Syllabus

O-Chem Lab I, CHEM 222, SU-A-2025 (*Subject to updates)*

WELCOME

This class welcomes any student that has satisfied the prerequisites, described below. Students arrive with a range of abilities, skills, knowledge, experience, and expectations. You belong here. We invite and encourage you to ask questions. Your input is necessary to a healthy teaching and learning environment. Diverse intellectual engagement helps us thoughtfully construct educational materials, instructions, delivery style, and thereby grow professionally. Contact me, Christine DiMeglio, to discuss strategies for your best performance.

INSTRUCTOR

Dr. Christine DiMeglio
Please reach me by email for any questions or concerns at christine.dimeglio@yale.edu.

Summer session preceptor

Dr. Ruth Son, ruth.son@yale.edu

STAFF

Teresa Lara-Jaime, teresa.lara.jaime@yale.edu, Manager, Undergraduate Teaching Lab
Lisa Vitale, elisa.vitale@yale.edu, Laboratory Coordinator, Undergraduate Organic Lab

COURSE DESCRIPTION

Students engage with concepts, trainings, and skills required for safe and effective chemical laboratory practice by focusing on eight teaching and learning areas: 1) safety, 2) scientific reporting, 3) chemical information literacy, 4) spectroscopic analysis, 5) non-spectroscopic analysis, 6) standard bench techniques for separation and purification, 7) synthesis of organic compounds, and 8) drawing connections between laboratory procedures and reaction mechanisms. Evaluation of student work is an ongoing process, with the aim of continual improvement and ultimate proficiency in all skill areas. Evaluative tools include prelab and post-lab assignments, lab notetaking, workshops trainings, and quizzes.

MEETING TIMES and LOCATION

The lab course runs on both Tuesday and Thursday afternoons, from 1-5 pm. Lab opens at 12:45 pm for set-up and clean up begins promptly at 4:15 pm. Students attend both lab sessions for each of the 5 weeks of the summer session and are available for the entire laboratory period with no overlap with other courses, job, volunteer, or research commitments. The lab meets in room 233 SCL (third floor of SCL).

STUDENT ACCESSIBILITY SERVICES

Students who require accommodations related to timed assessments with the Student Accessibility Services Office in advance of the summer term. Students forward their accommodation, and their letter from SAS, to Christine.dimeglio@yale.edu. **Reach out by email ASAP** to explain your needs and we will put accommodations in place while awaiting paperwork.

ATTENDANCE DURING SUMMER SESSION

Attendance is mandatory and there are no scheduled make-up days. If a student misses a lab day, they are required to make it up during regularly scheduled sessions by coming earlier, staying later, and working more efficiently while also performing regularly scheduled labs sessions. Students missing more than one lab session will need to withdraw, and should discuss their status with YSS Dean Alexander Rosas (Rosas, Alexander alexander.rosas@yale.edu)

PREREQUISITES

The Department of Chemistry strictly enforces prerequisites for chemistry laboratory courses. Students must have received a grade for General Chemistry CHEM 134L and 136L, or their equivalents, such as a college course elsewhere or the Chemistry Department placement exam. Organic Chemistry Lecture I (CHEM 220 or CHEM 174 or their equivalents) is a pre-requisite or co-requisite. When in doubt, contact the instructor or the DUS of chemistry

CANVAS

Canvas mediates course communication, linking together our learning community for a cohesive educational experience. Our most important Canvas features are:

- **Syllabus**: "Syllabus" serves as a roadmap through the term. It describes required materials and outlines the schedule/due dates for content, assignments, and quizzing. It describes policies about enrollment, grading, penalties, attendance, academic integrity, and citing sources.
- **Announcements: "**Announcements" provides a platform for sharing information of interest to the entire group such as corrections, due date reminders, important policy changes, and emergency notifications.
- **Modules: "**Modules" provides students with to access to all curricular course content, including links to experiment videos, assignments, and assessments. The Modules are organized by lab week.
- **Assignments:** This tool allows students to submit course work for grading.
- **Grades:** After submitting assignments, students can access feedback using this tool.

TYPICAL LAB DAY EXPERIENCE

This overview helps you understand the flow of events typical of a student lab experience.

1. Before the scheduled lab day students
    a. read and watch videos about the experiment in Canvas/Modules/Lab X Prelab Reading Assignment.
    b. prepare a detailed **experimental plan** and upload it to Canvas/Assignments.
2. At 1 PM on their assigned lab day, students are ready at their lab stations in appropriate PPE, decontaminating their hood sashes using 70% ethanol, setting up their notebook and lab supplies for experimentation. Students may weight reagents and gather solvents.
3. Following a brief lecture by the TF, students work in their designated hood toward the synthesis, isolation, purification, and characterization of a desired product.
4. While performing experimentation, students record lab notes.
5. At the end of the experiment, students clean their glassware, hood, lab bench, and manage waste. They ask their TF to sign their **lab notebooks** before leaving for the day.
6. After lab, students
    a. Complete/upload **post-lab assignments** and upload lab notes to Canvas/Assignments.
    b. Complete any assigned **quiz** through Canvas/Quizzes.

