PEL3D001 ELECTRICAL ENGINEERING MATERIALS

Module – I **(14 hours)**

Atomic bonding, crystallinity, Miller Indices, X-ray crystallorgraphy, structural imperfections, crystal growth. Free electron theory of metals, factors affecting electric conductivity of metals, thermal conductivity of metals, heat developed in current Carrying conductors, thermo electrice ffect, super conductivity**.**

Module – II **(10 hours)**

Polarization mechanism and dielectric constant, behavior of polarization under impulse and frequency switching, dielectric loss, spontaneous polarization, piezoelectric effect. Origin of permanent magnetic dipoles in materials, classifications, diamagnetism, paramagnetism, ferromagnetism, Magnetic Anisotropy magnetostriction.

Module – III **(14 hours)**

Energy band theory, classification of materials using energy band theory, Hall effect, drift and diffusion currents, continuity equation, P-N diode, volt-amp equation and its temperature dependence. Properties and applications of electrical conducting, semiconducting, insulating and magnetic materials.

Module – IV **(10 hours)**

Special purpose materials, Nickel iron alloys, high frequency materials, permanent magnet materials, Feebly magnetic materials, Ageing of a permanent magnet, Effect of impurities, Losses in Magnetic materials.

Text Books:

1. *A. J. Dekker, „Electrical Engineering Materials", Prentice hall of India, India*
2. *C. S. Indulkar & S. Thiruvengadam, „An introduction to Electrical Engineering Materials", S. Chand & Co., India*
3. *R. K. Rajput, „Electrical Engineering Materials", Laxmi Publications, India*

Reference Books:

1. *Ian P. Hones, „Material Science for Electrical & Electronics Engineers", Oxford University Press*
2. *K. M. Gupta – Electrical Engineering Materials, Umesh Publication, 2nd edition 2003*