

## **AMMR-9: MATERIALS CHARACTERIZATION -I**

### **Course Details:**

Chemical bonding, fundamentals of crystallography, reciprocal lattice, structures in metals, inorganic compounds, polymers, silicates & glasses, stereographic projections X ray diffraction, diffraction theory' atomic scattering factor, integrated intensity of diffracted beams, temperature factor, line broadening. Techniques: Laue, powder & rotating crystal technique; for studying bent crystal, texture, order-disorder changes, elemental compound & alloy crystals, mode of bonding, crystal types, density of packing, atomic stacking, inter-atomic voids, coordination polyhedra, Paulings rules, symmetry elements, space & point groups, group theoretical formulation. Electron & neutron diffraction techniques; Optical principles of microscopy — resolution, magnification, depth of focus electron diffraction, imaging (various contrasts), determination of crystal structure, Burgers vector, electron-beam – specimen interactions & other applications of transmission electron microscopy, applications of scanning electron microscopy & electron probe microanalyser, Principles of quantitative microscopy, volume density, surface density, length density, numerical density, particle & grain size.

### **Text Books and Reference:**

1. Elements of X-Ray Diffraction, B. D. Cullity (Addison Wesley)
2. Physical Methods for Metal Characterization, Pei Flewitt (Institute of Physics Pub.)

