friendly design-Aesthetics and visual aspects-environmental aspects-marketing aspects-team aspects-legal aspects-presentation aspects.

UNIT V    MATERIAL AND PROCESSES IN DESIGN  
Material selection for performance characteristics of materials-selection for new design-substitution for existing design-economics of materials-selection methods-recycling and material selection-types of manufacturing process, process systems- Design for manufacturability (DFM) - Design for assembly (DFA).

OUTCOMES:

- Ability to comprehend the steps in the new product design
- Understanding of customer equipments for new product and making specifications.
- Knowledge in the role of creativity in product design
- Ability to decide materials and processes in product development.

TOTAL: 45 PERIODS
TEXT BOOK:

REFERENCES:

ME8252 MANUFACTURING TECHNOLOGY – I L T P C 3 0 0 3

OBJECTIVE:
• To introduce the students to the concepts of basic manufacturing processes and fabrication techniques, such as metal casting, metal joining, metal forming and manufacture of plastic components.

UNIT I METAL CASTING PROCESSES 9
Sand Casting – Sand Mould – Type of patterns - Pattern Materials – Pattern allowances – Moulding sand Properties and testing – Cores –Types and applications – Moulding machines – Types and applications – Melting furnaces – Principle of special casting processes- Shell, investment – Ceramic mould – Pressure die casting – Centrifugal Casting - $\text{CO}_2$ process – Stir casting - Defects in Sand casting
UNIT III  BULK DEFORMATION PROCESSES


UNIT IV  SHEET METAL PROCESSES


UNIT V  MANUFACTURE OF PLASTIC COMPONENTS


OUTCOMES:

- Upon completion of this course, the students can able to apply the different manufacturing process and use this in industry for component production

TEXT BOOKS:


REFERENCES:


TOTAL: 45 PERIODS
OBJECTIVE

- To make the students understand and interpret drawings of machine components so as to prepare assembly drawings both manually and using standard CAD packages.
- To familiarize the students with Indian Standards on drawing practices and standard components.

UNIT I DRAWING STANDARDS 3


UNIT II FITS AND TOLERENCES 3

Limits, Fits – Tolerancing of individual dimensions – Specification of Fits – Preparation of production drawings and reading of part and assembly drawings, basic principles of geometric dimensioning & tolerancing.

UNIT III INTRODUCTION TO DRAFTING PACKAGE 6

Drawing, Editing, Dimensioning, Plotting Commands, Layering Concepts, Matching, Detailing, Detailed drawing, Basic principles of geometric dimensioning & tolerancing.

UNIT IV ASSEMBLY DRAWING
(Preparation of 2D assembled views for the given part details) 33


TOTAL: 20% of classes for theory classes and 80% of classes for practice = 45 PERIODS

Note: 50% of assembly drawings must be done manually and remaining 50% of assembly drawings must be done by using any 2D drafting package)

OUTCOMES

- Ability to develop engineering drawing for the industrial component using Indian Standard code of practice.

TEXT BOOK:
REFERENCES:

ME8262 MANUFACTURING TECHNOLOGY LABORATORY – I L T P C 0 0 3 2

OBJECTIVES:
- To Study and practice the various operations that can be performed in lathe, shaper, drilling, milling machines etc. and to equip with the practical knowledge required in the core industries.

LIST OF EXPERIMENTS:
Machining and Machining time estimations for:
1. Taper Turning
2. External Thread cutting
3. Internal Thread Cutting
4. Eccentric Turning
5. Knurling
6. Square Head Shaping
7. Hexagonal Head Shaping

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to demonstrate and fabricate different types of components using the machine tools

MA8302 PARTIAL DIFFERENTIAL EQUATIONS L T P C 3 1 0 4

OBJECTIVES
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.
- To acquaint the student with Fourier transform techniques used in wide variety of situations.
To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

UNIT I  PARTIAL DIFFERENTIAL EQUATIONS  9+3
Formation – Solutions of first order equations – Standard types and Equations reducible to standard types – Singular solutions – Lagrange’s Linear equation – Integral surface passing through a given curve – Classification of Partial Differential Equations - Solution of linear equations of higher order with constant coefficients – Linear non-homogeneous PDE.

UNIT II  FOURIER SERIES  9+3
Dirichlet’s conditions – General Fourier series – Odd and even functions – Half-range Sine and Cosine series – Complex form of Fourier series – Parseval’s identity – Harmonic Analysis.

UNIT III  FOURIER SERIES SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS  9+3
Method of separation of Variables – Solutions of one dimensional wave equation and one-dimensional heat equation – Steady state solution of two-dimensional heat equation – Fourier series solutions in Cartesian coordinates.

UNIT IV  FINITE DIFFERENCE SOLUTION TO HEAT EQUATION  9+3

UNIT V  FINITE DIFFERENCE SOLUTION TO POTENTIAL AND WAVE EQUATIONS  9+3
Iterative solution of linear system of equations: Gauss-Jacobi, Gauss-Seidel and SOR methods -- Finite difference techniques for the solution of two dimensional Laplace’s and Poisson’s equations on rectangular domain – Leibmann’s method –Lax-Wendroff scheme for first order hyperbolic equation - Explicit finite difference scheme for one space dimensional wave equation.

OUTCOMES
- The understanding of the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.

TEXT BOOKS:
REFERENCES:

CE8352 FLUID MECHANICS AND MACHINERY  L T P C  3 0 0 3

OBJECTIVE:
• The applications of the conservation laws to flow through pipes and hydraulic machines are studied. To understand the importance of dimensional analysis. To understand the importance of various types of flow in pumps and turbines.

UNIT I FLUID PROPERTIES AND FLOW CHARACTERISTICS  8
Units and dimensions- Properties of fluids- mass density, specific weight, specific volume, specific gravity, viscosity, compressibility, vapor pressure, capillarity and surface tension. Flow characteristics – concept of control volume - application of control volume to continuity equation, energy equation and momentum equation.

UNIT II FLOW THROUGH CIRCULAR CONDUITS  7

UNIT III DIMENSIONAL ANALYSIS  8
Need for dimensional analysis – methods of dimensional analysis – Similitude –types of similitude - Dimensionless parameters- application of dimensionless parameters – Model analysis.

UNIT IV PUMPS  12
UNIT V TURBINES

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to apply mathematical knowledge to predict the properties and characteristics of a fluid.
- Can critically analyse the performance of pumps and turbines.

TEXT BOOKS:

REFERENCES:

EC8352 ELECTRONICS ENGINEERING

OBJECTIVES:
- To provide knowledge in the basic concepts of Electronics Engineering including semiconductors, transistors, electronic devices, signal generators and digital electronics.

UNIT I SEMICONDUCTORS AND RECTIFIERS
Classification of solids based on energy band theory, Intrinsic semiconductors, Extrinsic semiconductors – P-type and N-type, P-N junction, VI Characteristics of PN junction diode, Half and Full wave rectifiers, Zener effect, Zener diode, Zener diode Characteristics, Zener diode as a regulator.

UNIT II TRANSISTOR AND AMPLIFIERS
Bipolar junction transistors – CB, CE, CC configurations and characteristics, Biasing circuits – Fixed bias, Voltage divider bias, CE amplifier, Concept of feedback, Negative feedback, voltage series feedback amplifier, Current series feedback amplifier.
UNIT III  FET AND POWER ELECTRONIC DEVICES  9
FET – Configuration and characteristics, FET amplifier, Characteristics and simple applications of SCR, Diac, Triac and UJT.

UNIT IV  SIGNAL GENERATORS AND LINEAR ICS  9

UNIT V  DIGITAL ELECTRONICS  9
Boolean algebra, Logic Gates, , Half and Full adders, Decoder, Encoder, Multiplexer, Demultiplexer, Flip flops, Digital to Analog converters - R-2R and weighted resistor types, Analog to Digital converters - Successive approximation and Flash types.

OUTCOMES:
- Ability to identify electronics components and use of them to design circuits.

TEXT BOOK:

REFERENCES:
Construction and Principle of operation DC machines- Characteristics of DC machines
Construction and Principle of operation of single phase transformers, synchronous machines, three-phase and single-phase induction motors

UNIT III MEASUREMENT AND INSTRUMENTATION 9
Classification of instruments – moving coil and moving iron meters – Induction type, dynamometer type wattmeters – Energy meter – Megger – Instrument transformers (CT & PT) – Wheatstone’s bridge for measurement of unknown resistance, Maxwell’s bridge for unknown inductance and Schering Bridge for unknown capacitance

UNIT IV TRANSUDCERS 9
Classification of transducers, strain, RTD, thermocouples, Piezo-electric transducer, LVDT, Turbine and electromagnetic flow meters, level transducers ultrasonic and fiber optic transducers, type of sensors, elastic sensors, viscosity, moisture and pH sensors, Digital transducers, vibrating wire instruments like load cells, stress meter, etc.

UNIT V SIGNAL CONDITIONING AND DISPLAY 9
Instrumentation amplifiers- Filters- A/D and D/A converters - Multiplexing and data acquisition - LED, LCD and CRT displays.

OUTCOMES:
- Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance

TEXT BOOKS:

REFERENCES:
OBJECTIVE:

- To familiarize the students to understand the fundamentals of thermodynamics and to perform thermal analysis on their behavior and performance.

UNIT I BASIC CONCEPTS AND FIRST LAW


UNIT II SECOND LAW AND AVAILABILITY ANALYSIS


UNIT III PROPERTIES OF PURE SUBSTANCE AND STEAM POWER CYCLE


UNIT IV IDEAL AND REAL GASES, THERMODYNAMIC RELATIONS


UNIT V GAS MIXTURES AND PSYCHROMETRY
Mole and Mass fraction, Dalton’s and Amagat’s Law. Properties of gas mixture – Molar mass, gas constant, density, change in internal energy, enthalpy, entropy and Gibbs function. Psychrometric properties, Psychrometric charts. Property calculations of air vapour mixtures by using chart and expressions. Psychrometric process – adiabatic saturation, sensible heating and cooling, humidification, dehumidification, evaporative cooling and adiabatic mixing. Simple Applications

TOTAL : 45 PERIODS

(Use of Steam tables, Mollier chart and Psychrometric chart permitted)

OUTCOMES:
• Upon completion of this course, the students can able to apply the Thermodynamic Principles to Mechanical Engineering Application.
• Apply mathematical fundamentals to study the properties of steam, gas and gas mixtures.

TEXT BOOKS:

REFERENCES:

ME8302 KINEMATICS OF MACHINES

OBJECTIVE:
• To understand the basic components and layout of linkages in the assembly of a system/machine.
• To understand the principles in analyzing the assembly with respect to the displacement, velocity, and acceleration at any point in a link of a mechanism.
• To understand the motion resulting from a specified set of linkages, design few linkage mechanisms and cam mechanisms for specified output motions.
• To understand the basic concepts of toothed gearing and kinematics of gear trains and the effects of friction in motion transmission and in machine components.

