

5th Semester	RPL5D006	Polymer Nanocomposites	L-T-P 3-0-0	3 Credits
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Module I: Introduction to nano-material and nano-composites (7 Hours)

General introduction to nanocomposites; Basics of Inorganic Materials Chemistry and Nano chemistry, Inorganic-Organic and Inorganic-Polymer Nanocomposite Materials

Module II: Reinforcement for nano-composites (10 Hours)

Nanocomposites: particulate, clay, and carbon nanotube nanocomposites- synthesis, Structure, properties characterization and applications

Module III: Clay/Polymer Nanocomposites (8 Hours)

Clay/Polymer Nanocomposites: Physical and chemical properties of clay nanoparticles; Synthesis; Potential Applications

Module IV: Metal/Polymer Nanocomposites: (8 Hours)

Metal/Polymer Nanocomposites: Physical and chemical properties of metal nanoparticles; Synthesis; Potential Applications Rheology and processing; Applications and economics.

Module V: Characterization of nano-composites (6Hours)

Characterization of polymer nano-composites-Mechanical, Morphological and Thermal (DSC/TGA/DMA)

Books:

- [1] Polymer nanocomposites: synthesis, characterization, and modeling / Ramanan Krishnamoorti, editor; Richard A. Vaia, editor. Washington, D.C.: American Chemical Society: Distributed by Oxford University Press (2002)
- [2] Polymer matrix nanocomposites, processing, manufacturing, and application: An overview, F. Hussain, M.Hojjati, M. Okamoto, R.E. Gorge, J. Comp. Mater., 40, 1511- 1575 (2006)
- [3] Polymer-clay nanocomposites / edited by T.J. Pinnavaia & G.W. Beall, Chichester; New York: John Wiley (2000).3. Polymer-layered silicate nanocomposites: preparation, properties, and uses of a new class of Materials, M. Alexandre, P.Dubois, Mater.Sci. Eng., 28, 1-63 (2000).