DME-301 MANUFACTURING PROCESS

UNIT:-I

GENERAL INTRODUCTION: Manufacturing processes, Classification of manufacturing processes, Types of production system, Manufacturing and basic definitions, Industrial safety, Factories act and accidents.

Unit:-II

PATTERN MAKING AND FOUNDRY: Moulding tool and equipment, Moulding sands, Type of moulding sand, Sand additives, Property of moulding sand, Sand preparation, Moulding processes, Moulding processes based on sand used.

UNIT:- III

MECHANICAL WORKING OF METALS: Introduction, Hot working, Hot rolling, Piercing or seamless tubing, Drawing, Deep drawing, Hot spinning, Extrusion, Cold- working, Cold-rolling, Cold-drawing, Cold-bending, Cold-spinning, Cold-extrusion, Squeezing, Peening, sizing, Coining and hobbing, Electro-hydraulic forming, Metallurgical aspects.

UNIT:- IV

WELDING AND RELATED PROCESSES: Introduction, Weldability, Type of welding, Metallurgy of weld, Gas welding, Oxy-acetylene welding, Air-acetylene welding, Oxy-hydrogen welding, Arc welding equipment, Arc welding methods, Resistance welding methods, Thermit welding, Solid state welding, Bronze Welding, Soldering, Brazing.

UNIT:- V

SHEET METAL WORK: Introduction, Metal used in sheet metal work, Sheet metal hand tools, sheet metal operations, Sheet metal joints : Hems and seams, Sheet metal allowance, Sheet metal working machines, Laying out a pattern.

LIST OF EXPERIMENTS :-

1 Making a split/solid pattern from wood. Making a core box. Carpentry /pattern
2 Tempering of sand, practice of green and dry sand making. pattern
3 Practise of core making and baking moulding.

4 Demonstration of metal melting in pit furnace& casting process. foundary

5 Practice of upsetting of a round on power hammer. Blacksmith

6Practice of making of washer of any size on a flypress. Blacksmith shop Tinsmith

REFERENCES

1. Workshop Technology by Hazara & Choudhary

2. Nirman Prakram (Hindi) by P.N. Vijayvargiya. (Deepak Prakashan, Morar, Gwalior)

3.Materials And Manufacturing process by Dalela.

4Manufacturing Processes by Yankee.

5.Manufacturing Process by S.E. Rusinof

DME-302 BASIC MECHANICAL ENGINEERING

UNIT:-I

ENGINEERING MATERIALS AND THEIR MECHANICAL PROPERTIES: Introduction , Classification of Engineering Materials, Mechanical Property Of Material, Iron and its Alloys, Cast Iron, Carbon Steels, Non-Ferrous Materials, Stress and Strain, Testing of Materials.

UNIT:-II

BASIC CONCEPT OF THERMODYNAMIC: Definition and importance of thermodynamics, thermodynamic system, boundary and surrounding, thermodynamic Property, state, process, cycles, Zeroth law of thermodynamics, Quasi-static process, Statements of I and II laws of thermodynamics.

UNIT:-III

PROPERTIES OF PURE SUBSTANCE :- *p-v* Diagram for a Pure Substance, *p-T* Diagram for a Pure Substance, *T-s* Diagram for a Pure Substance, *h-s Diagram or Mollier Diagram for a pure substance.*

UNIT:-IV

FLUIDS: Fluid properties,; pressure variation with depth, Bernauli's equation for incompressible fluids, Laminar and turbulent flow, working principle of fluid coupling, pumps, compressors, turbines, positive displacement machines and pneumatic machines. Hydro electric power plant.

