

Loyola University Chicago  
Chemistry 223-001 – SPRING 2024 – Syllabus

The purpose of this syllabus is to describe the course, resources, and policies. It is meant help all students understand the expectations and requirements for the course, and it should be used as a reference for questions about policies. When updates to the syllabus are made during the term, a new version will be posted electronically, and all students will be notified.

**Course Information:** Course: Chemistry 223 – Organic Chemistry A (3 credits: Lecture & Discussion)

**Prerequisites:** Completion of Chemistry 102/106 & Math 118 with a grade of C- or better or an equivalent. A student missing a prerequisite may be withdrawn at any time.

**Time Zone:** This syllabus lists dates/times using Chicago local time (U.S. Central Time Zone)

**In-Person Learning:** All graded assignments scheduled during class time are available in class only.

**Lectures:** Section 001, MWF 09:20 am - 10:10 am, Flanner Hall 133

**Discussions:** You must attend the discussion section for which you registered:

- Section 002, Tuesdays, 11:30 am - 12:20 pm, GALVIN AUDITORIUM
- Section 003, Tuesdays, 01:00 pm – 01:50 pm, MUNDELEIN 506

**Course Coordinator:**

Chemistry 223 is a multi-section lecture & discussion course with common content and common outcomes across all sections. This course includes a Final Exam during the Common Final Exam Period as scheduled by the University. The Course Coordinator is responsible for consultation and coordination with instructors regarding policies, exam writing, and grading. Your Section Instructor is responsible for communicating with you regarding all course content and policies and is the first and primary person you should contact questions about all aspects of the course. As needed, all Section Instructors will consult with a previous Course Coordinator throughout the semester. **Section Instructor:** Donald May (dmay4@luc.edu)

**Contact Information Office:** Flanner Hall 403 (shared office)

**Email:** if you are emailing me about this course, you may either: (1) reply directly to one of my messages, which are sent via Sakai and therefore automatically labeled with our course number or (2) type "Chem 223" in the subject line of your email (and nothing else). Doing either of these will ensure that I read your message.

**Office Hours Policy:** Appointments are not required.

**Office Hours Schedule:** WEDNESDAYS. 11:00 AM – 12:00 PM

**SI information** There are Supplemental Instruction (SI) study sessions available for this course. SI sessions are led by an SI leader, DIANA LAMBROPOULOS (dlambropoulos@luc.edu), who is a student that has recently completed CHEM 223 and/or CHEM 224. Session attendance is open to all and is voluntary. Times and locations for the SI session can be found here: [www.luc.edu/tutoring](http://www.luc.edu/tutoring). Sunday meetings at 06:00 PM <https://luc.zoom.us/j/85879743626> Students who attend these interactive sessions find themselves working with peers as they compare notes, demonstrate and discuss pertinent problems and concepts, and share study and test-taking strategies. Research shows students who regularly attend sessions, develop a better understanding of course concepts than those who do not. Students are asked to arrive with their Loyola ID number, lecture notes, and textbook.

**Required Course Materials**

- Textbook: eText via [WileyPlus](#) and/or hard copy: Organic Chemistry, Klein, David, 4th edition.
- Loyola Sakai course management site: [sakai.luc.edu/portal/](http://sakai.luc.edu/portal/) and tools integrated into the site.
- Loyola email: messages are sent to the entire class via Sakai, linked to your Loyola email account.
- Calculators are not used in this course.

**Recommended Course Materials:** Molecular Model Kit; Student Solutions Manual  
check with bookstore as they apparently have several choices available;

Other examples:

Duluth Labs: <https://duluthlabs.com/pages/product-comparison>

Pearson Prentice-Hall: ISBN-13: 978-0205081363

Darling Molecular Visions: ISBN-13: 978-0964883710

As a possible study aid, you may want to consider purchasing, a paperback by D.R. Klein entitled “Organic Chemistry as a Second Language: Translating the Basic Concepts” (I&II); 2004 by John Wiley & Sons, Inc.; ISBN 0-471-27235-3; [www.wiley.com/college/klein](http://www.wiley.com/college/klein). These are designed to help the student develop the skills required to solve a variety of problems in organic chemistry and to point out the fundamental principles in organic chemistry. An additional study aid is a paperback by D.P. Weeks entitled “Pushing Electrons: A Guide for Students of Organic Chemistry,” Third Edition (Thomson Brooks/Cole); ISBN 0-03-020693-6. The first 3 chapters (pp. 1-161) of this workbook are intended to help a student understand “structure and bonding in organic molecules,” as well as techniques of “electron pushing” to comprehend reaction mechanisms.