7. Students promptly and thoroughly read course Announcements from Canvas, which impart information about assignments, quizzing, due dates, emergencies, changes in the schedule, opportunities.

REQUIRED MATERIALS

All Students:

1. Lab textbook: **Techniques in Organic Chemistry**, Jerry Mohrig, *et al*., W.H. Freeman and Company, 4th edition, ISBN: 9781464134227**.** Buy/rent/share/hardcopy or e-copy.

2. **Lab Notebook**: **please purchase a NEW composition notebook**, available from any drugstore or department store for $1-5. You will receive specific instructions for how to use this notebook in organic chemistry lab. You must have a notebook like this by the first day of lab!

3. **Long Lab Coat: It must go to the knee**! **THIS IS NOT AN OPTION**. Buy it at the Yale Bookstore or from an online vendor. **Do not buy short lab coats**. Unisex, 40-inch, knee length, long sleeve, 65% poly/35% cotton, lab coat – example brands are White Swan and Dickies. Size chart: http://www.allseasonsuniforms.com/fssize.htm (Links to an external site.)Links to an external site.

   Do not let finances stand in your way. We have coats leftover from the great Covid event of 2020. Please reach out if you need one.

4. Technology that allows access to Canvas, Zoom, the Internet during and after lab class. Technology to convert work to pdf files for submission.

5. VPN connection to access Yale's Library resources when off campus.

6. Personal face coverings, currently optional.

7. **LOCK for backpack/coat lockers.** Backpacks and coats are not permitted in lab. The lockers are in the hallways outside of the lab rooms**. Protect your belongings from thieves**! However, you must remove your lock and your belongings at the end of lab.

8. Thick Sharpie Markers® for writing on glassware. The lab will not provide any paper, pens, or markers. Most work will be submitted electronically.

9. Phone camera for taking photos of spectra and set ups.

10. Proper Clothing: **pants** that cover legs **and ankles** (no shorts, skirts, or Capri), shirts that cover the torso and arms, shoes that cover the ENTIRE foot (no sandals, flip flops, or ballet type), no earbuds or headphones. **If you are in lab with improper clothing you will need to leave, change, and return.**

PROVIDED BY THE ORGANIC LAB

1. Lab safety glasses and/or goggles.
2. Nitrile gloves
3. Loner lab coats if you spill something on yours while in lab.
4. Disposable surgical masks for lab use only.

POLICIES

Lab is the most fun when it is the least stressful. We can manage stress by staying on task, not falling behind, and producing quality, creative work. That's what the policies are about.

- Non-graded assignments (complete/incomplete) that are not submitted result in *10-point penalty*.
- Experimental Plans (EP) are due in advance of the scheduled experiment and are worth 10 points each. Students are not welcome to participate in lab without an EP. Students who are unprepared receive a **10-point penalty**. A plan for lab make-up will be set with the instructor.
- Lab Notes are recorded directly into a student notebook during experimentation. The notebook is signed by the teaching assistant before students leave the lab. Students organize hard copies of spectra by stapling them into position in the lab notebook. Notes will be collected periodically.
- Post Lab Assignments will be assigned at intervals. They will vary in length and complexity and will be worth 25-100 points. Late post-lab assignments are subject to penalties of 5% per day.
- Quizzes will be given using Canvas. There will be five or six quizzes, multiple choice, tightly timed, one attempt. Lowest quiz is dropped. If a student misses their scheduled quiz, it's recorded as zero and can be dropped as their lowest score.

GRADING

The instructor assigns letter grades at the end of term, with scaling, as necessary. The following types of assignments contribute the course letter grade:

- Proper preparation, presence, participation, and safe practice in all lab activities.
- Note-taking/record keeping, in-lab assignments, post-lab assignments.
- Quizzing

Additional Information: 1) Several assignments are scored as credit/no credit, which give students an opportunity to receive feedback before receiving numerical grades. These assignments lower a student's grade only when they are not handed in on time. 2) The lowest EP grade is dropped, and the lowest Quiz grade is dropped. 3) If you miss your quiz, use that quiz as your drop

Most students earn A and B grades in this lab course because they:

- Attend every scheduled session on time.
- Complete experimentation with integrity and respect for the safety of themselves, mates, and environment.
- Keep an accurate, legible, usable, scientific lab notebook, which includes their independently acquired data, TF signatures for experimentation, and their collection of properly labelled lab spectra.
- Hand in all pre-lab and post-lab assignments on time and apply TF corrections to improve their written work as the term progresses.
- Take all quizzes on time.
- Faithfully follow the guidelines for academic integrity, as described below.

