

INTRODUCTION TO POLYMER CHEMISTRY

CM450/CM550

Fall 2002

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Online Course Materials: <http://www.clarkson.edu/~ochem> (follow link to CM450/CM550 Fall 2002)

Objectives

1. Introduction to Polymer Chemistry (CM450 and CM550) is a one-semester course that will provide an introduction to the chemistry of polymerization processes.
2. **Primary Textbook:** G. Odian "Principles of Polymerization".
Other useful texts: F. Billmeyer "Textbook of Polymer Science"
H. R. Allcock, F. W. Lampe "Contemporary Polymer Chemistry"
M. Stevens "Polymer Chemistry"
G. Moad, D. H. Solomon "The Chemistry of Free Radical Polymerization"
C. E. Carraher, Jr. "Seymour/Carraher's Polymer Chemistry"
P. Flory "Principles of Polymer Chemistry"
3. **Classes** are held Tuesdays and Thursdays at 9:30 am – 10:45 am in Snell 127.
4. **Topics covered will include:** kinetics and thermodynamics of polymerization; step-growth polymerization; radical polymerization; anionic, cationic polymerizations, copolymerizations; organometallic and inorganic polymers.
5. **Course objectives:** to learn how to make polymers and perform reactions on polymers; to understand polymerization kinetics, thermodynamics, reaction mechanisms, structure-property and structure-reactivity relationships; to become familiar with specialty polymers (e.g. for electronics, optics, ceramics, medicine, etc.).

Assignments

1. Classroom time is devoted primarily to the presentation and discussion of lecture materials. Students are strongly urged to read appropriate sections of the recommended textbook before class.
2. The schedule indicates the chapter and reading assignments and the tentative dates. Students are expected that in-chapter problems from Odian, along with additional problems, will be attempted.
3. Assessment is based on two exams (mid-semester and final) and an oral presentation on a special topic (10 minutes plus 5 minutes questions/discussion). In addition, graduate students are required to submit a term paper (15-20 pages).

Grading, Exams, Homework Assignments, Make-ups

The course will be graded according to the following:

Requirement	Weighting		Dates
	Undergrads	Graduates	
Homework Assignments / Class Participation	20%	15%	Homework: approx. every 2 nd week
Oral presentation	10%	10%	Tuesday 11/19 & Thursday 11/21
Mid-semester exam	35%	30%	Tuesday 10/17/02
Final exam	35%	30%	TBA
Term paper	-	15%	Tuesday 12/2/02

1. Homework Assignments will be handed out approximately every second week, and solutions the week after. The Homework will not be graded, but all students are strongly encouraged to do the Homework.
2. Term Papers will only be submitted by graduate students. Topics for the Term Papers are to be chosen by the students and approved before 10/21/02). A short outline (~ 1 page) is necessary for approval. A full draft of the term paper is to be handed in by 11/11/02. This will be read and suggestions/corrections will be given back to the student. The final version of the Term Paper is due 12/2/02.
3. The oral presentation will be held on Tuesday 11/19/02 & Thursday 11/21/02 (if necessary). The topic for these presentations can be the same as the Term Paper (in the past this was invariably so).
4. Exams will be held instead of class on the days indicated and will be 1.5 hours in duration. Contact me as early as possible if there are any clashes, etc.

Tentative Schedule

Week of	Week #	Topic (Chapter)	Notes
8/26	1	Scope & Introduction (1)	Classes begin
9/2	2	Step-growth Polym'n (2)	
9/9	3	Radical Polym'n (3)	
9/16	4	Emulsion/Suspension Polym'n (4)	
9/23	5	Controlling Radical Polym'n (-)	
9/30	6	Anionic & Living Polym'n (5)	Fall break (Mon – Wed inclusive)
10/7	7	Cationic Polym'n (5)	
10/14	8	Review & exam	Mid-semester exam 10/17
10/21	9	Ring-Opening, Heterocycles (7)	Term Paper outline due 10/21
10/28	10	Copolym'n, Statistics (5,6)	
11/4	11	Stereochem, Coord'n Polym'n (8)	
11/11	12	Organometallic, Inorganic Polymers	Draft of Term Paper due 11/11
11/18	13	Student presentations	Presentations 11/19 & 11/21
11/25	14	Reactions of Polymers, Structure-Property Relationship (9)	Thanksgiving Recess – Wed-Fri inclusive
12/2	15	Review	Term paper due 12/2
12/9	16	Exam	Final exam TBA

The "Topic (Chapter)" column refers to Odian.