

**MENG 5347 – Polymer Science and Engineering**  
**Course Syllabus**

<b>Semester / Year</b>	Spring / 2025
<b>Catalog Description</b>	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.
<b>Prerequisites</b>	MENG 3319: Materials Science and Manufacturing, or Graduate standing.
<b>Section Number</b>	050 and 051
<b>Instructor Name</b>	Dr. Shih-Feng Chou
<b>Contact Information</b>	3900 University Blvd., RBN 3005, Tyler TX. 75799 Phone: 903-566-6209 Email: <a href="mailto:skou@uttyler.edu">skou@uttyler.edu</a>
<b>Class Type / Instruction Mode / Location</b>	050, Lecture, f-2-f, RBN 3040 (TYL) 051, Lecture, synchronized Zoom (HEC)
<b>Class Time</b>	We 5:00 PM – 7:45 PM
<b>Office Hours</b>	Mo/We 10 – 11 AM and Th 2 – 3 PM or by appointment. Zoom: 840-9716-1632 (#957516)
<b>No. of Credits</b>	3
<b>Required Textbook</b>	N/A
<b>Optional References</b>	<ol style="list-style-type: none"> <li>1. Introduction to Polymers, 3rd edition, R.J. Young and P.A. Lovell, CRC Press, ISBN: 978-0-84933-929-5.</li> <li>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.</li> <li>3. Lecture notes.</li> </ol>
<b>Additional Rules and Requirements</b>	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.
<b>Evaluation Method</b>	Quizzes: 15% Homework: 20% Exams: 45% Final Project: 20%
<b>Grading Policy / Scale</b>	Letter grades, scale: A: 90 – 100, B: 80 – 89, C: 70 – 79, D: 60 – 69, F: < 60

<b>Important Events / Dates</b>	<p>1/27/2025 (Mo): Census Date.          2/12/2025 (We): 1<sup>st</sup> Exam.          3/12/2025 (We): 2<sup>nd</sup> Exam.          3/31/2025 (Mo): Last day to withdraw from one or more classes.          4/15/2025 (We): 3<sup>rd</sup> Exam.          4/23/2025 (We): Project presentation.          4/30/2025 (We): Final report.</p>																																																																				
<b>Attendance / Makeup policy / other rules</b>	<p>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.</p>																																																																				
<b>Course Learning Objectives / ABET &amp; PEOs Relation</b>	<p>By the end of this course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe types of polymers and their microstructures.</li> <li>2. Explain polymers synthesis methods.</li> <li>3. Explain characterization methods in polymers and the corresponding properties.</li> <li>4. Describe the use of polymers in nanotechnology and bioengineering.</li> <li>5. Produce a draft of a publishable level paper that demonstrates the scientific understanding of polymers in engineering applications.</li> </ol>																																																																				
<b>Tentative Topics / Course Plans</b>	<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" data-bbox="435 1199 1442 1692"> <thead> <tr> <th>Week</th> <th>Date</th> <th>Topics</th> <th>Assignments</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1/15</td> <td>Lec#1: Syllabus and Introduction</td> <td></td> </tr> <tr> <td>2</td> <td>1/22</td> <td>Lec#2: Materials Science</td> <td>HW#1</td> </tr> <tr> <td>3</td> <td>1/29</td> <td>Lec#3: Polymer Structures</td> <td>HW#2</td> </tr> <tr> <td>4</td> <td>2/5</td> <td>Lec#4: Polymer Systems</td> <td></td> </tr> <tr> <td>5</td> <td>2/12</td> <td><b>1<sup>st</sup> Exam (Wk.1 – Wk.4)</b></td> <td><b>Exam#1</b></td> </tr> <tr> <td>6</td> <td>2/19</td> <td>Lec#5: Step Polymerization</td> <td>HW#3</td> </tr> <tr> <td>7</td> <td>2/26</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><b>2<sup>nd</sup> Exam (Wk.6 – Wk.8)</b></td> <td><b>Exam#2</b></td> </tr> <tr> <td>10</td> <td>3/19</td> <td><b>Spring Break – No Class</b></td> <td></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</td> <td>HW#6</td> </tr> <tr> <td>13</td> <td>4/9</td> <td>Lec#10: Polymer Applications</td> <td></td> </tr> <tr> <td>14</td> <td>4/16</td> <td><b>3<sup>rd</sup> Exam (Wk.11 – Wk.14)</b></td> <td><b>Exam#3</b></td> </tr> <tr> <td>15</td> <td>4/23</td> <td><b>Project Presentation</b></td> <td><b>Presentation</b></td> </tr> <tr> <td>16</td> <td>4/30</td> <td><b>Final Project</b></td> <td><b>Report</b></td> </tr> </tbody> </table> <p>(Dr. Chou reserves the right to change schedule in course plan.)</p>	Week	Date	Topics	Assignments	1	1/15	Lec#1: Syllabus and Introduction		2	1/22	Lec#2: Materials Science	HW#1	3	1/29	Lec#3: Polymer Structures	HW#2	4	2/5	Lec#4: Polymer Systems		5	2/12	<b>1<sup>st</sup> Exam (Wk.1 – Wk.4)</b>	<b>Exam#1</b>	6	2/19	Lec#5: Step Polymerization	HW#3	7	2/26	Lec#6: Radical Polymerization	HW#4	8	3/5	Lec#7: Characterizations of Polymers		9	3/12	<b>2<sup>nd</sup> Exam (Wk.6 – Wk.8)</b>	<b>Exam#2</b>	10	3/19	<b>Spring Break – No Class</b>		11	3/26	Lec#8: Rheological Properties	HW#5	12	4/2	Lec#9: Mechanical Properties	HW#6	13	4/9	Lec#10: Polymer Applications		14	4/16	<b>3<sup>rd</sup> Exam (Wk.11 – Wk.14)</b>	<b>Exam#3</b>	15	4/23	<b>Project Presentation</b>	<b>Presentation</b>	16	4/30	<b>Final Project</b>	<b>Report</b>
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