

Description: CHEM 225 is a course about laboratory techniques used in organic chemistry. In this course, students will learn how to handle organic chemicals safely, characterize organic compounds by measuring selected physical properties, purify organic compounds, and determine the structures of organic compounds. Lastly, students will learn how to prepare for a chemical reaction that is designed to convert one organic compound into a different substance and then analyze the results of the reaction.

Pre-requisites: Grade of 'C-' or better in 1 year of General Chemistry Lecture and Lab.

Required Items: The course materials, including the lab procedures and background material, are posted on the course homepage, which is called Sakai. There is no printed lab manual or textbook. Some of the materials posted on Sakai DO NOT work on tablets or mobile devices. Therefore, access to a desktop or laptop computer with high-speed Internet access is required. Wired (ethernet cable) internet is preferred, but WI-FI is acceptable if the connection is reliable. If you do not have a desktop/laptop computer or Internet service and/or are unable to access a computer lab on campus, you need to contact Loyola ITS for information on their [equipment loan program](#) before or within the first few days of the start of the course and arrange for these resources. The lab instructor is not responsible for coordinating this for students.

Required Materials: Bound composition notebook
Full-length lab coat
Safety goggles (will be provided during safety training)

Course Homepage: Announcements, assessments, videos, the grade book, office hour times and locations, etc. are posted on the course site at Sakai.luc.edu. For this course, all materials and due dates will be posted under the "Lessons" tab. Students should familiarize themselves with the layout of the course Sakai page and check it frequently.

Meeting Times and Locations: All in-person sections of CHEM 225 meet in LSB-115.

Section	Day and Time	Instructor	Teaching Assistants
001	Mondays 8:00 AM - 10:45 AM	Dr. Eisenberg	Bailey Hanson Brooklyn Gasiorek
002	Mondays 12:10 PM - 2:55 PM	Dr. Eisenberg	Jordan Delev Sara Abuhadba
003	Tuesdays 8 AM – 10:45 AM	Dr. Eisenberg	Sara Abuhadba TJ DiPuma
004	Tuesdays 11:30 AM – 2:15 PM	Mr. Thomas	Cameron Forst TJ DiPuma
006	Wednesdays 8:00 AM - 10:45 AM	Dr. Eisenberg	An Vuong Brooklyn Gasiorek
007	Wednesdays 12:10 PM - 2:55 PM	Mr. Thomas	Zachary Liveris Keit Dine
008	Saturdays 10 AM – 12:45 PM	Mr. Thomas	Leslie Castillo Dulce Garcia
009	Thursdays 8 AM – 10:45 AM	Dr. Eisenberg	Jordan Delev TJ DiPuma
010	Fridays 8:00 AM - 10:45 AM	Dr. Eisenberg	Leslie Castillo
011	Fridays 12:10 PM - 2:55 PM	Mr. Thomas	Zachary Liveris Bailey Hanson

Faculty Contact Info: Dr. Jessica Eisenberg, jeisenberg2@luc.edu, (773) 508-8714
Mr. Tim Thomas, tthoma1@luc.edu, (773) 508-8115

Email: Faculty email addresses are posted on the open Internet for every software bot and spammer in the world to see. Therefore, faculty Outlook accounts are configured differently, and emails from outside sources are often blocked automatically and sent to the junk folder. Because of this and a Federal law relating to student privacy (FERPA), students must use a Loyola email address when contacting the instructor or TAs about this course. In the subject line of an email, please indicate your 225 section number.

Role of the TAs: Teaching Assistants are assigned to lab sections to aid the instructor in giving help and feedback to the students in the course. The TAs' primary responsibilities include answering student questions during lab and by holding weekly office hours, ensuring experiments are performed safely by ensuring safety rules are always followed in the lab, and grading certain assignments. Students should primarily email questions to the instructor and/or the TA assigned to their registered section but can feel free to attend any TA office hours (which will be held via Zoom this semester) if the timing for another TA's office hours works out better since the different sections follow the same guidelines. If at any time during the semester, questions or concerns arise about the behavior of a TA, please contact the instructor.

Grading: Lab grades will use the following scale and consist of the following components:

A>93%, A->90%, B+>87%, B>83%, B->80%, C+>77%, C>73%, C->70, D+>67%, D≥60%, F<60%

Misc. Assignments (listed below*)	25%
Technique Knowledge Checks	25%
Required Labster Simulations	25%
Lab Results/Make-Ups	<u>25%</u>
	100% total

Safety Training: Lab safety is extremely important. It is critical that everyone understands the potential hazards of working with chemicals and laboratory glassware and equipment. By avoiding risky behavior, accidents can be prevented. Everyone must read and understand the organic chemistry lab rules posted on Sakai. For students who meet in-person, safety training will be documented with a sign-in sheet in class. If safety training is not completed in class, the safety training quiz must be completed on Sakai before a student is allowed to work in the lab.

