



## BMEN 6321.001: Polymers for Biomedical Applications

**Professor** Taylor H. Ware

**Term** Fall 2018

**Meetings** Monday, Wednesday 8:30-9:45am CB 1.102

---

**Instructor:** Taylor H. Ware  
**Office Phone:** 972-883-4937  
**Office Location:** BSB 12.806  
**Email:** [Taylor.ware@utdallas.edu](mailto:Taylor.ware@utdallas.edu)  
**Office Hours:** Tuesdays from 8-10 am or by appointment

### General Course Information

<b>Pre- &amp; Co-requisites; Other restrictions</b>	N/A
<b>Course Description</b>	This course describes basic synthesis, characterization, and applications of synthetic and natural polymers. This course is designed for graduate students in all areas who are interested in biomedical applications of polymers including implantable devices, drug-delivery, and tissue engineering. Topics include: introduction to polymer chemistry and physics, biodegradable polymers, stimuli-responsive polymers, polymeric hydrogels, and current and future application of polymers in medicine.
<b>Student-learning Objectives</b>	<ol style="list-style-type: none"><li>1. Describe and discuss the role of polymer structure on natural and synthetic polymer mechanical and chemical properties. (A)</li><li>2. Apply fundamental concepts of polymer engineering to develop practical solutions to problems in biomedical engineering. (B)</li><li>3. Prepare as a member of a team written and oral presentations regarding polymers in biomedical applications. (C)</li></ol>
<b>Texts &amp; Materials</b>	Text Book Required: None Reference: Introduction to Physical Polymer Science L.H. Sperling; ISBN: 978-0-471-70606-9 Select journal articles that can be accessed through the UT Dallas Library. <b>A hand-held calculator will be needed for all quizzes, problem sets and exams. Use of programmable calculators or calculator programs on smart phones or similar devices is not permitted.</b>

### Assignments & Academic Calendar

Date	Topics
M 8/20	Course introduction- Intro to polymeric materials
W 8/22	Overview of polymer synthesis
M 8/27	Step-growth polymerization
W 8/29	Radical polymerization – Mechanical characterization of polymers
W 9/5	Class cancelled
M 9/10	Glass transition in polymers
W 9/12	Crystalline and Liquid crystalline polymers
M 9/17	Exam No. 1 Review
W 9/19	<b>Exam No. 1 (covers material from beginning of class)</b>
M 9/24	Theories of polymer solutions and gels
W 9/26	Polymer solution characterization

<b>M 10/1</b>	Elastomers
<b>W 10/3</b>	Hydrogels
<b>M 10/8</b>	Degradable Polymers
<b>W 10/10</b>	Drug delivery with polymers
<b>M 10/15</b>	Stimuli Responsive Polymers
<b>W 10/17</b>	Exam No. 2 Review
<b>M 10/22</b>	<b>Exam No. 2 (covers material after exam 1)</b>
<b>W 10/24</b>	Conducting Polymers
<b>M 10/31</b>	Polymers in Biosensors & Bioelectronics
<b>W 11/1</b>	Load-bearing Polymers
<b>M 11/5</b>	Biopolymers
<b>W 11/7</b>	Polymers in Tissue Engineering
<b>M 11/12</b>	Polymers in Tissue Engineering 2
<b>W 11/14</b>	Adhesives
<b>M 11/26</b>	In class presentations
<b>W 11/28</b>	In class presentations
<b>M 12/3</b>	Final Exam Review
<b>W 12/5</b>	<b>Final Exam (Comprehensive)</b>

### Course Policies

<b>Grading (credit)</b>	<b>in-class presentation (20%); midterm exams (25% each); final exam (30%)</b>												
<b>Grading policy</b>	<b>A minimum grade is guaranteed based on the table below. The professor reserves the right to assign a higher grade than the indicated table provides.</b>												
	<b>%</b>	100-93.0%	92.9%-90.0%	89.9%-87.0%	86.9%-83.0%	82.9%-80.0%	79.9%-77.0%	76.9%-73.0%	72.9%-70.0%	69.9%-67.0%	66.9%-63.0%	62.9%-60.0%	≤59.9
	<b>Letter Grade</b>	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
<b>Make-up Exams</b>	There will be no make-up in-class exams except for circumstances explicitly described in university policy. A single in-class exam absence, when <u>approved</u> by the instructor, will result in that exam being removed from grade calculation.												
<b>Late Work</b>	No late work will be accepted.												
<b>Special Assignments</b>	A class presentation will account for 20% of the grade. The presentation will consist of an in-class oral presentation over relevant scientific literature.												
<b>Class Attendance</b>	Class attendance is not specifically graded. However, any material discussed in class can be included on the exams. Furthermore, participation during lectures with student presentations will count towards the participation grade.												
<b>Classroom Citizenship</b>	<i>Cell-phone use:</i> Laptops, cellular telephones, recording devices, and other electronic devices must be turned off and put away during lectures and exams.												
<b>Field Trip Policies</b>	N/A												

Further information can be found at <http://go.utdallas.edu/syllabus-policies>.

These descriptions and timelines are subject to change at the discretion of the Instructor.