**Supplementary Textbooks:** Organic Chemistry, Eighth Edition by Wade (Pearson; 2016)

**Organic Chemistry**, Tenth Edition, by T.W.G. Solomons and C. Fryhle (John Wiley & Sons, Inc., 2011).

**Organic Chemistry**, Eighth Edition, by J. McMurry (Brooks/Cole Publishing Co., 2012).

**Organic Chemistry**, by F.A.Carey and R.M. Giuliano, Eighth Edition (McGraw-Hill, Inc., 2011).

**Organic Chemistry: Structure and Function**, by K.P.C. Vollhardt and N.E. Schore, Sixth Edition (W.H. Freeman and Co., 2011).

**Copyright/Intellectual Property reminder:** Course materials provided by your instructors at Loyola, **including my materials, may not be shared outside any course without the instructor's written permission**. Content posted without permission will be in violation of Copyright/Intellectual Property laws.

**Course Content & Learning Outcomes:** 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. Students who successfully complete this course will be able to do the following at an acceptable level, which includes but is not limited to: Relate molecular orbital hybridization to bonding types, angles, geometry; Name and draw simple and more complex organic structures; Predict both physical and chemical properties of alkanes, alcohols, alkenes, alkynes and alkyl halides; Differentiate between isomer types (structural and stereo) and conformers; predict and name different stereoisomers; Describe and differentiate between various mechanisms, such as elimination versus substitution; Relate reaction mechanisms to intermediates, stereochemistry, and kinetics; predict reaction mechanism from experimentally related data and vice versa; Work with multi-step reaction pathways; develop synthetic pathways to simple organic compounds; Use nuclear magnetic resonance (NMR), infrared (IR), ultraviolet (UV), and mass spectrometry (MS) data to identify structures; predict the spectroscopic data from the structure

**Method of instruction:** Lecture and discussion. Lectures may be supplemented with classroom discussion, use of molecular models, use of multimedia, and/or use of computer-based materials as well as individual and/or group problem solving. Suggested problems will be given from the textbook but will not be graded. Students are expected to attend the discussion on time; Graded discussion handouts may be assigned and be submitted as a group or may be assigned on an individual student basis; no make-up handouts will be accepted; no photocopies accepted; students must follow the directions on the handouts. **Discussion handouts will contribute 20% total, toward the final grade: the lowest discussion handout score will be dropped; any single missed discussion handout will be the dropped score with any additional missed discussion handouts incorporated with a zero score. GRADED DISCUSSIONS WILL BE GIVEN THE WEEK BEFORE EACH UNIT EXAM, DURING SCHEDULED DISCUSSION TIMES.**

Students are expected to attend the discussion on time; Attached e-mail or electronic copies of discussion handouts will not be accepted. Discussion handouts must be completed: in regular #2 or HB pencil only, are expected to be neat and legible, free of scribbling/scribbled responses, incorporate correct chemical symbols (Review the Chemical Periodic Table of the Elements). Students are expected to: Attend lectures and discussions on time; staying for the entire duration of lecture; College-level writing skills on exams; Communication skills for discussion and articulation of questions; Timely completion of suggested homework and reading assignments. It is recommended that the student read through each chapter before lecture and eventually work through the suggested problems.

**Student Accommodations:** Loyola University provides reasonable accommodations for students with disabilities. Any student requesting accommodations related to a disability or other condition is required to register with Student Accessibility Center (SAC), located in Sullivan Center, Suite 117. Professors receive the accommodation notification from SAC via Accommodate. Students are encouraged to meet with their professor individually in order to discuss their accommodations. All information will remain confidential. Please note that in this class, software may be used to record class lectures in order to provide equal access to students with disabilities. Students approved for this accommodation use recordings for their personal study only and recordings may not be shared with other people or used in any way against the faculty member, other lecturers, or students whose classroom comments are recorded as part of the class activity. Recordings are deleted at the end of the semester. For more information about registering with SAC or questions about accommodations, please contact SAC at 773-508-3700 or [SAC@luc.edu](mailto:SAC@luc.edu).

