### B.E. PRODUCTION ENGINEERING (PART TIME)  
#### I- VII SEMESTER CURRICULA AND SYLLABI

#### SEMESTER I

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**TOTAL CREDITS TO BE EARNED FOR THE AWARD OF THE DEGREE = 101**  
(15+14+15+14+14+14+15)

### ELECTIVES FOR B.E. PRODUCTION ENGINEERING – PART TIME (R-2013)

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OBJECTIVES

- To facilitate the understanding of the principles and to cultivate the art of formulating physical problems in the language of mathematics.

UNIT I MATRICES
9

UNIT II FUNCTIONS OF SEVERAL VARIABLES
9

UNIT III ANALYTIC FUNCTION
9
Analytic functions – Necessary and sufficient conditions for analyticity – Properties – Harmonic conjugates – Construction of analytic function – Conformal Mapping – Mapping by functions w = a + z, az, 1/z, - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION
9
Line Integral – Cauchy’s theorem and integral formula – Taylor’s and Laurent’s Series – Singularities – Residues – Residue theorem – Application of Residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

UNIT V LAPLACE TRANSFORMS
9

TOTAL: 45 PERIODS

OUTCOMES

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- 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.

BOOKS FOR STUDY

REFERENCES

PTPH8151 ENGINEERING PHYSICS

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
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.

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:

PTCY8152  ENGINEERING CHEMISTRY  L T P C
3 0 0 3

OBJECTIVES:
• To understand about the chemical thermodynamics.
• To impart knowledge in the basics of polymer chemistry.
• To develop sound knowledge on kinetics and catalysis.
• To impart basic knowledge on photochemistry and spectroscopy

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 work function: Criteria of spontaneity; Helmholtz and Gibbs free energy functions; 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
Introduction-reaction velocity, factors affecting reaction velocity, rate constant, order of reaction, molecularity, pseudo molecular reactions, zero, first, second, and third order reactions, reactions of fractional orders, determination of order of reactions. Catalysis: Auto catalysis -
Enzyme Catalysis: Michaelis-Menton equation; factors affecting enzyme catalysis.

UNIT IV PHOTOCHEMISTRY AND SPECTROSCOPY

UNIT V NANOCHEMISTRY

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:

PTGE8151 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  9

UNIT II  C PROGRAMMING BASICS  9

UNIT III  ARRAYS AND STRINGS  9

UNIT IV  FUNCTIONS AND POINTERS  9

UNIT V  STRUCTURES AND UNIONS  9
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.

TOTAL: 45 PERIODS

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:
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 STATICS OF PARTICLES 9

UNIT II  EQUILIBRIUM OF RIGID BODIES 9
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 9

UNIT IV  DYNAMICS OF PARTICLES 9

UNIT V  FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS 9
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.

TOTAL: 45 PERIODS

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.

TEXT BOOKS:
REFERENCES:

PTPR8201     ELECTRICAL, ELECTRONICS AND CONTROL SYSTEMS     L T P C

OBJECTIVE:
- To study about the electrical components, electronics devices, various types of motors, Control Systems and Measuring Systems.

UNIT I       BASIC ELECTRICAL COMPONENTS.  9
Ohm’s law, Kirchhoff’s laws ,Faradays law, Lenz ‘s law, Transformers-principle, operation, properties, and characteristics , Motors- D.C , A.C, Servo, and Stepper-principles, operation, properties and characteristics .

UNIT II      BASIC ELECTRONIC DEVICES:  9
R, L, C components- properties and types, Semiconductor devices – Diodes , BJT , FET, UJT, SCR, Displays -- operating principles, characteristics . and applications. Rectifier and power supply circuits.

UNIT III     ANALOG AND DIGITAL CIRCUITS  9

UNIT IV      BASICS OF CONTROL SYSTEM  9
Introduction to control systems – open loop and closed loop, Test signals, Block diagram and signal flow graph representation, concept of pole -zero of system, realization of transfer functions. Time and Frequency response of dynamic systems, Stability analysis of control systems.

UNIT V       MEASURING SYSTEMS  9

TOTAL: 45 PERIODS

OUTCOMES:
- The students will be able to construct analog and digital circuits with electrical and electronics component. They will be familiar with the use of electrical and electronic measuring systems.
TEXT BOOKS:

REFERENCES:

PTPR8202 FOUNDRY AND WELDING TECHNOLOGY  L T P C
3 0 0 3

OBJECTIVES:
- To understand the principle, procedure and applications of Foundry and Welding Processes.
- Class supported by video film shows on the various processes.

UNIT I CASTING PROCESS 10

UNIT II WELDING PROCESSES 9

UNIT III SPECIAL CASTING PROCESSES 8

UNIT IV SPECIAL WELDING PROCESSES 9

UNIT V TESTING OF CASTINGS & WELDMENTS 9

TOTAL: 45 PERIODS

OUTCOMES:
- Gives a comprehensive idea about the two different methods of production process.
- Student can select the appropriate process to make a part by the right method.
PTPR8203 METAL CUTTING AND CNC MACHINES

OBJECTIVES:
- To understand the theory of metal cutting.
- To understand the concepts of gear manufacture.
- To understand CNC machines constructional features, working and programming.

UNIT I TOOL MATERIAL, TOOL WEAR AND TOOL LIFE 9

UNIT II MECHANICS OF METAL CUTTING 9

UNIT III GEAR MANUFACTURE 8
Different methods of gear manufacture — gear generation – different methods - gear hobbing , gear shaping, gear planning and bevel gear generation. gear broaching – gear finishing methods - shaving – grinding , lapping and gear honing

UNIT IV CNC MACHINES 9
NC, CNC & DNC – types of CNC – constructional features of CNC machines - feed back devices – preset & qualified tools – Machining center – Turning center – CNC wire cut EDM.

