

MME 4371/5390

Engineering Problems: Polymer Engineering

Fall 2018

Instructor: David A. Roberson, Ph.D., droberon@utep.edu

Office Hours: M201-L Monday, Wednesday 1:00 PM – 2:30 PM or by appointment

Days: T-R 3:00 – 4:20 LART 306

Note: We will be performing some experiments on hopefully a regular basis, the location will vary and be communicated ahead of time.

Course Goals: 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 interesting topics such as shape memory polymers.

Texts: Recommended reading: Introduction to Polymers, Third Edition by Robert J. Young and Peter A. Lovell. We will also be referring to scientific journals which you should have access to through UTEP internet and VPN.

Tentative course outline:

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

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Grading:

Presentations	20%
Tests	20%
Laboratory Experiments	20%
Final, Thursday, December 10 th 4:00—6:45	20%

Attendance: University policy dictates that all students attend all scheduled classes meaning that attendance to both the class and laboratory sessions is mandatory, however, I understand if you have conferences or other school-related activities to attend. Please notify me of any commitments you may have prior to you being absent from class. “Emergency” absences will be handled on a case by case basis. If you have more than 6 unexcused absences, you will need to drop the class or receive an F. I do not allow for the taking of make-up quizzes or exams.

Drop deadline for the Fall, 2018 Semester is November 2, 2018.

Use of Electronic Devices: As a courtesy to me and the other students in class, the use of cell phones, pagers, and laptops is not allowed while class is in session. I am wise to Electronic devices should be stored IN a backpack or purse. I have seen many instances of folks trying to hide electronic device usage behind a backpack or purse while texting, etc. so do not even try it! Use of said electronic devices will result in your being asked to leave the class and receiving a zero grade for attendance for that day. The electronics policy also applies to the laboratory session.

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.”

See the Dean of Students office for further information at website

<http://sa.utep.edu/studentlife/>; judicial affairs process at <http://sa.utep.edu/studentlife/files/2010/10/Appendix-A-Discipline-process-NEW-OSL-2009.pdf>

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Cite, reference, or quote information obtained from other sources and give credit where credit is due. In addition, when it is specified that a task needs to be performed individually, soliciting your classmates' help is considered scholastic dishonesty. Do NOT copy any material regardless of where you obtained it into your own work. Do NOT submit work under your name if you did not complete it entirely yourself; you may **not submit work you completed for another class**, unless specifically stated otherwise. In accordance with university policy, any instances of plagiarism and dishonesty will be reported to the Dean of Students Office. If you are caught cheating you will be subject to the disciplinary action defined by UTEP's Standards of Conduct and Dishonesty including the receiving of an incomplete "I" for the class and adjudication by the Dean of Students.

Disabilities: UTEP seeks to provide reasonable accommodations for all qualified individuals with disabilities, including learning disabilities. This university will adhere to all applicable federal, state, and local laws, regulations and guidelines with respect to providing reasonable accommodations as required affording equal educational opportunity. It is the student's responsibility to register with The Center for Accommodations and Support Services in The Union Building East Room 106 and arrange the appropriate accommodations. The contact information for CASS is:

<http://sa.utep.edu/cass/>

(915) 747-5148

cass@utep.edu

Or

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.