CHM 425 – Qualitative Organic Analysis (Laboratory) | Syllabus | Fall 2024

Instructor: Lorenzo Mosca
Class Meetings: Tu-Th 2:00 pm – 5:00 pm
Where: Beaupre 235 – in person

Office Hours: Wednesdays 1:00 pm – 2:30 pm. Feel free to drop by my office.
If you wish to schedule outside the above time, please notify me with at least 24 hours of advance notice using a method of your choice (in person, email, phone call). Remote office hours are an option (Zoom). You may book using Starfish too.
Where: Beaupre 325D

Contacts: lorenzo@uri.edu, **put CHM 425** in the object.
(401) 874-2364
Office: Beaupre 325D

Your TA: **Francis Campos**, fcampos98@uri.edu – Lab 305
Francis' office hours will be communicated during the first lab period.

Textbook(s): There is no mandatory textbook for this laboratory course.
One suggested read is this brief booklet about laboratory safety:
→ **Safety in Academic Chemistry Laboratories: Best Practices for 1st and 2nd Year University Students.** | 8th Ed. | ACS | Download here ↓
https://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/safety-in-academic-chemistry-laboratories-students.pdf

However, if you would like to have reference books on organic laboratory techniques and spectroscopic characterization, these are my two recommendations:

→ **The Organic Chem Lab Survival Manual |** *James W. Zubrick* – Wiley.
Any recent edition (8th and onward) will work. You may find used copies for low prices (e.g. thriftbooks.com, abebooks.com, amazon.com). You may also find *lower prices* books in the places you look for *lower prices* books.

→ **Laboratory Techniques in Organic Chemistry |** *J. R. Mohrig, D. G. Alberg, G. R. Hofmeister, P. F. Schatz, C. N. Hammond* – W. H. Freeman and Co. | Macmillan.
3rd and 4th Editions are the most up to date. Same considerations on how to find this textbook for lower prices apply here. This book is a bit more expansive and richer than Zubrick's.

Other materials: Lecture handouts and notes from CHM 427, laboratory procedures, your laboratory notebook + data. While in the laboratory: labcoat, safety goggles, calculator.

Technology: You will need a personal laptop / PC / tablet to compile lab reports. Additionally, you will need to download and install ChemDraw and MNova. I highly recommend that you DO NOT use your devices in the teaching lab (contamination, accidental spills, fire hazards, etc.). You will need data transfer support to move data from the lab computers to your devices (USB drive).

Course website: All lecture notes, homework, answers and announcements will be put on Brightspace (https://brightspace.uri.edu)

Course description: Techniques in organic chemical research, including handling of air sensitive chemicals, flash chromatography, and instrumental methods of structure determination. Separation of mixtures and identification of components by infrared and nuclear magnetic resonance spectroscopies. (Laboratory: 6 crs.)

Course pre-reqs.: CHM 292 or CHM 226 + CHM 228 and credit or concurrent enrollment in CHM 427.

Course requirements (* contributes to grade):

- → Attendance will be taken (*see: Class Policies*)
- → Laboratory Reports (*see: Lab Reports*)
- → Laboratory Notebook (*see: Lab Notebooks*)
- → Cumulative Capstone Report (*see: Capstone Project*)

