# **Syllabus for Comprehensive Exam**

**Mechanical Behavior of materials.** Deformation of single and poly crystals. Temperature and strain rate effects in plastic flow - strain hardening. Tensile and Fatigue tests.

**Structure and characterization of materials.** Electron diffraction and Electron microscopy. Resolution and Rayleigh criterion, electron-specimen interactions. Principles of scanning electron microscopy, imaging modes and detectors.

**Texture**. Concepts of texture in materials, their representation by pole figure and orientation distribution functions. Texture measurement by different techniques. Origin and development of texture during

material processing stages: solidification, deformation, annealing, phase transformation. Influence of texture on mechanical and physical properties.

**Physical Metallurgy of Titanium alloys**. Basic properties, crystal structure, deformation modes, phase transformations, alloy classification, effect of processing and composition on microstructure and mechanical properties, high temperature titanium alloys.