UNIT V CNC PROGRAMMING 10

TOTAL: 45 PERIODS

OUTCOME
- Acquired knowledge will equip the candidate in selection of proper tools of required nomenclature and materials and also the replacement of tools with respect to quality requirement.

TEXT BOOKS:
REFERENCES:
5. Geoffrey Boothroyd, Winston A. Knight, “Fundamental sof Machining and Machine Tools”

PTPR8204 METALLURGY AND MATERIALS TESTING

OBJECTIVES:
• 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.
• To study the theoretical foundations of metallography, X-ray diffraction, electron diffraction, scanning electron microscopy, chemical and thermal analysis.

UNIT I CONSTITUTION OF ALLOYS AND PHASE DIAGRAMS

UNIT II HEAT TREATMENT AND STRENGTHENING

UNIT III FERROUS AND NON FERROUS METALS

UNIT IV MECHANICAL PROPERTIES AND TESTING
UNIT V  CHARACTERISATION OF MATERIALS


TOTAL: 45 PERIODS

OUTCOME
- Students could understand the correlation between the structure and mechanical properties of engineering materials.
- Students could select or suggest a suitable material for any engineering application.
- Students could understand and the need, principle, procedure, applications and limitations of various characterisation techniques.

TEXT BOOKS:

REFERENCES:

PTPR8211  METAL CUTTING AND CNC LAB  L  T  P  C
0  0  3  2

OBJECTIVE:
- To expose the students to write, simulate and Machine the various operations in CNC machines with metal cutting concept.

LIST OF EXPERIMENTS
1. Tool life study on a single point turning tool.
4. Acceptance test on RAM type milling machine as per ISI test chart & Measurement of single point tool angles.
5. Spur Gear milling in gear shaper.
6. Gear hobbing - (i) Spur Gear / Helical Gear.
7. Programming and machining of step turning and taper turning operation in CNC Lathe.
8. Programming and machining of thread cutting and grooving operation in CNC Lathe.
9. Programming and simulation for canned cycle in CNC lathe.
   (i) Stock removing in facing cycle.
   (ii) Stock removing in turning cycle.
(iii) Grooving cycle.
(iv) Thread cutting cycle.

11. Programming for mirroring / scaling function / Pocket milling and drilling cycle in a CNC milling.
13. Programming and Simulation in CNC Router.
14. Virtual CNC Programming & Study And Operation Of Machining / Turning Centre.

TOTAL: 45 PERIODS

OUTCOME
- Trained students will be able to understand the working of CNC machines and mechanisms of metal cutting. Acquire knowledge to in proper selection of tools.

PTPR8301 FLUID POWER DRIVES AND CONTROLS

OBJECTIVES:
- To understand the working principle of hydraulic and pneumatic components and its selection.
- To design hydraulic and pneumatic circuits for different applications.

UNIT I INTRODUCTION TO FLUID POWER & HYDRAULICS PRINCIPLE

UNIT II FLUID POWER DRIVES
Fluid Power drives – Pumps – working principle and construction details of Gear, vane and piston pumps, Hydraulic motors, Hydrostatic transmission drives and characteristics, Hydraulic supply components Pneumatic power supply – compressors, air distribution, air motors.

UNIT III FLUID POWER ELEMENTS

UNIT IV HYDRAULIC AND PNEUMATIC CIRCUITS DESIGN

UNIT V ELECTRO PNEUMATICS AND PLC CIRCUITS
Use of electrical timers, switches, solenoid, relays, proximity sensors etc. electro pneumatic sequencing Ladder diagram – PLC – elements, functions and selection – PLC programming – Ladder and different programming methods - Sequencing circuits.

TOTAL: 45 PERIODS

OUTCOME:
- Gives confidence to design any fluid power circuit.
- Acts as a ball to integrate various activities in a manufacturing activity.
TEXT BOOKS:

REFERENCES:

PTPR8302 METAL FORMING PROCESSES

OBJECTIVE:
- To understand the principle, procedure and application of Bulk Metal Forming and Sheet Metal Forming.

UNIT I FUNDAMENTALS OF METAL FORMING

UNIT II FORGING AND ROLLING

UNIT III EXTRUSION AND DRAWING PROCESSES

UNIT IV SHEET METAL FORMING PROCESSES

UNIT V POWDER FORGING AND RECENT ADVANCES
Powdered metals and fabrication procedures, Applications, Preparation of powders, Compacting and sintering, Yield criteria and flow rules, Hot and cold pressing (HIP, CIP) –P/M forming – Electro forming – fine blanking – Hydro forming – Peen forming – Laser Forming – Micro forming – Isothermal forging – high speed for forging and extrusion near net shape forming – Ultra fine grained materials by severe plastic deformation CAD and CAM in forming.

TOTAL: 45 PERIODS
OUTCOMES
• The students can understand load requirements for various bulk metal forming with or without addition of heat. The students can understand tooling and press capacity for making sheet metal components.

TEXT BOOKS:

REFERENCES:

PTPR8303 QUANTITATIVE TECHNIQUES IN MANAGEMENT L T P C
3 0 0 3

OBJECTIVE:
• To introduce the various quantitative techniques and optimization techniques and to make the students apply these techniques for modeling and solving many engineering situations in general and manufacturing situations in particular.

