

### **UNIT-1**

Properties of steam and Boilers: Steam formation. Types of steam. Steam properties –Specific Volume, Enthalpy and Internal energy. (simple numerical problems) Steam boilers – classification, Lancashire boiler, Babcock and Wilcox boiler, Boiler mountings, Accessories, their locations and applications. (No sketches for mountings and accessories)

9 Hours

### **UNIT-2**

Internal Combustion Engines: Classification, I.C. Engines parts, 2/4 – Stroke Petrol and 4-stroke diesel engines. P-V diagrams of Otto and Diesel cycles. Simple problems on Indicated power, Brake power, Indicated thermal efficiency, Brake thermal efficiency, Mechanical efficiency and specific fuel consumption.

9 Hours

### **UNIT-3**

Refrigeration and Air conditioning: Refrigerants, Properties of refrigerants, List of commonly used refrigerants. Refrigeration - Definitions - Refrigerating effect, Ton of Refrigeration, Ice making capacity, COP, Relative COP, Unit of Refrigeration. Principle and working of vapor compression refrigeration and vapor absorption refrigeration. Principles and applications of air conditioners, Room air conditioner.

6 Hours

### **UNIT-4**

Lathe and Drilling Machines: Lathe - Principle of working of a centre lathe. Parts of a lathe. Operations on lathe - Turning, Facing, Knurling, Thread Cutting, Drilling, Taper turning by Tailstock offset method and Compound slide swiveling method, Specification of Lathe.

Drilling Machine – Principle of working and classification of drilling machines. bench drilling Machine, Radial drilling machine. Operations on drilling machine -Drilling, Boring, Reaming, Tapping, Counter sinking, Counter boring and Spot facing. Specification of radial drilling machine.

6 Hours

### **UNIT-5**

Joining Processes : Soldering, Brazing and Welding: Definitions. Classification and method of Soldering, Brazing and welding and differences. Brief description of arc welding and Oxy-Acetylene welding

Power Transmission : Belt Drives - Classification and applications, Derivations of ratio of tensions. Definitions - Velocity ratio, Creep and slip, Idler pulley, stepped pulley and fast & loose pulley.

Gears - Definitions, Terminology, Types and uses. Gear drives and

Gear Trains – Definitions and classifications, Simple problems.

12 Hours

### **TEXT BOOKS:**

1. A Text Book of Elements of Mechanical Engineering – K.R. Gopalkrishna, Subhash Publishers, Bangalore.
2. A Text Book of Elements of Mechanical Engineering - S. Trymbaka Murthy, 3rd revised
3. edition 2006, I.K. International Publishing House Pvt. Ltd., New Delhi.

### **REFERENCE BOOKS:**

1. The Elements of Workshop Technology - Vol I & II , SKH Chowdhary,AKH Chowdhary , Nirjhar Roy, 11<sup>th</sup> edition 2001, Media Promoters and Publishers, Mumbai.
2. Elements of Mechanical Engineering –Dr.A.S.Ravindra, Best Publications, 7th edition 2009.

### **UNIT-1**

Introduction to Engineering mechanics: Basic idealizations - Particle, Continuum and Rigid body; Force and its characteristics, types of forces, Classification of force systems; Principle of physical independence of forces, Principle of superposition of forces, Principle of transmissibility of forces; Newton's laws of motion, Introduction to SI units, Moment of a force, couple, moment of a couple, characteristics of couple, Equivalent force - couple system; Resolution of forces, composition of forces; Numerical problems on moment of forces and couples, on equivalent force - couple system. 7 Hours

### **UNIT-2**

Composition of forces - Definition of Resultant; Composition of coplanar - concurrent force system, Principle of resolved parts; Numerical problems on composition of coplanar concurrent force systems. Composition of coplanar - non-concurrent force system, Varignon's principle of moments; Numerical problems on composition of coplanar non-concurrent force systems.  
Equilibrium of forces - Definition of Equilibrant; Conditions of static equilibrium for different force systems, Lami's theorem; Numerical problems on equilibrium of coplanar - concurrent and non concurrent force systems. 11 Hours

### **UNIT-3**

Trusses introduction, simple force, determination of forces in simple truss members, method of joint and method of sections. Numerical problems.  
Friction - Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose; Impending motion on horizontal and inclined planes; Wedge friction; Ladder friction; Numerical problems. 8 Hours

