

(4 Lect./Week)

(4 hrs. Lab/Week)

(1 Student's presentation /Week)

(Total Credits -7)

Paper 10: Polymer Blends and Composites

Polymer Blends

1. Introduction, Methods of blending, Phase Behaviour, The incompatibility problem, methods of compatibilization. Properties of blends (mechanical, morphological, rheology and thermal),
2. Different types of polymer blends (TPE, elastomeric blends and plastic blends). Characterization of blends by various techniques.

Polymer Composites

3. Introduction and classification of composites, selection criteria for polymer matrices for composites.
4. Fabrication Processes: hand-lay up process, spray-up technique, pultrusion, filament winding process, Prepeg technology, injection and compression moulding, vacuum bag moulding, fiber placement process, reaction transfer molding, laminating techniques, expansion processes, radiation processes, coating processes, fabrication processes: adhesion, cohesion and mechanical processes & FRPs.
5. Design of composite products: Basic design practice – material considerations, product considerations and design considerations.

Practical - Polymer VI:

1. Preparation of different polymer blends.
2. Compatibilization of blends.
3. Effect of blend composition on distribution of additives and effect of properties
4. Preparation of laminates.
5. Preparation of composites with various fillers and various filler loading.
6. Mechanical properties of blends and composites.

Suggested Readings:

1. Polymer Blends Volume 1 & 2, by D. R. Paul and C. B. Bucknall, Wiley-Interscience (2000).
2. Polymer Blends by Lloyd M. Robeson, Hanser Gardner (2007).
3. Polymer Blends by D. R. Paul and Seymour Newman, Academic Press (2000).
4. Polymer Blends Handbook Vol 1 & 2 by L. A. Utracki, Kluwer Academic (2003).
5. Polymer Composites by S. Thomas, K. Joseph, S. K. Malhotra, K. Goda, M. S. Sreekala, Volume 1, Wiley-VCH (2012).