UNIT I LINEAR PROGRAMMING 10

UNIT II REPLACEMENT MODELS AND GAME THEORY 8

UNIT III QUEUING MODELS AND SIMULATION 9

UNIT IV FORECASTING AND SEQUENCING 9

UNIT V PROJECT NETWORK ANALYSIS, LINE BALANCING AND DECISION TREE ANALYSIS 9
Network – CPM/PERT – Project time estimation – critical path – crashing of network; line balancing – applications; Decision tree analysis – applications

TOTAL: 45 PERIODS

17
OUTCOME
The students will be able to
(i) Formulate the given problem into a suitable model
(ii) Apply the appropriate optimisation technique

TEXT BOOKS:

REFERENCES:

PTPR8351 KINEMATICS AND DYNAMICS OF MACHINES
(Common to Production and Automobile) L T P C
3 0 0 4

OBJECTIVES:
• To understand the basic concepts of mechanisms and machinery.

UNIT I MECHANISMS

UNIT II FRICTION

UNIT III GEARING AND CAMS

UNIT IV BALANCING
Static and dynamic balancing – single and several masses in different planes – primary and secondary balancing of reciprocating masses – Balancing of single and multi cylinder engines – Governors and Gyroscopic effects.
UNIT V VIBRATION

TOTAL: 45 PERIODS

OUTCOME
- Students will be able to understand the concepts of mechanisms and machines
- Students can fabricate the mechanisms for their final year project work.

TEXT BOOKS:

REFERENCES:

PTPR8311 FLUID POWER LAB

OBJECTIVE:
- To study the functional aspects of different pneumatic and hydraulic Components and its use in circuits.
- To train the student in designing different pneumatic and hydraulic circuits for different applications.

LIST OF EXPERIMENTS
1. Study and use of pneumatic and hydraulic elements.
2. Simulation of speed control circuits in a hydraulic trainer.
3. Simulation of hydraulic circuits in a hydraulic trainer.
4. Simulation of single and double acting cylinder circuits using different directional control values.
5. One shot and regenerative pneumatic circuits.
7. Simulation of Electro-pneumatic circuits.
8. Simulation of Logic pneumatic circuits.
9. Simulation of electro pneumatic sequencing circuits.
10. Simulation of PLC based electro pneumatic sequencing circuits.
11. Simulation of pneumatic circuits using PLC.
12. To design and connect the circuits for the given problem (case study).
13. To compare the ladder diagram for electrical and PLC control for the given sequence.
14. Simulation of circuit for the given sequence using software.

TOTAL: 45 PERIODS

OUTCOME
- Will be able to automate stage by stage in present set up.
- Will be able to select the proper component for automation
OBJECTIVES:
- To introduce the concepts and applications of CAD.
- To introduce the various concepts and techniques used for product design and to develop product design skills.

UNIT I INTRODUCTION TO COMPUTER AIDED DESIGN 6
Introduction to Engineering Design – Various phases of systematic design – sequential engineering and concurrent engineering – Computer hardware & Peripherals – software packages for design and drafting.

UNIT II COMPUTER GRAPHICS FUNDAMENTALS 9

UNIT III GEOMETRIC MODELING 10

UNIT IV PRODUCT DESIGN CONCEPTS 12

UNIT V PRODUCT DATA MANAGEMENT 8

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can able to apply geometric modeling principles to design a component and also able to manage the product data and apply product life cycle management to industrial components.

TEXT BOOK:

REFERENCES:
OBJECTIVES:
- To understand the concept of Engineering metrology.
- To learn about metrology instruments and application for various measurements.
- To introduce the concepts of computer applications in metrology.

UNIT I  FUNDAMENTALS OF MEASUREMENT 8

UNIT II  LINEAR AND ANGULAR MEASURING SYSTEMS 10
Linear and Angular measuring systems. Slip gauges, micrometers, verniers, dial gauges and surface plates – Concept of comparators mechanical, electrical, optical and pneumatic comparators – Angular measuring systems – angle gauges – Sine bar – Precision spirit level, Auto collimators – Angle dekkor – Clinometers – Straightness and flatness measurement using precision level and auto collimators.

UNIT III  MEASUREMENT OF SURFACE TEXTURE AND MEASURING MACHINES 9

UNIT IV  METROLOGY OF SCREW THREADS & GEARS 9
Metrology of screw threads & gears Internal and external screw threads – terminology - measurement of various elements of screw threads – thread micrometer two wire and three wire - methods, gear terminology measurement of various elements of gears pitch circle method, constant chord method, base tangent method – plug method – Rolling gear tester.

UNIT V  LASER METROLOGY AND COMPUTER AIDED METROLOGY 9

TOTAL: 45 PERIODS

OUTCOME
- Knowledge acquired will equip the students to produce quality parts by implementing the usage of right (appropriate) measuring system.

TEXT BOOKS:

REFERENCES:
2. Galyer G.N. and Shotbolt C.R. “Metrology for Engineers” ELBS 1990
OBJECTIVES:
- To introduce the concepts of various types of jigs, fixtures and dies.
- To design jig / fixture/ die for a given component.

UNIT I LOCATION AND CLAMPING DEVICES IN JIGS AND FIXTURES 8
Principles of Jigs and Fixtures – Design concepts – Different types of locating devices – different

UNIT II DESIGN OF ELEMENTS OF JIGS AND FIXTURE 10
Design concepts of Template Jig, Plate Jig, Sandwich Jig, Vice Jaw Jig, Latch Jig, Turnover jig,
Box jig – Fixtures for Milling, Grinding, Turning, Welding, and Assembly – Modular fixtures.

UNIT III PRESS WORKING OPERATIONS AND FORMING DIES 8
Blanking, Piercing, lanc ing, notching, bending design features of dies for drawing, extrusion,
wire drawing and forging.

UNIT IV ELEMENTS OF DIE 9
Design concepts of the following elements of progressive, compound and Combination dies –
Die block – Die shoe – Bolster plate – punch – punch plate – punch holder – guide pins and
layout and development.

