

Introduction to Organic Materials
EMA 3066 Section 2836
Class Periods: MWF, 2nd, 8:30am-9:20am
Location: Pugh 170
Academic Term: Fall 2019

Instructor:

Laurie Gower, PhD

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Office Phone: 846-3336

Office Hours: Wednesdays 3:00-4:00pm

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Teaching Assistant:

Yi Wei (grad student working in Brennan group)

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Office Hours: TBD

Office Location: 135 Rhines Hall

Course Description

Uses, structure, processing and properties of organic materials, including polymers, biomacromolecules and small molecule organic materials. Scientific principles are introduced through discussion of developed organic materials for high technology applications. (3 credit hours).

Course Pre-Requisites / Co-Requisites

EMA 3010 and one of the following: EMA 3011, CHM 2200 or CHM 2210.

Course Objectives

This is an introductory course in organic materials, with emphasis on polymer science and engineering. The topics to be covered will be broken down into three categories- (1) synthesis and processing of polymers, (2) polymer structure and characteristics, and (3) properties and applications of polymers and advanced organic materials.

The specific objectives for the course are:

- a. To be able to choose the appropriate synthetic and processing strategy for preparing common polymers
- b. To be able to predict the properties of polymers and advanced molecular materials based on knowledge of structure and morphology.
- c. To be able to choose an appropriate polymer based on the properties needed for a particular application.

Materials and Supply Fees: NA

Professional Component (ABET): 3 credits towards engineering topics.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	Medium
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Medium
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Medium

* Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

- Title: Essentials of Polymer Science and Engineering
- Authors: Paul C. Painter & Michael M. Coleman
- Publication Date and edition: 2009, 1st edition (DEStech Publications Inc)
- ISBN: 978-1-932078-75-6
- The prior book by these authors, *Fundamentals of Polymer Science*, is acceptable

Recommended Materials

- Course lecture notes are developed and extensively used by the instructor. It is required that you bring a copy of the lecture notes to each class for additional markup. Alternatively, a laptop can be used for note taking, as long as the only screen showing is the lecture notes (and not distractors to neighboring students, such as social media, sports, etc.).

Course Schedule (tentative, according to pace)

Week of:	Topic	Reading Assign.
Aug. 19	Course Overview	Chapter 1
	Types of Polymers	Chapter 2
	Isomerism	
Aug. 26	Molecular Weight Distributions	
	Polymer Synthesis: Step-Growth (Condensation) Polym.	Chapter 3-5 (parts)
	Chain-Growth (Addition) Polymerization:	
Sept. 2	<i>Monday 2nd: Labor Day Holiday</i>	
	Coordination/Insertion Polymerizations and Catalysts	
	Ionic Polymerizations	
Sept. 9	Polymerization Processes	
	Copolymerization	Chapter 6 (parts)
	Cont.	
Sept. 16	Bonding	Chapter 8
	Exam 1: Wed. Sept. 18th evening (office hrs during class)	thru Topic
	Chain Conformation & Dimensions	
Sept. 23	Polymer Morphology	
	<i>Wed. Sept. 25th : Career Expo- (no class)</i>	
	Properties of Semicrystalline Polymers	Chapter 10

Sept. 30	Polarized light microscopy	Website/notes
	Glass transition	Chapter 10
	<i>Fri. Oct. 4th: Homecoming Holiday</i>	
Oct. 7	Factors affecting T _g	
	Thermodynamics of crystallization	
	Kinetics of crystallization	
Oct. 14	Factors effecting Crystallinity and T _m	
	Exam 2: Wed. Oct. 16th evening (office hrs in class time)	thru Topic
	Liquid Crystalline Molecules and Polymers	Notes
Oct. 21	Guest lecture	Notes
	Guest lecture	Notes
	Guest lecture	Notes
Oct. 28	Polymer Solubility	Chapter 11
	Flory-Huggins Theory	
	Polymer Phase Diagrams	
Nov. 4	Rubber Elasticity	Chapter 13
	Mechanical Properties of Polymers	
	Cont.	
Nov. 11	<i>Mon. Nov. 11th: Veterans Day Holiday</i>	
	Rheology of Polymer Melts	
	Viscoelasticity	
Nov. 18	Dynamic Mechanical Thermal Analysis (DMTA)	
	Exam 3: Wed. Nov. 20th evening (office hrs during class)	thru Topic
	Time-Temperature-Superposition	
Nov. 25	Materials Selection & Design	
	<i>Wed. 27th: Thanksgiving Holiday</i>	
	<i>Fri. 29th: Thanksgiving Holiday</i>	
Dec. 2	Materials Selection & Design	notes
	Materials Selection & Design	notes
	<i>Reading days</i>	
Dec. 12	FINAL EXAM (Thursday, 12th: 12:30-2:30pm)	Cumulative

Attendance Policy, Class Expectations, and Make-Up Policy

- **Homework:** Homework and grades will be posted on the class Canvas website, approximately weekly. Homework should be turned in at the beginning of class. No late submissions will be accepted in order that solutions can be posted after class. Students may work together, but must turn in their individual homeworks for credit.
- **Grade changes:** Requests for adjustment to any grade should occur within the 2 week period following the posted grade in question, and must be approved by the course instructor (you can discuss your concerns with the TA, but the TA cannot change grades without final approval from the instructor).
- **Policy on Class Attendance:** Lecture attendance is recommended. While attendance is not mandatory, experience has shown that those who attend lectures earn higher grades in the course. It is also required that you bring a printout of the lecture notes to every class because they are a template for adding further information and note taking during class.
- **Policy on Cell Phones:** Cell phones should be turned off or on vibrate mode during class, with the exception of a primary care giver. If/when receiving a call, promptly move to outside the classroom.
- **Make-up Exam Policy-** Make-up exams will be provided only with the **prior approval of the instructor or excused absence**. In general, acceptable reasons for excused absence include illness, serious family emergencies, special curricular requirements, military obligation, court-imposed legal obligations, religious holidays and participation in official university activities such as music performances, athletic competition or debate.
- **Excused absences** are consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.
- The **schedule** of topics and exams is tentative and subject to change at the discretion of the instructor.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (≈ 10)	variable	10%
Exam 1	100	20%
Exam 2	100	20%
Exam 3	100	20%
Final Exam	100	30%
		100%

Grading Policy

Percent	Grade	Grade Points
92 - 100	A	4.00
88 - 91.9	A-	3.67
84 - 87.9	B+	3.33
80 - 83.9	B	3.00
76 - 79.9	B-	2.67
72 - 75.9	C+	2.33
68 - 71.9	C	2.00
65 - 67.9	C-	1.67
62 - 64.9	D+	1.33
59 - 61.9	D	1.00
56 - 58.9	D-	0.67
0 - 55.9	E	0.00

More information on UF grading policy may be found at:
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.