MSE404 – Polymer Characterization Lab
Fall 2026

Course Description:
The main goals of the course are 1) to introduce and provide hands-on experience with the various lab techniques involved in polymer characterization, 2) to hone your scientific writing skills, and 3) to make connections between textbook learning and experiment.

Instructor:
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Teaching Assistant:
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Course Text:
There is no required textbook for the class. Instead, the lab experiments will be described on separate handouts. Electronic copies of readings and book chapters will be provided throughout the semester. Supplementary information can also be found online:

Saldivar-Guerra, E.; Vivaldo-Lima, E. Handbook of Polymer Synthesis, Characterization, and Processing. Wiley, 2013. (http://onlinelibrary.wiley.com/book/10.1002/9781118480793)

Sperling, L. H. Introduction to Physical Polymer Science. Wiley, 2005. (http://onlinelibrary.wiley.com/book/10.1002/0471757128)

Rudin, A.; Choi, P. The Elements of Polymer Science & Engineering. Academic Press, 2012. (http://www.sciencedirect.com/science/book/9780123821782)

Website:
https://canvas.illinois.edu

Class Meetings:
Lectures and labs will meet in person with no room capacity limit. Lectures will be given in 122 Kiln House prior to most of the scheduled labs.

Activity	Section	Time	Location
Laboratory	PC1	2:00 – 4:50 PM, Mon/Wed	123/124 Kiln House
	PC2	2:00 – 4:50 PM, Tues/Thurs	123/124 Kiln House
	PC3	8:00 – 10:50 AM, Tues/Thurs	123/124 Kiln House
Office Hours	11:00-11:50 AM Mon & Tues or by appointment		209 Ceramics

Grading:

Lab Reports & Homework & Presentation:	70%
Lab Quizzes:	15%
Attendance/Participation	10%
Lab 1 Report	5%

Grading Notes:

1. This course consists of 8 experiments to be completed in groups of 3-4 people. Generally, a lab report or homework assignment will be required for each experiment. Some reports encompass multiple experiments and some are based on just one experiment. Five lab reports are planned, one of which will be a presentation instead of written submission. In addition, one extra credit homework assignment is planned. Lab reports will be submitted individually and presentations will be prepared as a group.
2. Lab reports are to be submitted online via the course website. Adobe PDF is the preferred format, but MS Word (or similar) will also be accepted. If you are uncomfortable with online submission, paper copies will also be accepted but you must coordinate a time with me to deliver the report.
3. All students will receive 5 extension days. These can be applied to any report. A tracker will be maintained in the gradebook. Once all 5 days have been used, reports that are received late will be docked 5 points each day until they are submitted. Reports that are not received within 20 days of the due date receive no points. Unused extension days will be translated to points that will be added to a lab report score.
4. You are required to read the lab procedures before attending the lab session. A brief quiz will be given at the beginning of each lab session. The quiz is intended to focus on the fundamental concepts of each lab and not on minute experimental details.
5. Everyone is required to keep a lab notebook which will be inspected periodically.

Grading Scale:

98-100 = A+	92-97 = A	90-91 = A-
88-89 = B+	82-87 = B	80-81 = B-
78-79 = C+	72-77 = C	70-71 = C-
68-69 = D+	62-67 = D	60-61 = D-
≤59 = F		

*the lower number of the grading ranges may be lowered but not raised

Safety and Lab Rules:

This lab involves several potentially hazardous procedures. As in all labs, safety glasses/goggles must be worn at all times. The use of fume hoods will be necessary in several parts of the lab. Extreme care should be taken with the solvents that we will use, as in most cases they are toxic and flammable.

1. No food or beverages are allowed in the lab. Chewing gum is discouraged.
2. Long pants (covers the legs to the ankle) and closed-toed shoes are required for entry into the lab.
3. Avoid wearing your “best” clothes and consider purchasing/wearing a lab coat.
4. Confine long hair, loose clothing and dangling jewelry.
5. Cover any cuts or scrapes with a bandage before attending lab.
6. Safety glasses/goggles are available and must be worn at all times.
7. Wear disposable gloves at all times.
8. Never pipet by mouth.
9. Do not pick up broken glass with your hands, use a dust pan and broom.
10. Clean your lab space and equipment before departing.
11. Please exit the lab when making personal calls or sending texts or email messages. Abuse of this rule will result in cell phones being banned from the lab. Smartphones may be used during the lab exercises as references, calculators and other similar tools.
12. Thoroughly wash hands with soap prior to leaving the laboratory.

Illness/Absences:
If you are sick or otherwise cannot attend class, please let the instructor know. Missed quizzes will need to be repeated, and missed labs may need to be repeated at a time suitable for both the student and instructor.

Academic Integrity:
Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy found at https://studentcode.illinois.edu/article1/part4/1-401/. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask if you are in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

Students with Disabilities:
To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor as soon as possible and provide the instructor with a Letter of Academic Accommodations from Disability Resources and Educational Services (DRES). To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class should apply for services with DRES and see the instructor as soon as possible. If you need accommodation for any sort of disability, please speak to me after class. DRES provides students with academic accommodations, access, and support services. To contact DRES, visit 1207 S. Oak St., Champaign, call 217-333-1970, e-mail mdisability@illinois.edu or visit the DRES website at http://www.disability.illinois.edu/.