UNIT:-V

RECIPROCATING MACHINES: **Steam Engine,** classification of steam engine, construction of steam engine, working of steam engine,

IC Engine: I.C. Engines: Classification of I.C Engines, Different parts of I.C engines, Working of two stroke and four stroke engines-petrol and diesel engines, omparision betwwen two-stroke and four-stroke engine

REFERENCES

1 MATERIAL SCIENCE AND METALLURGY BY O.P. KHANNA
2 FLUID MECHANICS AND HYDRAULIC MACHINES BY DR. R.K. BANSAL

3 THERMODYNAMICS BY D.S. KUMAR

4 I.C ENGINE BY SHARMA & MATHUR

5 BASIC MECHANICAL ENGINEERING BY P.K NAG

DME-303 STRENGTH OF MATERIAL

UNIT:- I

Simple Stress and Strains : Introduction types of loads and deformation, types of stresses and strain. Hooke's law, stress strain diagram for ferrous and non ferrous materials modulus of elasticity. rigidity and bulk modules of materials Stress in bars of varying cross sections, composite sections and compound sections Thermal stresses and strains.

UNIT:-II

S.F. and B.M. Diagrams : Definition, types of loading types of beams, shear force and bending moment sign conventions S.F. and B.M. diagrams for cantilever simply supported and overhanging beams with point or concentrated loads uniformly distributed loads and combination of point and U.D.L. Point of contra flexure, numerical problems.

UNIT:-III

Principal Planes and Principal Stresses : Stresses on inclined plane subjected to direct shear or combination of stresses in two mutually perpendicular planes. Principal planes and principal stresses, analytical and graphical methods.

UNIT:-IV

Bending Stresses in Beams : Theory of simple bending as assumptions made in simple bending theory position of neutral axis, surface moment or resistance. Modules of section of symmetrical sections such as rectangular, circular and I sections, bending stresses in symmetrical sections. Simple problems.

UNIT:-V

Torsion of Shaft : Definition of torsion relation between stress, strain and angle of twist assumptions made strength of solid and hollow circular shaft, polar moment of inertia. Calculation of shaft diameter on the basis of strength and stiffness for the given horse power transmitted torsional rigidity. Maximum torque comparison of solid and hollow shaft size of a shaft for a given torque.

Spring : Definition types and use of springs, leaf spring, helical and spiral springs, Stiffness of a spring and maximum shear stress, defection of spring .

Columns and struts : Definitions crippling load different end conditions, slenderness ratio, equivalent length, Euler's theory Rankine's formulae, radius of gyration, Rankine constant for different materials Limitations of Rankine formula simple problem.

LIST OF EXPERIMENTS .

1 Study and demonstration of Universal Testing Machine & its attachments

2 Brinell Hardness Test on Mild Steel

3 Izod & Charpy - Impact tests of a standard specimen

4 Torsion Test on Mild steel bar

5 Rockwell hardness Test on Hardened Steel

REFERENCES

1 Strength of Materials. by B.C. Punmia.
2 Dravya Samarthya (Hindi) by K. D. Saxena (Deepak Prakashan, Morar Gwalior)
3 Strength of Materials . by R.S. Khurmi
4 Strength of Materials by S. Ramamuruthan.
5 Strength of Materials by K.D. Sexena

DME-304 THERMAL ENGINEERING

Unit I

Steam generators: classification, conventional boilers, low -pressure boilers like Cochran, Babcock and Wilcox and Lancashire boiler, Boiler accessories and mountings, performance and rating of boilers, equivalent evaporation, boiler efficiency, heat balance sheet, combustion in boilers, fuel and ash handling, boiler draught,

Unit II

Air compressors: working of reciprocating compressor, work input for single stage compression different, compression processes, effect of clearance, volumetric efficiency real indicator diagram, isentropic & isothermal and mechanical efficiency, multi stage compression, inter - cooling, condition for minimum work done, classification and working of rotary compressors.

Unit III

Steam condensers, cooling towers : introduction, types of condensers, back pressure and its effect on plant performance air leakage and its effect on performance of condensers, various types of cooling towers, design of cooling towers

UNIT:-IV

Heat Exchangers : classification of heat exchangers , parallel flow, counter flow and cross flow exchangers, Effect on performance of heat exchanger, Compare parallel flow and counter flow heat exchanger.

