CHEM 8L – Organic Chemistry Lab I
University of California, Santa Cruz

Have you ever wondered why roses are red and violets are blue? Why are plastics such a danger to our planet? What happens to your food as it digests? **Organic chemistry has the answers!** Trillions upon trillions of super small molecules are make up the colors that we see, the containers we eat and drink from, and the food we eat. Most of these life-sustaining molecules are organic (have a carbon backbone). Start your ochem journey and learn the behind-the-scenes magic that make life possible!

Teaching Team – please find TA lab schedule and office hours on Canvas

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Course Description: CHEM 8L (2 units, formerly 108L) is an introduction to common methods in synthetic organic chemistry, as it applies to pharmaceutical and research industries. You'll learn basic techniques for isolation and purification of organic chemicals, as well as qualitative and quantitative analysis. These fundamental skills will be applied to organic reactions. You'll learn to perform lab work in a safe and efficient manner. Technical writing is taught through lab reports and abstracts. **Prerequisites:** CHEM 1C and 1N and previous or concurrent enrollment in 8A.

Materials

- Modules in Canvas: canvas.ucsc.edu – Set Notifications > **Announcements** > Notify Immediately
- **Course Readers** – available for FREE on Canvas in Modules; *optional* to order prints from UCSC Copy Center
  - Workbook – templates to print, download, or copy by hand before Friday classes
  - Lab Manual – all other documents in Canvas Modules: writing guidelines, lab PDFs, worksheets, etc.
- **GradeScope**: online tool to upload lab reports, view grading feedback, and request regrades
- **Slugs@Home** Lab Previews: https://sites.google.com/ucsc.edu/slugshome/home
- **Lab notebook** is required – any designated, bound notebook is great; we advise against spiral-bound
- **Safety equipment** provided in lab: goggles, lab coat, and gloves
  - **Masks** are to be worn at all times; extras provided in lab
- *Optional textbook:* Mohrig, J. R.; *et. al*. "Techniques in Organic Chemistry, 4th Edition" Freeman, 2015

Attendance Policies

- **In-person lectures** – **Caitlin explains each experiment to guide your pre-lab preparation and lab report**
  - Lectures and notes are posted on Canvas "Lab Lecture Videos" page
  - Attendance is not required; watch class videos on the same day to stay on track!
- Required in-person labs start **Tuesday, January 17**
  - **Check** SAFETY RULES for what's OK and NOT OK to wear – no shorts, sandals, tank tops, or leggings
- **In-Person Lab Attendance** is expected and **Lab Notebook** preparation is required to start each lab
  - Everyone gets **1 excused lab day, no questions asked** – email your TA to let them know
  - 🤧 DO NOT COME TO LAB IF YOU ARE SICK!
    - See the "Missed Labs" page in the Canvas intro module.
    - Everyone can complete **1 experiment remotely** with TA guidance – contact us for more info
  - Please arrive early; email your TA if you'll be 10+ minutes late, otherwise, it may count as a missed lab
  - Participation credit is given for uploading your digitized notebook pages after lab
  - Email Caitlin and your TA with as much notice as possible if you cannot attend lab - include your enrolled section letter and all days/times you're available within that same week for an in-person **makeup lab**.
- **Email Caitlin & your TA if you miss a lab or assignment ASAP**! The sooner we know, the easier it is to help.

*** If you do not turn in 2 reports or miss 2 lab days without communicating with us, you cannot pass the course ***

Assignments

Introductory assignments to familiarize yourself with tools & resources – see Canvas

Required - 10% of course grade	Optional – encouraged for community
• GradeScope Test Assignment • Academic Integrity / Honor Code Form • Lab Basics & Safety Scavenger Hunt	**Pre-Class Survey** – for instructors only Introductory Discussion: **Cool Chemistry Apps**

Experiments and three (3) associated assignments are organized in Canvas Modules

1. **Quizzes** (25%) 2. **Lab Notebook** (25%) 3. **Lab Report** (40%)