*SciFinder Scholar Assignment: This assignment familiarizes students with an authoritative, reliable resource to consult in order to find physical property data on organic chemicals. These known values are used to compare to lab-measured values to gauge experiment success. **This assignment has unlimited submissions and no time limit up until the due date posted on Sakai.** The highest score will be recorded in the Sakai Gradebook. Students with no submission attempt before the due date will be allowed only one late submission up until 1 week after the posted due date with a 50% late penalty.

*ChemDraw Assignment: This assignment introduces students to a chemical structure drawing program and some of the features it contains. **This assignment allows one initial submission with no time limit up until the due date posted on Sakai; no late submissions on the first attempt will be accepted.** Once the initial submissions have been graded, feedback will be viewable under "Tests & Quizzes" and a retake option will be released. All students are allowed unlimited submissions on the retake up until the course hard deadline. The average score between the initial submission and the highest retake will be entered into the Sakai Gradebook; if no retake is submitted, the initial score will be recorded.

*Lab Notebooks: The ability to keep good records is a valuable, widely applicable skill. While you may never run a chemical reaction after this class, chances are good that you will be asked to keep good records no matter what your eventual profession. To practice this useful skill, students are required to keep a laboratory notebook for this course. A properly maintained notebook will make understanding a lab experiment easier

and keep experimental results all in one place. There is a handout posted on Sakai that reviews the content and format of a lab notebook for organic chemistry experiments.

One of the most important facets of laboratory work is that experiments should be recorded as completely and accurately as possible. So, students should write notebook entries with enough detail that someone else could recreate the experiment exactly. This means that the lab notebook entries should accurately reflect everything that happened during the experiment. Sometimes, important discoveries are made when things do not behave as expected. Therefore, it is critical that students report their actual observations and not what they think the correct answer should be.

For this course, student notebook pages will be checked at the end of each lab period. Students should be sure to show their lab notebooks to the TA before they leave the lab.

*Glassware and Equipment Identification Assignment: To accurately follow written procedures in organic chemistry, it is important that you be able to recognize and name some of the common lab equipment and glassware that organic chemists use. These items will be utilized in the course itself, as well as in prelab videos and lab simulations. Using the information posted on Sakai and the examples shown in lab, complete the Glassware & Equipment Identification Assignment on Sakai. Students with no submission attempt before the due date will be allowed only one late submission up until 1 week after the posted due date with a 50% late penalty. Assessments must be submitted to count. Spelling and grammar count to receive full credit.

Technique Knowledge Checks: Videos explaining and demonstrating various organic chemistry lab techniques are posted on Sakai. Some of the videos and presentations were prepared by the course instructors and show the use of equipment and materials in Loyola's organic chemistry lab space. Other videos are from the Journal of Visualized Experiments ([JoVE](#)), a peer-reviewed scientific video journal that shows the experiments being performed in laboratories at research institutions worldwide. After watching the provided video(s) on a given topic, students are asked to answer the questions in the corresponding Knowledge Check to demonstrate their understanding of the techniques. **These assignments allow unlimited submissions and no time limit up until the due date indicated on Sakai; the highest score will be recorded in the Sakai Gradebook.** Students with no submission attempt before the due date will be allowed only one late submission up until 1 week after the posted due date with a 50% late penalty. Assessments must be submitted to count. Spelling and grammar count to receive full credit.

Required Labster Simulations: [Labster](#) is another way to give students exposure to laboratory procedures that also includes the ability to manipulate a variety of experiments in a virtual space. All students should complete the Labster simulations during the weeks that will be noted in the "Lessons" tab on Sakai. The required Labster simulations help to keep all the sections on the same schedule around holidays and reinforce the course material. The links to the actual simulations are located on Sakai under the "Labster" tab. Points will be awarded as students work through the simulations by answering quiz questions and completing simulated lab tasks. Student progress is saved after certain stages of the simulations, allowing students to stop working and resume later if so chosen. The score from a student's "best completed attempt" at a simulation (i.e., the highest score for a simulation at 100% completion) will be entered into the Sakai Gradebook. There are recommended due dates for Labster, but all the simulations will remain open and available to students to complete for the duration of the course and may be repeated as often as desired. **Labster will turn off at 5:00pm on Saturday, December 11, 2021, and no scores will be accepted after this.**

