

Loyola University Chicago

Syllabus Organic Chemistry II CHEM 224 001; Monday, AUGUST 26 – Friday DECEMBER 1; 2024

Lecture: M, W, F 08:15 AM - 09:05 AM; FLANNER HALL 133; Prerequisite CHEM 222 or 223

Instructor: Donald May Contact: dmay4@luc.edu Office: Flanner Hall 403; W 11:30 AM – 12:30 PM

Discussion: All Sections in Flanner Hall 007; 002: M 09:20 AM – 10:10 AM; 003 M 10:25 AM – 11:15 AM

Required Materials: Textbook: ORGANIC CHEMISTRY by David Klein; 4th edition

Optional: - Student Study Guide and Solutions Manual

- Molecular Model kit

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&I); 2004 by John Wiley & Sons, Inc.; ISBN 0-471-27235-3; 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” so as 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).

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 allowed to work together on discussion handouts. Students are expected to attend the discussion on time: only the original will be accepted; no late handouts will be accepted; no photocopies accepted; students must follow the directions on the handouts. Graded discussions will be given the week preceding each unit exam. Discussion handouts will contribute 20% 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. Students must attend the lecture/discussion to receive the handout. Students are expected to attend the discussion on time only the original will be accepted; no late handouts will be accepted; no photocopies accepted; students must follow the directions on the handouts. 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). The instructor reserves the right to modify any of the course requirements at any time.

Final course grade assigned: A: 100% – 90.0% A-: 89.9% – 85.0% B+: 84.9% – 80.0%

B: 79.9% – 75.0% B-: 74.9% – 70.0% C+: 69.9% – 65.0% C: 64.9% – 60.0% C-: 59.9% – 55.0%

D: 54.9% – 40.0% F: < 40.0%

Grading: Final grades will be determined from one of the following exam contribution options, The best 2/3 graded discussion handouts = 20%; the best 2/3 unit exams = 50% (2@ 25% each); Comprehensive final exam = 30% Any subsequent missed in-class exams will be scored as zero. **No early and no make-up in-class exams; No make-up final exams will be given. No make-up discussion handouts. See attached schedule. Posting of Grades: Final course grades are posted only LOCUS.** Each student will also receive a midterm grade via LOCUS, 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:

GRADED DISCUSSIONS 20%;

TWO UNIT EXAMS 50%

FINAL EXAM 30%* *the final exam is mandatory to earn a passing grade

Total score 100%

Students must bring and present their Loyola I.D. to each exam. 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. If a student begins an exam it must be turned in for grading. Students must turn in all exam materials/pages when finished. Exam copies cannot be taken from lecture: see Academic Integrity Violations. Graded exams will be returned as soon as possible. Issues with graded exams must be submitted within 5 days of being returned, otherwise scores will be considered final. Students must submit a signed statement requesting a review of the exam question, although the entire exam is now subject to being re-graded. Any single regrade will be considered the final score and no subsequent regrade request will be considered. The student must have a valid and verifiable reason for missing the final exam, such as a serious illness requiring hospitalization, and so forth. Oversleeping, not knowing the date and time of the final exam or not being prepared and so forth, are not valid reasons. If a verifiable and valid reason cannot be provided, a zero score for the final exam will be recorded. Any make-up final exam will be in a different format.

Student Conduct: Only students officially enrolled for the course may attend. Students must attend only the discussion section for which they are officially enrolled. Students who are absent from lecture(s) should get the lecture notes from another student. At all times students are expected to conduct themselves in a mature and professional manner, which includes but is not limited to: treating everyone in class with respect, avoidance of extraneous comments and small group discussions during lecture. Eating, chewing gum/tobacco products and drinking (food items) are not allowed. Students are expected to take care of their personal matters before discussions/ lectures/exams. Additionally, radios, headphones, cell-phones or similar devices are not permitted during discussions/ lectures/exams. Not all contingencies can be listed but inappropriate conduct will be addressed.

Disruptive students will be asked to leave. If a cell phone rings (beeps, buzz, etc.) during any exam, the exam will be collected, and the student will not be allowed to continue. Exam questions, however, will come predominantly from lecture notes and from concepts related to suggested homework problems. If a student begins an exam it must be turned in for grading. Students are not allowed to leave the room during exams until their exam is handed in for grading. If you leave, you must turn in your exam, and you will be considered finished. Please keep noises and sounds to a minimum. When leaving, be respectful and leave quietly. During exams, only religious caps/ hats/hoods are allowed: nonreligious caps, hats, hoods, visors and so forth, will not be allowed to be worn during exams. All personal materials, besides pencils and erasers, will be placed at the front of the room, if available. Students will sit in every other seat during exams, if possible. Other specific instructions will also be given for exams.

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 the incident 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.

Course Practices Required: College-level writing skills on exams; communication skills for discussion and articulation of questions; completion of reading assignments and hand-outs. It is recommended that the student read through each chapter before lecture and eventually work through the suggested problems before the exam. Tutoring is available in the Sullivan Center; The ACS Loyola Chapter also provides tutoring, free of charge, on a walk-in basis, during the week in Flanner 129 (days/time announced); A few graduate students serve as private, one-to-one tutors but have individual rates of remuneration/monetary compensation for their services.

Learning Objectives: Students who successfully complete this course will be able to do the following at an acceptable level: Name and draw complex organic structures; Predict both physical and chemical properties as well as identify and name, aromatics, phenols, aldehydes, ketones, carboxylic acids, derivatives of carboxylic acid, and amines; Describe and differentiate between various mechanisms, such as electrophilic versus nucleophilic aromatic 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 NMR, IR, UV, and mass spectrometry data to identify structures; predict the spectroscopic data from the structure; Identify and describe biomolecules including carbohydrates, amino acids/proteins and heterocyclic/nucleotide/nucleic acids; Predict the structure and stereochemistry of various carbonyl and other condensation reactions.

