

**Organic Chemistry 224 - Spring 2021**

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Lecture M/W/F 4:10 – 5:00 p.m. Zoom (Sect 015)

Discussion Mon 9:30 – 10:20 a.m. Zoom (Sect 016)

Mon 10:50 – 11:40 a.m. Zoom (Sect 017)

Mon 2:50 – 3:40 p.m. Zoom (Sect 018)

Office Hours Wed: 2:00 p.m. – 3:30 p.m. & Fri: 2:00 p.m. – 3:30 p.m.

Teaching Assistant Monica Rasic  
Email masic@luc.edu  
Office Hours TBD

Supplemental Instructor Elias Crum  
Email [ecrum@luc.edu](mailto:ecrum@luc.edu)  
Office Hours Mon: 5:00 – 6:00 p.m., Tue 6:00 – 7:00 p.m., & Thur 5:00 – 6:00 p.m.

*Required Text:* David Klein, "Organic Chemistry" 3<sup>rd</sup> Ed. hard copy or eText

*Required Online:* WileyPLUS for Organic Chemistry (login information can be found under the resources tab in Sakai)

*Recommended:* Your favorite molecular modeling kit. Here are some options. (\$ not guaranteed)

- Darling \$18.65 in LUC Bookstore with cardboard box; \$15 in stockroom
- Darling \$36.00 in LUC Bookstore with green plastic box
- Prentice Hall Molecular Model Set for Organic \$35.33 (colorful & pretty)
- Prentice-Hall Framework Molecular Models (Brumlik) \$45.80 (tubes to cut)
- HGS Fundamental Organic Set \$17.00

*Extra help:* *Pushing Electrons* by Daniel Weeks  
*The Organic Chemistry Answer* by Matthew J. Hamiel

Do you have an interest in human health, prescription medicines and drugs? Organic chemistry is utilized by medicinal organic chemists for the design and construction of new molecules that are prescribed by doctors and dispensed by pharmacists to treat diseases. Organic chemistry is also the essential science for inventing new soaps and detergents, dyes, plastics, and resins, and it is also used in creating certain types of new photoreceptors for renewable solar energy.

1. *Content-specific Objectives:* Topics will include: nomenclature, structures, properties, reactions, mechanisms and synthesis of alkanes, alkyl halides, alkenes, alkynes, alcohols and ethers; study of molecular structure, geometry, and properties; functional groups; reactive organic species; stereochemistry; spectroscopy; spectrometry.

The student should learn how to:

1. Identify the various classes of organic compounds, their methods of preparation, and typical reactions.
2. Name and draw specific organic compounds.
3. Postulate a *logical* reaction mechanism for simple organic reactions.
4. Discriminate amongst relative stabilities of reaction intermediates.
5. Plan and write out multi-step syntheses using known functional group transformations, including synthesis of polyfunctional organic compounds.
6. Name, draw, and interpret 2- and 3-dimensional structures of important biopolymers, and techniques for their synthesis and characterization.
7. Analyze and interpret data from instruments used in separating and identifying compounds including: IR, MS,  $^1\text{H}$  &  $^{13}\text{C}$  NMR, and UV-vis.

2. *IDEA Objectives:* These objectives include learning outcomes beyond this course and will apply across multiple courses and disciplines as you develop as an independent learner at Loyola. These have been selected by the faculty to apply to all sections of Organic Chemistry:

1. Gaining factual knowledge (terminology, classifications, methods, trends)
2. Learning fundamental principles, generalizations, or theories
3. Learning to *apply* course material (to improve thinking, problem solving, and decisions)
4. Learning how to find and use resources for answering questions or solving problems
5. Learning to *analyze* and *critically evaluate* ideas, arguments, and points of view

3. *Exam Dates (subject to change):*

Friday, February 19, 2021:	<b>Mid-term Exam 1</b>
Friday, March 19, 2021:	<b>Mid-term Exam 2</b>
Friday, April 23, 2021:	<b>Mid-term Exam 3</b>
Wednesday, May 5, 2021:	<b>Final Exam, 8:00-10:00 p.m.</b>