UNIT I  BASICS OF MECHANISMS  9

UNIT II  KINEMATICS OF LINKAGE MECHANISMS  9

UNIT III  KINEMATICS OF CAM MECHANISMS  9

UNIT IV  GEARS AND GEAR TRAINS  9

UNIT V  FRICITION IN MACHINE ELEMENTS  9
Surface contacts – Sliding and Rolling friction – Friction drives – Friction in screw threads – Bearings and lubrication – Friction clutches – Belt and rope drives – Friction aspects in brakes – Friction in vehicle propulsion and braking.

TOTAL : 45 PERIODS

OUTCOMES:
• Upon completion of this course, the students can able to apply fundamentals of mechanism for the design of new mechanisms and analyse them for optimum design.

TEXT BOOK:

REFERENCES:

STANDARDS:

CE8361 FLUID MECHANICS AND MACHINES LABORATORY

OBJECTIVE:
• Students should able to verify the principles studied in theory by performing the experiments in lab.

A. FLOW MEASUREMENT
1. Calibration of Rotometer
2. Flow through Venturimeter
3. Flow through a circular Orifice
4. Determination of mean velocity by Pitot tube
5. Verification of Bernoulli’s Theorem

B. LOSSES IN PIPES
6. Determination of friction coefficient in pipes
7. Determination of losses due to bends, fittings and elbows

C. PUMPS
8. Characteristics of Centrifugal pumps
9. Characteristics of Gear pump
10. Characteristics of Submersible pump
11. Characteristics of Reciprocating pump

D. TURBINES
12. Characteristics of Pelton wheel turbine
13. Characteristics of Francis turbine

E. DETERMINATION OF METACENTRIC HEIGHT
14. Determination of Metacentric height

OUTCOMES:
- Ability to use the measurement equipments for flow measurement
- Ability to do performance trust on different fluid machinery

REFERENCE BOOKS:

EC8361 ELECTRONICS ENGINEERING LABORATORY

OBJECTIVES:
- Students should able to verify the principles studied in theory by performing experiments in the laboratory
  1. VI Characteristics of PN Junction and Zener Diodes.
  2. Characteristics of CE configuration of Transistor.
  4. Characteristics of FET.
  5. Operational Amplifier Applications Adder, Multiplier.
6. RC Oscillator
7. LC Oscillators
8. IC 555 Astable and Monostable multivibrators
9. Half and Full adders
10. RS, T and D FFs
11. BCD counter using IC 7490

TOTAL : 45 PERIODS

OUTCOMES:

- ability to use of diodes, transistors for rectifiers
- ability to use of operational amplifiers

EE8262 ELECTRICAL ENGINEERING LABORATORY L T P C

0 0 3 2

OBJECTIVES:

- Students should able to verify the principles studied in theory by performing experiments in the laboratory
1. Speed Control of DC Shunt Motor
2. Load Test on DC Shunt Motor
3. Study of starters
4. Swinburne’s Test
5. Load Test on DC Series Motor
6. Load Test on three Phase Alternator
7. Load Test on three Phase Induction Motor
8. Wheatstone’s Bridge
9. Load Test on single phase Induction Motor.
10. Load test on Single Phase Transformer.

TOTAL :45 PERIODS

OUTCOMES

- Ability to perform speed characteristic of different electrical machine
OBJECTIVES:
To the study of nature and the facts about environment.
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth’s interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY
Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.
Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES
Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land
degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT


UNIT V HUMAN POPULATION AND THE ENVIRONMENT


OUTCOMES:
Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.

- Public awareness of environmental is at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions
- Development and improvement in std. of living has lead to serious environmental disasters

TEXT BOOKS

REFERENCE BOOKS
OBJECTIVE:
To understand the stresses developed in bars, compounds bars, beams, shafts, cylinders and spheres.

UNIT I  STRESS, STRAIN AND DEFORMATION OF SOLIDS  9

UNIT II  TRANSVERSE LOADING ON BEAMS AND STRESSES IN BEAM  9

UNIT III  TORSION  9
Torsion formulation stresses and deformation in circular and hollows shafts – Stepped shafts – Deflection in shafts fixed at the both ends – Stresses in helical springs – Deflection of helical springs, carriage springs.

UNIT IV  DEFLECTION OF BEAMS  9
Double Integration method – Macaulay’s method – Area moment Theorems for computation of slopes and deflections in beams - Conjugate beam and strain energy – Maxwell’s reciprocal theorems.

UNIT V  THIN CYLINDERS, SPHERES AND THICK CYLINDERS  9
Stresses in thin cylindrical shell due to internal pressure circumferential and longitudinal stresses and deformation in thin cylinders – spherical shells subjected to internal pressure – Deformation in spherical shells – Lame’s theory – Application of theories of failure.

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to apply mathematical knowledge to calculate the deformation behavior of simple structures.
- Critically analyse problem and solve the problems related to mechanical elements and analyse the deformation behavior for different types of loads.

TEXT BOOKS:

REFERENCES:
2001

ME8401

DYNAMICS OF MACHINES

L T P C
3 0 0 3

OBJECTIVES:
• To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms.
• To understand the undesirable effects of unbalances resulting from prescribed motions in mechanism.
• To understand the effect of Dynamics of undesirable vibrations.
• To understand the principles in mechanisms used for governing of machines.

UNIT I
FORCE ANALYSIS

UNIT II
BALANCING

UNIT III
SINGLE DEGREE FREE VIBRATION

UNIT IV
FORCED VIBRATION
UNIT V  MECHANISM FOR CONTROL


TOTAL : 45 PERIODS

OUTCOMES:
• Upon completion of this course, the Students can able to predict the force analysis in mechanical system and related vibration issues and can able to solve the problem

TEXT BOOK:

REFERENCES:
ME8402  THERMAL ENGINEERING-I  L T P C  3 0 0 3

OBJECTIVE:

- To apply the concepts and laws of thermodynamics for cycle analysis and performance of heat engines - Internal Combustion (IC) engines and Gas Turbines.

UNIT I  GAS POWER CYCLES  9

UNIT II  AIR COMPRESSOR  9

UNIT III  INTERNAL COMBUSTION ENGINES AND ITS SYSTEMS  9
IC engine Classification, components and functions. Actual and theoretical - valve and port timing diagrams, p-v diagrams - for two stroke and four stroke engines. Comparison of two stroke & four stroke engines and SI & CI engines.

UNIT IV  INTERNAL COMBUSTION ENGINE FUELS, COMBUSTION & PERFORMANCE  9

UNIT V  GAS TURBINES  9

TOTAL: 45 PERIODS

OUTCOMES:

- Ability to understand the various thermal equipment and their cycles of operation
- Knowledge in working of Air Compressors and IC Engines
- Understanding of IC Fuels and their performance
- Knowledge in principle of operations of gas turbines and performance measurements of gas turbines.

TEXT BOOKS:

REFERENCES:
ME8451 MANUFACTURING TECHNOLOGY – II  L T P C  3 0 0 3

OBJECTIVES:
• To understand the concept and basic mechanics of metal cutting, working of standard machine tools such as lathe, shaping and allied machines, milling, drilling and allied machines, grinding and allied machines and broaching. To understand the basic concepts of Computer Numerical Control (CNC) of machine tools and CNC Programming

UNIT I THEORY OF METAL CUTTING  9
Mechanics of chip formation, single point cutting tool, forces in machining, Types of chip, cutting tools – nomenclature, orthogonal metal cutting, thermal aspects, cutting tool materials, tool wear, tool life, surface finish, cutting fluids and Machinability.

UNIT II TURNING MACHINES  9
Centre lathe, constructional features, specification, operations – taper turning methods, thread cutting methods, special attachments, machining time and power estimation. Capstan and turret lathes- tool layout – automatic lathes: semi automatic – single spindle : Swiss type, automatic screw type – multi spindle:

UNIT III RECIPROCATING, MILLING AND GEAR CUTTING MACHINES  9

UNIT IV ABRASIVE PROCESS AND BROACHING  9
Abrasive processes: grinding wheel – specifications and selection, types of grinding process – cylindrical grinding, surface grinding, centreless grinding, internal grinding- micro finishing methods - Typical applications – concepts of surface integrity, broaching machines: broach construction – push, pull, surface and continuous broaching machines
UNIT V   ADVANCED MANUFACTURING TECHNIQUES
Numerical Control (NC) machine tools – CNC types, constructional details, special features, machining centre, part programming fundamentals CNC – manual part programming – micro machining – wafer machining

TOTAL : 45 PERIODS

OUTCOMES:
• Upon completion of this course, the students can able to understand and compare the functions and applications of different metal cutting tools and also demonstrate the programming in CNC machining.

TEXT BOOKS:

REFERENCES:

ML8351  ENGINEERING MATERIALS AND METALLURGY

OBJECTIVE:
• To impart knowledge on the structure, properties, treatment, testing and applications of metals and non-metallic materials so as to identify and select suitable materials for various engineering applications.

UNIT I   ALLOYS AND PHASE DIAGRAMS
UNIT II  HEAT TREATMENT  

UNIT III  FERROUS AND NON-FERROUS METALS  
Effect of alloying additions on steel- α and β stabilisers– stainless and tool steels – HSLA, Maraging steels – Grey, white, malleable, spheroidal – alloy cast irons, Copper and copper alloys – Brass, Bronze and Cupronickel – Aluminium and Al-Cu – precipitation strengthening treatment – Bearing alloys, Mg-alloys, Ni-based super alloys, special non-ferrous metals and alloys of low coefficient of the thermal expansion, high corrosion resistance, heat resistant etc.

UNIT IV  NON-METALLIC MATERIALS  

UNIT V  MECHANICAL PROPERTIES AND DEFORMATION MECHANISMS  
Mechanisms of plastic deformation, slip and twinning – Types of fracture – Testing of materials under tension, compression and shear loads – Hardness tests (Brinell, Vickers and Rockwell), Micro and nano-hardness tests, Impact test Izod and charpy, fatigue and creep failure mechanisms.

OUTCOMES:
- Upon completion of this course, the students can able to apply the different materials, their processing, heat treatments in suitable application in mechanical engineering fields.

TEXT BOOKS:

REFERENCES:

TOTAL : 45 PERIODS
CE8362  STRENGTH OF MATERIALS LABORATORY  L T P C

0032

OBJECTIVES:

- To study the properties of materials when subjected to different types of loading.

LIST OF EXPERIMENTS

1. Tension test on mild steel rod
2. Double shear test on metal
3. Torsion test on mild steel rod
4. Impact test on metal specimen (Izod and Charpy)
5. Hardness test on metals (Rockwell and Brinell Hardness Tests)
6. Deflection test on metal beam
7. Compression test on helical spring
8. Deflection test on carriage spring

OUTCOMES:

- Ability to perform different destructive testing
- Ability to characteristic materials

REFERENCE:

1. Relevant Indian Standards
ME8411  THERMAL ENGINEERING LABORATORY – I  L T P C 0 0 3 2

OBJECTIVES:
- To study the value timing-V diagram and performance of IC Engines
- To Study the characteristics of fuels/Lubricates used in IC Engines
- To study the Performance of steam generator/ turbine

LIST OF EXPERIMENTS

I.C. ENGINE LAB AND FUELS LAB 30
2. Actual p-v diagrams of IC engines.
3. Performance test of Reciprocating Air compressor
6. Morse Test on Multi-cylinder Petrol Engine.
7. Retardation Test on a Diesel Engine.
8. Determination of Flash Point and Fire Point of various fuels / lubricants.

