

MSE/CHEM/CHBE 6752/4141

Polymer Characterization

Syllabus

Description:

This course is an advanced course dealing with polymer characterization, and in particular practical aspects of data collection and analysis. Topics to be covered include property predictions, as well as common techniques for bulk and surface characterization of a number of polymer properties.

Class Time: Lectures T/Th 09:30-11:00 hrs MRDC 3403
Labs. W 15:00-18:00 hrs times/places subject to change – listen/look out for notifications

Textbook: *There is no standard text book (yet) which covers all the topics in this course. Therefore, notes will be provided as well as suggested bibliography as appropriate for the various topics.*

Grading: 10% quizzes, 30% Labs, 30% midterm, 30% final

Course Expectations:

- Short quizzes will be given in class periodically (~fortnightly). These will be generally closed book unless otherwise indicated.
- Midterm and final exams will be closed book, relevant equations will be supplied.
- In many cases physical labs cannot be accommodated due to limitations of equipment availability and class numbers, assignments will be provided instead. All assignments need to be completed in the time stated. Any late submissions (except where proper reasons are given) will be marked, but will score 0.
- Notice should be given to Instructor a week in advance for any planned class absences. Missed classes due to illness require a medical note from your doctor.
- You will be expected to read relevant literature to supplement the course notes.

Course Outcomes:

At the end of the course you will be able to:

1. Make predictions about critical polymer properties.
2. Identify which properties are to be analyzed to evaluate the polymer.
3. Determine which technique(s) is(are) most appropriate to determine the property of interest.
4. Understand how to prepare the sample and collect the data.
5. Understand the fundamental basis of the measurement technique.
6. Analyze the experimental data and determine/calculate the relevant properties.

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Fall 2011

*Tentative Schedule**

Week	Date	Topic
1	23/25 Aug	Introduction Property predictions (density, volume & calorimetric properties)
2	30 Aug/1 Sept	Property predictions (T-transitions, solubility and miscibility)
3	6/8 Sept	Property predictions (Rheological and mechanical)
4	13/15 Sept	Data Analysis and Scattering Intro <i>Note: Class probably on 14 Sept at 15:00 hrs</i>
5	20/22 Sept	Scattering theory and practice
6	27/29 Sept	Wide versus small angle scattering
7	4/6 Oct	Reflection and grazing incidence scattering
8	11/13 Oct	Midterm (11th Oct) Review (NB – 14 th Oct drop date deadline)
9	18/20 Oct	Official school recess (18th Oct) Molecular weight determination
10	25/27 Oct	NMR (Prof H Beckham)
11	1/3 Nov	NMR (Prof H Beckham)
12	8/10 Nov	XPS and SIMS
13	15/17 Nov	IR and Raman spectroscopy
14	22/24 Nov	AFM and SEM/TEM Official School Recess (24th Nov)
15	29 Nov/1 Dec	Rheology (Prof V Breedveld)
16	6/8 Dec	Thermal Analysis
	13 Dec	Final Exam (08:00 – 10:50 hrs)

* class topics subject to change.