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 to discuss their accommodations. All information will remain confidential. Please note that in this class, software may be used to record class lectures 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

Disability Accommodations: Students requiring accommodations at the University need to contact the Coordinator of Services for Student Accessibility Center (SAC), Sullivan Center. Accommodations are provided after receiving documentation from SAC Testing and allowance of a reasonable time frame for arrangements (minimally, one week in advance). Accommodations cannot be retroactive. Contact: <http://www.luc.edu/sac/>

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/athleteadvising/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: One missed in-class exam due to absence for any reason is already accommodated in the course grading system. Given that only the best two in-class exams are included in this calculation, a missed exam would be the one not included in this calculation, as it would be the lowest score (0%) of the three exams.

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. For the FALL 2024 semester, students are able to convert a class to "Pass/No-Pass" or "Audit" through, . Students must submit a request for Pass/No-Pass or Audit to their Academic Advisor.

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/>

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 lectures, 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.

Changes to Syllabus

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 01st.
- 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 15-26 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.

Academic Calendar, www.luc.edu/academics/schedules **Course Repeat Rule** Effective with the Fall 2017 semester, students are allowed only three (3) attempts to pass courses in the Chemistry and Biochemistry department 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 department office, fill out a permission to register form or print it from the Department of Chemistry & Biochemistry website: <http://www.luc.edu/chemistry/forms/> and obtain a signature from 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. Students must bring and present their Loyola I.D. for each exam. **Final Exam** The University sets the schedule for all final exams, held on: 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).

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 completing the final exam is mandatory to earn a passing course grade (C- or higher). **EXAM DATES: EXAM I: MONDAY, SEPTEMBER 23, 2024; EXAM II: MONDAY, OCTOBER 21, 2024; EXAM III: MONDAY, NOVEMBER 18, 2024 FINAL EXAM SEE BELOW**

Lecture Outline (tentative / subject to change)

Week	Date	Chapter	Topic
1	08/26	14	Infrared Spectroscopy and Mass Spectrometry Review, NMR
	08/28	15	¹ H and ¹³ C NMR Spectroscopy
	08/30	15	¹ H and ¹³ C NMR Spectroscopy
2	09/02		NO CLASS: HOLIDAY
	09/04	15	¹ H and ¹³ C NMR Spectroscopy
	09/06	15	¹ H and ¹³ C NMR Spectroscopy
3	09/09	16	Conjugated Systems, Orbital Symmetry; 1,2 vs. 1,4 additions to 1,3-dienes
	09/11	16	Conjugated Systems, Orbital Symmetry; 1,2 vs. 1,4 additions to 1,3-dienes
	09/13	16	Molecular Orbital Theory
4	09/16	17	Aromatic Compounds and Ions
	09/18	17	Aromatic Compounds and Ions
	09/20	17	Aromatic Compounds and Ions, Huckel's rule
5	09/23		EXAM I
	09/25	16	Diels-Alder Reactions
	09/27	16	Diels-Alder Reactions
6	09/30	18	Reactions of Aromatic Compounds
	10/02	18	Reactions of Aromatic compounds
	10/04	18	Reactions of Aromatic Compounds
7	10/07	18	NO CLASS: FALL BREAK
	10/09	18	Reactions of Aromatic Compounds
	10/11	19	Aldehydes and Ketones, Nomenclature, Physical properties
8	10/14	19	Aldehydes and Ketones; Reactions, Synthesis
	10/16	19	Aldehydes and Ketones; Reactions, Synthesis
	10/18	19	Aldehydes and Ketones, Reactions, Synthesis, Spectroscopy
9	10/21		EXAM II
	10/23	20	Carboxylic Acids, Nomenclature, Physical Properties, Acidities
	10/25	20	Carboxylic Acids: Reactions; Syntheses
10	10/28	20	Carboxylic Acids: Reactions; Syntheses
	10/30	20	CA DERIVATIVES Reactions; Synthesis
	11/01	20	CA DERIVATIVES Reactions; Synthesis "W" day
11	11/04	20	CA DERIVATIVES Reactions; Synthesis
	11/06	20	CA DERIVATIVES Reactions; Synthesis
	11/08	20	SPECTROSCOPY
12	11/11	22	Amines: Nomenclature, Physical Properties, Acidities of Salts
	11/13	22	Amines: Reactions, Synthesis
	11/15	22	Amines: Reactions, Synthesis, Spectroscopy
13	11/18		EXAM III
	11/20	21	Condensations of carbonyls; alpha substitution
	11/22	21	Condensations of carbonyls; alpha substitution
14	11/25	21	Condensations of carbonyls; alpha substitution
	11/27		NO CLASS: Holiday: THANKSGIVING
	11/29		NO CLASS: Holiday: THANKSGIVING
15	12/02	24	Carbohydrates and Nucleic Acids
	12/04	24	Carbohydrates and Nucleic Acids
	12/06	25,26	Amino Acids, Lipids
16	12/12		THURSDAY DECEMBER 12, 2024, FINAL EXAM 09:00 AM – 11:00 AM

Course Topics Chapter 15: NMR Chapter 16: Conjugated Systems & Pericyclic Reactions

Chapter 17: Aromatic Compounds Chapter 18: Aromatic Substitution Reactions

Chapter 19: Aldehydes and Ketones Chapter 20: Carboxylic Acids & Derivatives

Chapter 21: α -Carbon Chemistry Chapter 22: Amines

Chapter 24: Carbohydrates Chapter 25: Amino Acids: Chapter 26: Lipids