STEAM LAB 15
1. Study of Steam Generators and Turbines.

TOTAL: 45 PERIODS

OUTCOMES:
- Ability to conduct experiment on IC engine to study the characteristic and performance of IC design/ steam turbines.

ME8461  MANUFACTURING TECHNOLOGY LABORATORY –II  L T P C 0 0 3 2

OBJECTIVES:
- To Study and acquire knowledge on various basic machining operations in special purpose machines and its applications in real life manufacture of components in the industry

LIST OF EXPERIMENTS:
1. Contour milling using vertical milling machine
2. Spur gear cutting in milling machine
3. Helical Gear Cutting in milling machine
4. Gear generation in hobbing
5. Gear generation in shaping
6. Spline Broaching
7. Plain Surface grinding
8. Cylindrical grinding
9. Tool angle grinding with tool and Cutter Grinder
10. Measurement of cutting forces in Milling /Turning Process
11. CNC Part Programming.

TOTAL: 45 PERIODS

OUTCOMES:
• Ability to use different machine tools to manufacturing gears.
• Ability to use different machine tools for finishing operations
• Ability to manufacture tools using cutter grinder
• Develop CNC part programming

ME8501 DESIGN OF MACHINE ELEMENTS

OBJECTIVES
• To familiarize the various steps involved in the Design Process
• To understand the principles involved in evaluating the shape and dimensions of a component to satisfy functional and strength requirements.
• To learn to use standard practices and standard data
• To learn to use catalogues and standard machine components

UNIT I STEADY STRESSES AND VARIABLE STRESSES IN MACHINE MEMBERS


Cylinders and Pressure vessels for industrial applications – Thin and thick cylinders – Spherical vessels

UNIT II SHAFTS AND COUPLINGS

Design of solid and hollow shafts based on strength, rigidity and critical speed – Keys, key ways and splines – crankshafts - Rigid and flexible couplings.
UNIT III  TEMPORARY AND PERMANENT JOINTS
Threaded fasteners - Bolted joints including eccentric loading, Knuckle joints, Cotter joints – Welded joints, riveted joints for structures - theory of bonded joints.

UNIT IV  ENERGY STORING ELEMENTS AND ENGINE COMPONENTS
Various types of springs, optimization of helical springs - rubber springs - Flywheels considering stresses in rims and arms for engines and punching machines- Connecting Rods and crank shafts.

UNIT V  BEARINGS
Sliding contact and rolling contact bearings - Hydrodynamic journal bearings, McKee’s Eqn., Sommerfeld Number, Raimondi & Boyd graphs, -- Selection of Rolling Contact bearings - Seals and Gaskets

TOTAL: 45 PERIODS

Note: (Use of P S G Design Data Book is permitted in the University examination)

OUTCOMES:
• Upon completion of this course, the students can able to successfully design machine components

TEXT BOOK:

REFERENCES:

STANDARDS:
1. IS 10260 : Part 1 : 1982 Terms, definitions and classification of Plain bearings Part 1 :
Construction.

ME8502 METROLOGY AND MEASUREMENTS L T P C
3 0 0 3

OBJECTIVE:
- To provide knowledge on the various Metrological equipments available to measure the dimension of the components and the correct procedure to be adopted while using these instruments.

UNIT I INTRODUCTION
5
Introduction to Metrology-Standards-Calibration-Terminologies in Measurement-Errors in Measurement-Care of Measuring Instruments- Reliability

UNIT II LINEAR AND ANGULAR MEASUREMENTS
10

UNIT III ADVANCES IN METROLOGY
12

UNIT IV THREAD, GEAR METROLOGY AND FORM MEASUREMENT
10
Thread ,Gear Metrology – Form measurement-Straightness-Flatness, Roundness.Surface finish measurement.

UNIT V MEASUREMENT OF POWER, FLOW AND TEMPERATURE
8

TOTAL : 45 PERIODS

OUTCOMES:
- Upon completion of this course, the Students can demonstrate different measurement technologies and use of them in Industrial Components

TEXT BOOKS :

REFERENCES:

ME8503 THERMAL ENGINEERING - II

OBJECTIVES:
• To integrate the concepts, laws and methodologies from the first course in thermodynamics into the analysis of cyclic processes.
• To apply the thermodynamic concepts into various thermal applications like Boilers, Compressors and Refrigeration and Air Conditioning Systems and Waste heat recovery systems.

UNIT I STEAM NOZZLE
Types of nozzles, Flow of steam through nozzles, Shapes of nozzles, Effect of friction, Critical pressure ratio, Metastable flow.

UNIT II BOILERS
Types of boilers, Thermal calculations, Heat balance, Mountings and Accessories, Boiler trial, Boiler code.

UNIT III STEAM TURBINES
Types, Impulse and reaction principles, Compoundings, Velocity diagrams for impulse and reaction blades, Work done on turbine blades and efficiency of components, Speed regulations, Governors.

UNIT IV COGENERATION AND WASTE HEAT RECOVERY

UNIT V REFRIGERATION AND AIR – CONDITIONING
Vapour compression Refrigeration cycle, Superheat, Sub cooling, Performance calculations, Working principle of vapour absorption system, Air cycle refrigeration, Thermo electric refrigeration, Psychrometry and Psychrometric properties, Psychrometric chart, Instrumentation, Cooling load calculations and circulating systems, concept of RSHF, GSHF and ESHF, Air conditioning systems.

TOTAL: 45 PERIODS
OUTCOMES:
- Knowing the types and flow characteristics of nozzles
- Understanding the types and working of boilers and steam turbines, cogeneration and heat recovery
- Knowledge of refrigeration and air conditioning system

TEXT BOOKS:

REFERENCES:

ME8551 COMPUTER AIDED DESIGN

OBJECTIVES:
• To provide an overview of how computers are being used in design

UNIT I FUNDAMENTALS OF COMPUTER GRAPHICS
Product cycle- Design process- sequential and concurrent engineering- Computer aided design – CAD system architecture- Computer graphics – co-ordinate systems- 2D and 3D transformations- homogeneous coordinates - Line drawing -Clipping- viewing transformation

UNIT II GEOMETRIC MODELING
Representation of curves- Hermite curve- Bezier curve- B-spline curves-rational curves- Techniques for surface modeling – surface patch- Coons and bicubic patches- Bezier and B-spline surfaces. Solid modeling techniques- CSG and B-rep

UNIT III VISUAL REALISM
UNIT IV  ASSEMBLY OF PARTS
Assembly modelling – interferences of positions and orientation – tolerance analysis-mass property calculations – mechanism simulation and interference checking.

UNIT V  CAD STANDARDS
Standards for computer graphics- **Graphical Kernel System** (GKS) - standards for exchange images- **Open Graphics Library** (**OpenGL**) - Data exchange standards - IGES, STEP, CALS etc. - communication standards.

TOTAL : 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to use computer and CAD software's for modeling of mechanical components

TEXT BOOKS:

REFERENCES:
OBJECTIVES

- To familiar with different measurement equipments and use of this industry for quality inspection

LIST OF EXPERIMENTS

1. Tool Maker’s Microscope
2. Comparator
3. Sine Bar
4. Gear Tooth Vernier Caliper
5. Floating gauge Micrometer
6. Co ordinate Measuring Machine (Study)
7. Surface Finish Measuring Equipment
8. Vernier Height Gauge
9. Machine Vision System (Study)
10. Bore diameter measurement using telescope gauge
11. Bore diameter measurement using micrometer
12. Force Measurement
13. Torque Measurement
14. Temperature measurement

TOTAL: 45 PERIODS

OUTCOMES

- Ability to handle different measurement tools and perform measurements in quality impulsion

ME8512 THERMAL ENGINEERING LABORATORY – II

OBJECTIVES

- To study the heat transfer phenomena predict the relevant coefficient using implementation
- To study the performance of refrigeration cycle / components

LIST OF EXPERIMENTS:

HEAT TRANSFER:

1. Thermal conductivity measurement using guarded plate apparatus.
2. Thermal conductivity measurement of pipe insulation using lagged pipe apparatus.
3. Determination of heat transfer coefficient under natural convection from a vertical cylinder.
4. Determination of heat transfer coefficient under forced convection from a tube.
5. Determination of Thermal conductivity of composite wall.
6. Determination of Thermal conductivity of insulating powder.
7. Heat transfer from pin-fin apparatus (natural & forced convection modes)
8. Determination of Stefan – Boltzmann constant.
10. Effectiveness of Parallel / counter flow heat exchanger.

REFRIGERATION AND AIR CONDITIONING LAB
1. Determination of COP of a refrigeration system
2. Experiments on Psychrometric processes
3. Performance test on a reciprocating air compressor
4. Performance test in a HC Refrigeration System
5. Performance test in a fluidized Bed Cooling Tower

TOTAL : 45 PERIODS

OUTCOMES
- Ability to demonstrate the fundamentals of heat and predict the coefficient used in that transfer application and also design refrigeration cycle.

ME8561 DYNAMICS LABORATORY

OBJECTIVES:
- To supplement the principles learnt in kinematics and Dynamics of Machinery.
- To understand how certain measuring devices are used for dynamic testing.

LIST OF EXPERIMENTS
1. a) Study of gear parameters.
   b) Experimental study of velocity ratios of simple, compound, Epicyclic and differential gear trains.
2. a) Kinematics of Four Bar, Slider Crank, Crank Rocker, Double crank, Double rocker, Oscillating cylinder Mechanisms.
b) Kinematics of single and double universal joints.

3. a) Determination of Mass moment of inertia of Fly wheel and Axle system.
   b) Determination of Mass Moment of Inertia of axisymmetric bodies using Turn Table apparatus.
   c) Determination of Mass Moment of Inertia using bifilar suspension and compound pendulum.

4. Motorized gyroscope – Study of gyroscopic effect and couple.

5. Governor - Determination of range sensitivity, effort etc., for Watts, Porter, Proell, and Hartnell Governors.

6. Cams – Cam profile drawing, Motion curves and study of jump phenomenon

   b) Multi degree freedom suspension system – Determination of influence coefficient.

8. a) Determination of torsional natural frequency of single and Double Rotor systems.- Undamped and Damped Natural frequencies.
   b) Vibration Absorber – Tuned vibration absorber.

9. Vibration of Equivalent Spring mass system – undamped and damped vibration.


11. a) Balancing of rotating masses. (b) Balancing of reciprocating masses.

12. a) Transverse vibration of Free-Free beam – with and without concentrated masses.
   b) Forced Vibration of Cantilever beam – Mode shapes and natural frequencies.
   c) Determination of transmissibility ratio using vibrating table.

TOTAL : 45 PERIODS

Note : Atleast 10 experiments must be conducted depending on availability of experiments.

OUTCOME

- Ability to demonstrate the principles of kinematics and dynamics of machinery
- Ability to use the measuring devices for dynamic testing.