UNIT V DESIGN OF DIES, JIGS AND FIXTURES 10

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students can be able to design jigs, fixtures and press
tools and drawing

TEXT BOOKS:

REFERENCES:

OBJECTIVE:
- To introduce the students the design and theory of common machine elements and to give
experience in solving design problems.

UNIT I INTRODUCTION 9
- Standards and Codes - Selection of Materials –Design against Static and Dynamic Load –
Modes of Failure, Factor of Safety, Principal Stresses, Theories of Failure-Stress Concentration, Stress Concentration Factors, Variable Stress, Fatigue Failure, Endurance Limit, Design for Finite and Infinite Life, Soderberg and Goodman Criteria.

UNIT II  DETACHABLE AND PERMANENT JOINTS  9
Design of Bolts Under Static Load, Design of Bolt with Tightening/Initial Stress, Design of Bolts subjected to Fatigue – Keys -Types, Selection of Square and Flat Keys-Design of Riveted Joints and Welded Joints.

UNIT III  SHAFTS, COUPLING AND BRAKES  9
Design of Shaft –For Static and Varying Loads, For Strength and Rigidity-Design of Coupling-Types, Flange, Muff and Flexible Rubber Bushed Coupling-Design of Brakes-Block and Band Brakes.

UNIT IV  GEARS AND BELT DRIVES  9
Design of Spur, Helical, Bevel and Worm Gear drives-Design of Belt drives-Flat and V Belts.

UNIT V  SPRINGS AND BEARINGS  9

TOTAL: 45 PERIODS

OUTCOME
- Students can design any machine components while developing and fabricating the mechanisms considering the load conditions.
- They will be fit to become a design engineer.

TEXTBOOK:

REFERENCES:

PTPR8411  METROLOGY LAB  L T P C  0 0 3 2

OBJECTIVE:
- To practice in the various measurement methods.

LIST OF EXPERIMENTS
2. Inspection of Internal and External taper angle.
6. Inspection of screw thread parameters using three wire method.
8. Tool makers microscope- critical parameter measurement.
10. Inspection using vision measuring system.
11. Measurements using CMM.
12. Straightness measurement using Autocollimator.
14. Measurement of dimensions using LASER.

TOTAL: 45 PERIODS

OUTCOME
- They will have the knowledge of selecting the proper instruments and measuring techniques for the measurement of various quality parameters of the components.

PTPR8501 FEA AND SYSTEM SIMULATION

OBJECTIVES:
- To introduce the concept of FEM and to apply in the field of Manufacturing Engineering.

UNIT I INTRODUCTION

UNIT II GENERAL PROEDURE OF FET
Discretization of Domain selection of interpolation polynomials-Convergence requirements-Formulation of element characteristics matrices and load vectors – Assembly of element characteristics matrices-Solution of finite element equations-Post processing of results.

UNIT III FINITE ELEMENT ANALYSIS OF ONE DIMENSIONAL AND TWO DIMENSIONAL PROBLEMS
One dimensional finite element analysis-Linear bar element-Quadratic bar element-Beam element-Frame elements-One dimensional heat transfer-Two dimensional finite element analysis approximation of geometry and field variables-Three nodded triangular element-Four nodded rectangular element-Six nodded triangular element-Natural coordinates and coordinate transformation – Numerical integration-Incorporation of boundary conditions

UNIT IV ISO-PARAMETRIC ELEMENTS
Iso-parametric elements-Dynamic analysis-Equations of motion using Lagrange’s approach-Consistent and Lumped mass matrices-Formulation of FE equations for vibration problems-Solution of Eigen value problems-Transient vibration analysis-Thermal transients.

UNIT V APPLICATION OF FINITE ELEMENT ANALYSIS

TOTAL: 45 PERIODS
OUTCOME
- For a given automotive components. The students will be able to select the proper sequence of manufacturing process and produce them.

TEXT BOOKS:

REFERENCES:

PTPR8502 MODERN MANUFACTURING PROCESSES

OBJECTIVE:
- To impart knowledge to the students about various non traditional machining processes and the principles of rapid prototyping.

UNIT I MECHANICAL ENERGY BASED PROCESSES
8

UNIT II CHEMICAL AND ELECTRO CHEMICAL ENERGY BASED PROCESSES
10

UNIT III ELECTRICAL ENERGY BASED PROCESSES
8

UNIT IV THERMAL ENERGY BASED PROCESSES
10
Laser Beam machining (LBM), Plasma Arc machining (PAM) and Electron Beam Machining (EBM), Principle – Equipment – Types – Applications.

UNIT V RAPID PROTOTYPING AND RAPID TOOLING
9

TOTAL: 45 PERIODS

OUTCOME
- The students will be in a position to select and employ a particular non traditional machining process as well as a rapid prototyping technique based upon the application in industries.
TEXT BOOKS:

REFERENCES:

PTPR8503 QUALITY CONTROL AND RELIABILITY L T P C
3 0 0 3

OBJECTIVES:
- To impart the knowledge of the quality control, control charts and application and construction of various quality control charts and the selection.
- To study the significance of design of experiments and its application.
- To train the students in the field of reliability and its estimation.

UNIT I STATISTICAL PROCESS CONTROL 9
Quality control – Definition – Quality Assurance Variation in process – Factors – control charts – variables \( X_R \) and \( X_\sigma \) - Attributes P, C and U-Chart Establishing and interpreting control charts process capability – Quality rating – Short run SPC.

UNIT II ACCEPTANCE SAMPLING 9
Lot by lot sampling types – probability of acceptance in single, double, multiple sampling plans – OC curves – Producer’s risk and consumer’s risk. AQL, LTPD, AOQL, Concepts Design of single sampling plan – standard sampling plans for AQL and LTPD – Use of standard sampling plans – Sequential sampling plan.