### **UNIT-4**

Types of beams, supports & loadings, statically determinate beams, Numerical problems on support reactions for statically determinate beams and Bending moment and Shear force in beams: Introduction, shear forces and bending moments, rate of loading, sign conventions, relationship between shear force and bending moments, shear force and bending moment diagrams for different beams subjected to concentrated loads, uniform distributed load (UDL) and couple for different types of beams. 9 Hours

### **UNIT-5**

Centroid of plane figures; Locating the centroid of triangle, semicircle, quadrant of a circle and sector of a circle using method of integration, Centroid of simple built up sections; Numerical problems.  
Moment of inertia of an area, polar moment of inertia, Radius of gyration, Perpendicular axis theorem and Parallel axis theorem; Moment of Inertia of rectangular, circular and triangular areas from method of integration; Moment of inertia of composite areas. 6 Hours

### **TEXT BOOKS:**

1. Engineering Mechanics by I. H. SHARMA
2. Mechanics for engineers: Statics by Ferdinand P B and E.Russel Jhonston
3. Engineering Mechanics by S.S. Bhavikatti, New Age International Publisher, New Delhi, 2nd edition 2010.
4. Engineering Mechanics by K L Kumar, TATA McGraw-Hill Book Company, New Delhi

### **REFERENCE BOOKS:**

1. Engineering Mechanics by S.Timoshenko, D.H.Young, and J.V.Rao TATA McGraw-Hill Book Company, New Delhi

**UNIT -1**

## Introduction to Computer Aided Sketching

Introduction, Drawing Instruments and their uses, BIS conventions, lettering, Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar, description of most commonly used tool bars, navigational tools. Coordinate system and reference planes. Definitions of HP, VP, RPP& LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line convention, material conventions and lettering.

5 Hours.

**UNIT-2**

Projections of points: Projections of points in all the four quadrants.

5 Hours.

**UNIT-3**

Projection of lines: Projection of lines (located in first quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems)

10 Hours.

**UNIT-4**

Projection of Planes: Introduction, projection of planes, triangle, square, rectangle, rhombus, pentagon, hexagon, and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates.)

10 Hours.

**UNIT-5**

Projection of Solids: Projection of Solids (first angle projection only) Introduction, projection of right-regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions. (No problems on octahedrons and combination solids)

10 Hours.

**UNIT-6**

Development of lateral Surfaces of Solids Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. Development of lateral surfaces of above solids, their frustums and truncations.

10 Hours.

**UNIT-7**

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of two Solids).

10 Hours.

**TEXT BOOKS:**

1. A primer on Computer Aided Engineering Drawing-2006, Published by VTU, Belgaum.
2. Question bank and solutions on Computer Aided Engineering Drawing-2006  
Published by VTU, Belgaum.
3. Engineering Graphics- K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore.

**REFERENCE BOOKS:**

1. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International  
Publishing house Pvt. Ltd., New Delhi, 3rd revised edition-2006.
2. Engineering Drawing- N.D. Bhatt & V.M. Panchal, 48th edition, 2005 Charotar publishing House, Gujarat.

Course Code: **PME 151/ 251**

L T P C

Course Name: **WORK SHOP**

**0 0 3 2**

**Note : The jobs assigned in each shop(except Machine Shop), will be made as per drawing provided.**

**FITTING SHOP:**

Study of fitting tools and processes: one simple exercise involving fitting works

**CARPENTRY SHOP**

Study of tools and their uses, carpentry joints and preparation of half lap corner joints or mortise and tennon joints. study of wood working lathes.

**WELDING SHOP**

Study of tools and their uses, simple butt join,Lap joint,different welding processes and preparation of any one welding joints.

**SHEET METAL SHOP:**

Studyof tools and operations, making one job out of the following: funnel complete with soldering/fabrication of tool box/tray/Tape dispenser.

**MACHINE SHOP:**

Study and demonstration of tools and operations on lathe / shaper/milling machine/grinding machine/drilling machine.

**REFERENCE BOOKS:**

1. The Elements of Workshop Technology -, Vol 1 & 2, S.K.H. Choudhury, A.K.H.Choudhury, Nirjhar Roy, 11thedition, 2001, Media Promoters and Publishers, Mumbai.
2. Raghuvanshi B S. workshop technology vol 1 & 2,Dhanpat Rai