

# ORGANIC CHEMISTRY OF POLYMERS

**COURSE NUMBER:** CHM 5275 CHM 4930

**CREDIT HOURS:** 2

**TERM:** FALL 2024

**LOCATION:** SCOTT FAMILY HALL 221 (SFH 221)

**CLASS MEETING TIME:** TUESDAY AND THURSDAY 3:00 – 3:50 PM

**INSTRUCTOR:** Prof. Amal Narayanan, Office: Sisler Hall 229B, Email: [narayanana@ufl.edu](mailto:narayanana@ufl.edu), Phone number: 352-846-6328

**OFFICE HOURS:** Tuesday 4 – 5 PM, The timing is subject to change, please e-mail Prof. Narayanan to confirm.

**COURSE TA:** Ani Davis, Email: [ani.davis@chem.ufl.edu](mailto:ani.davis@chem.ufl.edu)

**COURSE COMMUNICATIONS:** Students may communicate with the instructors through Canvas or e-mail.

**RECOMMENDED TEXTBOOKS:** There is no specific textbook for this course and the instructor will provide reading materials. The reading materials and handouts will be a combination of chapters from the textbooks listed below.

1. Principles of Polymerization by George Odian, 4<sup>th</sup> Edition
2. Introduction to Polymers by Robert J. Young and Peter A. Lovell, 3<sup>rd</sup> Edition
3. Polymer Chemistry by Paul C. Hiemenz and Timothy P. Lodge, 2<sup>nd</sup> Edition

**RECOMMENDED SOFTWARES:** It is recommended that the students have access to computers with chemical drawing tools (ChemDraw or Chemical Sketch, <https://www.rcsb.org/chemical-sketch>) and plotting software such as MS Excel, OriginPro or Matlab. Please contact UF IT or the course TA if you need software-related assistance.

**CLASSROOM ETIQUETTE.** Use of Cell phones is strictly always prohibited in the lecture hall. You are not allowed to record the classes without the permission of the instructor.

**COURSE DESCRIPTION:** Classification of polymerization types and mechanisms from a mechanistic/organic point of view. The structure of synthetic and natural polymers. Reactions of polymers and practical synthetic methods of polymer preparation.

**PREREQUISITE KNOWLEDGE AND SKILLS:** CHM 2210, 2211 (sophomore organic chemistry) or equivalent.

**COURSE OBJECTIVES:** By the end of this course, students will learn:

1. The chemical structures of popular monomers and polymers.
2. Methods for creating polymers from chemically distinct monomers using:
  - a. Condensation polymerization
  - b. Anionic polymerization
  - c. Cationic polymerization
  - d. Radical polymerization
  - e. Controlled radical polymerization
  - f. Ring-opening polymerization
3. Chemical characterization of polymers using nuclear magnetic resonance spectroscopy and size exclusion chromatography.
4. How chemical structures of the polymer affect the bulk and solution physical properties of defined polymers.
5. New directions of research in polymer science and engineering and the impact of polymer science in advancing water-healthcare-energy nexus.

**INSTRUCTIONAL METHODS:** This class is scheduled to be offered in person only. Due to unavoidable circumstances, some of the lectures may be given virtually on Zoom. If this is to be the case, the rescheduling and Zoom link will be provided to those enrolled in the course.

#### COURSE POLICIES:

**ATTENDANCE POLICY:** Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

**EXAM DATES/POLICIES:** There will be two exams with equal weightage towards the final grades:

1. Exam I will be on Thursday, October 17<sup>th</sup>, 2024 (3:00 – 3:50 PM); this exam will be solely based on what you have learned in the class until October 15<sup>th</sup>.
2. Exam II will be held on Wednesday, December 3<sup>rd</sup>, 2024 (3:00 – 3:50 PM); this exam will be based on what you have learned from the class including the literature presentations by your colleagues.

There will be no “Final Exam”.

If you have a question concerning the grading, you may submit the entire exam sheet for complete regrading. Your score may increase or decrease accordingly. The exam

must be submitted for regrading by the end of the first class meeting after the date the exam was returned to the class. This means that exams handed back on Tuesday should be submitted for regrading by the end of class on Thursday. Please note that your graded exams will be photocopied before being returned to you.

**MAKE-UP POLICY:** Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

**ASSIGNMENT POLICY:** Assignments or Homework will be uploaded in the Canvas system. The students are encouraged to scan the document and upload it to Canvas before the deadline. Typically, the Homework given on Tuesday will be due next Tuesday. The regrading policy will be the same as for the exams (see below). The students may e-mail the TA directly if there are technological difficulties that arise while uploading the homework or assignments on Canvas.

**COURSE TECHNOLOGY:** All students will have access to the Canvas website: <https://ufl.instructure.com/>

You will login with your Gatorlink account username and password. This is where you will find general class information, important news, office hours, handouts, class notes, and keys. This is also where you will be able to find out your point totals and histograms.

**ONLINE COURSE EVALUATION:** Include a statement informing students of the online course evaluation process such as:

“Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semesters, 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>.

## UF POLICIES:

### **UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:**

“Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [www.dso.ufl.edu/drc](http://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.”

**UNIVERSITY POLICY ON ACADEMIC CONDUCT:** 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 honesty 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 (<http://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.

**CLASS DEMEANOR OR NETIQUETTE:** All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats.

#### GETTING HELP:

For issues with technical difficulties for Canvas, please contact the UF Help Desk at:

- <http://helpdesk.ufl.edu>
- (352) 392-HELP (4357)
- Walk-in: HUB 132

Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from the Help Desk when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

(Required) Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

## GRADING POLICIES:

### **METHODS BY WHICH STUDENTS WILL BE EVALUATED AND THEIR GRADE DETERMINED:**

Exam I: 200 pt (based on what is taught until October 15<sup>th</sup>)

Exam II: 200 pt (based on what is taught until November 28<sup>th</sup> (100 pt) + the topics covered in literature presentations (100 pt))

Homework I: 150 pt

Homework II: 150 pt

Literature presentation: 200 pt

Attendance & Class Participation: 100 pt

## COURSE SCHEDULE:

### **CRITICAL DATES:**

October 17<sup>th</sup>, 2024: Exam I

December 3<sup>rd</sup>, 2024: Exam II

November 14<sup>th</sup>, 19<sup>th</sup>, and 21<sup>st</sup>: Literature presentations

There will be no class on

1. Tuesday, November 5<sup>th</sup>, 2024 – Election Day
2. Thursday, November 28<sup>th</sup>, 2024 – Thanksgiving Holiday

**Disclaimer: The syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.**