4. *Quiz Dates (subject to change):*

Mon, February 1, 2021	<b>Quiz 1</b>
Mon, February 15, 2021	<b>Quiz 2</b>
Mon, March 1, 2021	<b>Quiz 3</b>
Mon, March 22, 2021	<b>Quiz 4</b>
Mon, April 12, 2021	<b>Quiz 5</b>
Mon, April 26, 2021	<b>Quiz 6</b>

5. *Quizzes, Exams, and Grading:* A total of six group quizzes will be given during the day of your discussion section. You will be assigned a discussion group the first week of class. Each group's quiz will be posted to the discussion section Sakai page. Each group will find the quiz posted under the "Assignments" tab at 12:00 p.m. Each group must submit one answered copy, signed by every member of the group, no later than 8:00 p.m. that same night. Do not submit more than one copy of the quiz per group. The lowest of your seven quiz grades will be dropped. If you miss a quiz, that is the quiz that will be dropped. **No make-up quizzes will be given under any circumstances.**

There are three cumulative 50-minute mid-term exams and one cumulative 2-hour final exam. The three mid-term exams will be administered at the beginning of the scheduled lecture class. The exam will be posted to Sakai 10 minutes before the exam time. This time is to be used to print out a copy of the exam and get yourself into a quiet and comfortable place. All exams will be proctored over Zoom. **Students MUST take their exams on camera.** The use of cell phones, tablets, or any electronic devices is prohibited. You may not discuss or share the questions and answers with any other student in any class. Any violation of these policies will be in violation with the Academic Honesty policy described below. **Students cannot use their tablet or phone to take the exam. Exams must be answered on a printed copy of the exam or on loose leaf paper.** After the 50 minutes, you will have an additional 10 minutes to scan your exam (I recommend using CamScan) and upload your exam to Sakai. Exams will be graded and returned to you via Gradescope within one week. Exams will consist of a combination of short and long answer questions. After the return of the graded exam, students will have three days to redo any long answer question that was marked wrong for 50% credit. Long answer questions will be clearly marked on the exam. All grading questions, points of clarification, and grading errors must be brought to the instructor's attention during office hours no later than one week after return of the exam. Depending on the class average, exams may be curved. The lowest of the three mid-term exams will be dropped. If you miss an hourly exam, that is the exam that will be dropped. **No make-up mid-term exams will be given under any circumstances.** The final exam is cumulative and cannot be dropped.

WileyPLUS	13%	
Quizzes	12%	(Best five out of six quizzes)
Mid-term exams	40%	(Best two out of three mid-term exams)
<u>Final Exam</u>	<u>35%</u>	
TOTAL	100%	

The grading scale used to determine letter grades are as follows: **A** 100 – 93, **A-** 92 – 87, **B+** 86 – 83, **B** 82 – 78, **B-** 77 – 73, **C+** 72 – 68, **C** 67 – 61, **C-** 60 – 55, **D** 54 – 50, **F** < 50.

Students wanting to drop lecture after midterm may stay in the co-req lab only if lecture midterm grade, posted in LOCUS, is a D or better. Students should continue to attend lecture until the week of the drop date to gain as much background knowledge as possible. For Fall 2017 students wishing to drop lecture, and have a mid-term grade of D or better, can seek assistance from the Department of Chemistry and Biochemistry office beginning Monday 10/30 at 9:00am through Friday 11/3 at 4:00pm. Students with a midterm grade of F must drop the co-req lab along with the lecture. **No exceptions.**

6. *Final Exam:* The University sets the schedule for all final exams. The final exam will be held on:

**Wednesday, May 5, 2021 8:00 – 10:00 p.m.**

You will have 2 hours to complete the exam. There will be no make-up final exams given under any circumstance, and the exam will not be given early, either. Please contact your instructor immediately about any issues (e.g. poor internet connection, defective equipment) that arise before or during the exam.

Instructors may not reschedule final exams for a class for another day and/or time during the final exam period. There can be no divergence from the posted schedule of dates for final exams. Individual students who have four (4) final examinations scheduled for the same date may request to have one of those exams rescheduled. If a student reports having four final examinations scheduled for the same date, students should be directed to e-mail a petition to Adam Patricoski, Assistant Dean for Student Academic Affairs, CAS Dean's Office ([apatricoski@luc.edu](mailto:apatricoski@luc.edu)).