**Student Conduct: RETURNING TO CAMPUS:** Please be familiar with and adhere to all guidelines posted on the *On-Campus Guidelines in Classroom Scenarios of the Return to Campus Guidelines* site: (<https://www.luc.edu/returntocampus/classroomscenarios/>)

**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). The Department advises that it is preferable to complete a course with a grade of C or C-, and to demonstrate growth in future coursework, than to withdraw from a course. 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: <https://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.

**Academic Integrity:** All students in this course are expected to have read and to abide by the demanding standard of personal honesty, drafted by the College of Arts & Sciences, which can be viewed at: <https://www.luc.edu/cas/advising/academicintegritystatement/>

A basic mission of a university is to search for and to communicate the truth as it is honestly perceived. A genuine learning community cannot exist unless this demanding standard is a fundamental tenet of the intellectual life of the

community. Students of Loyola University Chicago are expected to know, to respect, and to practice this standard of personal honesty. Academic dishonesty can take several forms, including, but not limited to cheating, plagiarism, copying another student's work, and submitting false documents.

Any instance of dishonesty (including those detailed on the website provided above or in this syllabus) will be reported to The Chair of The Department of Chemistry & Biochemistry who will decide what the next steps may be. Evidence of cheating in this course will result in, at a minimum, a score of zero (which cannot be dropped from grade calculations) and penalty up to failure of the course. College policies include that instructors will report incidents of academic misconduct to their chairperson as well as to the Assistant Dean for Student Academic Affairs in the CAS Dean's Office. I will report incidents to the Chemistry & Biochemistry Department for further action(s).

Academic Dishonesty also includes, but is not limited to, such infractions as:

- Obtaining a copy of tests or scoring devices
- Using another student's answers during an examination
- Providing another student questions or answers to or copies of examination questions
- Having another person impersonate the student to assist the student academically
- Impersonating another student to assist the student academically
- Representing as one's own work the product of someone else's creativity
- Using, or having available for use, notes or other unpermitted materials during "closed book" examinations
- Duplicating any portion of another student's homework, paper, project, laboratory report, take-home examination, electronic file or application for submission as accepting a copy of tests or scoring devices
- Having someone other than the student prepare any portion of the student's homework, paper, project, laboratory report, take-home examination, electronic file or application, other than for a teacher-approved collaborative effort.
- Permitting another student to copy any portion of another student's homework, paper, project, laboratory report, take-home examination, electronic file or application other than for a teacher-approved collaborative effort
- Using any portion of copyrighted or published material, including but not limited to electronic or print media, without crediting the source
- Any other action intended to obtain credit for work that is not one's own.

**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 i.e., "[Athletic Competition & Travel Letter](#)" 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 to the professor in the first week of a semester. It is the responsibility of the student to make up any assignments. If the student misses an examination, the instructor is required to allow the student to take the examination at another time. (<https://www.luc.edu/athletheadvising/attendance.shtml>)

Students who will miss class for an academic competition or conference must provide proper documentation to their instructor as early in the semester as possible.

**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.

**Universal Absence Accommodation Policy:** The purpose of a universal absence accommodation policy is to account for emergency circumstances (e.g., serious illness, caring for a family member, car accident) that require you to be absent from class, while maintaining fairness in grading for students who attend and complete all in-class graded assignments. We believe that class attendance and participation are essential for your success in this class, and that your health is important to us and our shared community. Please use good judgement and stay home if necessary/prudent for your circumstances. This is the universal accommodation policy for in-class graded assignments: the single lowest score for a graded discussion and for a unit exam, including any single missed graded discussion handout or graded unit exam will be dropped. You may provide documentation for an absence, but it is not required. These accommodations are automatically available to all students.

**Pass/Fail Conversion Deadlines and Audit Policy**

A student may request to convert a course into or out of the "Pass/No-Pass" or "Audit" status only within the first two weeks of the semester.

**Health, Safety, and Well-Being On-Campus**

Please be familiar with and adhere to all policies and protocols posted on the *Campus Info & Resources* site:

<https://www.luc.edu/healthsafetyandwellbeing/campusinforesources/>

#### SPRING 2024 Classroom Masking Policy

We will follow all University guidance and requirements for masking, including any updates made during the semester. It will remain a principle of this class-section that, out of respect for the health of housemates and others in regular contact with members of our community, we will be respectful of anyone who wears a mask in the classroom.