UNIT III EXPERIMENTAL DESIGN AND TAGUCHI METHOD 9

UNIT IV RELIABILITY AND ITS PREDICTION 9

UNIT V FAILURE DATA ANALYSIS 9
Real time distribution, exponential, normal, log normal, gamma and weibull – reliability data requirements – Graphical evaluation.

TOTAL: 45 PERIODS
OUTCOME
- The students will be able to solve engineering problems in 1D, 2D problems by various methods like classical method and nodal approximation method.

TEXT BOOKS:

REFERENCES:

PTPR8551 PRODUCTION OF AUTOMOTIVE COMPONENTS
(Common to Production and Manufacturing )

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OBJECTIVES:
- To impart knowledge in various manufacturing methods in developing automotive components.
- To study the principle of automobile engineering.

UNIT I ENGINE
Working principle of two strokes, four stroke and wankel engines – wet and dry liners – Piston and Piston rings – types – classification. Production of – Cylinder block, Cylinder head,liners, oil pan, piston and piston rings and testing.

UNIT II ENGINE PARTS
Working principle of crank shaft – Cam shaft – valve operating mechanisms – carburetors - spark plug Production of – Connecting rod – Crankshaft - push rod and rocker arm – valves – tappets – carburetors and spark plugs

UNIT III FUEL AND TRANSMISSION SYSTEM

UNIT IV CHASSIS AND SUSPENSION SYSTEM

UNIT V RECENT ADVANCES

TOTAL: 45 PERIODS

OUTCOME
- For a given automotive components the students will be able to select the proper sequence of manufacturing process and produce them.
TEXT BOOKS:

REFERENCES:
2. Newton and steels, the motor vehicle, ELBS, 1990

PTPR8511 ANALYSIS AND SIMULATION LAB

OBJECTIVE:
- To train the students to make use of software for simulation and analysis for various applications in the field of manufacturing engineering.

LIST OF EXPERIMENTS
1. One Dimensional FEA Problem.
   a. Truss structure analysis.
   b. Cantilever beam analysis.
   c. Temperature distribution problem.
2. Two Dimensional FEA Problem.
   a. Plane stress analysis.
   b. Axisymmetric analysis.
   c. Vibration Analysis.
3. Three Dimensional FEA Problem.
   a. 3D Shell Analysis.
   b. 3D Contact Analysis.
4. FEA Application in metal forming, Metal cutting, Casting process etc.
6. Simulation of simple mechanism using solid modeling software.

TOTAL: 45 PERIODS

OUTCOME
- Students will be able to solve some engineering problems with the help of FEA simulation problems etc.

PTPR8601 MECHATRONICS FOR AUTOMATION

OBJECTIVE:
- This syllabus is formed to create knowledge in Mechatronics systems and impart the source of concepts and techniques, which have recently been applied in practical situation. It gives the frame work of knowledge that allows engineers and technicians to develop an interdisciplinary understanding and integrated approach to engineering.

UNIT I MECHATRONICS SYSTEMS ANS SENSORS

Introduction to Mechatronics Systems, key elements, ways of integration – hardware and software. sensors – Characteristics –static and dynamic, types - linear, rotational, velocity
acceleration, force, torque, flow, temperature, proximity, optical, Micro and Nano sensors, selection of sensors

UNIT II ACTUATORS
Electrical actuators – switches – mechanical, solid state, solenoids, relays, Motors – Types and characteristics Micro and Nano actuators, Drive circuits for various actuators. Selection of actuators.

UNIT III SYSTEM MODELS AND SIMULATION

UNIT IV MICROCONTROLLER AND APPLICATIONS
8051 processors – Architecture , ,Address modes, Instruction sets , simple programming exercises - Memories – different types , 8255 Programmable Peripherals interfacing – Different I/O devices , Stepper motor interface , A/D and D/A interface.

UNIT V MECHATRONICS SYSTEM DESIGN

TOTAL: 45 PERIODS

OUTCOME
• The students will learn various components of Mechatronics system and will be able to automate the systems in Mechatronics approach.

TEXT BOOKS:

REFERENCES:

PTPR8602 OPERATIONS PLANNING AND COST ESTIMATION

OBJECTIVES:
• To develop a good process planning capabilities.
• To impart the knowledge on cost estimation of a given product.

UNIT I PROCESS PLANNING
UNIT II     ESTIMATION, COSTING AND ELEMENTS OF COST

UNIT III  ANALYSIS OF OVERHEAD EXPENSES & METHODS OF DEPRECIATION

UNIT IV     ESTIMATION OF COSTS FOR FORGING, CASTING AND WELDING

UNIT V     ESTIMATION OF MACHINING TIME

TOTAL: 45 PERIODS

OUTCOME
• The student will be in a position to develop process planning sheets for manufacturing various components and decide a selection of machines, equipment etc.

TEXT BOOKS:

REFERENCES:
1. G.B.S. Narang and V.Kumar, “Production and costing”, Khanna publishers, 2000

PTPR8603     ROBOTIC ENGINEERING

OBJECTIVE:
• To study the kinematics, drive systems and programming of robots.
UNIT I  FUNDAMENTALS OF ROBOT  7

UNIT II  ROBOT DRIVE SYSTEMS AND END EFFECTORS  10

UNIT III  SENSORS IN ROBOTICS  8
Force sensing, touch and tactile sensors, proximity sensors, non contact sensors, safety considerations in robotic cell, proximity sensors, fail safe hazard sensor systems, and compliance mechanism.  Machine vision system - camera, frame grabber, sensing and digitizing image data – signal conversion, image storage, lighting techniques, image processing and analysis – data reduction, segmentation, feature extraction, object recognition, other algorithms, applications – Inspection, identification, visual servoing and navigation.

