

**SYLLABI OF PH.D ENTRANCE TEST ADMISSION IN
DEPTT. OF MATERIALS AND METALLURGICAL ENGINEERING**

Specialization 1: ME Materials and Metallurgical Engineering

Physical Metallurgy, Phase diagrams, Phase Transformations, Heat-treatment of ferrous and non ferrous metals, Mechanical Metallurgy, Crystal defects, Elastic and Plastic deformation, strengthening mechanisms, mechanical forming processes, Materials Characterization techniques-X-Ray Diffraction, Scanning electron microscopy, Transmission Electron Microscopy, Spectroscopy, Destructive and non destructive testing of materials, Materials-their properties and applications (Polymers, ceramics, Composites), Nano materials-their synthesis techniques and characterization

Specialization 2: ME Corrosion Engineering

Electrochemistry, Principles of Electrometallurgy, Chemical corrosion, Electrochemical corrosion, The electrode potential in electrochemical cells, The corrosion current and polarization, Types of electrochemical corrosion, Corrosion mechanisms, Protection against corrosion. Microbial degradation and biodegradable polymers, Oxidation and other gas reactions, wear and erosion