PPE7J002 POLYMER RHEOLOGY

Module I

Viscoelastic behavior of Polymer solution and melts stress-strain curves for Polymers, creep of Polymeric material, elastic deformation, irrecoverable follow deformation.
Rubber like deformation, Time-temp superposition (WLF Equation) Models of viscollastity such as Maxwell and kelvin model. Types of viscosity, stress relaxation.

Module II

Introduction and Basic concept of Rheology, classification of fluids, Newtonian and non

Newtonian fluids, shear stress, shear strain and shear rate, shear modulus, bulk modulus, Zero shear viscosity,

Methods to determine shear viscosity by capillary viscometer, cone and plate viscometer, Cup and bob viscometer, Measurement of normal stresses. Theories of viscocities of dilute (De-bye Bueche theory) and conc. Solutions (Grasselley's entanglement theory)

Module III

Rheology of dilute and concentrated suspensions, effect of Rheology during Injection moulding and extrusion and blow moulding of polymers. Rheometers- Bubble inflation rheometers, compressional rheometer, stress relaxation instruments. Torque rheometer, rotational & sliding surface rheomete

Text Book:

1. *Ferry JD Viscoelastic Properties of Polymers, 3rd ed, John Wiley & Sons, New York(1980).*
2. *Han CD. Rheology in Polymer Processing, Academic Press, New York (1976)*
3. *Chang Dae Han, Rheology and Processing of Polymeric Materials Volume I &II, Oxford University Press, New York (2007)*
4. *Yamakawa H. Modern Theory of Polymer Solutions, Harper Row, New York (1971)*