Class Calendar | Dates and Reminders

09/03/24	T	Advising Day
09/04/24	W	First Day of Classes | e-Campus open add
09/05/24	Th	**First Day of CHM 425** | Orientation, Safety, Check-In, Overview
09/10/24	T	Diels-Alder Cycloaddition | e-Campus open add closes
09/12/24	Th	Diels-Alder Cycloaddition
09/17/24	T	Reduction of a Ketone | e-Campus late add closes | Last day for Pass/Fail
09/19/24	Th	Reduction of a Ketone
09/24/24	T	Aldol Condensation
09/26/24	Th	Aldol Condensation | Drops after 09/26 will count as withdrawals “W”
10/01/24	T	Hantzsch’s synthesis of Nifedipine (NIF)
10/03/24	Th	Hantzsch’s synthesis of NIF
10/08/24	T	Hantzsch’s synthesis of NIF | Photochemical Degradation of NIF
10/10/24	Th	Photochemical Degradation of NIF
10/15/24	T	Indigenous Day Classes make up day | **425/427 does not meet**
10/17/24	Th	Synthesis of Stilbenes – Wittig | Late drop form required after 10/18
10/22/24	T	Synthesis of Stilbenes – Wittig
10/24/24	Th	Synthesis of Stilbenes – Metathesis
10/29/24	T	*Catch up day*
10/31/24	Th	*Catch up day*
11/05/24	T	Election Day | **All classes do not meet**
11/06/24	W	Capstone Project | Election Day Make Up Day | **CHM 425/427 meets**
11/07/24	Th	Capstone Project
11/12/24	T	Capstone Project
11/14/24	Th	Capstone Project
11/19/24	T	Capstone Project
11/21/24	Th	Capstone Project
11/26/24	T	Capstone Project
11/28/24	Th	Thanksgiving Recess (until 12/01)
12/03/24	T	Capstone Project
12/05/24	Th	Capstone Project
12/10/24	T	Lab Cleaning and Checkout

12/11/24	W	Last Day of Classes
12/12/24	Th	Reading Day
12/13/24	F	First Day of Finals
12/19/24	Th	Last Day of Finals
12/20/24	F	Final Make Up Day (snow or cancellations)
12/27/24	F	Final grades due in e-Campus

Note: This schedule may be subject to changes and adjustments depending on our timing with lab work. All laboratories and presentations will be given in Beaupre 235.

Course Aims

This course aims at solidifying practical laboratory skills:

- → setting up and quenching organic reactions
- → purification by extraction, recrystallization, chromatography
- → spectroscopic characterization is emphasized for each organic compound for the confirmation of reaction products and their stereochemistry (IR, NMR)
- → safe handling of hazardous organic and inorganic compounds

Proper laboratory notebook-keeping is fundamental for each student and will be strongly reinforced in this laboratory course.

This course aims at instilling the students with a real-world example of synthetic organic chemistry, by asking the students to develop a 3-step synthesis to give a target compound (*Capstone*). This portion of the laboratory reinforces skills learned in previous experiences and adds reaction planning and literature searching to repertoire.

Grading – Your final grade will be computed as average of the following graded items:

① Attendance (each lab session)
② Lab citizenship (each lab session)
③ Lab reports (7×)
④ Laboratory notebook (10×)
⑤ Capstone report (3×)

I will grade according to a scale no stricter than the one reported in the table below.
Re-grading policy. You may request a re-evaluation of your work for up to 7 days after the return of your evaluation. Extra credit will not be offered for this course.

93% – 100%	**A**	**4.0**	**73% – 76.9%**	**C**	**2.0**
90% – 92.9%	**A–**	**3.7**	**70% – 72.9%**	**C–**	**1.7**
87% – 89.9%	**B+**	**3.3**	**67% – 69.9%**	**D+**	**1.3**
83% – 86.9%	**B**	**3.0**	**63% – 66.9%**	**D**	**1.0**
80% – 82.9%	**B–**	**2.7**	**60% – 62.9%**	**D–**	**0.7**
77% – 79.9%	**C+**	**2.3**	**0% – 59.9%**	**F**	**0**

Your part – Here are a few points where your full commitment is required:

- → Note-taking – Feel free to take plenty of notes, share them with your colleagues, read them/reorganize them before the next class.
- → Keep your lab space and notebook neat and tidy.

- Work with yours and your colleagues' safety in mind.
- Do your part in the lab – as obvious as it may seem, you need to keep your focus and pay attention to your surroundings. Laboratories can be dangerous places.
- Ask me/your colleagues questions – the *rule of the class* is that there is no such thing as a stupid question.
- Practice, practice, practice! Presenting any kind of work is an acquired skill. Practice your presentations. A rule of thumb is that the presentation should be rehearsed fully the day before your scheduled time. Fully rehearsing a presentation before class will not help.
- Use the opportunity of more facetime during student hours!
- Be ready to challenge yourselves and to critically review your work.

