

Syllabus of the Admission Test for PhD Admission ODD SEM 2025-2026

Metallurgical and Materials Engineering Department

Core Subjects:

Physical metallurgy: Structure of metals and alloys, Phase diagram, Phase transformation, Heat Treatment, Corrosion and its prevention

Mechanical Metallurgy: Theory of elasticity and plasticity, Dislocations, Strengthening mechanism, Creep, Fracture, Fatigue, Metal forming processes, Tensile, hardness and torsion test

Process Metallurgy: Iron Making, Steel Making, Environmental management of Metallurgical Industry, Non-ferrous process Metallurgy, Fuel furnace and refractories.

Thermodynamics & Kinetics of Engineering Materials: Solution Thermodynamics, Criteria of equilibrium, Concept of entropy and enthalpy, Reaction kinetics.

Materials Characterization: Optical microscopy, Electron Microscope, X-Ray Diffraction

Manufacturing Processes: Foundry Technology, Casting and solidification, Cast Iron, Powder Metallurgy, Welding Technology.

Optional Subjects:

1. Computational Materials Science
2. Surface Engineering
3. Composite Materials
4. Ceramic Technology
5. Production of Ferro alloys
6. Functional materials & nanomaterials