Mental Health:
Significant stress, mood changes, excessive worry, substance/alcohol misuse or interferences in eating or sleep can have an impact on academic performance, social development, and emotional wellbeing. The University of Illinois offers a variety of confidential services including individual and group counseling, crisis intervention, psychiatric services, and specialized screenings which are covered through the Student Health Fee. If you or someone you know experiences any of the above mental health concerns, it is strongly encouraged to contact or visit any of the University's resources provided below. Getting help is a smart and courageous thing to do for yourself and for those who care about you.

Counseling Center (217) 333-3704
McKinley Health Center (217) 333-2700
National Suicide Prevention Lifeline (800) 273-8255
Rosecrance Crisis Line (217) 359-4141 (available 24/7, 365 days a year)

If you are in immediate danger, call 911.

Disruptive Behavior:
Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office for Student Conflict Resolution (https://conflictresolution.illinois.edu; mconflictresolution@illinois.edu; 333-3680) for disciplinary action.

Emergency Response Recommendations:
Emergency response recommendations and campus building floor plans can be found at the following website: https://police.illinois.edu/em/run-hide-fight/.

Religious Observances:
Illinois law requires the University to reasonably accommodate its students' religious beliefs, observances, and practices in regard to admissions, class attendance, and the scheduling of examinations and work requirements. Students should complete the Request for Accommodation for Religious Observances form should any instructors require an absence letter in order to manage the absence. In order to best facilitate planning and communication between students and faculty, students should make requests for absence letters as early as possible in the semester in which the request applies.

Sexual Misconduct Reporting Obligation:
The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options.

A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found at http://wecare.illinois.edu/resources/students/#confidential.

Other information about resources and reporting is available at http://wecare.illinois.edu.

August 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24 Polymer Characterization Intro	25 Polymer Characterization Intro	26 **Lab 1** – Preliminary Evaluation of Polymers **Quiz 1**	27 **Lab 1** – Preliminary Evaluation of Polymers **Quiz 1**	28	29
30	31 **Lab 2** - Dilute Solution Viscometry (Pt. 1) **Quiz 2**					

September 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 **Lab 2** - Dilute Solution Viscometry (Pt. 1) **Quiz 2**	2 **Lab 2** - Dilute Solution Viscometry (Pt. 2)	3 **Lab 2** - Dilute Solution Viscometry (Pt. 2)	4	5
6 **Lab 1 Report Due @ 11:59PM**	7 No Class (Labor Day)	8 No Class	9 **Lab 3** – Gel Permeation Chromatography **Quiz 3**	10 **Lab 3** – Gel Permeation Chromatography **Quiz 3**	11	12
13	14 **Lab 4** – Fourier Transform Infrared Spectroscopy (Pt. 1, Sample Prep)	15 **Lab 4** – Fourier Transform Infrared Spectroscopy (Pt. 1, Sample Prep)	16 **Lab 4** – Fourier Transform Infrared Spectroscopy (Pt. 2, Data Collection) **Quiz 4**	17 **Lab 4** – Fourier Transform Infrared Spectroscopy (Pt. 2, Data Collection) **Quiz 4**	18	19
20 **Lab 2+3 Report Due @ 11:59PM**	21 **Lab 5** – Differential Scanning Calorimetry (Pt. 1, Sample Prep)	22 **Lab 5** – Differential Scanning Calorimetry (Pt. 1, Sample Prep)	23 **Lab 5** – Differential Scanning Calorimetry (Pt. 2, Data Collection) **Quiz 5**	24 **Lab 5** – Differential Scanning Calorimetry (Pt. 2, Data Collection) **Quiz 5**	25	26
27 **Lab 4 Report Due @ 11:59PM**	28 **Lab 6** – Melt Rheology (Pt 1, Lecture Only)	29 **Lab 6** – Melt Rheology (Pt 1, Lecture Only)	30 **Lab 6** – Melt Rheology (Pt. 2, Data Collection) **Quiz 6**			

October 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 **Lab 6** – Melt Rheology (Pt. 2, Data Collection) **Quiz 6**	2	3
4 **Lab 5 Report Due @ 11:59PM**	5 **Lab 7** – Time Temperature Superposition (Pt. 1, Lecture Only)	6 **Lab 7** – Time Temperature Superposition (Pt. 1, Lecture Only)	7 **Lab 7** – Time Temperature Superposition (Pt. 2, Data Collection) **Quiz 7**	8 **Lab 7** – Time Temperature Superposition (Pt. 2, Data Collection) **Quiz 7**	9	10
11 **Lab 6 Report Due @ 11:59PM**	12 **Lab 8** – Gel Electrophoresis **Quiz 8**	13 **Lab 8** – Gel Electrophoresis **Quiz 8**	14 **Presentations**	15 **Presentations**	16 Polymer Characterization Ends	17
18	19	20	21	22	23 **Lab 7 Extra Credit Due @ 11:59PM** **Lab 8 Extra Credit Due @ 11:59PM**	24
25	26	27	28	29	30	31