7. *WileyPLUS Assignments:* Organic chemistry is a new language that is spoken in words and structures. The best way to learn a language is to work problems **every day**. The purpose of WileyPLUS assignments is to

help you master essential foundational concepts in the course. Remembering and understanding foundational concepts is a prerequisite to **APPLYING** those concepts and analyzing problems: you need to learn the basics first so that you can use them! There will be WileyPLUS assignment sets assigned on Monday, Wednesday, and Friday after each class. Monday's assignment will be due on Wednesday night at 11:59 p.m., Wednesday's assignment will be due on Friday night at 11:59 p.m., and Friday's assignment will be due on Sunday night at 11:59 p.m.

**Late Score Policy:** You have 2 days after the due date to complete any assignment with a 25% late penalty. After that, you can still complete any assignment with a 75% late penalty.

8. *Course Repeat Rule:* Effective with the Fall 2017 semester, students are allowed only **THREE** attempts to pass Chemistry courses with a C- or better grade. The three attempts include withdrawals (W).

After the second attempt, the student must secure approval for a third attempt. Students must come to the Chemistry Department, fill out a permission to register form or print it from the Department of Chemistry & Biochemistry website: <http://www.luc.edu/chemistry/forms/> and personally meet and obtain a signature from either the Undergraduate Program Director, Assistant Chairperson, or Chairperson in Chemistry. A copy of this form is then taken to your Academic Advisor in Sullivan to secure final permission for the attempt.

9. *Norms of Online Course Proceedings:* Class will consist of a live Zoom lecture. Students are encouraged to attend the live lecture. The Zoom chat function will be enabled so students can ask questions in real time. All lectures will be recorded and posted to the class Sakai page for students who are unable to attend the lecture or would like to review the content that was discussed during the lecture.

The classroom is to be a safe place to question and explore ideas. Student and teacher voices are important to this work. Collegial disagreement can be a healthy part of this process but must always include respect for all members of the class.

Course activities will be designed to help students reach the goal of learning chemistry content and developing critical thinking skills. This will more often be driven using data and reasoning to discover concepts and solutions rather than the identification and exchange of chemical facts and algorithms.

**Students are expected to read individually on their own time outside of class.**

10. *Discussion:* The discussion section will be devoted to working on discussion hand-outs and answering questions regarding homework problems. Discussion worksheets containing exam level content will be posted to the Sakai page on Mondays at 9:00 a.m. CST. Use the time before your discussion section to work on these problems. The discussion class will be used to discuss how to answer these problems. All discussions will be recorded and posted to the class Sakai page for students who are unable to attend the discussions or would like to review the content that was discussed during the discussion class.

11. *Panopto and Recorded Lectures:* In this class software will be used to record live class discussions. As a student in this class, your participation in live class discussions will be recorded. These recordings will be made available only to students enrolled in the class, to assist those who cannot attend the live session or to serve as a resource for those who would like to review content that was presented. All recordings will

become unavailable to students in the class when the course has concluded. *Students will be required to turn on their cameras at the start of class. Students who have a need to participate via audio only must reach out to me to request audio participation only without the video camera enabled.* The use of all video recordings will be in keeping with the University Privacy Statement shown below.

### **Privacy Statement**

Assuring privacy among faculty and students engaged in online and face-to-face instructional activities helps promote open and robust conversations and mitigates concerns that comments made within the context of the class will be shared beyond the classroom. As such, recordings of instructional activities occurring in online or face-to-face classes may be used solely for internal class purposes by the faculty member and students registered for the course, and only during the period in which the course is offered. Students will be informed of such recordings by a statement in the syllabus for the course in which they will be recorded. Instructors who wish to make subsequent use of recordings that include student activity may do so only with informed written consent of the students involved or if all student activity is removed from the recording. Recordings including student activity that have been initiated by the instructor may be retained by the instructor only for individual use.

12. *Copyright and Intellectual Property:* All material disseminated to the class (lectures, discussion worksheets, quizzes, exams) are copyrighted and the Intellectual Property of the class's Instructor. Students cannot share, upload, or distribute in any way the material presented in the class to any person who is not enrolled in the class without the Instructor's written permission. All materials distributed to the class will become unavailable to students in the class when the course has concluded.