Lab Results/ Make-Ups: After completing the Knowledge Checks at least once online, students will come to lab to perform the experiments and obtain data. At the end of each experiment and before leaving lab, all students must check-out with their TA to confirm that the experiment was completed, and all materials were cleaned up and put away properly. Students are to record their results in a laboratory notebook. A properly

maintained notebook keeps the experimental results in one place. The format of the notebook is described in a handout posted on Sakai. One of the most important facets of experimental work is that data should be recorded as completely and accurately as possible. Sometimes, important discoveries are made when things don't behave as expected. Therefore, it is critical that students report their actual data and not what it is thought that the correct answer should be. Students who complete the entire experiment in good faith will automatically receive all of the Lab Results points, minus any relevant deductions. Point deductions will be made for things such as safety violations, not participating in collecting the data, not coming to lab prepared, not finishing the experiment, not cleaning up, etc.

*****If a student must miss lab** (e.g., because of illness, quarantine, university-sponsored event, etc.), that student may complete the alternative make-up work that is posted on Sakai. Most of the make-up work is to complete Labster simulations. Asking permission to miss lab isn't necessary, but an absent student should notify the instructor via email to ensure that the make-up score is transferred from Labster to Sakai. Students who completed the in-person experiments may also wish to do the Labster simulations as well in order to further master the material, but there are no extra points awarded for this.

Late Policies and Hard Deadline: To keep students on track throughout this course, assignments are due on a weekly basis. The specific due dates for each assignment are posted under the "Lessons" tab on Sakai within the topic folders using an assignment check-list feature. See the additional notes included with each assignment type above for the policies regarding late assignment submissions. **The hard deadline for the submission of all assignments is 5:00 PM on Saturday, December 11, 2021.** Final grades will be calculated based on materials submitted by this hard deadline. If there are substantial materials that are missing and that cannot be submitted before this deadline, the student should consider withdrawing from the course or requesting an Incomplete by completing [this form](#) prior to the end of the term.

Re-grades: All requests to have items re-graded must be submitted in writing within one week after the graded materials are returned to the student.

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: <http://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. The penalty for academic dishonesty is a zero on the assignment and a possible letter grade reduction of the final course grade.

Copyright/Privacy Statements: Course content is designed for use ONLY by students in this course. All materials are subject to privacy and copyright laws. Students are NOT allowed to share any course resources (Labster info, Panopto videos, PowerPoints, quiz/test/exam questions, documents, etc.) with anyone not registered for the course, nor are students allowed to upload, post, copy, share them to any outside media sites without explicit permission from the instructor. If discovered that a student completes such action, the Chair of the Chemistry & Biochemistry Department will be notified immediately.

Course/Instructor Evaluation – SmartEval: The following information came from the University regarding course evaluations:

"Towards the end of the course, the students will receive an email from the Office of Institutional Effectiveness reminding them to provide feedback on the course. They will receive consistent reminders

throughout the period when the evaluation is open, and the reminders will stop once they have completed the evaluation.

-The evaluation is completely anonymous. When the results are released, instructors and departments will not be able to tell which student provided the individual feedback.

-Because it is anonymous and the results are not released to faculty or departments until after grades have been submitted, the feedback will not impact a student's grade.

-The feedback is important so that the instructor can gain insight into how to improve their teaching and the department can learn how best to shape the curriculum."

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.

Student Accommodations: Loyola provides services for students with disabilities. Any student who would like to use any of these university services should contact the Student Accessibility Center (SAC), Sullivan Center, (773) 508-3700. Further information is available at <http://www.luc.edu/sac/>.

COVID-19 Statement: As a Departmental policy, even in the event the University relaxes its universal requirement for indoor mask-wearing during the Fall 2021 semester, it will remain a principle of this class that, out of respect for the health of housemates and others in regular contact with members of our community, in this class we properly wear masks at all times (e.g., over nose and mouth). Additionally, please do not feel compelled to come to lab if you are feeling ill or have a strong suspicion of exposure to COVID-19 or are awaiting test results. Students can complete the make-up work at any time during the semester.

Topics Covered: (Note: the final schedule will be posted on Sakai.)

1. Syllabus and Organic Chemistry Lab Glassware and Equipment
2. Introduction to Organic Chemistry
3. Chemical Structure Drawing Software and Chemistry Information Resources
4. Lab Safety and Lab Notebooks
5. Functional Group Identification by Chemical Tests and Infrared (IR) Spectroscopy
6. Phase Changes of Organic Compounds: Melting and Boiling Points
7. Chemical Isomers and Polarimetry
8. Distillation
9. Recrystallization
10. Extraction
11. Chromatography
12. Substitution Reactions
13. Elimination Reactions
14. Competing Reactions: Substitution vs. Elimination