



Course CHEM 6V39
Course Title Polymer Chemistry (Special Topics in Organic Chemistry)
Professor Mihaela Corina Stefan
Term Spring 2018
Meetings TR 5:30 PM – 6:45 PM

Professor's Contact Information

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Office Location BE 2.522
Email Address mihaela@utdallas.edu
Office Hours T/R 2:00-3:00 pm
Other Information Contact by e-mail to set up an appointment if you cannot make it to office hours

Description: Polymer science is concerned primarily with synthetic polymers, such as plastics. The field of polymer science includes research in multiple disciplines including chemistry, physics, and engineering. This course describes the methods used to make organic polymers by studying polymerization kinetics, thermodynamics, reaction mechanisms, structure-reactivity correlation, and structure-properties correlation. The course notes used during lectures can be downloaded as pdf files from E-Learning. Supplementary material will also be posted on E-Learning. Specialty reviews on some of the included topics will be provided on E-Learning.

Objectives: **Critical Thinking (CT)**—to include analysis of experimental data to investigate reaction mechanism and kinetics; develop methods for the synthesis of various polymeric materials; evaluation of research papers to understand methods for the synthesis of advanced polymeric materials;
Communication (COM)—to include the ability to prepare and deliver an oral presentation on a polymer chemistry topic and answer questions;
Empirical and Quantitative Skills (EQS)—to include the analysis of numerical data included in papers to determine possible errors or additional experiments needed to demonstrate a certain mechanism.
Teamwork (TW)—to include the ability to work as a team on the design of a small research project to synthesize various polymers.

General Course Information

Pre-requisites, Co-requisites, & other restrictions No pre-requisites or co-requisites necessary for this course

Learning Outcomes Upon completing this class students will learn: Step polymerizations (polycondensation and polyaddition); Chain polymerizations (radical, anionic, cationic polymerizations); Living polymerizations; Ring opening polymerization; Ring opening metathesis polymerization; Ziegler-Natta Polymerization; Copolymerization; Biodegradable and biocompatible polymers, conducting polymers, polymers for drug delivery and tissue engineering; Glass transition and mechanical properties of polymers

Required Texts & Materials Principles of Polymerization, 4th Edition, George Odian, Wiley, 2004

Suggested Texts, Readings, & Materials Polymer Chemistry, 2nd Edition, Paul Hiemenz, Timothy Lodge, CRC press, 2007

Assignments & Academic Calendar

[Topics, Reading Assignments, Due Dates, Exam Dates]

Date	Topic	Test
Jan. 9	Types of Polymers, Molecular Weight (Chapter 1)	N
Jan. 11	Step Growth Polymerization (Chapter 2)	N
Jan. 16	Step Growth Polymerization (Chapter 2)	N
Jan. 18	Step Growth Polymerization (Chapter 2)	N
Jan. 23	Radical Polymerization (Chapter 3)	N
Jan. 25	Radical Polymerization (Chapter 3)	N
Jan. 30	Radical Polymerization (Chapter 3)	N
Feb. 01	Radical Polymerization (Chapter 3)	N
Feb. 06	Living Radical Polymerization (Reversible Deactivation)	N
Feb. 08	Emulsion and Suspension Polymerization (Chapter 4)	N
Feb. 13	Cationic Polymerization (Chapter 5)	N
Feb. 15	Cationic Polymerization (Chapter 5)	N
Feb. 20	Test 1	Y
Feb. 22	Anionic Polymerization (Chapter 5)	N
Feb. 27	Anionic Polymerization (Chapter 5)	N
Mar. 01	Chain Copolymerization (Chapter 6)	N
Mar.06	Chain Copolymerization (Chapter 6)	N
Mar. 08	Ring-Opening Polymerization (Chapter 7)	N
Mar. 20	Ring-Opening Polymerization (Chapter 7)	N
Mar. 22	Stereochemistry of Polymerization (Chapter 8)	N
Mar. 27	Ziegler-Natta Polymerization (Chapter 8)	N
Mar.29	Metalocene Polymerization (Chapter 8)	N
Apr.03	Living Polymerization (Chapter 8)	Y
Apr.05	Glass Transition Theories	N
Apr.10	Mechanical Properties of Polymers	N
Apr.12	Test 2	Y
Apr.17	Presentations	N
Apr.19	Presentations	N
Apr 24	Presentations	N
Apr.26	Presentations	N

Days with either a test or quiz are marked in bold

Course Policies

<p>Grading (credit) Criteria</p>	<p>Grades will be determined from a combination of tests, oral presentation, and term paper. The oral presentation will cover polymer topics such as polycondensation, radical polymerization, ionic polymerization, or specialty polymers (organic electronics, drug delivery, 3D printing, biopolymers, recyclable polymers). The student presentations will be scheduled as 10 minutes time slots + minutes for discussion. Presentations are scheduled for April 19, 24, and 26. Topics should be proposed and approved by April 17. The term paper will consist of a graded team project. The teams will be made of four student who will work on an assigned project. A term paper of 5-10 pages should be prepared for the team project. The term paper should contain an introduction section, a proposed experiments section, and a discussion of the applications and potential pitfalls. The team papers should also describe the contribution of each team member.</p> <table border="0"> <tr> <td>Tests</td> <td>2x 250 points</td> <td>500 points</td> </tr> <tr> <td>Presentation</td> <td>1x 200 points</td> <td>200 points</td> </tr> <tr> <td>Term paper</td> <td>1 x 300 points</td> <td>300 points</td> </tr> </table> <p>A+ (1000-950); A (949-900); A- (899-850); B+ (849-780); B (779-710); B- (709-640); C+ (639-570); C (569-500); C- (499-430) D+ (429-380); D (379-330); D- (329-280); F (279-0)</p>	Tests	2x 250 points	500 points	Presentation	1x 200 points	200 points	Term paper	1 x 300 points	300 points
Tests	2x 250 points	500 points								
Presentation	1x 200 points	200 points								
Term paper	1 x 300 points	300 points								
<p>Make-up Exams</p>	<p>There will be no make-up exams.</p>									
<p>Extra Credit</p>	<p>There will not be any extra credit.</p>									
<p>Late Work</p>	<p>Late homework will not be considered for grading.</p>									
<p>Special Assignments</p>	<p>Homework will be assigned as review papers which will be posted on E-learning and discussed in the class. Students are responsible for reading the assigned review papers.</p>									
<p>Class Attendance</p>	<p>It is important for the students to know that this course requires attendance and also a time commitment outside the class.</p>									
<p>Classroom Citizenship</p>	<p>Cellular phones and pagers must be turned off during lectures and exams.</p>									
<p>Comet Creed</p>	<p><i>This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:</i></p> <p>“As a Comet, I pledge honesty, integrity, and service in all that I do.”</p>									
<p>UT Dallas Syllabus Policies and Procedures</p>	<p><i>The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus.</i></p> <p><i>Please go to http://go.utdallas.edu/syllabus-policies for these policies.</i></p>									

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.