

CHE 486/586 - Fundamentals of Polymers - Fall 2008

Section 50 - Tuesday, Thursday 4:30-5:45 PM, Room FT 10

Course Description: Emphasis on polymer molecular structure and its relation to physical properties, such as molecular weight distributions, gel point, glass transition, heat capacity, and viscosity. Other topics include polymerization kinetics; condensation esterification; emulsion polymerization; and methods of analysis, such as X-ray diffraction, infrared spectroscopy, and other important basic engineering properties of polymers.

Instructor: Prof. Nolan B. Holland, Dept. of Chemical & Biomedical Engineering

Location: Stilwell Hall 462 (office), Stilwell Hall 450 (lab)

Phone: 687-2572

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Office hours: Tuesday, Thursday 3:00-4:00

Textbook:

Introduction to Physical Polymer Science, *4th Edition* by L.H. Sperling, John Wiley & Sons:Hoboken, NJ, 2006. ISBN 047170606X

Evaluation:

The final grade will be determined as follows

	486	586
Exam I (October 2)	20%	20%
Exam II (November 20)	20%	20%
Final Exam (December 9)	40%	30%
Homework	20%	15%
Review paper		15%
Total	100%	100%

Note: The schedule and/or syllabus may be revised at any time by the instructor.

Course Outline for Fundamentals of Polymers (CHE 486/586)

Aug. 26	1 Introduction to Polymers		Chapter 1
Section I. Macromolecular Structure			
Aug. 28	2 Synthetic Schemes		Chapter 1
Sep. 2	3 Molecular Structure	HW1 due	Chapter 2
Section II. Polymers in Solution			
Sep. 4	4 Dilute Solutions		Chapter 3
Sep. 9	5 Mixing Thermodynamics		Chapter 3
Sep. 11	6 Light Scattering	HW2 due	Chapter 3
Sep. 16	7 Solution Hydrodynamics		Chapter 3
Sep. 18	8 Other MW Techniques	HW3 due	Chapter 3
Sep. 23	9 Concentrated Solutions		Chapter 4
Sep. 25	10 Suspensions/Emulsions		Chapter 4
Sep. 30	11 Review	HW4 due	
Oct. 2	12 Exam I (Covering Lectures 1-11)		
Section III. Bulk Polymers			
Oct. 7	13 Amorphous State		Chapter 5
Oct. 9	14 Crystalline State		Chapter 6
Oct. 14	15 Crystallization	HW5 due	Chapter 6
Oct. 16	16 Mechanical Properties		Chapter 8
Oct. 21	17 Thermal Transitions		Chapter 8
Oct. 23	18 Rubber Elasticity	HW6 due	Chapter 9
Oct. 28	19 Viscoelasticity		Chapter 10
Oct. 30	20 Time-Temperature Superposition		Chapter 10
Nov. 4	21 Melt Properties		Chapter 10
Nov. 6	22 Deformation and Fracture Mechanics	HW7 due	Chapter 11
Nov. 11	Veterans Day - No Class		
Nov. 13	23 Fracture/Fatigue	HW8 due	Chapter 11
Nov. 18	24 Summary/Review		
Nov. 20	25 Exam II (Covering Lectures 13-24)		
Section IV. Polymer Processing Techniques/Special Topics			
Nov. 25	26 Processing Overview		Handout
Nov. 27	Thanksgiving - No Class		
Dec. 2	27 Plant tour/Special lecture	Paper due	
Dec. 4	28 Processing Overview		Handout
Dec. 9	4:00-6:00	Comprehensive Final Exam	

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