



KHAJA BANDANWAZ UNIVERSITY

Rauza-i-Buzurg, Kalaburagi 585104

Department of Mechanical Engineering

Ph.D.Program2025-26

SYLLABUSFORENTRANCETEST

- **Thermodynamics:**Laws of I& II Thermodynamics, zeroth Law, applications.
- **I. C. Engine:**Classification of I. C Engines - 2 Stroke & 4 Stroke Petrol & Diesel Engines. Concept of Mechanical efficiency BHP & IHP.
- **Heat Transfer, Refrigeration and Air Conditioning:**Conduction. Convection and Radiation. Heat Transfer, Heat Exchangers, Boiling and condensation.Refrigeration and heat pump cycles. Refrigeration systems. Coefficient of performance. Psychometric and psychometric chart. Comfort indices
- **Fluid Mechanics and Machines:**Fluids-Properties, Pressure Forces, Buoyancy and stability. Laminar and turbulent flow, equation of continuity. Energy and momentum equation. Bernoulli's Theorem. Dimensional analysis.
- **Power transmission & Mechatronics:** Belt drives, gear drives, Introduction to mechanics- open loop & closed loop control System Advantages & Disadvantages.
- **Engineering Mechanics:** Forces and moments-Equilibrium and analysis of force systems-friction-centre of gravity, moment of Inertia-Kinetics.
- **Strength of Materials:** Stress and strain in 2-D, Mohr's circles; Relations between Elastic Constants. Beams- Bending Moments, Shear forces and deflection. Shafts- Combined bending, Direct and torsional stresses. Thick-Thin Walled cylinders and spheres under Pressure, Struts and Columns. Theories of failure.
- **Engineering Materials. Heat treatment of Metals:** Annealing, Normalizing hardening, tempering, carburizing, cyaniding, Nitriding and flame hardening, Iron, Carbon equilibrium diagram. Composite Materials – Types of matrix materials, FRP & MMC advantages & applications.
- **Manufacturing Process:** Part of a lathe, operation in a lathe, Types of Drilling Machine, operation a Drilling machine. Types of milling machines, operation on milling machines Grinding machines, bonding materials, grinding terminology.