#### Class Recording & Content Information

In general lecture, meetings may be recorded. The following is a mandatory statement for all courses in the College of Arts & Sciences (CAS). We will discuss class norms and standards during the first week and continue the discussion as needed throughout the semester.

**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.

#### Additional Content, Copyright & Intellectual Property Statement

By default, students may not share any course content outside the class without the informed written consent of the owner of that content. This includes any additional recordings posted by students, materials provided by the instructor, and publisher-provided materials. For example, lectures, quiz/exam questions, book figures/slides, and videos may not be shared online outside the class. In some cases, copyright/IP violations may overlap with breaches of academic integrity. Remember that obtaining consent to share materials is an active process.

#### Final Exam

The University sets the schedule for all final exams. The final will be on Wednesday, MAY 1<sup>st</sup>, 7:00 – 09:00 pm; The location will be updated on LOCUS when available. You will have exactly 2 hours to complete the exam. Additional time will not be granted, even if you start late. There will be no make-up final exams given under any circumstance, and the exam will not be given early, either. 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)).

The purpose of exams is to align your course grade with your level of learning, based on your ability to complete a cumulative and comprehensive test on the application of essential course concepts. The final is a 2-hour exam, completed on paper, in class on the last day of the term. Questions may include all material assigned for the semester. The final exam will not be returned, and a score will be posted on Sakai. Note that taking the final exam is mandatory to earn a passing course grade (C- or higher).

**Changes to Syllabus:** The instructor reserves the right to modify all of the course requirements at any time, including exam dates, course %-grade correlation, order of chapters/topics covered.

There may be changes to the syllabus during the semester. *You are responsible for all syllabus changes made in class whether you attend.*

#### Other Items

- A link to the official Loyola calendar can be found here: <https://www.luc.edu/academics/schedules/>
- The Withdraw deadline for the semester is on Friday November 4<sup>th</sup>.
- Loyola is using SmartEvals to provide instructor & course feedback. **OIE** will send emails near the end of the term.
- A tentative class schedule is listed below. We will cover most of Chapters 1-14 this semester, and pre-lecture readings will be continually updated and expected. Please be prepared to help your classmates get caught up if they miss a class for any reason. Establish a communication plan to share notes/topics/outlines as needed.

### Course Grading System

The departmental standards for each letter grade are listed here according to all required course components. Each student will receive a midterm grade via LOCUS at least one week prior to the Withdraw deadline for the semester. Grades are only based on the criteria listed in the syllabus:

no substitutions, and no additions.

**Grading Scheme** Discussion: 20% (lowest graded discussion dropped); Best two (2) unit exams at 25% each = 50%; final exam 30% Total 100% \*the final exam is mandatory to earn a passing grade

**Letter Grade Cutoffs\*:**

A 90.0%	C+ 65.0%
A- 85.0%	C 60.0%
B+ 80.0%	C- 55.0%
B 75.0%	D 40.0%
B- 70.0%	F < 40%

**No early and no make-up in-class exams; No make-up final exams will be given. No make-up discussion handouts. For a single, missed in-class unit exam, this will be the dropped unit exam score/percent. See attached schedule.** Students are not allowed to leave during exams. If you leave, you must turn in your exam, and you will be considered finished with the exam. Students must turn in all exam pages when finished. Exams cannot be taken from lecture: see Academic Integrity Violations. Students must bring and present their Loyola I.D. for each exam.

**Posting of Grades: Final course grades at the end of the semester are posted only LOCUS. Grades are never sent via email.**

**EXAM DATES: (Tentative): EXAM I: MONDAY, FEBRUARY 12, 2024;  
 EXAM II: MONDAY, MARCH 18, 2024; EXAM III: MONDAY, APRIL 15, 2024;  
 FINAL EXAM: WEDNESDAY, MAY 01, 2024; 07:00 PM – 09:00 PM; LOCATION TBD**