Grades are calculated as [total points earned – **deductions**]/total points available and scaled as appropriate for the TA. Students who receive 25 or more deductions, will not earn an A or B range grade.

Deductions are assessed for:

Submitting assignments after the due date/time. The penalty is 5% per day beginning at the due date/time for work with a point value. The penalty is 10 points for missing for complete/incomplete work, and -5 points if it is turned in late. Students without a completed EP at lab time will incur a penalty of 10 points and will work out make-up lab plans with the instructor. **Work is always due on your regularly scheduled lab day, even if you are sick**.

Questions about graded assignments

Please ask for an explanation from your grader if you do not understand comments, or if you think we made an error in your score. Requests to have points returned need to be submitted by email to christine.dimeglio@yale.edu with a brief explanation. (Instructors have access to all information through Canvas – brief explanation!) Regrades involve the entire document.

ACADEMIC INTEGRITY

The Chemistry Department Teaching Staff are here to help you toward personal and professional growth. Assignments and assessments are designed with this goal in mind. Breaches in academic integrity undermine our goals. Knowing the rules of academic integrity and applying those rules to your conduct, bench work, and written submissions is integral to your advancement as a scientist. Please refer to the materials on Academic Integrity at Canvas/Modules/Academic Integrity. You will be asked to read and sign our Academic Integrity policy. Your signature means that you understand the expectations described within and know that you will be referred to the Executive Committee if you breach the boundaries.

A copy our full Academic Integrity Policy is available at Canvas/Syllabus for CHEM 222.

SCHEDULE

Updates will continue throughout the term to reflect changes in activities, due dates, point values, and other dynamic course content. Link to all curricular materials through Canvas/Modules.

Lab 1 May 27

Check In, Tour, Safety Review, Notebooks, Functional Groups, Chemical Table for Lab 2

Due:

Chemical Table for Lab 2 (completed and uploaded in lab)
Paperwork, including Student Information Sheet, Academic Integrity Policy (signature required), Safety Contract (signature required)

Lab 2 May 29

Infrared Spectroscopy (IR),
Functional groups, IR worksheet, IR training for liquid and solid samples

Due:

EP-2; IR Worksheet
Quiz A on safety and functional groups and IR

Lab 3 June 3

Thin Layer Chromatography (TLC)
Finding an appropriate TLC developing solvent, analyzing a product of a reaction

Due: EP-3, LN-3,

Lab 4 June 5

Reflux and Synthesis of Salicylic Acid
Methyl salicylate to salicylic acid by hydrolysis with base, with IR and TLC for analysis

Due: EP4, LN-4, Quiz B on Labs 3 and 4

Post Lab Assignment A is given, based on Labs 1-5 – begin now!

Lab 5 June 10

Recrystallization and MP, TLC, and IR Analysis of Salicylic Acid
Finding an appropriate recrystallization solvent, operating MP instrumentation

Due: EP5, LN-5

Lab 6 June 12

Green Chemistry in the Bromination of Stilbene
Due: EP-6, LN-6, Quiz C on Labs 5 and 6

Lab 7 June 17

Literature Searching, Scientific Writing, Downloading ChemDraw
Due: EP-7, PLA on Labs 1-5

Lab 8 June 19

SN2 reaction, with isolation and analysis
Due: EP 8, LN-8, Quiz D on Labs 7 and 8

POST LAB ASSIGNMENT B is posted and based on Labs 6-9 – begin now!

Lab 9 June 24

SN1 to Make a Diphenylmethyl Ether with Isolation and Characterization

Due: EP 9, LN-9
Quiz E on Lab 9 and general knowledge
PL Assignment B is due WEDNESDAY 6/25 5 pm

QUIZ E opens 5pm and closes WEDNESDAY 6/25 11:59 pm

General knowledge means familiarity with all names and purposes of all basic lab equipment, functional groups, acidity, basicity, polarity, interpreting data (IR, MP, TLC), purpose/use of vacuum filtration, recrystallization, drying agents, separatory funnel/extraction technique, reflux, safe waste management regarding proper disposal of materials, meaning of GHS symbols, meaning of common acronyms (PPE, RAMP, SDS, MSDS).

Lab 10 June 26

Loose ends and CHECK OUT

Due: Last chance to hand in all items for grading. Nothing will be accepted past 5pm 6/26.

- The PostEm tool will be activated during the last week of classes.
- Please check that you can access this tool.
- Grades will be posted using the confidential posting tool PostEm ASAP.

End syllabus