ME8601 DESIGN OF TRANSMISSION SYSTEMS L T P C 3 0 0 3

OBJECTIVES:

- To gain knowledge on the principles and procedure for the design of Mechanical power Transmission components.
- To understand the standard procedure available for Design of Transmission of
Mechanical elements

• To learn to use standard data and catalogues

UNIT I  SELECTION OF PRIME MOVERS AND DESIGN FOR FLEXIBLE ELEMENTS  9
Electric motor classification, Alternating current motors, Polyphase motors, Universal motors, Motor selection: Speed-Torque curves for AC & DC motors, Speed control of electrical motors, Driven machine speed-Torque curves, Motor selection: Matching the motor to the driven machine, Time to accelerate operating speed, Gasoline and diesel engines. Design of Flat belts and pulleys - Selection of V belts and pulleys – Selection of hoisting wire ropes and pulleys – Design of Transmission chains and Sprockets. Selection of pulleys and sprockets for the above transmission systems.

UNIT II  SPUR GEARS AND PARALLEL AXIS HELICAL GEARS  9
Speed ratios and number of teeth-Force analysis -Tooth stresses - Dynamic effects - Fatigue strength - Factor of safety - Gear materials – Design of straight tooth spur & helical gears based on strength and wear considerations – Pressure angle in the normal and transverse plane- Equivalent number of teeth-forces for helical gears.

UNIT III  BEVEL, WORM AND CROSS HELICAL GEARS  9
Straight bevel gear: Tooth terminology, tooth forces and stresses, equivalent number of teeth. Estimating the dimensions of pair of straight bevel gears.
Worm Gear: Merits and demerits- terminology. Thermal capacity, materials-forces and stresses, efficiency, estimating the size of the worm gear pair.
Cross helical: Terminology-helix angles-Estimating the size of the pair of cross helical gears.

UNIT IV  GEAR BOXES  9
Geometric progression - Standard step ratio - Ray diagram, kinematics layout -Design of sliding mesh gear box -Constant mesh gear box. – Design of multi speed gear box for machine tool applications – Variable speed gear box, Fluid Couplings, Torque Converters for automotive applications.

UNIT V  CAMS CLUTCHES AND BRAKES  9
Cam Design: Types-pressure angle and under cutting base circle determination-forces and surface stresses. Design of plate clutches –axial clutches-cone clutches-internal expanding rim clutches-shoe and band brakes - external shoe brakes – Internal expanding shoe brake - Electromagnetic clutches

TOTAL : 45 PERIODS

Note: (Use of P S G Design Data Book is permitted in the University examination)

OUTCOMES:
• Upon completion of this course, the students can able to successfully design transmission components used in Engine and machines
TEXT BOOK:

REFERENCES:

STANDARDS:
1. IS 4460 : Parts 1 to 3 : 1995, Gears – Spur and Helical Gears – Calculation of Load Capacity.
2. IS 7443 : 2002, Methods of Load Rating of Worm Gears
OBJECTIVES:

- To understand the mechanisms of heat transfer under steady and transient conditions.
- To understand the concepts of heat transfer through extended surfaces.
- To learn the thermal analysis and sizing of heat exchangers and to understand the basic concepts of mass transfer.

UNIT I  CONDUCTION  8+3

UNIT II  CONVECTION  7+3

UNIT III  PHASE CHANGE HEAT TRANSFER AND HEAT EXCHANGERS  9+3

UNIT IV  RADIATION  9+3

UNIT V  MASS TRANSFER  6+3

OUTCOMES:

- Upon completion of this course, the students can able to understand and apply different heat and mass transfer principles of different applications.

TEXT BOOK:

REFERENCE BOOKS:

ME8652 INDUSTRIAL MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:
• To develop modern concepts of Industrial Management

UNIT I INTRODUCTION 9

UNIT II FUNCTIONS OF MANAGEMENT 9

UNIT III ORGANIZATIONAL BEHAVIOUR 9
UNIT IV     GROUP DYNAMICS


UNIT V     MODERN CONCEPTS


OUTCOMES:

- Students gain knowledge on the basic management principles to become management(s) professional.

TEXT BOOKS:


REFERENCE BOOKS:


ME8653     MECHATRONICS

OBJECTIVES:

- This syllabus is formed to impart knowledge for the students about the elements and techniques involved in Mechatronics systems which are very much essential to understand the emerging field of automation.
UNIT I   INTRODUCTION


UNIT II   8085 MICROPROCESSOR


UNIT III  PROGRAMMABLE PERIPHERAL INTERFACE


UNIT IV   PROGRAMMABLE LOGIC CONTROLLER

Introduction – Basic structure – Input and output processing – Programming – Mnemonics – Timers, counters and internal relays – Data handling – Selection of PLC.

UNIT V   ACTUATORS AND MECHATRONIC SYSTEM DESIGN


TOTAL : 45 PERIODS

OUTCOMES:

•  Upon completion of this course, the students can able to design mechatronics system with the help of Microprocessor, PLC and other electrical and Electronics Circuits.

TEXT BOOKS:


REFERENCES:


HS8561 EMPLOYABILITY SKILLS L T P C
( Lab / Practical Course ) 0 0 2 1
(Common to all branches of Fifth or Sixth Semester B.E / B.Tech programmes)

OBJECTIVES
• To enhance the employability skills of students with a special focus on Presentation skills, Group discussion skills and Interview skills
• To help them improve their soft skills, including report writing, necessary for the workplace situations
  2. Creating effective PPTs – presenting the visuals effectively
  3. Using appropriate body language in professional contexts – gestures, facial expressions, etc.
  4. Preparing job applications - writing covering letter and résumé
  5. Applying for jobs online - email etiquette
  6. Participating in group discussions – understanding group dynamics - brainstorming the topic
  7. Training in soft skills - persuasive skills – People skills - questioning and clarifying skills – mock GD
  8. Writing Project proposals – collecting, analyzing and interpreting data / drafting the final report
  9. Attending job interviews – answering questions confidently
 10. Interview etiquette – dress code – body language – mock interview

OUTCOME
• The students will have enough confidence to present themselves well using proper oral and written communication skills to any interview (or) discussion (or) presentation.

REFERENCE BOOKS:

EXTENSIVE READERS

WEB RESOURCES
1. www.humanresources.about.com
2. www.careerride.com

ME8611 CAD / CAM LAB L T P C 0 0 3 2

OBJECTIVES:
• To gain practical experience in handling 2D drafting and 3D modelling software systems.
• To study the features of CNC Machine Tool.
• To expose students to modern control systems (Fanuc, Siemens etc.,)
• To know the application of various CNC machines like CNC lathe, CNC Vertical Machining centre, CNC EDM and CNC wire-cut and studying of Rapid prototyping.

1. 3D GEOMETRIC MODELLING 24 PERIODS

LIST OF EXPERIMENTS
1. Introduction of 3D Modelling software

Creation of 3D assembly model of following machine elements using 3D Modelling software

2. Flange Coupling
3. Plummer Block
4. Screw Jack
5. Lathe Tailstock
6. Universal Joint
7. Machine Vice
8. Stuffing box
2. MANUAL PART PROGRAMMING. 21 PERIODS

(i) Part Programming - CNC Machining Centre
   a) Linear Cutting.
   b) Circular cutting.
   c) Cutter Radius Compensation.
   d) Canned Cycle Operations.

(ii) Part Programming - CNC Turning Centre
    a) Straight, Taper and Radius Turning.
    b) Thread Cutting.
    c) Rough and Finish Turning Cycle.
    d) Drilling and Tapping Cycle.

3. COMPUTER AIDED PART PROGRAMMING

   e) CL Data and Post process generation using CAM packages.
   f) Application of CAPP in Machining and Turning Centre.

4. STUDY OF CNC EDM, CNC EDM WIRE-CUT AND RAPID PROTOTYPING. TOTAL: 45 PERIODS

OUTCOMES

- Ability to develop 2D and 3D models using modeling softwares.
- Ability to understand the CNC control in modern manufacturing system.
- Ability to prepare CNC part programming and perform manufacturing.

ME8612 CREATIVE AND INNOVATIVE PROJECT

The goal of this course is to help students to identify innovative projects that promotes and
inhibit creativity to explore the variables that affect creativity and innovation. By the end of the period, students should be familiar with current thinking in their field, and able to apply the concepts to relevant research problems or practical applications.

The goal of this course is to drive them to learn concepts, models, frameworks, and tools that engineering graduates need in a world where creativity and innovation is fast becoming a pre-condition for competitive advantage.

Each student will choose a nagging workplace problem or socially relevant problems that have been difficult for them to “solve.” At the end of the semester, each or group of students have to submit a report for evaluation.

**OUTCOMES:**
- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

**ME8253**
**POWER PLANT ENGINEERING**

| L.T.P.C. | 3.0.0.3 |

**OBJECTIVE:**
- Providing an overview of Power Plants and detailing the role of Mechanical Engineers in their operation and maintenance.

**UNIT I**
**COAL BASED THERMAL POWER PLANTS**
10

**UNIT II**
**DIESEL, GAS TURBINE AND COMBINED CYCLE POWER PLANTS**
10

**UNIT III**
**NUCLEAR POWER PLANTS**
7

**UNIT IV**
**POWER FROM RENEWABLE ENERGY**
10
Hydro Electric Power Plants – Classification, Typical Layout and associated components including Turbines. Principle, Construction and working of Wind, Tidal, Solar Photo Voltaic
(SPV), Solar Thermal, Geo Thermal, Biogas and Fuel Cell power systems.

**UNIT V ENERGY, ECONOMIC AND ENVIRONMENTAL ISSUES OF POWER PLANTS**

Power tariff types, Load distribution parameters, load curve, Comparison of site selection criteria, relative merits & demerits, Capital & Operating Cost of different power plants. Pollution control technologies including Waste Disposal Options for Coal and Nuclear Power Plants.

**OUTCOMES:**
- Upon completion of this course, the students can able to understand different types of power plant, and its functions and their flow lines and issues related to them.
- Analyse and solve energy and economic related issues in power sectors.

**TEXT BOOK:**

**REFERENCES:**

**ME8701 COMPUTER INTEGRATED MANUFACTURING**

**OBJECTIVE:**
- To understand the application of computers in various aspects of Manufacturing viz., Design, Proper planning, Manufacturing cost, Layout & Material Handling system.

**UNIT I INTRODUCTION**

UNIT II PRODUCTION PLANNING AND CONTROL AND COMPUTERISED PROCESS PLANNING


UNIT III CELLULAR MANUFACTURING


UNIT IV FLEXIBLE MANUFACTURING SYSTEM (FMS) AND AUTOMATED GUIDED VEHICLE SYSTEM (AGVS)


UNIT V INDUSTRIAL ROBOTICS


OUTCOMES:

- Knowledge gained in usage of computers and software’s in various manufacturing activities
- Understanding of product and process classifications in electronic automation of shop floor
- Knowledge in FMS and AGVS in manufacturing automation
- Usage of Robots and programming of Robots

TOTAL : 45 PERIODS

TEXT BOOK:


REFERENCES:


ME8752 FINITE ELEMENT ANALYSIS

OBJECTIVES:

- To introduce the concepts of Mathematical Modeling of Engineering Problems.
- To appreciate the use of FEM to a range of Engineering Problems.

