



DEPARTMENT OF MECHANICAL ENGINEERING

M.Tech. – ENERGY & ENVIRONMENTAL MANAGEMENT

Syllabus PG Entrance Test

1. Basic and Applied Thermodynamics

Basic concepts, Heat and work. Zeroth, First, Second and Third Law – assertions and applications. Real and Ideal gases. Standard vapor, Gas power and Refrigeration cycles, Psychrometry.

2. Heat Transfer

Modes of heat transfer. Heat dissipation from extended surfaces, Heat exchangers, free and forced Convection, Black body and basic concepts in Radiation.

3. Fluid Mechanics and Fluid Machinery

Basic Concepts, Pressure and its measurement, forces on immersed surfaces, Buoyancy, stability of floating bodies, Kinematics and Dynamics. Applications of Bernoulli's equation, Dimensional analysis, Similitude and modeling.

4. Electrical Engineering

Ohm's law – Kirchoff's law – A.C. circuits – D.C. machines – Transformers – Synchronous machines – Instrumentation.

5. Theory of Machines

Kinematic and dynamic analysis of planer mechanisms, Cams, Gears and gear trains, Flywheels, Governors. Balancing of rigid rotors, linear vibration analysis of mechanical systems, Critical speeds and whirling of shafts.

6. Machine Design

Design of Joints, couplings, clutches, belt drives, power screws. Design of Power transmission systems: gears and gear drives shaft and axle.

7. Strength of Materials

Stress and strain, bending moment and shear force diagram, bending stresses and deflection of beams. Torsion of shafts, helical springs. Combined stresses, thick-and thin-walled pressure vessels.

8. Engineering Materials

Basic concepts on structure of solids. Crystalline materials, Binary phase diagrams. Structure and properties of common engineering materials. Heat treatment of steels. Plastics, Ceramics and composite materials.

9. Production Engineering

Metal Forming, Metal Casting, Fabrication Processes, Metal Cutting, Cutting Tools Materials.