Syllabus for "Introduction to Organic Materials"

EMA 3066; Class Number 13464
Class Periods: MWF, 2nd, 8:30 am-9:20 am
Location: Online
Academic Term: Fall 2020

Instructor:
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Office Hours: TBD
Office Location: 135 RHN

Teaching Assistants:
Email:

Course Description (from the catalog)

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 special 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): 3 credits Engineering Topics

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. Complex Problem	Medium
2. Design	
3. Communication	
4. Ethics and Professionalism	Medium
5. Teams	
6. Experiment and Data	
7. Acquire and Apply New Knowledge	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

Osswald, Tim A. Menges, Georg. (2012). *Material Science of Polymers for Engineers (3rd Edition).* Hanser Publishers. NOTE: This textbook is available for free online via the UF library. You need to set up a VPN connection to the library to use it off campus: https://cms.uflib.ufl.edu/offcampus

We will also refer to material in other freely available books or articles from the library. A good reference for the synthesis part is the online book: Fundamental principles of polymeric materials / Christopher S. Brazel, Stephen L. Rosen (Wiley Pub., 3rd edition, 2012)

The book that is recommended as probably the easiest to read is the one by Painter and Coleman ("Essentials of Polymer Science and Engineering" DEStech Publishers, 2009). However, it is not available online and hence is not free to use from the UF library.

NOTE: material for the tests will be from class notes, slides, homework, and a limited amount of designated reading. You will not have to use any textbook, except for optional background reading or clarification.

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

Week of:	Topic #
Aug. 31	Course Overview and Applications
	Types of Polymers
	Configurations
Sept. 7	Polymer Synthesis: Step-Growth ("Condensation")
	Free-radical polymerization
Sept. 7	***Labor Day Holiday***
Sept. 14	Coordination and ionic polymerizations

Week of:	Topic #
	Review for test 1 (synchronous on Wednesday)
	Exam 1: Friday Sept. 18
Sept. 21	Polymerization Practice
	Copolymerization
	PET and Phenolic polymers
Sept. 28	Chain Conformation & Dimensions
	Semi-crystalline Polymers
	HOLIDAY FOR HOMECOMING: OCT 2
Oct. 5	Glass transition and PVC
	Review for test 2
	Exam 2: Friday Oct. 9
Oct. 12	Glass transition factors
	Polymer characterization
	Solubility, Crystallization
Oct. 19	Kinetics of crystallization
	Factors effecting Crystallinity and Tm
	Examples of amorphous and crystalline polymers
Oct. 26	Liquid Crystalline Molecules and Polymers
	Review for test 3
	Exam 3: Friday. Oct. 30
Nov 2	Polymer blends, Polymer Phase Diagrams
	Mechanical Properties
	Mechanical Properties
Nov. 9	Elasticity
	Wednesday Nov. 11th: Veterans Day Holiday
	Rheology
Nov 16	Viscoelasticity
	Review for test 4

Week of:	Topic #
	Exam 4: Friday Nov. 20th
Nov. 23	Time-temperature superposition
	Wed. 25: Thanksgiving Holiday
	Fri. 27: Thanksgiving Holiday
Nov. 30	Biomaterials
	Additives
	Processing
Dec. 7	Review for test 5
	Exam 5: Wed. December 9
	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. If recorded lectures are available, please do not wait until just before a test to watch them and study. A routine meeting (even with video conferencing) of a small (2-5) group seems to work best.
- **Policy on Cell Phones**: Cell phones should be turned off or on vibrate mode during a live 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.
- **For online courses with recorded materials:** Our class sessions may be audio and visually recorded for students in the class to refer back to and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise,

students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Grades

Each of the five exams is worth 20 points. Homework will not be graded, but homework questions may be part of each exam.

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/.