

## AMMR-13 ELECTRONIC AND OPTICAL MATERIALS

1. Electron dynamics and concept of holes,
2. Conductivity in relation to band structure, direct and indirect band gap,
3. Degenerate and non-degenerate semiconductor, Intrinsic and extrinsic semiconductor,
4. Application of semiconductor, DC and AC conductivity of metals,
5. Hall effect and Magnetoresistance, Thermal conductivity and specific heat of material,
6. Thermo power of metals. Ionic conduction- review of defect equilibrium and diffusion mechanism,
7. Theory of ionic conduction, conduction in glasses,
8. Application in sensors and batteries, conducting polymers and organic semiconductors, piezoelectric materials, optical materials, electron-hole recombination,
9. Solid state LED's, Laser and IR-detector, band gap engineering, light interaction with materials- transparency,
10. Translucency, opacity, refraction and refractive index,
11. Reflection, absorption and transmission.

### Reference books:

1. "Thin Film Fundamentals" by A Goswami
2. "Fundamentals of Power Electronics" by Robert W Erickson and Dragan Maksimovic