UT Tyler ENGINEERING

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MENG 5347 – Polymer Science and Engineering
Course Syllabus

Semester / Year	Spring / 2026
Catalog Description	This course provides an introduction to polymer science and engineering, including polymer synthesis, microstructure, characterization methods, mechanical and rheological properties of polymers, and the applications of polymers in nanotechnology and bioengineering.
Prerequisites	MENG 3319: Materials Science and Manufacturing, or Graduate standing.
Section Number	001 and 051
Instructor Name	Dr. Shih-Feng Chou
Contact Information	3900 University Blvd., RBN 3005, Tyler TX. 75799 Phone: 903-566-6209 Email: schou@uttyler.edu
Class Type / Instruction Mode / Location	001, Lecture, f-2-f, RBN 3038 051, Lecture, synchronized Zoom, A218
Class Time	Mo 5:00 PM – 7:45 PM
Office Hours	Mo/We 3:30 – 4:30 PM and Tu 11:00 AM – 12:00 PM or by appointment. Zoom: 843-9631-4485 (#871683)
No. of Credits	3
Required Textbook	N/A
Optional References	1. Introduction to Polymers, 3rd edition, R.J. Young and P.A. Lovell, CRC Press, ISBN: 978-0-84933-929-5. 2. Principles of Polymer Systems, 6th edition, F. Rodriguez. C. Cohen, C.K. Ober, L.A. Archer, CRC Press, ISBN: 978-1-48222-387-3. 3. Lecture notes.
Additional Rules and Requirements	1. Since the mechanical engineering program is designed to prepare students for professional practice, all submitted work (e.g., homework, lab reports, projects, presentations) is expected to meet professional standards. Work that does not reflect professional quality may be subject to grade reductions, even if professionalism is not explicitly listed in the grading rubric. 2. This course allows the use AI tools (such as ChatGPT and Copilot) in self-learning. Students will be notified as to when and how these tools will be used, along with guidance for attribution. Using AI tools outside of these parameters violates UT Tyler's Honor Code, constitutes plagiarism, and will be treated as such.

Evaluation Method	Quizzes: 15% Homework: 20% Exams: 45% Final Project: 20%
Grading Policy / Scale	Letter grades, scale: A: 90 – 100, B: 80 – 89, C: 70 – 79, D: 60 – 69, F: < 60
Important Events / Dates	1/26/2026 (Mo): Census Date. 2/16/2026 (Mo): 1st Exam. 3/23/2026 (We): 2nd Exam. 3/30/2026 (Mo): Last day to withdraw from one or more classes. 4/20/2026 (Mo): Project presentation. 4/27/2026 (Mo): Final Exam Week: 3rd Exam and Final Report.
Attendance / Makeup policy / other rules	1. Attendance will be checked throughout the semester. 2. Make-up exams are required to obtain instructor's approval prior to the event. 3. Students with SAR status should contact the UT Tyler Office of Student for accommodations. 4. All assignments must be submitted to Canvas for grades.
Course Learning Objectives / ABET & PEOs Relation	By the end of this course, students will be able to: 1. Describe types of polymers and their microstructures. 2. Explain polymers synthesis methods. 3. Explain characterization methods in polymers and the corresponding properties. 4. Describe the use of polymers in nanotechnology and bioengineering. 5. Produce a draft of a publishable level paper that demonstrates the scientific understanding of polymers in engineering applications.
Tentative Topics / Course Plans	Polymer Materials; Polymer Synthesis; Kinetics of Polymerization; Step-Growth Polymerization; Copolymerization; Microstructure and Crystallization; Polymer Solutions; Measurement of Molecular Weight; Mechanical and Rheological Properties; Applications of Polymers. Course Plan:

	(Dr. Chou reserves the right to change schedule in course plan.)
University Policies	https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information-rev122025.pdf

Week	Date	Topics	Homework	Project
1	1/12	Lec#1: Syllabus and Introduction		
2	1/19	**MLK Day – No Class**		
3	1/26	Lec#2: Materials Science and Polymes	HW#1	Topic Due
4	2/2	Lec#3: Polymer Structures	HW#2	
5	2/9	Lec#4: Polymer Systems		Headings Due
6	2/16	**Exam#1 (Wk.1 – Wk.5)**		
7	2/23	Lec#5: Step Polymerization	HW#3	
8	3/2	Lec#6: Radical Polymerization	HW#4	
9	3/9	**Spring Break – No Class**		
10	3/16	Lec#7: Characterizations of Polymers		Draft Report Due
11	3/23	**Exam#2 (Wk.7 – Wk.10)**		
12	3/30	Lec#8: Rheological Properties	HW#5	
13	4/6	Lec#9: Mechanical Properties	HW#6	
14	4/13	Lec#10: Polymer Applications		
15	4/20	Lec#11: Polymer Applications		Project Presentation
16	4/27	**Exam#3 (Wk.12 – Wk. 15)**		Final Report