UNIT IV  ROBOT KINEMATICS AND PROGRAMMING  12
Forward kinematics, inverse kinematics and the difference: forward kinematics and Reverse Kinematics of Manipulators with two, three degrees of freedom (in 2 dimensional), four degrees of freedom (in 3 dimensional) – derivations and problems.  Homogeneous transformation matrices, translation and rotation matrices - Teach pendant programming, lead through programming, robot programming languages – VAL programming – Motion Commands, Sensors commands, End-Effector Commands, and simple programs.

UNIT V  APPLICATIONS OF ROBOT  8
Role of robots in inspection, assembly, material handling, underwater, space and medical fields.

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

TEXT BOOKS:

REFERENCES:

PTPR8611  MECHATRONICS AND ROBOTICS LAB  L T P C
0 0 3 2

OBJECTIVE:
- To understand the various concepts of sensors and robots.
To impart practical knowledge in Robotic equipment, Simulation softwares and Microcontroller programming.

LIST OF EXPERIMENTS:
1. Study of characteristics of optical and temperature transducers
2. I/O port programming of an 8051 microcontroller.
3. Applications of ideal operational amplifiers.
5. PC parallel port and microcontroller interfacing of a unipolar stepper motor.
7. Modelling and Simulation of mechanisms using ADAMS.
10. Robot control with stepper motor interfacing.
11. Experimental verification of Frankenstein equation for 1 DOF robot.
12. Experiments on LVDT.
13. AC & DC power control.
14. Distance measurement using Acoustic techniques.

TOTAL: 45 PERIODS

OUTCOME
- Help them to design mechatronic system.
- To appreciate the design of proper robotic type

PTPR8701 COMPUTER INTEGRATED MANUFACTURING

OBJECTIVE:
- To understand the various automated manufacturing activities.
- To study the application of computer Technology in the manufacturing activities.
- To know the smooth transition from conventional manufacturing to automated production and computer integrated manufacturing.

UNIT I INTRODUCTION TO CIM AND AUTOMATED PRODUCTION SYSTEMS

UNIT II MATERIAL HANDLING AND STORAGE SYSTEM
UNIT III GROUP TECHNOLOGY AND CELLULAR MANUFACTURING


UNIT IV FLEXIBLE MANUFACTURING SYSTEM

FMS - Definition and Types – FMS components – Workstations, Material Handling and storage system – FMS Layout type, computer control system, Human resource – Flow chart showing various operations in FMS – Dead lock in FMS – FMS application and benefits – FMS planning and implementation issues.

UNIT V AUTOMATED ASSEMBLY AND SHOP FLOOR CONTROL


TOTAL: 45 PERIODS

OUTCOME

- The students will be in a position to apply computers to the various manufacturing activities in industries.

TEXT BOOK:


REFERENCES:

UNIT II INVENTORY MANAGEMENT
Purpose of inventory – Cost related to inventory – Basic EOQ model – variations in EOQ model – Finite Production, quantity discounts – ABC Analysis – MRP.

UNIT III OPERATIONS MANAGEMENT

UNIT IV FINANCIAL MANAGEMENT

UNIT V MARKETING MANAGEMENT

TOTAL: 45 PERIODS

OUTCOMES
• The students after successful completion of the course will be in a position to manage manufacturing and manufacturing related activities in industries and will be coordinate better with other department in industries.

TEXT BOOKS:

REFERENCES:

PTGE8251 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C
(Common to Manufacturing, Mechanical, Printing, Production, EEE, CSE, IT, Civil, Textile, Chemical, Industrial ) 3 0 0 3

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  14
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: 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  8
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  10
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  7
UNIT V  HUMAN POPULATION AND THE ENVIRONMENT


TOTAL : 45 PERIODS

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:

PTMG8651  TOTAL QUALITY MANAGEMENT  L T P C
(Common to Manufacturing, Mechanical, Printing, Production, 3 0 0 3
CSE, Industrial, ECE, IT,EEE, Industrial, Leather, Automobile)

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 9
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 9

UNIT IV TQM TOOLS & TECHNIQUES II 9

UNIT V QUALITY SYSTEMS 9

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

TEXT BOOK:

REFERENCE BOOKS:

PTPR8001 ADVANCES IN OPERATIONS RESEARCH L T P C 3 0 0 3

OBJECTIVE:
• To introduce the advanced OR models and to apply them for Engineering problems.

UNIT I INTRODUCTION 5

UNIT II CLASSIC OPTIMIZATION TECHNIQUES 10
UNIT III NON-LINEAR PROGRAMMING
Introduction – Lagrangeon Method – Kuhn-Tucker conditions – Quadratic programming – Separable programming – Stochastic programming

UNIT IV INTEGER PROGRAMMING

UNIT V DYNAMIC PROGRAMMING
Formulation – Application to capital budgeting, reliability improvement, shortest path, solution of LP using DP.

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

TEXT BOOKS:

REFERENCES:

PTPR8002 APPLIED PROBABILITY AND STATISTICS

OBJECTIVE:
• To train the students so that students will be able to design experimental designs and use these concepts for research design.

UNIT I PROBABILITY THEORY
Random variables – probability density and distribution functions-moment generating and characteristic functions – Binomial, Poisson, Normal distributions and their applications.

UNIT II SAMPLING THEORY
Sampling distributions – Standard error – t, F, Chi square distributions – applications.

UNIT III ESTIMATION THEORY
Interval estimation for population mean, standard deviation, difference in means, ratio of standard deviations – point estimation.

UNIT IV TESTING OF HYPOTHESIS
Hypothesis testing – Small samples – Tests concerning proportion, means, Standard deviations – Tests based on chi square
UNIT V ANOVA
One, two factor models – Design of experiments.

