MSE-342 Polymer Engineering

Credit Hours: 3-0

Pre-requisites: MSE-241 Polymer Science

Course Objectives

Polymer Engineering is an engineering field that covers manufacturing, designs, analyses, and/or testing of polymeric materials. Polymer engineering covers aspects of petrochemical industry as synthetic polymers are made from monomers derived from this industry, polymerization, structure and characterization of polymers, properties of polymers, compounding and processing of polymers and description of major polymers, structure property relations and applications. Principal purpose of Polymer Engineering course is that students encompass the testing, processing, design, development, and manufacture of polymeric products. Specific objectives of the course of Polymer Engineering are outlined below:-

- To recognize the Challenges, Needs, and Opportunities which are presented by the polymeric materials in today's world both in academia and industry.
- To provide an integrated, complete and stimulating introduction to polymer engineering.
- To bring into one framework the fundamental relationship between structure relationship.
- To introduce the description of major polymeric materials
- To introduce various important testing and characterization techniques.
- To provide insight into polymer processing techniques.
- To enable students to determine the choice and design of polymeric materials by keeping in view a specific targeted applications.

Course Contents

- Manufacturing, properties and applications of Polymers
- Polystyrene, polybutadeine, polyester, poly methyl methacrylate (PMMA), nylon, acrylonytryl-butadeine-styrene (ABS)

- Manufacturing of foams, adhesives, formaldehyde, polyurethane and other advanced polymers
- Testing and identification of polymers, high density and high molecular weight polymers, polymeric fibers

Course Outcome

At the end of the course the students are expected to have learned the following:

- How to determine/design which polymeric materials can be appropriate to meet the demand of a specific engineering application.
- How to determine which technique would be useful for analysis and characterization
- To understand the Structure-property relationships of polymeric materials
- To understand the fundamental of polymeric processing, modifications and engineering principles involved in it.
- Description of major polymers materials, which are vital for in today's world.
- Modern topics in polymer research and applications, in academia and industry
- To carry out a case-study, in which group of student will be given short project to design/determine/modify/characterize the polymer materials for the specific applications.

Suggested Books

- V. Tobolsky *Properties and Structure of Polymers, 2nd Edition, John Wiley and Sons*
- N. G. McGrum, C. P. Buckley, C. B. Bucknall, *Principles of Polymer Engineering, 2nd Edition Chapman and Hall Publishers, 1991*