UNIT I INTRODUCTION


UNIT II ONE-DIMENSIONAL PROBLEMS


UNIT III TWO DIMENSIONAL SCALAR VARIABLE PROBLEMS


UNIT IV TWO DIMENSIONAL VECTOR VARIABLE PROBLEMS

Equations of elasticity – Plane stress, plane strain and axisymmetric problems – Body forces and temperature effects – Stress calculations - Plate and shell elements.

UNIT V ISOPARAMETRIC FORMULATION AND ADVANCED TOPICS


TOTAL: 45 PERIODS
OUTCOMES:
- Upon completion of this course, the students can able to understand different mathematical Techniques used in FEM analysis and use of them in Structural and thermal problem

TEXT BOOK:

REFERENCE BOOKS:

ME8661 MECHATRONICS LABORATORY L T P C
0 0 3 2

OBJECTIVE:
- To know the method of programming the microprocessor and also the design, modelling & analysis of basic electrical, hydraulic & pneumatic Systems which enable the students to understand the concept of mechatronics.

LIST OF EXPERIMENTS:
2. Stepper motor interface.
4. Speed control of DC motor.
5. Study of various types of transducers.
7. Modelling and analysis of basic hydraulic, pneumatic and electrical circuits using ‘AUTOMATION STUDIO’ Software.
8. Study of PLC and its applications.
9. Study of image processing technique.

OUTCOMES:
- Upon completion of this course, the students can able to design mechatronics system with the help of Microprocessor, PLC and other electrical and Electronics Circuits.
OBJECTIVES:

To give exposure to software tools needed to analyze engineering problems.
To expose the students to different applications of simulation and analysis tools.

A. SIMULATION

1. MATLAB basics, Dealing with matrices, Graphing-Functions of one variable and two variables
2. Use of Matlab to solve simple problems in vibration and Laplace Transforms
3. Simple Mechanism Simulation using commercially available software – Demonstration only

B. ANALYSIS

1. Force and Stress analysis using link elements in Trusses, cables etc.
2. Stress and deflection analysis in beams with different support conditions.
3. Stress analysis of flat plates and simple shells.
5. Thermal stress and heat transfer analysis of plates.
7. Vibration analysis of spring-mass systems.
8. Model analysis of Beams.
9. Harmonic, transient and spectrum analysis of simple systems.

OUTCOMES:

Upon completion of this course, the Students can model, analyse and simulate experiments to meet real world system and evaluate the performance.

TOTAL: 45 PERIODS

TEXT BOOKS:


OBJECTIVES:

To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.
A project topic must be selected by the students in consultation with their guides. The aim of the project work is to deepen comprehension of principles by applying them to a new problem which may be the design and fabrication of a device for a specific application, a research project with a focus on an application needed by the industry/society, a computer project, a management project or a design project.

The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated jointly by external and internal examiners constituted by the Head of the Department based on oral presentation and the project report.

OUTCOMES:
- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

ME8001 ADVANCED INTERNAL COMBUSTION ENGINEERING L T P C
3 0 0 3

OBJECTIVES:
- To understand the underlying principles of operation of different IC Engines and components.
- To provide knowledge on pollutant formation, control, alternate fuel etc.

UNIT I SPARK IGNITION ENGINES

UNIT II COMPRESSION IGNITION ENGINES

UNIT III POLLUTANT FORMATION AND CONTROL
UNIT IV  ALTERNATIVE FUELS
Alcohol, Hydrogen, Compressed Natural Gas, Liquefied Petroleum Gas and Bio Diesel - Properties, Suitability, Merits and Demerits - Engine Modifications.

UNIT V  RECENT TRENDS

TOTAL: 45 PERIODS

OUTCOME:
• Upon completion of this course, the students can able to compare the operations of different IC Engine and components and can evaluate the pollutant formation, control, alternate fuel

TEXT BOOKS:

REFERENCES:

ME8002  CASTING AND WELDING PROCESSES  L T P C
3 0 0 3

OBJECTIVE:
• The objective of the course is to impart knowledge on Design of Gating system for castings, Foundry Practice of Ferrous, Non Ferrous alloys, Foundry Mechanisation Welding Processes and Welding Metallurgy.

UNIT I  DESIGN OF GATING SYSTEM

UNIT II  FERROUS AND NON FERROUS CASTINGS
Steel Casting – The family of cast iron – melting of steels and cast irons – Grey iron foundry practice – Ductile iron – Malleable Iron casting design – Considerations Aluminium, Magnesium, Copper, Zinc. ,Duplex Stainless Steel and Titanium alloys foundry practice.
UNIT III  FOUNDRY MECHANISATION  
Mechanical equipments in foundry – plant site location, layout – Plant Engineering – Maintenance – Services – Practical aspects.

UNIT IV  WELDING PROCESS AND TECHNOLOGY  

UNIT V  WELDING METALLURGY  

OUTCOMES:
- Upon completion of this course, the students can able to compare different types of casting and welding process for effective casting and Welding of Structural components.

TEXT BOOK:

REFERENCES:
2. A.K.Chakrabarti, Casting Technology and Cast Alloys, Prentice –Hall Of India Ltd, 2005
3. T.V.Rama Rao, Metal casting Principles and Practice, New Age International, 2010

ME8003  COMPOSITE MATERIALS AND MECHANICS  L T P C  3 0 0 3

OBJECTIVES
- To understand the fundamentals of composite material strength and its mechanical behavior.
- To understand fabrication and properties of different composites
- Combinations of plies with different orientations of the fiber.
- Thermo-mechanical behavior and study of residual stresses in Laminates during processing. Implementation of Classical Laminate Theory (CLT) to study and analysis for residual stresses in an isotropic layered structure such as electronic chips.

UNIT I  INTRODUCTION TO COMPOSITE MATERIALS  
Definition-Matrix materials-polymers-metals-ceramics - Reinforcements: Particles, whiskers, inorganic fibers, metal filaments- ceramic fibers- fiber fabrication- natural composite wood, Jute
Advantages and drawbacks of composites over monolithic materials. Mechanical properties and applications of composites, Particulate-Reinforced composite Materials, Dispersion-Strengthened composite, Fiber-reinforced composites Rule of mixtures-Characteristics of fiber-Reinforced composites, Manufacturing fiber and composites,

UNIT II PROCESSING OF COMPOSITES

Processing of PMCs-handlay-up, spray technique, filament winding, Pultrusion, RTM, bag molding, injection moulding, SMC - Processing of MMCs-solid state, liquid state, vapour state processing, Processing of CMCs – hot pressing-reaction bonding process-infiltration technique, direct oxidation-interfaces

UNIT III INTRODUCTION, LAMINA CONSTITUTIVE EQUATIONS


UNIT IV LAMINA STRENGTH ANALYSIS


UNIT V THERMAL ANALYSIS


TOTAL: 45 PERIODS

OUTCOMES:
• Upon completion of this course, the students can able to analyse the fiber reinforced Laminate for optimum design
• Apply classical laminate theory to study and analyse the residual stresses in Laminate.

TEXT BOOKS:
REFERENCES:

ME8004    DESIGN OF HEAT EXCHANGERS   LT P C
3 0 0 3

OBJECTIVES:
• To learn the thermal and stress analysis on various parts of the heat exchangers
• To analyze the sizing and rating of the heat exchangers for various applications

UNIT I    INTRODUCTION
Types of heat exchangers, shell and tube heat exchangers – regenerators and recuperators - Temperature distribution and its implications - Parts description, Classification as per Tubular Exchanger Manufacturers Association (TEMA)

UNIT II    PROCESS DESIGN OF HEAT EXCHANGERS

UNIT III    STRESS ANALYSIS
Stress in tubes – header sheets and pressure vessels – thermal stresses, shear stresses - types of failures, buckling of tubes, flow induced vibration.

UNIT IV    COMPACT AND PLATE HEAT EXCHANGER
Types- Merits and Demerits- Design of compact heat exchangers, plate heat exchangers, performance influencing parameters, limitations.
UNIT V CONDENSERS AND COOLING TOWERS

Design of surface and evaporative condensers – cooling tower – performance characteristics.

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to apply the mathematical knowledge for thermal and stress analysis on various parts of the heat exchangers components.

TEXT BOOKS:


REFERENCES:

ME8005 DESIGN OF PRESSURE VESSELS AND PIPING L T P C
3 0 0 3

OBJECTIVES:
- To understand the Mathematical knowledge to design pressure vessels and piping
- To understand the ability to carry of stress analysis in pressure vessels and piping

UNIT I INTRODUCTION

UNIT II STRESSES IN PRESSURE VESSELS

UNIT III DESIGN OF VESSELS
Design of Tall cylindrical self supporting process columns – Supports for short vertical vessels – Stress concentration at a variable Thickness transition section in a cylindrical vessel, about a circular hole, elliptical openings. Theory of Reinforcement – Pressure Vessel Design.
UNIT IV  BUCKLING AND FRACTURE ANALYSIS IN VESSELS

Buckling phenomenon – Elastic Buckling of circular ring and cylinders under external pressure – collapse of thick walled cylinders or tubes under external pressure – Effect of supports on Elastic Buckling of Cylinders – Buckling under combined External pressure and axial loading.

UNIT V  PIPING


OUTCOMES:
• Upon completion of this course, the students can able to apply the mathematical fundamental for the design of pressure vessels and pipes. Further they can able to analyse and design of pressure vessels and piping.

TEXT BOOK:

REFERENCES

ME8006  GAS DYNAMICS AND SPACE PROPULSION

OBJECTIVES:
• To understand the differences between incompressible and compressible flow.
• To understand the phenomenon of shock waves and its effect on flow.
• To gain basic knowledge about jet propulsion and rocket propulsion.

UNIT I  BASIC CONCEPTS AND ISENTROPIC FLOWS

UNIT II  FLOW THROUGH DUCTS
Flows through constant area ducts with heat transfer (Rayleigh flow) and Friction (Fanno flow) – variation of flow properties. Use of tables and charts.

UNIT III  NORMAL AND OBLIQUE SHOCKS

UNIT IV  JET PROPULSION
Theory of jet propulsion – thrust equation – thrust power and propulsive efficiency. Operation, cycle analysis and performance of ram jet, turbojet, turbofan and turbo prop engines.

UNIT V  SPACE PROPULSION

TOTAL: 45 PERIODS

OUTCOMES:
• Upon completion of this course, the students can able to successfully apply gas dynamics principles in the Jet and Space Propulsion

TEXT BOOKS:

REFERENCES:
1. Radhakrishnan, E., Gas Dynamics, Printice Hall of India, 2008
OBJECTIVE:
• The student will be able to understand the sources of vibration and noise in automobiles and make design modifications to reduce the vibration and noise and improve the life of the components

UNIT I BASICS OF VIBRATION
Introduction, classification of vibration: free and forced vibration, undamped and damped vibration, linear and non-linear vibration, response of damped and undamped systems under harmonic force, analysis of single degree and two degree of freedom systems, torsional vibration, determination of natural frequencies.

UNIT II BASICS OF NOISE
Introduction, amplitude, frequency, wavelength and sound pressure level, addition, subtraction and averaging decibel levels, noise dose level, legislation, measurement and analysis of noise, measurement environment, equipment, frequency analysis, tracking analysis, sound quality analysis.