It is my utmost priority to ensure that your learning takes place in a respectful, safe, and constructive environment. I will not tolerate aggressions and any other actions based upon prejudice and intolerance. As a group of people with biases, we shall learn how to understand and work with our differences. Equity and inclusion are critical components for campus community members to thrive and become responsible citizens of the World. If you are a target or a witness of a bias incident, you are encouraged to submit a report to the URI Bias Response Team at www.uri.edu/brt. There you will also find people and resources to help you.

Lab Notebook

Your lab notebook is the primary record of your work in the lab. Lab notebook records must be kept on a bound hard- or soft-cover book. Spiral or ring-bound notebooks, notepads and other detachable sheet formats are not allowed. Records must be kept in indelible ink (no pencil, erasable pens, etc.) and dated. Pages must be numbered. You may use consecutive sheets for the same experiments. If it is not possible to use consecutive sheets, you must clearly identify where your experiment continues to/from. Each experiment must contain the following parts:

- Date
- Experiment number (your initials followed by a progressive number, for example: LMM-01)
- A reaction scheme (if the experiment is a chemical reaction): your scheme must include all reagents, conditions (solvent, temperature, time), product of reaction, and molecular formula and molecular weights for all entities involved.
- A reagents table, including names (or product codes, e.g., LMM-01), molecular formula, molecular weights, experimental mass (g or mg), moles (or mmols), density and volume (if liquids) for all reagents and solvents.
- A description of the experiment. Be as detailed as possible (some use a prose style; some use bullet points and flow-chart style). Here is where you note timing of experiments, changes to color, appearance, and all other observations you have. This includes mishaps (for example, I spilled 1 mL of solvent, but since the total volume of was 50 mL, I decided to proceed).
- The work-up of your reaction must be well documented.
- Final characterization should report the dry weight of your compound, yields (before and after purification, if necessary), melting points, NMRs and IR (including their preparation methods).

Lab Reports

Please follow the instructions in the Lab Report templates that will be shared with you at the beginning of each lab (and available on Brightspace). Use your lab notebook as a reference to compile the experimental section. Attach your annotated IR and NMRs at the end of the Lab Report. Each lab report will be slightly different as some sections will ask you to elaborate on specific aspects of the experiment.
Turn in your lab reports as soon as they are completed with all the needed information and experimental characterization. All your late lab reports **must be turned in** by the last day of classes (12/11/24). Late submissions past this date will not be accepted and will be marked with 0 points.

Class Policies

A. Attendance

Attendance for this class is required. You must notify the instructor with sufficient advance if you are unable to attend class. Justifiable absences include illness or injury, religious observances of holy days, grievance, or participation in school-mandated events. It is your sole responsibility to communicate with me prior to the classes. A catch-up laboratory session may be available to complete the experiment and obtain the data you may need for the lab report. **Important!** You **do not need to present a doctor's note**, or a justification letter. It suffices for you to let me know that you won't be coming to class. The reason I ask you to notify me in advance is because in a class of low enrollment, we might be faced with a situation where 50% or more of the class might be absent. In such cases, it is better to cancel or restructure the class period.

B. Class participation

This class is built upon a discussion of topics in organic chemistry. You should participate in the discussion. Questions, comments and rebuttals are more than welcome. Make a rule to say something in each class period. Remember the class rule: there is no such thing as a stupid question*!*

C. COVID-19

As members of the URI community, students and instructors are required to comply with standards of conduct and take precautions to keep themselves and others safe. Visit web.uri.edu/coronavirus/ to keep yourself up to date with the latest guidance about the URI COVID-19 response. **Important**! Do not attend class if you show any symptoms of COVID-19 or related respiratory illness. Instead, you should go get tested. Notify me of your absence before the start of class by email: lorenzo@uri.edu, or phone: (401) 874-2364.

