

## Organic Chemistry Lab II CHEMS223L,

### Summer 2024 Provisional

## Syllabus

### *WELCOME*

This class welcomes participation from any student who has satisfied the appropriate prerequisites, described below. Students journey to this course along many different pathways with a range of abilities, skills, knowledge, experiences, and expectations. We invite students to ask questions. Asking questions helps to clear the path of stumbling blocks for you and for others. Your input contributes to a healthy teaching and learning environment. Diverse intellectual engagement helps your teachers to thoughtfully construct educational materials, instructions, delivery style, and thereby grow professionally. Contact me, [jonathan.parr@yale.edu](mailto:jonathan.parr@yale.edu), to discuss strategies for your best performance.

### *INSTRUCTOR*

Dr. Jonathan Parr, [jonathan.parr@yale.edu](mailto:jonathan.parr@yale.edu)

### *TF*

TBA

### *STAFF*

Teresa Lara-Jaime, [teresa.lara.jaime@yale.edu](mailto:teresa.lara.jaime@yale.edu), Manager, Undergraduate Teaching Lab

Lisa Vitale, [elisa.vitale@yale.edu](mailto:elisa.vitale@yale.edu), Laboratory Assistant, Undergraduate Organic Lab

### *COURSE DESCRIPTION*

In Organic Chemistry Lab II, CHEMS223L, students engage with concepts, trainings, and skills required for safe and effective laboratory work. This is accomplished by focusing efforts on eight teaching and learning areas: safety, scientific reporting, chemical information literacy, spectroscopic analysis, non-spectroscopic analysis, standard bench techniques for separation and purification, and synthesis of organic compounds, 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, development of lab skills, reports, and quizzes.

### *PREREQUISITES*

The Department of Chemistry enforces prerequisites for chemistry laboratory courses rigorously. Students must have received a grade for General Chemistry CHEM 134L and 136L, or their equivalents, and CHEM 222L, in order to be eligible to enrol. Organic Chemistry Lecture II (CHEM 221, S221 or 174 or their equivalents) is a pre-requisite or co-requisite. When in doubt, contact the instructor ([jonathan.parr@yale.edu](mailto:jonathan.parr@yale.edu))

## COVID STATEMENT

The organic chemistry lab operates in such a manner to ensure that students, teaching assistants, instructors, and support staff are safe in the time of Covid-19. This includes daily decontamination, appropriate PPE, and social distancing in the lab. We are a small class, and there is plenty of space in the lab.

## CANVAS

Canvas is the learning management platform used to facilitate communication of all course content. The important features of our course Canvas site that enable us to work together effectively include:

- **Syllabus:** The syllabus serves as a roadmap for the course, describing required materials and outlining the schedule/due dates for content, assignments, and quizzing. It also describes policies about enrollment, grading, penalties, attendance, academic integrity and citing sources.
- **Announcements:** Important course information is posted here for the group.
- **Modules:** Modules, organized by lab week, comprise all curricular course content.
- **Assignments:** This Canvas tool allows students to submit course work for grading.
- **Grades:** Students are able to access feedback on their submitted assignments using this tool.

Expect the Canvas site to be a living document, evolving as our course takes shape, so stay current with posted changes and updates.

## REQUIRED MATERIALS 1: You need to supply:

1. Lab textbook: **Techniques in Organic Chemistry**, Jerry Mohrig, *et al.*, W.H. Freeman and Company, 4<sup>th</sup> edition, ISBN: 9781464134227. Buy online or at the **Yale Bookstore**. **The electronic version is fine. An older version is fine.**
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, please do not buy short lab coats. Buy it at the Yale Bookstore or from an online vendor. We also have a variety of used coats if you are tight on funds or do not receive yours on time.

Link for purchase: <https://yale.bncollege.com/School-Supplies-ArtTech/Uniforms/Labcoats/Jackets/Fashion-Seal-Unisex-41-Lab-Coat/p/284925830>

4. Proper Clothing includes pants that cover legs and ankles (no shorts, skirts, or Capri), shoes that cover the entire foot, without leaving the forefoot exposed - no sandals, flip-flops, ballet type, mesh top, Crocks/Frocks with holes – and definitely no earbuds or headphones. Please check out the safety video in the Media Library on the Canvas page for CHEMS223L. If you are in lab with improper clothing, you will need to leave, change, come back to carry out your experiment. You may want to think about keeping a change of lab clothes in the lab for the summer session since we are the only group using the space throughout the session.

5. Combination lock. 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.
6. Technology that allows access to Canvas, Zoom, Word, Excel. The ability to convert student work to pdf files and the ability to use Google Chrome or Mozilla for taking Canvas quizzes.