UNIT III AUTOMOTIVE NOISE SOURCES

UNIT IV CONTROL TECHNIQUES
Vibration isolation, tuned absorbers, un-tuned viscous dampers, damping treatments, application dynamic forces generated by IC engines, engine isolation, crank shaft damping, modal analysis of the mass elastic model shock absorbers.

UNIT V SOURCE OF NOISE AND CONTROL
Methods for control of engine noise, combustion noise, mechanical noise, predictive analysis, palliative treatments and enclosures, automotive noise control principles, sound in enclosures, sound energy absorption, sound transmission through barriers

OUTCOMES:
• Understanding causes, source and types of vibrations in machineries
• Gaining knowledge in sources and measurement standard of noise
• Ability to design and develop vibrations and noise control systems.

TEXT BOOKS:
REFERENCES:

ME8008 THEORY OF METAL FORMING  L T P C  3 0 0 3

OBJECTIVES:
• This course aims to impart the knowledge about various metal forming processes. It deals with metal forming concepts like theory of plasticity and special metal forming techniques. After this course a student will have a good exposure about this subject. This also gives the recent trends in the metal forming processes.

UNIT I THEORY OF PLASTICITY  9

UNIT II CONSTITUTIVE RELATIONSHIPS AND INSTABILITY  7
Uniaxial tension test – Mechanical properties – Work hardening, Compression test, bulge test, plane strain compression, plastic instability in uniaxial tension stress, plastic instability in biaxial tension stress – Material models – Elasto plasticity, Rigid plasticity, visco plasticity.

UNIT III ANALYSIS OF METAL FORMING  12
Slab analysis – Slip line method, upper bound solutions, numerical methods, contact problems, effect of friction, thermo elastic- analysis of forging, rolling, extrusion and wire
drawing processes – forming load – Net and Near net shape forming – Cold and Hot Forging.

UNIT IV SHEET METAL FORMING


UNIT V SPECIAL METAL FORMING PROCESSES

Orbital forging, Isothermal forging, Warm forging, Hot and Cold isotrophical pressing, high speed extrusion, rubber pad forming, micro blanking – Overview of Powder Metal Techniques – Powder rolling.

OUTCOMES:

• Students will learn how to determine the loading of the forming tool or machine, and how to determine the critical values of deformation

TEXT BOOKS:


REFERENCES:

OBJECTIVE:
• To understand the operating principles of various turbomachines and analyse their use for various engineering applications.

UNIT I PRINCIPLES

UNIT II CENTRIFUGAL FANS AND BLOWERS

UNIT III CENTRIFUGAL COMPRESSOR

UNIT IV AXIAL FLOW COMPRESSOR

UNIT V AXIAL AND RADIAL FLOW TURBINES

OUTCOMES:
• Upon completion of this course, the students can able to explain the various systems, principles and applications and different types of turbo machinery components.

TEXT BOOKS:

REFERENCES:

ME8071 AUTOMOBILE ENGINEERING L T P C 3 0 0 3

OBJECTIVE:

• To provide a first course of teaching such that the learners are able to visualise the scope of Automobile Engineering.

UNIT I INTRODUCTION TO AUTOMOTIVES 10
An overview of different types of automobiles and their power sources. Specifications, Performance Parameters, Quality standards, Trends in automobile design.

UNIT II POWER SOURCE FEATURES 10
Reciprocating Engine systems, Rotary Engine systems, Gas Turbine systems, Hybrid systems. Pollutant emissions and their control; Catalytic converter systems, Electronic Engine Management systems.

UNIT III TRANSMISSION, SUSPENSION AND BREAKING SYSTEMS 10
Clutch system, Gear box system, propeller shafting, differential, axles, wheels and tyres and prelimineries of suspension systems

UNIT IV OTHER AUXILIARY SYSTEMS 10
Electrical and electronic systems, safety systems, Heating, Ventilation, and Air Conditioning (HVAC) systems, Vehicle Thermal Management System and vehicle body design features.

UNIT V TESTS, SERVICE AND MAINTENANCE 5
Engine Tuning, vehicle maintenance, engine and Chassis Dynamometry Pollutants and emissions check, Wind Tunnel Tests, preliminaries of engine and vehicle testing.

TOTAL: 45 PERIODS

OUTCOMES:

• Upon completion of this course, the students will be able to identify the different components in automobile engineering.
• Have clear understanding on different auxiliary and transmission systems usual.

TEXT BOOK:
REFERENCES:

ME8072 COMPUTATIONAL FLUID DYNAMICS

OBJECTIVES:
• To introduce Governing Equations of viscous fluid flows
• To introduce numerical modeling and its role in the field of fluid flow and heat transfer
• To enable the students to understand the various discretization methods, solution procedures and turbulence modeling.
• To create confidence to solve complex problems in the field of fluid flow and heat transfer by using high speed computers.

UNIT I GOVERNING EQUATIONS AND BOUNDARY CONDITIONS

UNIT II FINITE DIFFERENCE AND FINITE VOLUME METHODS FOR DIFFUSION

UNIT III FINITE VOLUME METHOD FOR CONVECTION DIFFUSION
Steady one-dimensional convection and diffusion – Central, upwind differencing schemes – properties of discretization schemes – Conservativeness, Boundedness, Transportiveness, Hybrid, Power-law, QUICK Schemes.

UNIT IV FLOW FIELD ANALYSIS

UNIT V TURBULENCE MODELS AND MESH GENERATION
Turbulence models, mixing length model, Two equation (k-ԑ) models – High and low

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students can able
- To create numerical modeling and its role in the field of fluid flow and heat transfer
- To use the various discretization methods, solution procedures and turbulence modeling to solve flow and heat transfer problems.

TEXT BOOKS:

REFERENCES:

ME8073 DESIGN FOR MANUFACTURING

OBJECTIVES:
- To understand the principles of design such that the manufacturing of the product is possible.
- To educate students on various design aspects to be considered for manufacturing the products using different processes.

UNIT I MANUFACTURING METHODOLOGY AND PROCESSES
Methodologies and tools, design axioms, design for assembly and evaluation, minimum part assessment, Taguchi method, robustness assessment, manufacturing process rules, designer’s tool kit, Computer Aided group Technology, failure mode effects analysis, Value Analysis, Design for minimum number of parts, development of modular design, minimizing part variations, design of parts to be multi-functional, multi-use, ease of fabrication, Poke Yoke principles.
UNIT II GEOMETRIC ANALYSIS
Surface finish, review of relationship between attainable tolerance grades and different machining processes, part features-feature of size-control from-placement material condition – MMC – LMC

UNIT III FORM DESIGN OF CASTINGS AND WELDMENTS
Redesign of castings based on parting line considerations, minimizing core requirements, redesigning cast members by welded structure, use of welding symbols.

UNIT IV MECHANICAL ASSEMBLY
Selective assembly, deciding the number of groups, control of axial play, examples, Grouped datum systems, different types, geometric analysis and applications, design features to facilitate automated assembly, Assembly analysis worst case Arithmetic method, Monte-Carlo method.

UNIT V TRUE POSITION THEORY
Virtual size concept, floating and fixed fasteners, projected tolerance zone, assembly with gasket, zero true position tolerance, functional gauges, paper layout gauging, examples. Operation sequence for typical shaft type of components. Preparation of process drawings for different operations, tolerance worksheets and centrality analysis, examples.

OUTCOMES:
- Upon completion of the subject, students will be able to
- understand the concept of mass customization and product family design;
- apply appropriate methods to achieve quality in product design;
- analyze product design for assembly, manufacturing, and end-of-life issues;
- understand how global environmental requirements affect product design;
- analyze product design in terms of environmental impact and suggest improvements.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:
# ME8074  DESIGN OF JIGS, FIXTURES AND PRESS TOOLS  

## OBJECTIVES:
- To understand the functions and design principles of Jigs, fixtures and press tools.
- To gain proficiency in the development of required views of the final design.

## UNIT I  LOCATING AND CLAMPING PRINCIPLES:

## UNIT II  JIGS AND FIXTURES
Design and development of jigs and fixtures for given component- Types of Jigs – Post, Turnover, Channel, latch, box, pot, angular post jigs – Indexing jigs – General principles of milling, Lathe, boring, broaching and grinding fixtures – Assembly, Inspection and Welding fixtures – Modular fixturing systems- Quick change fixtures.

## UNIT III  PRESS WORKING TERMINOLOGIES AND ELEMENTS OF CUTTING DIES

## UNIT IV  BENDING AND DRAWING DIES

## UNIT V  OTHER FORMING TECHNIQUES
Bulging, Swaging, Embossing, coining, curling, hole flanging, shaving and sizing, assembly, fine Blanking dies – recent trends in tool design- computer Aids for sheet metal forming Analysis – basic introduction - tooling for numerically controlled machines- setup reduction for work holding – Single minute exchange of dies – Poka Yoke.

**TOTAL:** 45 PERIODS

**Note:** (Use of P S G Design Data Book is permitted in the University examination)
OUTCOMES:
- Upon completion of this course, the students can able to design jigs, fixtures and press tools.

TEXT BOOK:

REFERENCES:
5. ASTME Fundamentals of Tool Design Prentice Hall of India.

ME8075 ENERGY CONSERVATION IN INDUSTRIES L T P C 3 0 0 3

OBJECTIVES:
At the end of the course, the student is expected to
- understand and analyse the energy data of industries
- carryout energy accounting and balancing
- conduct energy audit and suggest methodologies for energy savings and
- utilise the available resources in optimal ways

UNIT I INTRODUCTION 8

UNIT II ELECTRICAL SYSTEMS 12
UNIT III THERMAL SYSTEMS

UNIT IV ENERGY CONSERVATION IN MAJOR UTILITIES
Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems – Cooling Towers – D.G. sets

UNIT V ECONOMICS
Energy Economics – Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing –ESCO concept

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students can able to analyse the energy data of industries.
- Can carryout energy accounting and balancing
- Can suggest methodologies for energy savings

TEXT BOOK:

REFERENCES:

ME8076 ENTREPRENEURSHIP DEVELOPMENT L T P C 3 0 0 3

OBJECTIVE:
- Study of this subject provides an understanding of the scope of an entrepreneur, key areas of development, financial assistance by the institutions, methods of taxation and tax benefits, etc.
UNIT I  ENTREPRENEURSHIP

UNIT II  MOTIVATION
Major Motives Influencing an Entrepreneur – Achievement Motivation Training, self Rating, Business Game, Thematic Apperception Test – Stress management, Entrepreneurship Development Programs – Need, Objectives.

UNIT III  BUSINESS

UNIT IV  FINANCING AND ACCOUNTING

UNIT V  SUPPORT TO ENTREPRENEURS

TOTAL: 45 PERIODS

OUTCOMES :
- Upon completion of the course, students will be able to gain knowledge and skills needed to run a business successfully.