D. Communication with the Instructor

Phone: (401) 874-2364
Email: lorenzo@uri.edu
I expect to get back to you as soon as possible or within 24 hours during weekdays. Emails and messages received after 8:00 pm will be addressed at my earliest convenience or on the next available weekday.

E. Drops and Withdrawals

Missing attendance for the first two class meetings (without notifying me) will result in removal from the class roster. You can drop this class until the third week of classes. You can withdraw (W on transcript) until 09/26/2024.

F. Academic Honesty and Integrity

You are expected to be honest in all academic work. Your name on any written work or exam shall be regarded as an assurance that the work is the result of your own independent thought, study and effort. You have an obligation to know how to quote, paraphrase, summarize, cite and reference the work of others with integrity. The following are examples (non-comprehensive) of academic dishonesty:

- → Using material, directly of paraphrasing, from published sources without proper citation
- → Claiming disproportionate credit for work not done independently
- → Unauthorized possession or access to exams
- → Unauthorized communication during exams
- → Unauthorized use of another's work or preparing work for another person
- → Taking an exam for another person
- → Altering or trying to alter grades
- → The use of notes/text or electronic devices to gain an unauthorized advantage during exams
- → Fabricating or falsifying facts, data, or references
- → Facilitating or aiding another's academic dishonesty

All instances of academic dishonesty should be faced as ethical responsibilities and include the use of machine learning engines (= generative "AI").

The university policy on academic honesty is clear. Any incidence of academic dishonesty (see above or URI's Student Handbook), will result in either one or all of the following: a grade of zero, failure of the course, formal notification to the Dean.

G. Electronics and Recording

You may not record any audio and/or video of lectures, student presentations, or student hours *without in-writing permission from all individuals present*. You may choose to take your notes in writing or typing, but your use of electronic devices (laptop, iPad, tablets) should not disrupt the lecture, the instructor, or your colleagues. The use of electronic devices must be limited only to course-specific tasks. Refusal to comply will result in dismissal from the course.

H. Disability Accommodations

Please notify me with your Disability Access and Inclusion (DAI, formerly DSS) accommodation letter as early as possible. I will be happy to discuss and arrange for your approved academic accommodation. If you have not yet established services through DAI, please contact them to engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom. DAI can be reached here: (401) 874-2098, web.uri.edu/disability, https://web.uri.edu/disability/request-form/ email: dai@etal.uri.edu.

I. Student Resources

Your success in this class and as a senior student is very important to me. If you struggle with the course materials or requirements do not hesitate to contact me so that we can discuss possible solutions. Additional resources are available to you as a student at URI.

- → Academic Enhancement Center (AEC) – offers free face-to-face and web-based services to undergraduate students seeking academic support. Peer tutoring is available for STEM-related courses by appointment online and in person.
- → The Writing Center offers peer tutoring focused on supporting undergraduate writers at any stage of a writing assignment.
- → The UCS160 course and academic skills consultations offer students strategies and activities aimed at improving their studying and test-taking skills. Complete details about each of these programs, up-to-date schedules, contact information and self-service study resources are all available on the AEC website: uri.edu/aec

- → Wellness Resource Center (WRC) – provides a relaxing atmosphere and a safe, comfortable space for you to escape the stresses of life. The WRC is located on the lower level of the Anna Fascitelli Fitness and Wellness Center.
- → Campus Recreation offers free membership to their facilities (included in your tuition). Access includes the Fascitelli Fitness and Wellness Center, Mackal indoor courts, cardio and weight rooms, Tootell Aquatic Center, and numerous other facilities and group classes. https://web.uri.edu/campusrec/facilities/
- → *Well-being Coaching* offers one on one meetings with a certified Well-being Coach, who is trained to identify your strengths and support you with a goal or behavior change. Your coach will guide you holistically and support you through day-to-day struggles. https://web.uri.edu/campusrec/well-being-coaching/ or wellcoach@etal.uri.edu

J. Changes to the Syllabus

Due to unforeseen circumstances, the contents of the syllabus and the content of the course may be subject to changes. You will be notified of any change in advance.