AMMR-9 MATERIALS CHARACTERIZATION-I

1. Chemical bonding, fundamentals of crystallography, reciprocal lattice,
2. Structures in metals, inorganic compounds, polymers, sib ates & glasses,
3. Stereographic projections X ray diffraction, diffraction theory' atomic scattering factor,
4. Integrated intensity of diffracted beams, temperature factor, line broadening.
5. Techniques: Laue, powder & rotating crystal technique; for studying bent crystal, texture, order-disorder changes, elemental compound & alloy crystals,
6. Mode of bonding, crystal types, density of packing,
7. Atomic stacking, inter-atomic voids, coordination polyhdra,
8. Paulings rules, symmetry elements, space & point groups, group theoretical formulation. Electron & neutron diffraction techniques;
9. Optical principles of microscopy- resolution, magnification, depth of focus electron diffraction, imaging (various contrasts), determination of crystal structure,
10. Burgers vector, electron-beam- specimen interactions & other applications of transmission electron microscopy,
11. Applications of scanning electron microscopy & electron probe microanalyser,
12. Principles of quantitative microscopy, volume density,
13. Surface density, length density, numerical density, and particle & grain size.

Reference Books:

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