Before Lab

- Read the **lab PDF** or listen to the **podcast**
- Attend **lecture** while filling in **class note** templates
- Preview the lab on Slugs@home and watch the conceptual **pre-lab videos** on Canvas
- Prepare for the pre-lab quiz: complete the **pre-lab questions** in the lab PDF, lab lecture helps ☺
- Open the **worksheet** on Canvas – use as template for preparing **notebook pages – see next page for help**
- Take **pre-lab quiz** on Canvas before your enrolled lab section's start time

During Lab

- Arrive ~5 minutes early, show prepared notebook pages to your TA
- **Check-ins, Pre-lab talk**, Q&A
- Perform the **lab** with a partner as you enter data & observations in the worksheet
- **In-lab questions** are discussed as a group, along with any other Q&A.
- Take pictures of completed **notebook pages** and upload as soon as you can after lab

After lab

- Submit the **lab report** on GradeScope, due a few days after experiment is completed

Assignment Policies

- **Due dates** are on Canvas – do your best to plan ahead!
- The lowest **quiz, lab notebook, and report** scores for Exp 1-5 are automatically dropped on Canvas 😊
  - Note: Experiment 6 scores are NOT dropped.
- *We'll help if we can!* Email your TA if you need an **extension** on any assignment.
  - Please contact us before the due date, to the best of your ability, for the best chance of turning in late work.
  - Note: Canvas automatically enters a '0' on late assignments until they're graded.
- Email your TA (cc Caitlin) ASAP if you have **any issues** with attendance, submitting assignments, etc.
  - Ex. Technical or other issues with the pre-lab quiz? Email your TA for an extra attempt.
  - We're open to new policies and **accommodations** but we need to know what's going on!
- Incorporate **feedback** from graded reports into future assignments.
  - Instructions for reviewing feedback on assignments – Intro Module – GradeScope Guides for Students.
  - Your TA is happy to *discuss* any grading questions or concerns in a kind & compassionate manner.
  - Submit brief **regrade requests** directly in GradeScope – instructions on Canvas.

If you do not turn in 2 reports or miss 2 lab days without communicating with us, you cannot pass the course.

BEFORE: Lab Preparation

Lecture, Videos, & Slugs@home – Caitlin goes over procedures and principles in each lecture to set you up for success on assignments! Each Canvas experiment overview page includes brief, animated concept videos. Please use the **Slugs@home** platform for a safe preview of each experiment and to guide your notebook preparation.

PRE-LAB QUIZ – Lab PDFs contain pre-lab questions that are incorporated into a Canvas quiz, due the Monday before lab.

- **Be prepared with your responses to the pre-lab questions *before* starting the quiz.**
- There is a 20-minute time limit on the quiz and you get two attempts.
    - Make sure you have enough time to complete the quiz - you can't save and come back later.
    - If you choose to re-take the quiz, your grade will be the highest of the two attempts.
- **Though we generally encourage collaboration, the pre-lab quiz is an individual assignment.**
    - The responses should be a product of your original work to assess *your* understanding of the material.
    - Sharing your quiz or the correct responses in any format (screenshots, email, CHEGG, social media, text, carrier pigeon, etc.) is in violation of the UCSC academic integrity policy (more details later in syllabus).

Lab Notebook Preparation – *worksheet provided on Canvas as suggested template to copy by hand into notebook*

- **Purpose:** one-sentence summary of the main lab goals plus the scheme with structures (see notes & lab PDF)
- **Reagent Table** – add chemical properties; Wikipedia is a reliable source for chemical info!
- **Procedure with Diagrams** – complete before starting lab; sample on Canvas
    - Use the procedure that follows to create your hand-drawn experimental instructions
        - Simple sketches & labels for all **equipment, chemical names** with **amounts**, & **transfers**
    - Format: Break it up with flow charts, bullet-points, comic strip, and/or whatever works for you!
        - Avoid copying the procedure word-for-word; **complete sentences not required**.
        - Make it easy for anyone to follow your procedure without referring to this document.
    - **Slugs@home** - Equipment & Safety pages; pictures & videos of the whole lab
    - The **class notes** include useful diagrams as well
- **Data & Observations** – copy data tables from the template, leaving space for notes & calculations

