

MENG 5347 – Polymer Science and Engineering
Course Syllabus

Semester / Year	Spring / 2024
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 041
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, f-2-f, RBN 3039 041, synchronized Zoom
Class Time	Tu 5:00 PM – 7:45 PM
Office Hours	Th 10 – 11 AM and WeFr 1:30 – 2:30 PM or by appointment. Zoom: 878-1035-6601 (#272197)
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	N/A
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	1/29/2024 (Mo): Census Date. 2/13/2024 (Tu): 1 st Exam. 3/19/2024 (Tu): 2 nd Exam. 3/25/2024 (Mo): Last day to withdraw from one or more classes. 4/23/2024 (Tu): 3 rd Exam. 4/30/2024 (Tu): Project report and presentation.																																																																				
Attendance / Makeup policy / other rules	Attendance will be checked throughout the semester. Make-up exams are required to obtain instructor's approval prior to the event. Student with SAR status should contact the UT Tyler Office of Student Accessibility and Resources for exam arrangements. 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	<p>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.</p> <p>Course Plan:</p> <table border="1"> <thead> <tr> <th>Week</th> <th>Date</th> <th>Topics</th> <th>Assignments</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1/16</td> <td>Lec#1: Syllabus and Introduction</td> <td></td> </tr> <tr> <td>2</td> <td>1/23</td> <td>Lec#2: Materials Science</td> <td>HW#1</td> </tr> <tr> <td>3</td> <td>1/30</td> <td>Lec#3: Polymer Structures</td> <td>HW#2</td> </tr> <tr> <td>4</td> <td>2/6</td> <td>Lec#4: Polymer Systems</td> <td></td> </tr> <tr> <td>5</td> <td>2/13</td> <td>1st Exam (Wk.1 – Wk.4)</td> <td>Exam#1</td> </tr> <tr> <td>6</td> <td>2/20</td> <td>Lec#5: Step Polymerization</td> <td>HW#3</td> </tr> <tr> <td>7</td> <td>2/27</td> <td>Lec#6: Radical Polymerization</td> <td>HW#4</td> </tr> <tr> <td>8</td> <td>3/5</td> <td>Lec#7: Characterizations of Polymers</td> <td></td> </tr> <tr> <td>9</td> <td>3/12</td> <td>Spring Break – No Class</td> <td></td> </tr> <tr> <td>10</td> <td>3/19</td> <td>2nd Exam (Wk.6 – Wk.8)</td> <td>Exam#2</td> </tr> <tr> <td>11</td> <td>3/26</td> <td>Lec#8: Rheological Properties</td> <td>HW#5</td> </tr> <tr> <td>12</td> <td>4/2</td> <td>Lec#9: Mechanical Properties I</td> <td>HW#6</td> </tr> <tr> <td>13</td> <td>4/9</td> <td>Lec#10: Mechanical Properties II</td> <td></td> </tr> <tr> <td>14</td> <td>4/16</td> <td>Lec#11: Polymer Applications</td> <td></td> </tr> <tr> <td>15</td> <td>4/23</td> <td>3rd Exam (Wk.11 – Wk.14)</td> <td>Exam#3</td> </tr> <tr> <td>16</td> <td>4/30</td> <td>Final Project</td> <td>Presentation & Report</td> </tr> </tbody> </table> <p>(Dr. Chou reserves the right to change schedule in course plan.)</p>	Week	Date	Topics	Assignments	1	1/16	Lec#1: Syllabus and Introduction		2	1/23	Lec#2: Materials Science	HW#1	3	1/30	Lec#3: Polymer Structures	HW#2	4	2/6	Lec#4: Polymer Systems		5	2/13	1st Exam (Wk.1 – Wk.4)	Exam#1	6	2/20	Lec#5: Step Polymerization	HW#3	7	2/27	Lec#6: Radical Polymerization	HW#4	8	3/5	Lec#7: Characterizations of Polymers		9	3/12	Spring Break – No Class		10	3/19	2nd Exam (Wk.6 – Wk.8)	Exam#2	11	3/26	Lec#8: Rheological Properties	HW#5	12	4/2	Lec#9: Mechanical Properties I	HW#6	13	4/9	Lec#10: Mechanical Properties II		14	4/16	Lec#11: Polymer Applications		15	4/23	3rd Exam (Wk.11 – Wk.14)	Exam#3	16	4/30	Final Project	Presentation & Report
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University Policies	https://www.uttyler.edu/academic-affairs/files/syllabus_information_2021.pdf
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