

CHE-360: Fundamentals of Polymer Engineering

Credit Hours: 3-0

Pre-requisites: None

Course objective

To enhance the knowledge of polymers, their raw materials, processing techniques, and uses

Course Contents

- i. Introduction to polymers: Polymer classification and terminology.
- ii. Colligative properties: measurement and characterization of molecular weight distribution.
- iii. Polymer thermal properties and microstructure: melting point and glass transition temperature.
- iv. Rheological measurements of polymer melts.
- v. Flow phenomena: tensile viscosity, viscoelastic effects and spring-and-dashpot models, die-swell, flow instabilities.
- vi. Elasticity, stress-strain behavior, creep: significance for moulding and forming processes; and for service life of plastics.
- vii. Polymerization mechanisms, free radical chain reactions; condensation polymerization; coordination (Zeigler) polymerisation.
- viii. Polymers processing techniques
- ix. Applications of polymers and environmental considerations of polymers

Course Outcomes

After taking this course, students should have knowledge of the importance and utilization of polymers in chemical industry.

Recommended Books

- Fried Joel R. "Polymer Science and Technology", 2000, Prentice Hall.
- Stanley Middleman, Fundamentals of Polymer Engineering, 3rd Edition, 1996
- Tim A. Ossworld, Georg Menges, Hanser Material Science of Polymer for Engineering 2003.
- M. Ward & D. W. Hadley, Wiley, An Introduction to the Mechanical Properties of Solid Polymer, 3rd Edition, 1998