DURING: Lab Conduct…*Safety first!*

The complete SAFETY RULES are posted on Canvas and will be reviewed on the first day of lab ☺
Highlights…

- No food or drink in the lab; Wear proper attire and arrive to lab a few minutes early
- **Goggles, gloves, and lab coats** are to be properly worn when anyone is using chemicals in the lab or instrument room – points deducted for not wearing personal protective equipment (PPE)
- Pay attention to **waste procedures and chemical hazards** – table given in each experiment
- Take care of chemical spills immediately; consult the instructor
- Notify your TA of all chemical exposures; **rinse minor exposure areas with water for 15 min**
- Label all glassware before adding chemicals to it, including water!
- **Clean the balance and reagent areas immediately** after obtaining chemicals every time
- Keep your work station clean; follow instructions on washing glassware - remove gloves
- **Check your results and workstation with your TA at the end of each lab**
- Foster a sense of community – ask your TA for a community cleanup task before you leave
- **ABSOLUTELY NO GLASS IN THE TRASHCANS**

AFTER: Lab Reports

Reports are completed **individually (Exp 1-3)** with the *option* to complete Exp 4-6 reports with a partner. You're encouraged to discuss material and results with your partner – please see the Academic Integrity guidelines for advice on how to still turn in an individual report.

Partner reports (Exp 4-6): Discuss the report during lab and who will type which parts of the report. It is OK to do these reports individually if your schedules don't work. If you and your partner agree to complete any report together, include the **Partner Agreement** in your notebook pages – discuss this on the day of lab to determine how you'll share responsibilities. Meet to exchange and proofread each other's work at least a day or two before the due date. One student submits the final assignment to GradeScope and "add group members" so both students get that same grade. **Include the partner agreement (and any changes to it) in your report.** The idea is to incentivize collaboration and hold each other accountable.

Start working on lab reports early, ideally during lab, to leave time to ask for help!

ABSTRACT – SEE WRITING GUIDELINES ON CANVAS

- This section applies to the Exp's 2, 3, and 5 reports (no abstract in Exp 1, 4, or 6).
- The abstract is a *concise, typed overview* of the experiment: purpose, methods, main result(s), and conclusions.
- There will be an activity during Exp 2 to help you write the first abstract, including guidelines to help with future abstracts.
- Details are provided in the lab PDFs to guide you to the proper abstract content.

IN-LAB QUESTIONS – ON LAST PAGE OF EACH LAB PDF

- **Type the responses to in-lab questions in complete sentences**.
- Calculations, structures, and mechanisms can be hand-written. Do not copy/paste from other sources.
- Tables should be given clear labels (**Table 1**, etc.) and a descriptive title.
- In the event of a missed lab, do not copy data from another student. Contact instructors for guidance.
- *Makeup remote labs, by permission only:* Randomized data is provided by the TA or within the remote lab itself. Please communicate with your TA to arrange a meeting to go over the Slugs@home website.
    - Be sure to note that your "data was obtained via Slugs@home" in your report.

Neatness & Organization

- Refer to report guidelines above, in the experiment handout, and the writing guidelines.
- This includes spelling, grammar, format, and overall clarity.

Strict Grade Distribution

A+ 98.00 – 100%	A 93.00 – 97.99%	A- 90.00 – 92.99%
B+ 88.00 – 89.99%	B 83.00 – 87.99%	B- 80.00 – 82.99%
C+ 78.00 – 79.99%	C 70.00 – 77.99%	
D 55.0 – 69.99%	F < 55.0%	

Academic Integrity - https://www.ue.ucsc.edu/academic_integrity
Complete the Academic Integrity Agreement form on Canvas

Students are encouraged to discuss the experiments. Below is an overview of assignments that should be completed individually vs. those that are turned in with a partner. If you and your partner agree to complete any report together, include the **Partner Agreement** in your notebook pages – discuss this on the day of lab to determine how you'll share responsibilities. One student submits the final assignment to GradeScope and "add group members" so both students get that same grade. **Include the partner agreement (and any changes to it) in your report.** The idea is to incentivize collaboration and hold each other accountable.

