

CHEM/CHE/ME/MSE/PTFE 4776 (2-3-3)

Polymer Science and Engineering II: Analysis, Processing, and Laboratory

Emphasis: Polymer fabrication processes and methods of characterization. Experiments in polymerization, processing, and property evaluation of polymers.

Pre- or corequisite: CHEM/CHE/ME/MSE/PTFE 4775

Lecture Period: MW 2:05–2:55 (all sections)

Room: MRDC 3403

Laboratory T 12:05–2:55 and 3:05–5:55

Room: TBA

Text: *Principles of Polymer Systems*, F. Rodriguez

Instructors:	Dr. David Bucknall	<u>Office</u> MRDC 4503	david.bucknall@ptfe.gatech.edu
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Tentative Course Outline and Schedule

Date	Lecture Topic(s)	Rodriguez chapter sections
Jan 7/9	Introduction/Scientific Reporting/Molecular Weight of Polymers	6.1, 6.2, 6.3
Jan 14/Jan 16	Step-Growth Polymerization	4, 5.2
Jan 23/28	Addition/Emulsion Polymerization	4, 5.5
Jan 30/Feb 4	Molecular Weight Determination by GPC and Dilute Solution Viscometry	6.4 – 6.6
Feb 6/11	Light Scattering	6.7
Feb 13/18	NMR/IR Spectroscopy	17.1, 17.2, 17.5, 17.6
Feb 20	Review	
Feb 25	<i>Exam 1</i>	
Feb 27/Mar 3	Thermal Analysis	8, 17.3, 17.4
Mar 5/10	Rheology	7
Mar 12/24	Extrusion	13.1 – 13.3
Mar 26/31	Injection Molding	13.6 – 13.8
Apr 2/7/9	Mechanical Properties and Testing	9
Apr 14	Review	
Apr 16	<i>Exam 2</i>	
Apr 21/23	Special Topics	

Date	Laboratories (location TBA)
Jan 8	No Lab
Jan 15	Step-Growth Polymerization
Jan 22	Emulsion Polymerization
Jan 29	Dilute Solution Viscometry
Feb 5	Gel Permeation Chromatography
Feb 12	Light Scattering
Feb 19	Spectroscopy
Feb 26	No Lab
Mar 4	Thermal Analysis
Mar 11	Rheology
Mar 18	Spring Break
Mar 25	Film Extrusion
Apr 1	Injection Molding
Apr 8	Mechanical Testing
Apr 15	No Lab
Apr 22	Orals

Grading:	Exam 1	20%
	Exam 2	20%
	Laboratory reports	50%
	Oral presentation	10%

Course Policies:

1. Passing the course requires completing each laboratory and submitting a report for each.
2. Lab reports are due one week after completing the laboratory work. They should be submitted to the instructing professor for that laboratory. No late lab reports will be accepted. If the lab report is not in the professor's office by 6 PM on the due date, a zero will be awarded for that laboratory report.
3. No make-up exams will be given for Exam 1. If you must miss it because of a valid, documented reason, the grade for Exam 2 will be used in place of the missed exam.
4. The laboratory reports will be graded for written communication skills in addition to technical content.