UNIT:-V

Steam Nozzles: Introduction of steam nozzle, steam flow through nozzle, Classification of nozzle, Nozzle efficiency, Conversion nozzle, Diversion nozzle, Conversion –Diversion nozzle, Velocity and pressure in nozzle flow. Steam nozzle and its use.

List of Experiments:

1. Study of working of some of the low pressure boilers.
2. Study of Induced draft/forced and balanced draft by chimney
3. Determination of Calorific value of a fuel

4. Study of different types of steam turbines
5. Determination of efficiencies of condenser
6. Find Out heat transfer area of a parallel flow/counter flow heat exchanger
7. Determination of thermal efficiency of steam power plant

References:

1. P.K.Nag; Basic and applied Thermodynamics; TMH.
2 R.K RAJPUT THERMAL ENGINEERING.
3. R.Yadav Thermal Engg.
4. Kadambi & Manohar; An Introduction to Energy Conversion – Vol II. Energy conversion cycles.
5 Ganesan; Gas turbines; TMH.

DME-305 MECHANICAL DRAFTING

UNIT:-I

Projection and multi view Representation: Projection orthographic projection. First and third angle projection, superfluous view, choice of views, auxillary views- views -full and partial, conversion of pictorial views in to orthographic views, conventional representation,

UNIT:-II

Sectional Views : Full section, half section, partial or broken section, revolved section, removed section, offset section. Sectioning conventions, section lines. Hatching procedure for different materials.

UNIT:-III

Dimensioning Tolerance, Machining : Types of dimensions (size and location), dimensioning terms and notations, general rules for dimensioning and practical, Dimension of cylinder holes arcs of circle narrow space, angles, counter sunk hole, screw threads taper etc, Application of tolerances, Machining marks, finish marks, countersinking, counter boring spot facing, Representation of characteristics machining, limits, size, tolerance, clearance.

UNIT:-IV

Assembly Machine Drawing: Basic Concept, Plotting technique, Assembly and blow up of parts, Bill of materials, Product data: Cutter and knuckle joints, Pedestal and foot step bearings, Crosshead, Stuffing box, IC engines parts-piston and connecting rods; Lathe machine parts.

UNIT:-V

Design of Component: Design of component subject to static loads, Riveted joints, Welding joints, Threaded joints, Pin, Key, Knuckle and cotter joints.

List of Experiments:

1 Projection and multi views representation 02
2 Sectional views 02
3 Dimensioning, tolerance, machining 02
4 Assembly Machine drawing 08
5 Designing of component 04

REFERENCES

1Machine Drawing and Design by Dhanpat Rai & Co.
2 Mechanical Drawing By N.D.Bhatt
3 Mechanical Drawing By P.S.Gill
4 Mechanical Drawing By R.K.Dhawan
5 Fundamentals of Engineering Drawing by Warren J. Luzadder (Prentice-Hall).

DME-306 AUTO CAD

UNIT:-I

Introduction to Auto CAD: Coordinate system. Draw commandline ,arc, circle rectangle, polygon, point, ellipse, hatch, table. Modify commands-erase, copy, offset, array, trim, extend, break, join, chamfer, fillet, move, rotate, scale, stretch, lengthen.

UNIT:-II

Dimensioning Tray settings: snap, grid, ortho, polar, osnap Format commands: line type, point style, units, layers, drawing limit, dimension style

UNIT:-III

Application of Auto CAD: practice of assembly drawings using Auto CAD

arc, circle rectangle, polygon, ellipse**,**

UNIT:-IV

Bacis Fundamental of Design: Design process, Design procedure of machine component, Design considerations, Knuckle joint, Cotter joint, Stuffing box, Cross head, Tool post.

UNIT:-V

Various Consideration In Design: Safety consideration in design, Design for recycle and reuse, optimization in design, Design of IC engine parts etc.