**Lecture Outline** (tentative, subject to change)

Week	Date	Chapter	Topic	*
1	01/15		NO CLASSES, HOLIDAY	
	01/17	01	Constitutional isomers, Lewis structures, Formal Charges	
	01/19	01	Bonding, Bond-line structures, Molecular Orbital Theory, Hybridization	
2	01/22	01	Bonding, Resonance, VESPR Theory	
	01/24	02	Molecular Representations, Bond-line structures, Condensed/Partially condensed	
	01/26	02	Constitutional isomers revisited, Structural representations of functional groups.	
3	01/29	02	Identifying Lone Pairs, Formal Charge revisited, Dash-Wedge 3-D	
	01/31	02	Curved arrow notation, Resonance, Formal Charge revisited,	
	02/02	03,04	Bronsted-Lowry Acid-Base conjugates, Lewis Acid/Bases, Newman Projections,	
4	02/05	04	Alkanes, Cycloalkane nomenclature, Complex substituents	
	02/07	04	Newman Projections; Conformational analysis, Translating Dash-Wedge	
	02/09	04	Cycloalkanes; Chair conformations; Haworth projections	
5	02/12		<b>EXAM I</b>	
	02/14	05	Stereoisomerism, Chiral centers, Chirality, R-S configurations, Diastereomers	
	02/16	05	Stereochemistry, Chiral centers Chirality, R-S configurations, Diastereomers	
6	02/19	05	Enantiomers, Fischer Projections optical activity, Meso compounds, E-Z Alkenes	
	02/21	06	Homolytic Bond dissociations; Enthalpy, Entropy, Reaction Profiles	
	02/23	06	Kinetics, Nucleophiles, Electrophiles	
7	02/26	06	Curved arrow electron movement, mechanisms, Carbocation stabilities rearrangements	
	02/28	07	Alkyl Halides, Classification, Nomenclature	
	03/01	07	SN2 Mechanisms; Kinetics, Walden Inversions	
8	03/04		NO CLASSES, SPRING BREAK	
	03/06		NO CLASSES, SPRING BREAK	
	03/08		NO CLASSES, SPRING BREAK	
9	03/11	07	Nucleophilic Strength. Alkyl Halide reactivities	
	03/13	07	E2 Mechanisms/ Kinetics, Alkene Stabilities: Zaitsev vs Hofmann alkenes	
	03/15	07	SN1 vs E1 Reaction Mechanisms, Carbocations revisited, Alkyl Halide reactivities.	
10	03/18		<b>EXAM II</b>	
	03/20	08	Alkene nomenclature, degrees of unsaturation	
	03/22	08	Alkene reactions, hydrohalogenation, halogenations, hydration, carbocations revisited.	
11	03/25	08	Dihydroxylation, oxidative cleavage; Syntheses	
	03/27	09	Alkynes, classification, Nomenclature, Acidities	
	03/29	09	Preparation, Reductions: Syn vs Anti addition of H <sub>2</sub> ; Hydrohalogenation	
12	04/01	09	Hydration, Keto-Enol tautomerism, Halogenation, Ozonolysis	
	04/03	09,10	Alkyne Syntheses, Radical Classification, Stabilities	
	04/05	10,11	Radical Mechanisms, Selectivity's; Syntheses	
13	04/08	14	Infrared Spectroscopy (IR); Mass Spectrometry (MS)	
	04/10	14	Infrared Spectroscopy (IR); Mass Spectrometry (MS)	
	04/12	14	Infrared Spectroscopy (IR); Mass Spectrometry (MS)	
14	04/15		<b>EXAM III</b>	
	04/17	12	Alcohols, classification, properties, nomenclature	
	04/19	12	Reactions: oxidation, halogenation dehydration, carbocation rearrangements	
15	04/22	12	Reductions, Grignard Reagents, Halogenation	
	04/24	13	Ethers; nomenclature, physical properties	
	04/26	13	Reactions of ethers, Synthesis	
16	04/29 to 05/04		<b>FINAL EXAM WEDNESDAY 07:00 PM – 09:00 PM LOCATION: TBD</b>	

**Course Topics**

Chapter 1: Review  
 Chapter 2: Drawing Molecules  
 Chapter 3: Acids & Bases  
 Chapter 4: Alkanes and Cycloalkanes  
 Chapter 5: Stereochemistry  
 Chapter 6: Chemical Reactivity & Mechanisms  
 Chapter 7: Alkyl Halides  
 Chapter 8: Alkenes  
 Chapter 9: Alkynes  
 Chapter 11: Total Synthesis  
 Chapter 12: Alcohols  
 Chapter 13: Ethers  
 Chapter 14: Infrared Spectroscopy, Mass Spectrometry

## Chapter 10: Radicals