Description: CHEM 225 is a laboratory course designed to create foundational knowledge and proficiency in essential organic chemistry concepts and laboratory skills. It includes hands-on experiments designed to teach laboratory skills needed to isolate and characterize organic compounds.

Academic Calendar: It is the student's responsibility to know both the schedule for this course, which is posted on Sakai, and the official Fall 2022 University Academic Calendar.

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

Section	Day and Time	Instructor	Teaching Assistants
001	Mondays 8:30 AM - 11:15 AM	Dr. Eisenberg	Cody Busch
002	Mondays 11:30 AM - 2:15 PM	Mr. Thomas	Mitch Meves
003	Mondays 2:45 PM – 5:30 PM	Mr. Thomas	Emily Radz and Aryana Sayeed
004	Tuesdays 8:30 AM – 11:15 AM	Dr. Eisenberg	Monika Rasic and Evan Scruggs
005	Tuesdays 11:30 AM – 2:15 PM	Dr. Eisenberg	Megan Beulke and Mitch Meves
006	Tuesdays 5:45 PM – 8:30 PM	Mr. Thomas	TJ DiPuma and Marianna Haddad
007	Wednesdays 8:30 AM - 11:15 AM	Mr. Thomas	Brian Aranda and Catherine Barth-Yoakum
008	Wednesdays 11:30 AM - 2:15 PM	Dr. Eisenberg	Catherine Barth-Yoakum and Oliwia Ozog
009	Wednesdays 2:45 PM – 5:30 PM	Dr. Eisenberg	Leslie Castillo and Aryana Sayeed
010	Thursdays 8:30 AM – 11:15 AM	Dr. Eisenberg	Monika Rasic
011	Fridays 8:30 AM – 11:15 AM	Dr. Eisenberg	Jordan MacQueen and Emily Radz
012	Fridays 11:30 AM - 2:15 PM	Mr. Thomas	Leslie Castillo and Jordan MacQueen

Office Hours: Office hours for the instructors and TAs will be posted on Sakai.

Pre-requisites: Grade of 'C-' or better in (CHEM 102 and CHEM 112) or CHEM 106.

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

This course contains some elements that require a desktop or laptop computer with high-speed Internet access. Some of the virtual lab simulations used DO NOT WORK on tablets or mobile devices. 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, you will need to go to the Information Commons on campus or contact the extended loan equipment program within the first few days of the start of the course and arrange for these resources.

Course Homepage: Announcements, assessments, extra copies of the handouts, the grade book, etc. are posted on Sakai.luc.edu. Students should check Sakai frequently as it is central to how the course operates. **Please note that all course materials should be accessed under the Lessons tab**, where details are broken down by topic/experiment. Certain assignments may not open properly if attempts are made to access them through other tabs.

Safety Rules: Before lab safety day, all students will be expected to have watched the safety videos, read the lab safety rules, and submitted the lab safety quiz, all of which are posted on Sakai. Students MUST follow these rules throughout the course. On lab safety day, students must sign a Lab Safety Contract that acknowledges that the student received the safety rules and agrees to follow them. A lab safety contract must be signed by a student before they will be allowed to work in lab. Anyone who does not adhere to the safety rules will receive point deductions and may not be allowed to remain in the laboratory, depending on the severity of the violation. Students must bring eye protection and a full-length lab coat to every experiment and dress in appropriate clothing and footwear such that there is no exposed skin at any point below the shoulders. For the sake of hygiene and other reasons, students may not borrow goggles and/or a lab coat. Any student

who comes to lab without these items will automatically not be allowed to perform the experiment. More information on the course attendance policy and safety points can be found below.

***** WHENEVER CHEMICALS ARE PRESENT, NO ONE MAY ENTER LSB-115 UNLESS THEY ARE WEARING THE FOLLOWING: *****

1. **EYE PROTECTION (These must be type G, H or K goggles and must meet or exceed ANSI Z87.1)**
2. **FULL-LENGTH LAB COAT**
3. **CLOSED-TOE, CLOSED-HEEL SHOES**
4. **APPROPRIATE ATTIRE THAT FULLY COVERS ALL SKIN BELOW THE WAIST**

Grading: Course grades consist of the following components:

Lab Results, drop lowest one	50%
Post-lab Exercises, unlimited attempts until the due date	25%
Safety Points	25%
	100% total

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

Attendance: Students are expected to attend every lab session. **Any student who does not have their safety goggles or lab coat, is not dressed appropriately, or has not completed the pre-lab preparation before lab starts will be marked absent.** Missing a lab period for any reason will result in a zero for any work that is not completed. However, the lowest results score will be dropped from the overall grade calculation. If a student must miss more than one experiment, documentation of the reason for the absence must be submitted to the instructor. Any additional missed work beyond two absences will receive a zero.

There will be an attendance sheet that students are required to sign upon entering the lab. It is critical that the attendance sheet exactly matches who is present in the lab in the event of an emergency. If someone must leave the lab after signing in (e.g., to use the restroom, get a drink of water, etc.) they must be sure to log out on the attendance sheet. For safety's sake and to get better results, limit time out of the lab. Students who leave the lab for a period longer than 10 minutes, arrive late, and/or do not sign in on the attendance sheet themselves may receive a deduction for their Safety Points for that experiment.