TOTAL: 45 PERIODS

OUTCOME
- The student will be in a position to make statistical analysis or experimental results of project work.

TEXT BOOK:

REFERENCES:

PTPR8003 MICRO ELECTRO MECHANICAL SYSTEMS AND NANO TECHNOLOGY

OBJECTIVE:
- To expose the students to the evolution of micro electromechanical systems, to the various fabrication techniques and to make students to be award of micro actuators.

UNIT I MATERIALS FOR MEMS AND MINIATURISATION

UNIT II FABRICATION PROCESSES

UNIT III MICROSYSTEM – WORKING PRINCIPLE AND PACKAGING

UNIT IV MICROSYSTEMS DESIGN

UNIT V NANO TECHNOLOGY
Classification of nano structures – effect of the nanometer length scale effects of nano scale dimensions on various properties – structural, thermal, chemical, mechanical, magnetic, optical and electronic properties – effect of nanoscale dimensions on biological systems. Fabrication methods – Top down processes – bottom up process – nano positioning systems.

OUT COME
• To understand basics concepts of Nano technology and MEMS. It helps to design micro level sensors, micro-grippers, and its supporting systems.

TEXT BOOKS:

REFERENCES:

PTPR8004 MICROMACHINING AND FABRICATION L T P C
3 0 0 3

OBJECTIVE:
• To introduce the various types of micromachining processes and their Applications.

UNIT I INTRODUCTION
Introduction to micromachining process – Classification of micromachining and nanomachining processes – Molecular dynamics, principle of molecular dynamics simulation potential energy function – Boundary condition – MD simulation procedure.

UNIT II MICROFABRICATION METHODS
Methods of microfabrication – Maleno deposition – Electro discharge depositant, Chemical vapour deposition physical vapour deposition – Electro Chemical spark deposition – LIGA.

UNIT III MECHANICAL MICROMACHINING
Ultrasonic machining – Abrasive jet machining – Abrasive water jet machining, water jet machining – Beam energy micromachining – Electron beam machining, electro discharge machining, ion beam machining, focused con beam machining.
UNIT IV MICROMACHINING AND NANO FUNCTIONING WITH ABRASIVE FLOW


UNIT V HYBRID MICRO MACHINING


TOTAL: 45 PERIODS

OUTCOME

• To understand various micromachining techniques and able to suggest suitable micromachining for industrial components

TEXT BOOKS:


REFERENCES:


PTPR8005 NON DESTRUCTIVE TESTING METHODS

OBJECTIVES:

• To understand principle behind various NDT techniques.
• To study about NDT equipments and accessories.
• To learn working procedures of various NDT techniques.

UNIT I NON-DESTRUCTIVE TESTING: AN INTRODUCTION

Introduction to various non-destructive methods – Comparison of Destructive and Non destructive Tests, Visual Inspection, Optical aids used for visual inspection, Applications.

UNIT II LIQUID PENETRANT TESTING AND MAGNETIC PARTICLE TESTING

Physical principles, procedure for penetrant testing, Pentrant testing materials, Penetrant testing methods – Applications Principle of MPT, Magnetising technical and procedure used for testing a component, Equipment used for MPT, Applications

UNIT III EDDY CURRENT TESTING AND ACOUSTIC EMISSION TESTING


UNIT IV ULTRASONIC TESTING

PRINCIPLE, Ultrasonic transducers, Inspection Methods – Normal incident pulse-echo Inspection, through – transmission testing, angle Beam Pulse-echo testing, Techniques A-Scan, B-Scan, C-Scan – Applications.
UNIT V RADIOPHGRAPHY, COMPARISON AND SELECTION OF NDT METHODS  
Basic principle, Effect of radiation of Film, Radiographic Imaging – Inspection Techniques – Single wall single image, Double wall Penetration & Multiwall Penetration technique – Comparison and selection of various NDT techniques.

TOTAL: 45 PERIODS

OUTCOMES

• Ability to defect the flow and other defects using non destructive testing procedure for industrial component.

TEXT BOOKS:

REFERENCES:
3. www.ndt.net

PTPR8006 PLANT LAYOUT AND MATERIAL HANDLING SYSTEMS  
OBJECTIVE:

• To introduce the concepts of Plant Layout and Materials Handling Systems and their Applications in industry.

UNIT I INTRODUCTION  

UNIT II PLANT LAYOUT  
Layout for mass production – types of facilities and layouts used for different levels of production quantity and product variety – Single model and mixed model production lines – Flow line production layouts Set up time – Change over times – Manufacturing Support Systems – Automation migration strategy composite part concept – machine cell design – Arranging machines in a G.T. Cell.

UNIT III MATERIAL HANDLING  

UNIT IV ANALYSIS OF MATERIAL TRANSPORT SYSTEMS  
Charting techniques in material handling – Analysis of vehicle based systems – Conveyor analysis – Single direction conveyor – Recirculating conveyor analysis.
UNIT V STORAGE SYSTEMS
Storage system performance – Comparison of storage strategies – storage location strategies conventional and automated storage systems. Automated storage and retrieval systems – Engineering Analysis of storage systems.

TOTAL: 45 PERIODS

OUTCOME
- The student will be in a position to develop good plant layouts and material handling system.

TEXT BOOKS:

REFERENCES:

PTPR8007 PROCESSING OF POLYMERS AND COMPOSITES

OBJECTIVES:
- To study matrix material, particulates and fibres of polymer matrix composites, MMC and ceramic matrix composites.
- To develop knowledge on processing, interfacial properties and application of computers.