13. *Forums:* Forums, found in Sakai, will be used to ask questions regarding the class, exams, and WileyPLUS. Please feel free to use this option to ask questions and start conversations that pertain to these topics.

14. *Students Accommodations:* The Student Accessibility Center (formerly known as Services for Students with Disabilities), Sullivan Center (773-508-3700), <http://www.luc.edu/sac>, has the mission "to support, service, and empower Loyola University Chicago students with disabilities" and to "Partner with faculty and staff to provide opportunities for collaboration, professional development, personal growth, and staff interaction, as they relate to students with disabilities." Please direct all questions concerning accommodations of disabilities to the Student Accessibility Center. Academic accommodations afforded to students require documentation and review. The Student Accessibility Center will issue accommodation letters for registered students to present to their instructors: accommodations are not active until students present these letters to their instructors. If students' accommodations involve attendance or deadlines, instructors and students will jointly complete and execute an Agreement Form articulating their terms. See <https://www.luc.edu/sac/faculty/facilitatingaccommodations/> for guidance about implementing various kinds of accommodations in a way that is appropriate to your class. The Student Accessibility Center stands ready to work with you.

15. *Academic Honesty:* All students in this course are expected to have read and abide by the demanding standard of personal honesty, drafted by the College of Arts & Sciences, that can be viewed at:

[http://www.luc.edu/cas/pdfs/CAS\\_Academic\\_Integrity\\_Statement\\_December\\_07.pdf](http://www.luc.edu/cas/pdfs/CAS_Academic_Integrity_Statement_December_07.pdf)

Anything that you submit that is incorporated as part of your grade in this course (e.g. quiz, examination, homework, lab report) must represent your own work. Any students caught cheating will, at the very minimum, receive a grade of “zero” for the exam that was submitted and this grade cannot be dropped. If the cheating occurred during a course exam, the incident will be reported to the Chemistry Department Chair and the Office of the CAS Dean. Depending on the seriousness of the incident, additional sanctions may be imposed.

16. *Strategies and Suggestions:*

- The best method of learning organic chemistry is to work the assigned problems and write out the answers. *Then* check your answers versus the Answer Key.
- Study at least 10 hours per week and maintain a steady pace of studying. Organic chemistry continually builds, like a language, so studying some every day is most effective.
- Skim the current chapter before the corresponding lecture, so that you will be aware of the topics to be covered.

17. *Practices for Success:* Supporting claims with evidence, making applications, solving and analyzing problems, and using chemical principles to explain phenomena are critical skills in the field of chemistry. The development of these skills is not without some frustration, but it carries the reward of deepening one’s ability to think critically and solve problems in any field. The use of targeted, guiding questions, regularly scheduled work, and strategic study plans can greatly assist the learning of chemistry. With such a focus, hopefully any frustration will quickly turn to appreciation and fascination for the relevance and connectedness of chemistry in your life and within the world around you. Solving and analyzing problems is the most important feature of this work. If, at any time, you need assistance framing such plans for your work in chemistry, please do not hesitate to ask the instructor.

18. *Tutoring:* The tutoring Center at the university offers free tutoring to students. To see the complete tutoring schedule and find additional information, visit the Tutoring Center webpage at [www.luc.edu/tutoring](http://www.luc.edu/tutoring)

19. *Office Hours:* My “office” door will be open per the times listed. Join the Zoom link posted for office hours. Please use this time to if you have extra questions regarding this course. If you are unavailable to meet at the listed times, please use “*Forums*” to ask me questions.

20. *Email:* Feel free to email me questions at any time. All emails must be sent through the student’s LUC email address and **MUST** include “CHEM 224-015” in the subject line. Emails that are sent Monday – Friday will be answered within 24 hours. Emails sent on Saturday, Sunday, or during breaks will be answered within 48 hours. This policy applies to the Instructor, Teaching Assistant, and Supplemental Instructor.

