Introduction to Organic Materials
EMA 3066; Section 2836
Class Periods: MWF, 2nd, 8:30 am-9:20 am
Location: Pugh Hall 170
Academic Term: Fall 2018

Instructor:
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Teaching Assistants:
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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. This highly versatile and widespread class of materials are expected to enable the development of many future applications in electronics, medicine and other fields.
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 a knowledge of structure and morphology.

c. To be able to choose appropriate polymers based on the properties needed for targeted applications.

Materials and Supply Fees: NA

Professional Component (ABET):

This is a 3 credit course. It provides 2 credits towards engineering sciences and 1 credit towards design.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
a. Apply knowledge	Medium
b1. Conduct experiments	
b2. Statistical design of experiments	
c. Design	High
d. Function on teams	
e. Solve problems	Medium
f. Professional and ethical responsibility	Medium
g. Communicate	
h1. Economic impact	High
h2. Global, societal, and environmental impact	High
i. Lifelong learning	Medium
j. Contemporary issues	Medium
k. Techniques, skills, and tools for degree program	Medium

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

Recommended Textbook and Software

- Title: ***Essentials of Polymer Science and Engineering***
- Authors: Painter and Coleman
- Publication Date and edition: 2009

Course Schedule (tentative, according to pace and student interests)

Week of:	Topic #
Aug. 22	Course Overview
	Types of Polymers
	Molecular Weight Distributions
Aug. 27	Polymer Synthesis: Step-Growth (Condensation)
	Free-radical polymerization
	Chain-Growth (Addition) Polymerization:

Sept. 3	***Labor Day Holiday***
	Coordination/Insertion Polymerizations and Catalysts
Sept. 10	Ionic polymerizations
	Polymerization Practice
	Exam 1: Wed. Sept. 12
	Copolymerization (pg. 227 Braun)
Sept. 17	Cont.
	Bonding
	Chain Conformation & Dimensions
Sept. 24	Polymer Morphology
	Properties of Semi-crystalline Polymers
Oct. 1	Polymer characterization methods
	Exam 2: Wed. Oct 3
	Glass transition
	Factors effecting Tg
Oct. 8	Solubility
	Crystallization
	Kinetics of crystallization
Oct. 15	**Exam 3: Wed. Oct. 24th**
	Factors effecting Crystallinity and Tm
	Liquid Crystalline Molecules and Polymers
Oct. 22	Polymer blends
	Flory-Huggins Theory
	Polymer Phase Diagrams
Oct. 29	Composites
	Mechanical Properties
Nov. 5	Mechanical Properties
	Rubber Elasticity
Nov 12	***Monday Nov. 12th: Veterans Day Holiday***

	Exam 4: Wed. Nov. 14th
	Stability of polymers
Nov. 19	Rheology of Polymer Melts
	Viscoelasticity
	Wed. 21nd: Thanksgiving Holiday
	Fri. 23th: Thanksgiving Holiday
	Dynamic Mechanical and Thermal Analysis (DMTA)
Nov. 26	Materials Selection & Design
	Materials Selection & Design
Dec. 3	Review and special topics
	Exam 5: Wed. December 5
	No Final Exam

Attendance Policy, Class Expectations, and Make-Up Policy

- **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.
- **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.

Grades: Each of the five exams is worth 20 points

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.

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:

http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html

Campus Resources:

Academic Resources:

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.

Health and Wellness:

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

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 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/.