TEXT BOOKS :

REFERENCES :

ME8077 MARKETING MANAGEMENT L T P C 3 0 0 3

OBJECTIVE:
- To understand the various processes involved in Marketing and its Philosophy.
- To learn the Psychology of consumers.
- To formulate strategies for advertising, pricing and selling

UNIT I MARKETING PROCESS 9
Definition, Marketing process, dynamics, needs, wants and demands, marketing concepts, environment, mix, types. Philosophies, selling versus marketing, organizations, industrial versus consumer marketing, consumer goods, industrial goods, product hierarchy

UNIT II BUYING BEHAVIOUR AND MARKET SEGMENTATION 9
Cultural, demographic factors, motives, types, buying decisions, segmentation factors - demographic -Psycho graphic and geographic segmentation, process, patterns.
UNIT III PRODUCT PRICING AND MARKETING RESEARCH
Objectives, pricing, decisions and pricing methods, pricing management. Introduction, uses, process of marketing research.

UNIT IV PLANNING AND STRATEGY FORMULATION
Components of marketing plan-strategy formulations and the marketing process, implementations, portfolio analysis, BCG, GEC grids.

UNIT V ADVERTISING, SALES PROMOTION AND DISTRIBUTION
Characteristics, impact, goals, types, and sales promotions- point of purchase- unique selling proposition. Characteristics, wholesaling, retailing, channel design, logistics, and modern trends in retailing.

OUTCOMES:
- The learning skills of Marketing will enhance the knowledge about Marketer’s Practices and create insights on Advertising, Branding, Retailing and Marketing Research.

TEXT BOOKS:

REFERENCES:
7. Graeme Drummond and John Ensor, Introduction to marketing concepts, Elsevier, Indian Reprint, 2002

ME8078 NEW AND RENEWABLE SOURCES OF ENERGY

OBJECTIVE:
- At the end of the course, the students are expected to identify the new methodologies / technologies for effective utilization of renewable energy sources.

UNIT I INTRODUCTION
World Energy Use – Reserves of Energy Resources – Environmental Aspects of Energy

UNIT II  SOLAR ENERGY

UNIT III  WIND ENERGY

UNIT IV  BIO - ENERGY

UNIT V  OTHER RENEWABLE ENERGY SOURCES

TOTAL : 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to identify the new methodologies / technologies for effective utilization of renewable energy sources.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:

• To understand material removal by using various forms of energy and machining new materials and complex parts with high accuracy by using non-traditional machining.

UNIT I  INTRODUCTION

Need of Non-Traditional Machining Processes – Classification Based on Energy, Mechanism, source of energy, transfer media and process - Process selection-Based on Physical Parameters, shapes to be machined, process capability and economics – Overview of all processes.

UNIT II  MECHANICAL PROCESS


UNIT III  ELECTRICAL DISCHARGE MACHINING


UNIT IV  CHEMICAL AND ELECTRO CHEMICAL MACHINING


UNIT V  HIGH ENERGY MACHINING PROCESS

OUTCOMES:
• Upon completion of this course, the students can able to demonstrate different unconventional machining processes and know the influence of difference process parameters on the performance and their applications.

TEXT BOOKS:

REFERENCES:

ME8080 REFRIGERATION AND AIR CONDITIONING L T P C 3 0 0 3

OBJECTIVES:
• To understand the underlying principles of operations in different Refrigeration & Air conditioning systems and components.
• To provide knowledge on design aspects of Refrigeration & Air conditioning systems

UNIT I INTRODUCTION
Introduction to Refrigeration - Unit of Refrigeration and C.O.P.– Ideal cycles- Refrigerants Desirable properties – Classification - Nomenclature - ODP & GWP.

UNIT II VAPOUR COMPRESSION REFRIGERATION SYSTEM 10

UNIT III OTHER REFRIGERATION SYSTEMS 8
Working principles of Vapour absorption systems and adsorption cooling systems - Steam jet refrigeration- Ejector refrigeration systems- Thermoelectric refrigeration- Air refrigeration- Magnetic - Vortex and Pulse tube refrigeration systems.
UNIT IV  PSYCHROMETRIC PROPERTIES AND PROCESSES
Properties of moist Air-Gibbs Dalton law, Specific humidity, Dew point temperature, Degree of saturation, Relative humidity, Enthalpy, Humid specific heat, Wet bulb temperature Thermodynamic wet bulb temperature, Psychrometric chart; Psychrometric of air-conditioning processes, mixing of air streams.

UNIT V  AIR CONDITIONING SYSTEMS AND LOAD ESTIMATION
Air conditioning loads: Outside and inside design conditions; Heat transfer through structure, Solar radiation, Electrical appliances, Infiltration and ventilation, internal heat load; Apparatus selection; fresh air load, human comfort & IAQ principles, effective temperature & chart, calculation of summer & winter air conditioning load; Classifications, Layout of plants; Air distribution system; Filters; Air Conditioning Systems with Controls: Temperature, Pressure and Humidity sensors, Actuators & Safety controls.

TOTAL: 45 PERIODS

OUTCOMES:
• Upon completion of this course, the students can able to demonstrate the operations in different Refrigeration & Air conditioning systems and also able to design Refrigeration & Air conditioning systems.

TEXT BOOK:

REFERENCES:

ME8081  RELIABILITY CONCEPTS IN ENGINEERING

OBJECTIVE:
• To impart knowledge in reliability concepts, reliability estimation methods and reliability improvement methods

UNIT I  RELIABILITY CONCEPT
Reliability definition – Reliability parameters- f(t), F(t) and R(t) functions- Measures of central tendency – Bath tub curve – A priori and posteriori probabilities of failure – Component mortality - Useful life.
UNIT II    LIFE DATA ANALYSIS
Data classification – Non parametric methods: Ungrouped, Grouped, Complete, Censored
data – Time to failure distributions – Probability plotting: Exponential, Weibull - Goodness of
fit tests – Survival graphs.

UNIT III    RELIABILITY ESTIMATION
Series parallel configurations – Parallel redundancy – m/n system – Complex systems: RBD
approach – Baye’s method – Minimal path and cut sets - Fault Tree analysis – Standby system.

UNIT IV    RELIABILITY MANAGEMENT
Reliability testing: Failure terminated test – Time terminated test – Upper and lower MTBFs –

UNIT V    RELIABILITY IMPROVEMENT
Analysis of downtime – Repair time distribution – Maintainability prediction – Measures of
maintainability – Availability definitions – System Availability – Replacement decisions –
Economic life.

TOTAL: 45 PERIODS

OUTCOMES:
• Upon successful completion of this course, the students can able to apply the concept for
  reliable component production

REFERENCES:
1. An Introduction to Reliability and Maintainability Engineering, Charles E.Ebeling, TMH,
   2000.
2. Roy Billington and Ronald N. Allan, Reliability Evaluation of Engineering Systems,

ME8552    HYDRAULICS AND PNEUMATICS    L T P C
3 0 0 3

OBJECTIVE:
• This course will give an appreciation of the fundamental principles, design and
  operation of hydraulic and pneumatic components and systems and their application in
  manufacturing and mechanical systems.

UNIT I    FLUID POWER PRINCIPLES AND HYDRAULIC PUMPS
Introduction to Fluid power- Advantages and Applications- Fluid power systems – Types of
fluids- Properties of fluids – Basics of Hydraulics – Pascal’s Law- Principles of flow – Friction
loss- Work, Power and Torque. Problems
Sources of Hydraulic power: Pumping Theory – Pump Classification- Construction, Working,
Design, Advantages, Disadvantages, Performance, Selection criterion of Linear, Rotary- Fixed
and Variable displacement pumps-Problems
UNIT II HYDRAULIC ACTUATORS AND VALVES
Hydraulic Actuators: Cylinders– Types and construction, Application, Hydraulic cushioning

UNIT III HYDRAULIC SYSTEMS
Accumulators, Intensifiers, Industrial hydraulic circuits- Regenerative, Pump Unloading, Double-pump, Pressure Intensifier, Air-over oil, Sequence, Reciprocation, Synchronization, Fail-safe, Speed control, Hydrostatic transmission, Electro hydraulic circuits, Mechanical Hydraulic servo systems.

UNIT IV PNEUMATIC SYSTEMS

UNIT V TROUBLE SHOOTING AND APPLICATIONS

OUTCOMES:
- Identify hydraulic and pneumatics components.
- Ability to design hydraulic and pneumatic circuits.

TEXT BOOK:

REFERENCES:
MA8356  PROBABILITY AND STATISTICS  L T P C  3 1 0 4

OBJECTIVES:
- To make the students acquire a sound knowledge in statistical techniques that model engineering problems.
- The Students will have a fundamental knowledge of the concepts of probability.

UNIT I  RANDOM VARIABLES  9+3
Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT II  TWO-DIMENSIONAL RANDOM VARIABLES  9+3
Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III  TESTS OF SIGNIFICANCE  9+3

UNIT IV  DESIGN OF EXPERIMENTS  9+3
Completely randomized design – Randomized block design – Latin square design - 2^k - factorial design - Taguchi’s robust parameter design.

UNIT V  STATISTICAL QUALITY CONTROL  9+3
Control charts for measurements (X̅ and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

OUTCOMES:
After successfully completing the course, students should be able to do the following:
- Use statistical methodology and tools in the engineering problem-solving process.
- Compute and interpret descriptive statistics using numerical and graphical techniques.
- Understand the basic concepts of probability, random variables, probability distribution, and joint probability distribution.
- Compute point estimation of parameters, explain sampling distributions, and understand the central limit theorem.

TEXT BOOKS:

REFERENCES:

GE8751 ENGINEERING ETHICS AND HUMAN VALUES L T P C 3 0 0 3

OBJECTIVES:
- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I HUMAN VALUES 10

UNIT II ENGINEERING ETHICS 9

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9
Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law – The Challenger Case Study

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9

UNIT V GLOBAL ISSUES 8
Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development
OUTCOMES:
- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

TEXT BOOKS:
- M. Govindarajan, S. Natarajan and V.S. Senthil Kumar - published by PHI revised edition - 2012

REFERENCES:

WEB SOURCES:
1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

MG8654 TOTAL QUALITY MANAGEMENT

AIM
To provide comprehensive knowledge about the principles, practices, tools and techniques of Total quality management.

OBJECTIVES
- To understand the various principles, practices of TQM to achieve quality.
- To learn the various statistical approaches for Quality control.
- To understand the TQM tools for continuous process improvement.
- To learn the importance of ISO and Quality systems.
UNIT I INTRODUCTION

UNIT II TQM PRINCIPLES
Quality statements - Customer focus –Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Continuous process improvement – PDCA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I

UNIT IV TQM TOOLS & TECHNIQUES II

UNIT V QUALITY SYSTEMS

OUTCOMES:
- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXT BOOK:

REFERENCE BOOKS:
OBJECTIVES:

- To know the principle methods, areas of usage, possibilities and limitations as well as environmental effects of the Additive Manufacturing technologies
- To be familiar with the characteristics of the different materials those are used in Additive Manufacturing.

UNIT I INTRODUCTION

UNIT II CAD & REVERSE ENGINEERING

UNIT III LIQUID BASED AND SOLID BASED ADDITIVE MANUFACTURING SYSTEMS

UNIT IV POWDER BASED ADDITIVE MANUFACTURING SYSTEMS

UNIT V MEDICAL AND BIO-ADDITIVE MANUFACTURING
Customized implants and prosthesis: Design and production. Bio-Additive Manufacturing-Computer Aided Tissue Engineering (CATE) – Case studies

OUTCOMES:

- Upon completion of this course, the students can compare different methods and discuss the effects of the Additive Manufacturing technologies and analyse the characteristics of the different materials in Additive Manufacturing.