21. *Loyola University Absence Policy for Students in Co-Curricular Activities (including ROTC):* Students missing classes while representing Loyola University Chicago in an official capacity (e.g. intercollegiate athletics, debate team, model government organization) shall be allowed by the faculty member of record to make up any assignments and to receive notes or other written information distributed in the missed classes.

Students should discuss with faculty the potential consequences of missing lectures and the ways in which they can be remedied. Students must provide their instructors with proper documentation (develop standard

form on web) describing the reason for and date of the absence.

This documentation must be signed by an appropriate faculty or staff member, and it must be provided as far in advance of the absence as possible. It is the responsibility of the student to make up any assignments. If the student misses an examination, the instructor is required to give the student the opportunity to take the examination at another time.

(<https://www.luc.edu/athletheadvising/attendance.shtml>)

22. *Accommodations for Religious Reasons*: If you have observances of religious holidays that will cause you to miss class or otherwise effect your performance in the class you must alert the instructor **within 10 calendar days of the first class meeting of the semester** to request special accommodations, which will be handled on a case by case basis.

23. *Harassment (Bias Reporting)*: It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. The university qualifies these incidents as incidents of bias.

In order to uphold our mission of being Chicago's Jesuit Catholic University-- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice and faith, any incident(s) of bias must be reported and appropriately addressed. Therefore, the Bias Response (BR) Team was created to assist members of the Loyola University Chicago community in bringing incidents of bias to the attention of the university. If you believe you are subject to such bias, you should notify the Bias Response Team at this link: <http://webapps.luc.edu/biasreporting/>

**Organic Chemistry 224 Tentative Lecture Schedule (subject to change)**

1-18	--	<i>Martin Luther King Jr. Day</i>
1-20	14	Introduction & Review, IR, MS
1-22	15	$^1\text{H}$ & $^{13}\text{C}$ NMR
1-25	15/16	$^1\text{H}$ & $^{13}\text{C}$ NMR/Conjugated Pi Systems and Pericyclic Reactions
1-27	16	Conjugated Pi Systems and Pericyclic Reactions
1-29	16	Conjugated Pi Systems and Pericyclic Reactions
2-1	17	Aromatic Compounds
2-3	17	Aromatic Compounds
2-5	17/18	Aromatic Compounds/Aromatic Substitution Reactions
2-8	18	Aromatic Substitution Reactions
2-10	--	<i>Spring Break 1.0?</i>
2-12	--	<i>Spring Break 1.0?</i>
2-15	18	Aromatic Substitution Reactions
2-17	18	Aromatic Substitution Reactions
2-19	--	<i>EXAM 1 (Chapters 14 – 18 or as announced)</i>
2-22	19	Aldehydes and Ketones
2-24	19	Aldehydes and Ketones
2-26	19	Aldehydes and Ketones
3-1	19	Aldehydes and Ketones
3-3	20	Carboxylic Acids and Their Derivatives
3-5	20	Carboxylic Acids and Their Derivatives
3-8	--	<i>Spring Break 2.0?</i>
3-10	20	Carboxylic Acids and Their Derivatives
3-12	20	Carboxylic Acids and Their Derivatives
3-15	21	Alpha Carbon Chemistry
3-17	21	Alpha Carbon Chemistry
3-19	--	<i>Exam 2 (Chapters 19 – 21 or as announced)</i>
3-22	22	Amines
3-24	22	Amines
3-26	22	Amines
3-29	23	Introduction to Organometallic Compounds
3-31	23	Introduction to Organometallic Compounds
4-2	--	<i>Easter Break</i>
4-5	23/24	Introduction to Organometallic Compounds/Carbohydrates
4-7	24	Carbohydrates
4-9	24	Carbohydrates
4-12	24	Carbohydrates
4-14	25	Amino Acids, Peptides, and Proteins
4-16	25	Amino Acids, Peptides, and Proteins
4-19	25	Amino Acids, Peptides, and Proteins
4-21	26	Lipids
4-23	--	<i>Exam 3 (Chapters 22 – 25 or as announced)</i>
4-26	26	Lipids
4-28	27	Synthetic Polymers
4-30	27	Synthetic Polymers
5-5	--	<b>Cumulative Final Exam, Zoom Wednesday, May 5, 8:00-10:00 p.m.</b>