



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Introduction to Polymer Engineering at Macro-, Micro-, and Nanoscale

CBE 5777

Credit Hours:

3.00 - 3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

An introduction to nanomaterials and nanotechnology. Important polymeric micro/nanomaterials and structures, and their manufacturing techniques.

Prerequisites and Co-requisites:

Prereq: 3521 (521), MechEng 3500 (500), 4510 (510), MatScEn 2251 (401), or 3151 (526), or permission of instructor.

Course Goals / Objectives:

- Be exposed to conventional and new polymer and composite processing techniques
 - Master the application of transport phenomena to polymer processing problems
 - Be familiar with various polymer related nanomaterials and nanotechnologies
 - Be familiar with micro/nanofabrication techniques relevant to polymeric materials
 - Be familiar with polymer and nanomaterial characterization methods
 - Be able to select proper polymeric materials, nanoparticles and processing methods for specific applications
 - Be able to work as a team in the polymer processing and nanomaterial characterization labs
 - Be able to write short technical reports and present technical results
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Course Topics:

- Introduction to Polymeric Materials and Polymer Processing
 - Introduction to Polymer Synthesis
 - Brief Review of Transport Phenomena and Rheology
 - Introduction to Polymer Mixing
 - Introduction to Major Polymer Processing Methods
 - Introduction to Reactive Processing and Composite Fabrication Methods
 - Nanoparticles
 - Polymer Nanocomposites
 - Polymer-Biomolecule Nanoparticles and Nanodevices
 - Polymer Thin Films
 - Polymer Nanofibers (John Lannutti*)
 - Characterization at Micro/Nanoscale
 - Micro/Nano-Machining (Wu Lu*, Allen Yi*)
 - Micro/Nano-Machining (Dave Farson*)
 - Transport Phenomena and Rheology at Micro/Nanoscale
 - Micro/Nano-Injection Molding
 - Micro/Nano-Embossing and Imprinting
 - Soft Lithography
 - Team Project Presentations
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Designation:

Elective