UNIT I INTRODUCTION TO POLYMERS
Chemistry and Classification of Polymers – Glass transition temperature, thermal expansion molecular weight, stress strain behaviour - Properties of Thermo plastics – Properties of Thermosetting Plastics – Properties and application of Epoxy, polyester, PMMA, PEEK, Polypropylene, polymide, phenolics, polyetherimide – Merits and Disadvantages.

UNIT II PROCESSING OF POLYMERS

UNIT III INTRODUCTION TO FIBRES AND COMPOSITE MATERIALS

UNIT IV PROCESSING OF POLYMER MATRIX COMPOSITES
UNIT V  PROCESSING OF METAL MATRIX COMPOSITES AND CERAMIC MATRIX COMPOSITES


OUTCOMES
- Ability to select suitable matrix, reinforce materials for polymer matrix composites, metal matrix composites and ceramics matrix composites

TEXT BOOK:

REFERENCES:

PTPR8008 PURCHASING AND MATERIALS MANAGEMENT

OBJECTIVE:
- To introduce the various aspects of Purchasing And Materials Management

UNIT I FUNCTIONS OF MATERIALS MANAGEMENT
Introduction to materials management – objectives – organization – Functions operating cycle – value analysis – make or buy decisions.

UNIT II PURCHASING MANAGEMENT

UNIT III STORES MANAGEMENT

UNIT IV INVENTORY MANAGEMENT

UNIT V QUANTITATIVE TECHNIQUES IN MATERIAL MANAGEMENT

OUTCOMES
- To explain the functions and structure of materials, purchase and store management
- To perform analysis on materials planning
- To perform calculation using different inventory models.

**TEXT BOOKS:**

**REFERENCES:**

**PTPR8009 SELECTION OF MATERIALS**

**OBJECTIVE:**
- By considering various constraints like material chart, process attributes, Material cost, recyclability, materials are selected for the engineering components.

**UNIT I MATERIALS AND PROPERTIES**

**UNIT II FACTORS IN SELECTION PROCESS**
Design process - types of design, design requirements, function, Material attributes. Shape and Manufacturing processes - Materials processing and design processes and their influence on design, Process attributes, Systematic process selection, Process selection diagrams, Process cost, Energy consumption for production, Material costs, availability and recyclability, Environmental consideration.

**UNIT III MATERIALS SELECTION PROCESS**
Materials selection methods: Screening, Ranking - weighted ranking, Performance indices - Materials selection charts, Deriving property limits and material indices, Structural indices. Shape factors, Efficiency of standard sections, Material limits for shape factors, Material indices which include shape-microscopic or micro structural shape factor, Co-selecting material and shape.

**UNIT IV CASE STUDIES ON APPLICATIONS**
Automobile materials (Body and Crank shaft), Marine structural materials (Hull and Propeller), Aircraft structural materials (Wings and landing gears), Materials for space (Gas turbines and Nose), Materials for power generation machinery (Boilers and Pressure vessels), Materials for medical applications (Surgical knives and Bone replacements), Chemical and petrochemical industries (Acid storage tanks and Fuel carrying pipes).

**UNIT V SUBSTITUTION OF MATERIALS & MINI PROJECT WORK**
Environmental design, Economics and environmental impact of materials, Hybrid materials: composites, sandwich structure, lattices and segmented structure, case studies on hybrid materials, polymer foams, Natural Biomaterials and Implantable Biomaterials. Students will carry out a materials selection exercise for a hypothetical design project, identifying selection parameters and potential materials.

**TOTAL: 45 PERIODS**
OUTCOME

- It gives in sight of various metallurgical properties of materials and to suggest suitable material for real time application with considering design constraints.

TEXT BOOK:


REFERENCES:


PTPR8071 ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT L T P C
(Common to Production, Leather and Manufacturing) 3 0 0 3

OBJECTIVE:

- To introduce the concepts of economics as applied to Engineering and Management of Finance in business.

UNIT I FINANCIAL ACCOUNTING


UNIT II PROFIT VOLUME ANALYSIS


UNIT III WORKING CAPITAL MANAGEMENT

Current assets and liability decisions – Estimation of working capital requirements – Management of accounts receivable – Inventory – Cash – Inventory valuation methods.

UNIT IV CAPITAL BUDGETING

Significance of capital budgeting – payback period – present value method – Accounting rate of return method.

UNIT V ENGINEERING ECONOMICS


TOTAL: 45 PERIODS
OUTCOME
- The student will be in a position to plan for finance and budget and will be able to manage finance.

TEXT BOOKS:

REFERENCES:

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<td>3003</td>
<td>(Common to Production and Manufacturing)</td>
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OBJECTIVE:
- To expose the student on the various treatment and procedures available.

UNIT I  METAL CLEANING AND PREVIEW ON SURFACE ENGINEERING  8

UNIT II  THERMAL SPRAYING PROCESSES AND ELECTRODEPOSITED COATINGS  10

UNIT III  HOT DIP COATING AND DIFFUSION COATINGS  10

UNIT IV  NON-METALLIC COATING OXIDE AND COVERSION COATINGS  9

UNIT V  QUALITY ASSURANCE, TESTING AND SELECTION OF COATINGS  8

TOTAL: 45 PERIODS
OUTCOMES:
- Explain the importance of surface engineering to industries
- Use of thermal spray for coating
- Explain the process and mechanism of different diffusion coating process
- Explain the methods of non metallic coating
- Explain the testing procedure for quality assurance.

TEXT BOOKS:

REFERENCES:

PTGE8071 DISASTER MANAGEMENT L T P C 3 0 0 3

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 9
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) 9
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 Processes 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 9
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.

TOTAL: 45 PERIODS

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

PTGE8072  HUMAN RIGHTS  L T P C
3 0 0 3

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: