

MECHANICAL ENGINEERING (CODE NO. 11)

1. Engineering Mechanics and Mechanics of Solids

Simple Application of Equilibrium Equations, Equations of Motion; Simple Harmonic Motion; Work, Power and Energy.

Stress and Strain Relationship and Elastic Constants; Thermal Stresses; Shear Force and Bending Moment Diagrams of Simple Beams, Bending of Beam and Torsion of Shaft; Rankine and Euler's Formula for Column; Thin walled Cylinders. Mechanical Properties of Materials and Testing.

2. Theory of Machines

Kinematic Links, Pairs, Chains, Mechanism and Inversions, Degree of Freedom and Constraint Motion; Classification and Terminology of Gears, Gear Trains, Bearings, Clutches, Cams and Followers; Function of Flywheel and Governor; Balancing of Rotating Masses; Gyroscopic Action.

3. Design of Machine Elements

Properties and Structure of Engineering Materials; Heat Treatment; Design Concepts, Design for Static and Dynamic Loading, Factor of Safety; Theory of Failure; Fatigue Strength and SN Diagram; Design of parts subjected to simple stresses such as Keys, Pins, Cotter etc.

4. Production Engineering

Basic types of Metal Cutting Machine Tools and their Operations; Geometry of Single Point Cutting Tool; Cutting Tool Materials; Metal Forming Processes and Machines –Drawing, Rolling, Forging & Extrusion; Sand Casting – Pattern and Mould Design, Casting Defects & their Remedies; Joining Processes –Arc Welding, Resistance Welding, TIG & MIG Welding.

5. Production Management

Method & Time Study Process charts, Estimation of Standard Time; Motion Economy & Work Place Design; Manufacturing Cost Estimation; Break Even Analysis; Site Selection; Plant Layout &

Material Handling; Job Shop & Mass Production – Scheduling, Dispatching & Routing.

6. Thermodynamics

Zeroth Law and Thermometry; Thermodynamic Equilibrium; Heat and Work; First and Second Laws of Thermodynamics; Carnot, Rankine, Otto and Diesel Cycles; Vapour Power Cycles.

7. Fluid Mechanics

Hydrostatics; Stability of Submerged and Floating Bodies; Continuity Equation; Rotational and Irrotational Flows; Bernoulli's Theorem; Flow Measurement; Concept of Laminar and Turbulent Flows.

8. Heat Transfer, Refrigeration and Air Conditioning

One Dimensional Steady State Conduction through Composite Walls and Cylinders; Heat Transfer Co-efficient; Laws of Thermal Radiation; Air Refrigeration System; Vapour Compression Refrigeration System, Simple Saturated and Actual Cycles; Properties of Refrigerants; Use of Psychrometric Chart; Psychrometric Processes.

9. Energy Conversion

Compression Ignition and Spark Ignition Engines; Rating of SI and CI Engine Fuels; Reciprocating Air Compressors; Flow of Steam through Nozzles; Impulse and Reaction Steam Turbines; Layout of Steam Thermal Power Plants; Fluidized Combustion and Forced Circulation Boilers.

10. Computer Programming and Computer Aided Engineering

Computer Hardware and Software; Flow Charting; Principles of Object Oriented Programming; Features of Windows; Introduction of c++ programme.