TEXT BOOKS:

REFERENCES:

MF8074

INDUSTRIAL ROBOTICS

OBJECTIVES:
• To understand the functions of the basic components of a Robot.
• To study the use of various types of End of Effectors and Sensors
• To impart knowledge in Robot Kinematics and Programming
• To learn Robot safety issues and economics.

UNIT I  FUNDAMENTALS OF ROBOT
Robot - Definition - Robot Anatomy - Co ordinate Systems, Work Envelope Types and Classification-Specifications-Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load-Robot Parts and their Functions-Need for Robots-Different Applications.

UNIT II  ROBOT DRIVE SYSTEMS AND END EFFECTORS
Pneumatic Drives-Hydraulic Drives-Mechanical Drives-Electrical Drives-D.C. Servo Motors, Stepper Motors, A.C. Servo Motors-Salient Features, Applications and Comparison of all these Drives, End Effectors-Grippers-Mechanical Grippers, Pneumatic and Hydraulic- Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations.

UNIT III  SENSORS AND MACHINE VISION
UNIT IV   ROBOT KINEMATICS AND ROBOT PROGRAMMING

Forward Kinematics, Inverse Kinematics and Difference; Forward Kinematics and Reverse Kinematics of manipulators with Two, Three Degrees of Freedom (in 2 Dimension), Four Degrees of freedom (in 3 Dimension) Jacobians, Velocity and Forces-Manipulator Dynamics, Trajectory Generator, Manipulator Mechanism Design-Derivations and problems. Lead through Programming, Robot programming Languages-VAL Programming-Motion Commands, Sensor Commands, End Effector commands and simple Programs.

UNIT V   IMPLEMENTATION AND ROBOT ECONOMICS

RGV, AGV; Implementation of Robots in Industries-Various Steps; Safety Considerations for Robot Operations - Economic Analysis of Robots.

TOTAL: 45 PERIODS

OUTCOMES:
• Upon completion of this course, the students can able to apply the basic engineering knowledge for the design of robotics

TEXT BOOKS:

REFERENCE BOOKS:

MF8075   MEMS AND MICRO SYSTEM FABRICATION

OBJECTIVES:
• To understand the mechanics, scaling and design of micro system
• To learn various micro fabrication processes
• To impart knowledge on microsystems packaging and metrology of micro machined components
UNIT I  INTRODUCTION

UNIT II  MECHANICS, SCALING AND DESIGN

UNIT III  MICRO SYSTEM FABRICATION PROCESSES
Introduction-Photolithography- Ion implantation- Chemical Vapor deposition-Physical Vapor deposition- clean room- Bulk micromachining : etching, isotropic and anisotropic etching, wet and dry etching- Surface micro machining : process, mechanical problems associated with surface micro machining- LIGA process : general description, materials for substrates and photo resists- SLIGA process- Abrasive jet micro machining-Laser beam micro machining-Micro Electrical Discharge Micro Machining – Ultrasonic Micro Machining- Electro chemical spark micro machining- Electron beam micro machining- Focused Ion Beam machining

UNIT IV  TOOL BASED MICROMACHINING

UNIT V  MICROSYSTEMS PACKAGING AND METROLOGY OF MICRO MACHINED COMPONENTS
Introduction - Microsystems Packaging- Interfaces in Microsystems Packaging-Essential Packaging Technologies- Three dimensional Packaging- Assembly of Microsystems- Signal Mapping and Transduction-Metrology of Micromachined components: SEM, optical microscopy, Scanning white light interferometry, Confocal Laser scanning microscopy, SPM, Molecular measuring machine, Micro coordinate measuring machine

TOTAL: 45 PERIODS

OUTCOMES
- Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory control theory and apply them to electrical engineering problems.
- Ability to understand and analyse, linear and digital electronic circuits.
TEXT BOOKS:

REFERENCES:

MF8077 PRODUCT DESIGN AND DEVELOPMENT L T P C
3 0 0 3

OBJECTIVE:
• To Teach the students basic concepts of Product Design and Process Development.
  Expose the students to the importance, various stages, concepts, management and prototyping of Product Design and Process Development.

UNIT I  INTRODUCTION
Strategic importance of Product development - integration of customer, designer, material supplier and process planner, Competitor and customer - behavior analysis. Understanding customer-promoting customer understanding-involve customer in development and managing requirements - Organization process management and improvement.

UNIT II  CONCEPT GENERATION, SELECTION AND TESTING

UNIT III  PRODUCT ARCHITECTURE
Product development management - establishing the architecture - creation - clustering - geometric layout development - Fundamental and incidental interactions - related system level design issues - secondary systems -architecture of the chunks - creating detailed interface specifications-Portfolio Architecture.

UNIT IV  INDUSTRIAL DESIGN
Integrate process design - Managing costs - Robust design - Integrating CAE, CAD, CAM tools – Simulating product performance and manufacturing processes electronically - Need for
industrial design-impact – design process - investigation of customer needs - conceptualization - refinement - management of the industrial design process.

UNIT V DESIGN FOR MANUFACTURING AND PRODUCT DEVELOPMENT 9
Definition - Estimation of Manufacturing cost-reducing the component costs and assembly costs – Minimize system complexity - Prototype basics - Principles of prototyping - Planning for prototypes - Economic Analysis.

TOTAL: 45 PERIODS

OUTCOME
The student would have the
- Ability to launch own ideas and the ideas of others, which enables them to manage to work with innovation and development in large companies
- Ability to apply new theories on innovation and change, including emerging paradigms such as user-driven innovation, open innovation and market forecasting in practice.

TEXT BOOK:

REFERENCES:

MF8451 PROCESS PLANNING AND COST ESTIMATION L T P C 3 0 0 3

OBJECTIVE:
- To introduce the process planning concepts to make cost estimation for various products after process planning

UNIT I INTRODUCTION TO PROCESS PLANNING 10
Introduction- methods of process planning-Drawing interpretation-Material evaluation – steps in process selection-.Production equipment and tooling selection

UNIT II PROCESS PLANNING ACTIVITIES 10
Process parameters calculation for various production processes-Selection jigs and fixtures-selection of quality assurance methods - Set of documents for process planning-Economics of process planning- case studies
UNIT III  INTRODUCTION TO COST ESTIMATION  8

UNIT IV  PRODUCTION COST ESTIMATION  8
Estimation of Different Types of Jobs - Estimation of Forging Shop, Estimation of Welding Shop, Estimation of Foundry Shop

UNIT V  MACHINING TIME CALCULATION  9
Estimation of Machining Time - Importance of Machine Time Calculation - Calculation of Machining Time for Different Lathe Operations, Drilling and Boring - Machining Time Calculation for Milling, Shaping and Planning - Machining Time Calculation for Grinding

TOTAL: 45 PERIODS

OUTCOMES:
• Upon completion of this course, the students can able to use the concepts of process planning and cost estimation for various products.

TEXT BOOKS:

REFERENCES:

MF8751  OPERATIONS RESEARCH  L T P C
3 0 0 3

OBJECTIVE:
• To provide knowledge and training in using optimization techniques under limited resources for the engineering and business problems.

UNIT I  LINEAR MODELS  15

UNIT II  TRANSPORTATION MODELS AND NETWORK MODELS  8
UNIT III INVENTORY MODELS
6
Inventory models – Economic order quantity models – Quantity discount models – Stochastic
inventory models – Multi product models – Inventory control models in practice.

UNIT IV QUEUEING MODELS
6
Queueing models - Queueing systems and structures – Notation parameter – Single server
and multi server models – Poisson input – Exponential service – Constant rate service –
Infinite population – Simulation.

UNIT V DECISION MODELS
10
Decision models – Game theory – Two person zero sum games – Graphical solution- Algebraic
solution – Linear Programming solution – Replacement models – Models based on service life –
Economic life – Single / Multi variable search technique – Dynamic Programming – Simple
Problem.

OUTCOMES:
• Upon completion of this course, the students can able to use the optimization techniques
for use engineering and Business problems

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCE BOOKS:
1990.

ML8022 NONDESTRUCTIVE MATERIALS EVALUATION L T P C
3 0 0 3

OBJECTIVE:
To study and understand the various Non Destructive Evaluation and Testing methods, theory
and their industrial applications.
UNIT I   OVERVIEW OF NDT
NDT Versus Mechanical testing, Overview of the Non Destructive Testing Methods for the
detection of manufacturing defects as well as material characterisation. Relative merits and
limitations, Various physical characteristics of materials and their applications in NDT., Visual
inspection – Unaided and aided.

UNIT II   SURFACE NDE METHODS
Liquid Penetrant Testing - Principles, types and properties of liquid penetrants, developers,
advantages and limitations of various methods, Testing Procedure, Interpretation of results. Magnetic
Particle Testing - Theory of magnetism, inspection materials Magnetisation methods, Interpretation
and evaluation of test indications, Principles and methods of demagnetization, Residual magnetism.

UNIT III   THERMOGRAPHY AND EDDY CURRENT TESTING (ET)
Thermography- Principles, Contact and non contact inspection methods, Techniques for
applying liquid crystals, Advantages and limitation - infrared radiation and infrared detectors,
Instrumentations and methods, applications.
Eddy Current Testing-Generation of eddy currents, Properties of eddy currents, Eddy current
sensing elements, Probes, Instrumentation, Types of arrangement, Applications, advantages,
Limitations, Interpretation/Evaluation.

UNIT IV   ULTRASONIC TESTING (UT) AND ACOUSTIC EMISSION (AE)
Ultrasonic Testing-Principle, Transducers, transmission and pulse-echo method, straight beam
and angle beam, instrumentation, data representation, A/Scan, B-scan, C-scan. Phased Array
Ultrasound, Time of Flight Diffraction.

UNIT V   RADIOGRAPHY (RT)
Principle, interaction of X-Ray with matter, imaging, film and film less techniques, types
and use of filters and screens, geometric factors, Inverse square, law, characteristics of
films - graininess, density, speed, contrast, characteristic curves, Penetrameters, Exposure
charts, Radiographic equivalence. Fluoroscopy- Xero-Radiography, Computed Radiography, Computed
Tomography

OUTCOMES:
• Upon completion of this course, the students can able to use the various Non Destructive
Testing and Testing methods understand for defects and characterization of industrial
components

TEXT BOOKS:
2. Ravi Prakash, “Non-Destructive Testing Techniques”, New Age International Publishers,
1st revised edition, 2010
REFERENCES:

GE8072 DISASTER MANAGEMENT
OBJECTIVES:
• To provide students an exposure to disasters, their significance and types.
• To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
• To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
• To enhance awareness of institutional processes in the country and
• To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS
Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR)
Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Institutional Processess and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT
Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and
Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA
Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS
Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

OUTCOMES:
The students will be able to
- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

TEXTBOOK:

REFERENCES
1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005

GE8073 HUMAN RIGHTS

OBJECTIVES:
- To sensitize the Engineering students to various aspects of Human Rights.
UNIT I

UNIT II

UNIT III
Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNIT IV
Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V

TOTAL : 45 PERIODS

OUTCOME :
• Engineering students will acquire the basic knowledge of human rights.

REFERENCES: