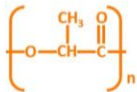
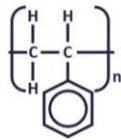
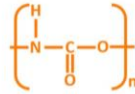
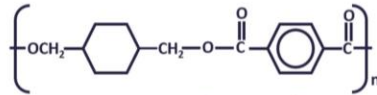
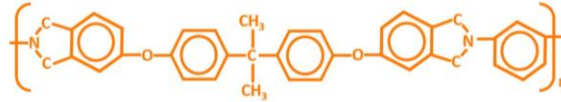


MME 4310/5390 & MASE 6390 Polymer Engineering  
CRN: 18698/17052 & 17778  
Fall 2022



**Instructor: David A. Roberson, Ph.D.,: [droberon@utep.edu](mailto:droberon@utep.edu)**

**TA: TBD**

**Office Hours: W: 12:00-2:00 or by appointment**

### **COURSE DESCRIPTION**

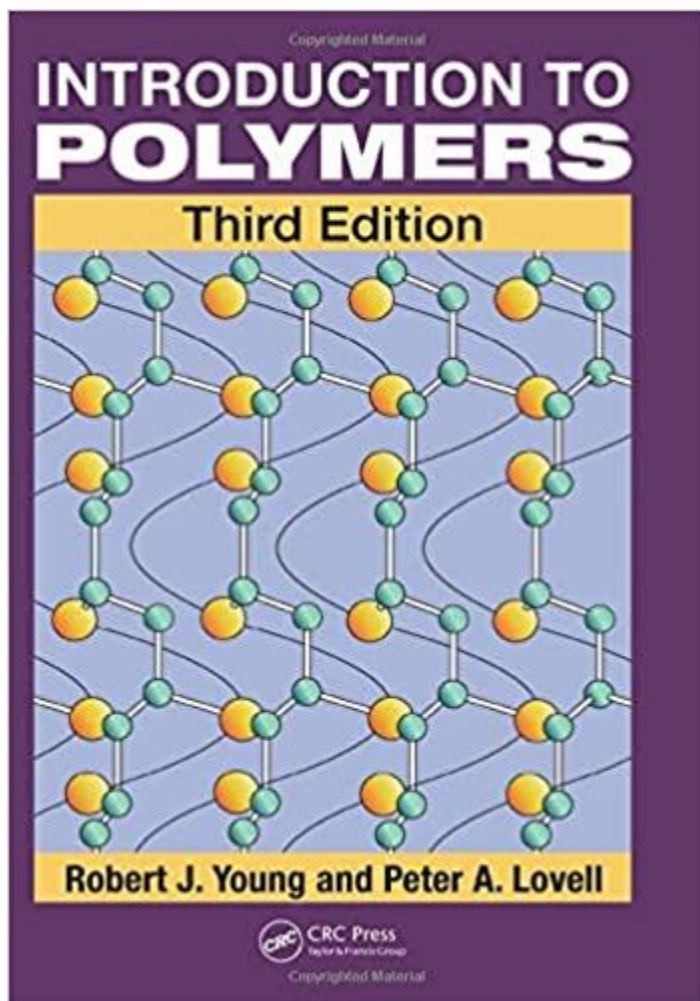
MME 4310 is an elective course for the MME program. This course is intended to provide students with a general overview of the use of polymeric materials by our society. There will be a strong focus on thermoplastics as this is the category of polymers most commonly used. We will also touch upon additional topics such as shape memory polymers, polymer failure analysis, and polymer degradation.

### **COURSE OBJECTIVES OR EXPECTED LEARNING OUTCOMES**

After completing this course, students will be able to:

- Explain the differences between polymer types
- Associate polymer structure with mechanical properties
- Define the types of polymer processing methods
- Understand the concept of crystallinity in polymers
- Interpret polymer property data from characterization equipment such as dynamic mechanical analysis
- Articulate the meaning of polymer fracture surface features

**RECOMMENDED TEXT:**



ISBN-13: 978-0849339295

[SEE THIS BOOK ON AMAZON](#)

You will also need regular access to a computer, stable, consistent internet, Blackboard, a UTEP VPN connection and your UTEP email account.

Several articles will also be used in this class. They should be accessible through UTEP VPN.

**COURSE ASSIGNMENTS AND GRADING**

Assignments for this course are assessed according to a designated Grading Rubric with crucial information that could affect your grade for each activity. You can find these rubrics by clicking on the appropriate assignment link in Blackboard and choosing to “View Rubric” from the button beneath the Points Possible for the assignment.

### Grade Distribution:

100-90 = A      89-80 = B      79-70 = C      69-60 = D      59 and Below = F

○ Grad student presentations	10%
○ Quizzes	20%
○ Tests	40%
○ Final Project	30% (Grad)/40% (UG)

### COURSE CALENDAR

A detailed calendar for this course is provided as a separate document on Blackboard titled “Course Calendar.” A brief outline is below:

#### Tentative course outline:

1. Introduction to polymers
2. Organic Chemistry Basics
3. **The Basics:** Nomenclature, basic polymeric structure
4. Polymerization
  - a. Crosslinking example
5. Polymer blending
  - a. Examples of thermoplastic blending
6. Polymer rheology
  - a. Melt Flow Index example
7. Thermoplastic composites
  - a. Sustainable composite example
8. Polymer Processing
9. Polymer Additive Manufacturing Processes
  - a. Melt Extrusion
  - b. Stereolithography
  - c. Selective Laser Sintering
10. Mechanical properties
  - a. Rubber toughening example
  - b. Crystallinity example
11. Failure analysis
  - a. Characteristics of static load
  - b. Characteristics of cyclic load
  - c. Differences from metallic failure
12. Shape memory polymers
  - a. Shape memory polymer example
13. Environmental Impact of Polymers

## ATTENDANCE POLICY

- Much of the course will incorporate hands-on activities. Please do your best to attend all course sessions. **However, if you are sick, please let me know and stay home.** If you have planned travel, please let me know ahead of time.

## NOTE ON CROSSLISTING:

As this is an undergraduate course with a cross-listed graduate section there is the expectation that graduate students perform a level of work commensurate with that level of study. Graduate students will give a presentation on one of the topics listed below (Each student shall pick one topic):

1. Strategies to Reduce the Environmental Impact of Polymers
2. The Use of Polymers in Water Purification Applications
3. Shape Memory Polymers as used in Biomedical Applications

The Rubric for this assignment is as follows:

25 Points	25 Points	25 Points	25 Points
Demonstration of knowledge of the researched topics.	Quality of Slides with useful and easy to read figures.	Referencing of at least 10 sources.	Fielding of audience questions.

Graduate student presentations will be given the final week of classes.

## TECHNOLOGY REQUIREMENTS

Some content for this course may be delivered via the Internet through the Blackboard learning management system (LMS). Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Mozilla Firefox and Google Chrome are the most supported browsers for Blackboard; other browsers may cause complications with the LMS. When having technical difficulties, update your browser, clear your cache, or try switching to another browser.

You will need to have or have access to a computer/laptop. You will need to download or update the following software: Microsoft Office, Adobe, Flashplayer, Windows Media Player, QuickTime, and Java. Check that your computer hardware and software are up-to-date and able to access all parts of the course.

If you encounter technical difficulties beyond your scope of troubleshooting, please contact the [Help Desk](#) as they are trained specifically in assisting with technological needs of students.

## LATE WORK POLICY

Please do your best to turn in assignments on time. Instances of late work will be handled on a case by case basis.

## DROP POLICY

In order to drop this class, please contact the [Registrar's Office](#) to initiate the drop process. If you cannot complete this course for whatever reason, please contact me. If you do not, you are at risk of receiving an "F" for the course. **The drop deadline for the Fall 2022 semester is October 28th.**

Other important dates can be found by clicking [HERE](#)

## ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#).

## SCHOLASTIC INTEGRITY

### ***Cheating, Plagiarism, Scholastic Dishonesty, and Student Discipline***

Students who engage in scholastic dishonesty will be subject to disciplinary action as stated in the UTEP-HoOP:

"Scholastic dishonesty (which includes the attempt of any student to present the work of another as his or her own, or any work which s(he) has not honestly performed, or attempting to pass any examination by improper means) is a serious offense and will subject the student to disciplinary action. The aiding and abetting of a student in any dishonesty is held to be an equally serious offense. All alleged acts of scholastic dishonesty should be reported to the Dean of Students for disposition. It is the Dean of Students' responsibility to investigate each allegation, dismiss the allegation, or proceed with disciplinary action in a manner which provides the accused student his or her rights of due process."

Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more [HOOP: Student Conduct and Discipline](#).

## STUDENT RESOURCES

UTEP provides a variety of student services and support:

- [UTEP Library](#): Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- [Help Desk](#): Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- [Math Tutoring Center \(MaRCS\)](#): Ask a tutor for help and explore other available math resources.
- [History Tutoring Center \(HTC\)](#): Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- [Military Student Success Center](#): UTEP welcomes military-affiliated students to its degree programs, and the Military Student Success Center and its dedicated staff (many of whom are veterans and students themselves) are here to help personnel in any branch of service to reach their educational goals.
- [RefWorks](#): A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.