PMT5J002 NANO MATERIALS

Module-I (12 Hours)

Introduction: Emergence and challenges of nanotechnology, Types of nonmaterial.
Synthesis and Characterization: Bottom-up and top-down approaches, Solid, Liquid, Gas phase synthesis, Hybrid Phase synthesis.

Module – II (12 Hours)

Structural characterization by XRD, SAXS, SEM, TEM, SPM, gas adsorption; Chemical characterization by spectroscopy techniques.

Module – III (16 Hours)

Properties and application of nanomaterials: Stability of nanomaterials, Mechanical properties, Optical, Electrical and Magnetic properties, Diffusion. Application of nanomaterials: Electronics and optoelectronics applications, Nanobots, Biological applications, Catalytic applications, Quantum devices, Application of carbon nanotubes, Nanofluids.

Books for reference:

1. *Nanostructures and Nanomaterials: Synthesis, Properties and Applications by G. Cao, Imperial College Press.*
2. *Textbook of Nanoscience and Technology , B.S.Murthy, P.Shankar, Baldev Raj, B.B.Rath and James Murday, University press-IIM-2012*
3. *Nanomaterails Handbook, (Ed.) by Y. Gagotsi, Taylor and Francis.*
4. *Introduction to Nanotechnology by C. P Poole and F. T. Owee, Willey Press.*
5. *Nano Materials Synthesis, Properties and Applications, by Edlstein and Cammarate.*
6. *Nano Materials, by A.K. Bandyopadyay, New age Publications.*
7. *Nano - The Essentials, by T. Pradeep, TMH.*
8. *Nanostructured Materials: Processing, Properties and applications, by C. Koch, William Andrew Publishing.*