Pre-Lab Preparation: Success in organic lab depends on advance preparation. Therefore, there are several things you must do **before** coming to lab. The pre-lab materials consist of background videos to watch. Once the background videos have been completed, a pdf file of the procedure will become available on Sakai– **all lab materials should be accessed under the Lessons tab on Sakai.** Students should read the procedure and prepare their notebooks before class. The lab procedure will not become available until the pre-requisite materials are watched. Sakai indicates required materials with a black asterisk that will change to a green checkmark when the item is completed. You must complete the pre-lab before class begins in order to be eligible to participate in lab. Technical difficulties will not be accepted as a reason for not completing the pre-lab work on time; no late submissions will be accepted.

Lab Results: For this class, lab results will be recorded in a notebook that is scanned and submitted for a grade for each experiment. The ability to keep good records is a valuable skill that is widely applicable in fields beyond chemistry. As such, students are required to record their experimental notes and results for every experiment. Proper lab documentation should always be completed AS THE EXPERIMENT IS PERFORMED IN CLASS. 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. Lab notebook entries should be written DURING LAB. After the lab is completed, the pages will then be scanned and uploaded to Sakai to maintain a digital record of the work as well as for grading purposes. **Notebook entries are always due 48 hours after the lab ends.** Additional instructions for the format of notebook pages and the submission process are posted on Sakai and must be followed to earn full credit. Additionally, certain experiments have additional results (e.g. unknown information, spectra, graphs,

or a series of questions) indicated on Sakai that should also be included in the Discussion/Conclusion section of the notebook pages.

Post-Lab Exercises: While performing an experiment, students are often very focused on the tasks being completed and do not always pause to consider why certain things are done in specific ways. To reinforce the concepts and techniques that were performed in lab and allow more time to think through the techniques, students will also complete lab simulations outside of class after each experiment. These post-labs will be available all semester and each can be submitted an unlimited number of times until the hard deadline for the course (December 9, 2022, at 5 PM). As with all lab materials, there will be details and links to these simulations posted on Sakai in the experimental Lessons folders. These simulations are designed by Labster and have been used in lab courses over the last several years with positive student response. More information on Labster and technical support options are posted on Sakai.

Safety Points: Laboratory safety is an extremely serious and important topic. All violations of the safety rules will result in point deductions. Some safety violations may also result in the student being expelled from lab. As employees, the instructors and Teaching Assistants are expected to enforce the safety rules and disciplinary actions may be taken against them by Loyola if the safety rules are not enforced. Therefore, please do not ask the instructors or Teaching Assistants to ignore any safety rules or to not apply any penalties for safety infractions. They are not optional. Some examples of safety violations that result in immediate point deductions include things like touching your phone with your gloved hands, eating or drinking in lab, etc. These are just some examples—the list is not all-inclusive because it is impossible to foresee every potential safety violation. Some examples of safety violations that will result in immediate expulsion from the laboratory include things like wearing inappropriate attire that leaves skin exposed below the waist, dumping chemical waste down the sink, etc. Again, this list is just some examples. There are potentially other safety violations that come up may result in a student being asked to leave the lab. In addition, incurring multiple lesser safety violations may result in a student being asked to leave the lab—even if the infractions wouldn't warrant expulsion individually. Experiment will have three safety points at stake. Once the safety point score reaches zero, the student will be required to leave the lab.

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.

Late Policy: Materials that are submitted after the designated due date but up to 1 week after the designated due date will receive a 25% deduction. No materials will be accepted more than 1 week late.

Hard Deadline: All materials of any kind must be submitted by 5 PM on December 9, 2022. No materials will be accepted after this time. Final grades will be calculated based only on materials submitted by this 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.

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 an outside contractor also scans faculty email. Emails from outside sources are often blocked automatically. Because of this and a federal law relating to student privacy (FERPA), students must use a Loyola email address when contacting the TAs or the instructor about this course. In the subject line of an email, please put Chem 225-section number and TA's name.

Interactions with TAs: To increase the amount of individual assistance you receive in lab, Teaching Assistants will participate in delivering this course. If at any time during the semester, you have any questions or concerns about the behavior of your Teaching Assistant, please contact the instructor.

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) will be reported to The Chair of The Department of Chemistry & Biochemistry, who will decide what the next steps may be. The penalty may include a grade of zero for that assignment and/or failure of the course.

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/

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). 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.

Student Accommodations: The Student Accessibility Center (SAC, formerly known as SSWD), 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.

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 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/athleteadvising/attendance.shtml).

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.

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. Additionally, all materials from this course cannot be shared outside the course without the instructor's written permission.

Instructor Contacts: Dr. Eisenberg, LSB 124, (773) 508-8714, jeisenberg2@luc.edu
Mr. Thomas, LSB 124, (773) 508-8115, tthoma1@luc.edu

Experiments

1. Laboratory Safety
2. Molecular Modeling
3. Functional Group Identification: Chemical Tests and IR Spectroscopy
4. Simple Distillation
5. Melting Point Analysis
6. Recrystallization of Organic Solids
7. Structural Effects on Acidity
8. Extraction
9. Natural Product Extraction and Mass Spectrometry
10. Fractional Distillation
11. Nuclear Magnetic Resonance (NMR) Spectroscopy
12. Nucleophilic Substitution
13. Combined Spectroscopy Unknowns