

PPE3I104 POLYMER CHEMISTRY

Module-I

Basic concepts of macromolecules - Monomers- Functionality - Classification and nomenclature of polymers. Types of polymers - plastics and rubbers - Step growth polymerization - Mechanism - Kinetics - Bi-functional systems - Poly functional systems.

Module II

Addition polymerization Mechanism and kinetics of free radical- Cationic- Anionic Polymerisation - Initiator systems - Chain length and degree of Polymerisation - Control of molecular weight- Chain transfer- Inhibition Coordination polymerisation- Mechanism - Kinetics- Ring opening polymerization - Diene polymerization - Advanced Polymerization Techniques - Atom Transfer Radical Polymerization (ATRP), Group Transfer Polymerization (GTP), Reversible Addition Fragmentation Termination (RAFT).

Module III

Copolymerization - Mechanism and Kinetics of free radical - Ionic copolymerization. Types of copolymers- Copolymer composition - Determination of Monomer reactivity ratios. Polymerization techniques -Bulk polymerization -Solution polymerization - Suspension polymerization - Emulsion polymerization - Interfacial condensation.

Module IV

Molecular weight- Molecular weight averages- Molecular weight distribution- Unidispersity, polydispersity, degree of polymerization - Molecular weight determination - Basic concepts of end group analysis, colligative properties, osmometry, light scattering, and gel permeation chromatography - Viscosity of polymers solutions, size of the polymer molecules.

Text Books:

1. F.W. Billmeyer, –*Textbook of Polymer Science*||, Wiley international publishers, 2000
2. George Odian , – *Principles of polymerisation*||, Seymour Robert
3. V.R. Gowariker, –*Polymer Science*|| – New Age International (P) Ltd, Publishers

References:

1. J.M.G. Cowie, –*Polymers: Chemistry and Physics of Modern Materials*||, Blackie, and London, 1991.
2. R.J. Young and P.Lovell, –*Introduction to Polymers*||, 2nd Ed., Chapman & Hall, 1991.
3. Premamoy Ghosh, –*Polymer Science and Technology of Plastics and Rubbers*||, Tata McGraw- Hill, New Delhi, 1990.