### *REQUIRED MATERIALS 2: We will supply:*

1. Course Curricular Materials, at Canvas/Modules. All information of importance to this lab course will be posted at Canvas in various folders, organized chronologically by time of first use.
2. Plastic wrap as protection for your electronic devices while in the lab.
3. Nitrile gloves, with options for those with nitrile allergies.
4. Loner lab coats if you spill something on yours while in lab.
5. Disposable surgical masks for in-lab use only.
6. Lab safety glasses/goggles. Contact wearers need safety goggles.

### *LABORATORY LOCATION, DAY, AND TIMES*

- Organic Chemistry Labs take place in Room 233 Sterling Chemistry Lab (SCL 225 Prospect Street, 3<sup>rd</sup> floor).
- The lab course runs on both Tuesday and Thursday afternoons, from 12:30-4:30pm.
- Students attend both lab sessions for each of the 5 weeks of the summer session. Students need to be available for the entire laboratory period with no overlap with other courses, jobs, or volunteer or research commitments.

### *ASSIGNMENTS*

There are several types of assignments in this course. Each assignment will be explained in detail in advance of its due date. A tentative schedule of activities and the due dates of related assignments appears at the end of this syllabus.

Assignment types for ChemS223L include: experimental plans (EP); lab notes (LN), post lab assignments (PL), quizzes, and Worksheets (IR, <sup>1</sup>H NMR)

## *GRADING*

Letter grades are assigned at the end of term by the instructor. Students who attend all scheduled sessions, submit all work on time, and make a good faith effort in all areas of work will typically earn A and B grades. No student who completes everything on time earns lower than B-.

Grades are calculated as [total points earned – penalties]/total points available. Scaling is applied as required. Several types of assignments contribute to letter grades. Broadly, the assignments include the following:

- Proper preparation, full participation, submission of related documentation (~64%)
- Quizzing (~36%)

### *Penalties include*

- a) Submitting graded assignments after the due date/time. The penalty is 5% per day beginning at the due date/time. Work is always due on your regularly scheduled lab day, even if you are sick. If you have an exceptional situation, please make contact with Parr.
- b) Unexcused absence from scheduled lab sessions. -20 points per session and likely more, since a missed lab will mean missed data and assignments that cannot be completed.
- c) Complete/incomplete assignments are not accepted late and will be penalized their full value if not submitted.

### *Questions about graded assignments*

Please ask for an explanation from your grader if you do not understand comments/deductions. Everything we do is for your education, including deductions. We want you to learn through the explanations of why points are taken away.

### *Attendance, Reschedules, Tardiness*

Due dates apply for all students, even when a student is not present for their regular lab session.

### *Academic Integrity*

It is the goal of the Chemistry Department Teaching Staff to assist you in your 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.

Link to our full policy here: [academic integrity policy](#)

### *Schedule of Activities*

- The schedule is provisional, updated to reflect changes in activities, due dates, point values, and any other dynamic course content.
- **Links to materials will be available through Canvas/Modules/Week of Session**

*WEEK 1*

July 2<sup>nd</sup>: Exp 1. NMR

Due before lab: Student information sheet (C/I)  
Due before lab: Academic Integrity Policies Document (C/I)  
Before lab: Watch the NMR film in the Experiment 2 Module.

July 4<sup>th</sup>: Exp 3. Cycloaddition (I): Writing Chemistry

Due before lab: EP 3 including chemical table (10 points, C/I) (due before lab)  
NMR Worksheet (20 points)

*WEEK 2*

July 9<sup>th</sup>: Exp 3. Cycloaddition (II): Work-Up and Characterization

July 11<sup>th</sup>: Exp 4. Electrophilic Aromatic Substitution (EAS)

EP 4 including chemical table (10 points) (due before lab)  
PL and LN Cycloaddition (20 points, graded)

QUIZ 1: NMR, Safety (20 points)

*WEEK 3*

July 16<sup>th</sup>: Exp 5: Carbonyl Chemistry - Benzoin, Benzil I

EP 5 including chemical table (10 points) (due before lab)  
PL and LN EAS (20 points)

July 18<sup>th</sup>: Exp 5 Carbonyl Chemistry (II) Benzoin, Benzil II

QUIZ 2: Cycloaddition and EAS (20 points)

*WEEK 4*

July 23<sup>rd</sup>: Esterification, Two Ways

EP 6 including chemical table (10 points) (due before lab)  
PL and LN Benzoin Benzil (20 points, graded)

Jul 25<sup>th</sup>: Aldol Condensation

EP 7 including chemical table (10 points) (due before lab)

PL LN Esterification (20 points, graded)  
Quiz 3: Carbonyl Chemistry (20 points)

*WEEK 5*

July 30<sup>th</sup>:

Acetaminophen

EP 8 including chemical table (10 points) (due before lab)

PL LN Aldol (20 points, graded)

August 1<sup>st</sup>:

Checkout

PL LN Acetaminophen (20 points, graded)

QUIZ 4: Aldol and Esterification; Acetaminophen (10 points)