

Course Syllabus for Spring 2016

Course Name: Polymer Laboratory Methods – CHEE 6860/8860 (*class size 6-8 students*)

Instructor: Dr. Joseph G. Lawrence (Dr. Abraham Avalos & Mr. Michael Mumford)

Office: NE 2428

Office Hours: Monday 10:00 AM – 11:00 AM, Friday 10:00 AM - 11:00 AM

Laboratory Location: North Engineering, room 1470

Course Time: Wednesday, 1:00 – 3:50 PM

Email: joseph.lawrence@utoledo.edu

Course Description:

This course will cover the major aspects of polymer characterization and analytical methods. Course highlights include detailed description of the theory behind the particular lab method, usage of the instruments, hands on sample analysis. A laboratory report will be due for each of the lab class the following week. A midterm exam and a final exam will be given based on the experiments performed in the laboratory.

Course Objectives:

This course is intended to provide the graduate students involved in polymer research, an understanding of the various methods used to characterize the polymers. Specific course objectives include:

1. Demonstrate knowledge and skills related to various polymer characterization techniques
2. Provide hands on training on various instruments used in polymer laboratories
3. Enhance report writing skills that will help students to write technical reports
4. Provide the ability to produce relevant and meaningful data related to polymer properties

Course Material:

Required course materials will be provided. The students will be asked to refer various textbooks in the library to analyze the data and write reports

Student Requirements:

Graduate students with basic knowledge of polymers and laboratory practice

Grading:

Laboratory reports: 50%, Midterm exam: 25% and Final exam: 25%

Schedule of Classes:

Date	Lab Experiment
1/13/2016	(1) Infrared Spectroscopy
1/20/2016	(2) Differential Scanning Calorimetry
1/27/2016	(3) Oxygen Permeation through Polymers
2/3/2016	(4) Water Vapor Transmission of Polymers
2/10/2016	(5) Dilute Solution Viscosity
2/17/2016	(6) Density Measurement
2/24/2016	(7) Measurement of Creep
3/2/2016	<i>Mid-Term Exam</i>
3/9/2016	<i>Spring Break – No Class</i>
3/16/2016	(8) Small Angle Light Scattering
3/23/2016	(9) X-Ray Diffraction
3/30/2016	(10) Microscopy of Polymers
4/6/2016	(11) Polymer Extrusion
4/13/2016	(12) Rheology/Melt Viscosity - Capillary
4/20/2016	(13) Rheology/ Viscoelastic Properties
4/27/2016	(14) Tensile Stress-Strain Properties
5/4/2016	<i>Final Exam</i>