

CHE-461: Polymer Reaction Engineering

Credit Hours: 3-0

Pre-requisites: None

Course objective

- The proposed specialization stream would provide an opportunity for the chemical engineering students to be trained as professionals equipped with academic background and skills to tackle the technical challenges related to Polymer processing/manufacturing Industry.
- The graduating students would have a diverse range of avenues to work in technical areas related to polymer/plastics and rubber manufacturing, processing and applications which also include various sectors of our strategic organization. Polymers provide materials for light weight composite structures.

Course Contents

- i. Introduction to polymerization processes
- ii. Polymerization reactions
- iii. Polymerization techniques
- iv. Step-Growth Polymerization
- v. Equal reactivity Hypothesis
- vi. Equilibrium step-growth polymerization
- vii. Reaction engineering of MWD of ARB polymerization
- viii. Chain-Growth of polymerization
- ix. Radical polymerization, kinetic modeling of radical polymerization, Ionic/anionic polymerization
- x. Reaction engineering of chain-growth polymerization
- xi. Polymer reaction engineering aspects
- xii. Design of reactors
- xiii. Co-polymerization, recycling and degradation of polymers
- xiv. Suspension polymerization
- xv. Emulsion polymerization
- xvi. Emulsion polymerization CSTR
- xvii. Time dependent emulsion polymerization

Course Outcomes

After taking this course, students should have knowledge 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. Osswald, 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