- **Individual:** Intro assignments; all quizzes and lab notebook pages; Exp 1-3 reports, option for Exp 4-6 reports
- **Pairs:** Option for Exp 4-6 Lab reports

Collaboration is great, but each partnership should submit original work. *Zero points will be assigned to duplicate lab reports, or sections of lab reports that are obviously copied from another group, at the TA's discretion.* Such incidents will be reported to the UCSC Academic Misconduct office. This is an unfortunate but necessary consequence.

We want our **expectations** of you to be clear to set you up for success! Please feel free to **reach out** to instructors to talk through this process and **ask questions** whenever you feel unsure. I put together the guidelines below after reflecting on **discussions with students**.

HOW TO HAVE GREAT ACADEMIC 'TEGRITY:

- Start assignments early to leave time to ask questions.
- Use the provided writing guidelines for general style and specific abstract format.
- **Everyone is expected to submit assignments that reflect their and/or their partner's understanding of the material** based on the reading, lecture, discussion with instructors and peers, and personal lab experience.
- The experiment PDFs online contain most of the information you need to successfully complete assignments, with elaboration and clarification in lab and lecture. It may be necessary to look up new terms or general concepts, but otherwise *avoid searching for answers to pre- and in-lab questions online.*
- **Prevent the temptation to cheat** by working on assignments **well in advance of the due date**.
  - Ask instructors for help during lab and office hours.
  - Feel free to reach out *via* email if you need an extra day or two extension.
- *Both students in a lab pair should contribute to the remote lab, including recording observations and writing the lab report*.
  - Each student submits a **Partner Agreement** & **Data / Observations** at the end of each lab period.
  - TAs will confirm that work is done collaboratively and help reduce miscommunication between partners.
- Perform calculations and analysis *individually before discussing* with another student.
- Talk through the question with lab mates and instructors.
- Ask for help on ***how* to solve a problem** rather than asking for an answer.
- **Type all of your own work instead of copy/pasting from other sources.**
- Lab partners are encouraged to **proofread** each other's work after a draft has been completed.

WHAT TO AVOID:

- Avoid searching for answers to pre- and in-lab questions online. This knowledge is provided in the experiment PDFs, lab lectures, and remote labs. Online sources can be problematic and often wrong!
- Reading and posting lab reports or any other course materials on sites like CHEGG and Course Hero *violates UCSC academic integrity policy.* The same applies to using paper or electronic copies of **old lab reports**. *If someone offers you their old reports, don't accept them or give them back!* The questions and criteria change each term, making these instances relatively easy to catch.
- **Reading another group's report then rewording it is considered cheating**, as this is not reflecting your own ideas or understanding.
- Do not copy/paste from other unauthorized sources, then alter it to make it look different.
- **Do not email reports to anyone outside of your group.**

Disability Accommodation

UC Santa Cruz is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability who requires accommodations to achieve equal access in this course, **submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) using the form on Canvas** – Home Page or Quizzes, preferably within the first two weeks of the quarter. We can set up a time to meet and discuss how to ensure your full participation in the course. *This may also include* ***scheduling make-up labs if there are time conflicts due to extended exam times*** *for other courses.* We encourage all students who may benefit from learning more about DRC services to contact DRC by phone at 831-459-2089 or by email at drc@ucsc.edu.

On a personal note, Caitlin utilizes DRC accommodations for instruction at UCSC and for her classes at CSUMB. This is a valuable resource that unfortunately has social stigmas. I encourage you to advocate for yourself so we can help you.

Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the Campus Advocacy Resources & Education (CARE) Office by calling (831) 502-2273**.** In addition, Counseling & Psychological Services (CAPS) can provide confidential, counseling support, (831) 459-2628. You can also report gender discrimination directly to the University's Title IX Office, (831) 459-2462**.** Reports to law enforcement can be made to UCPD, (831) 459-2231 ext. 1. For emergencies call 911.

Faculty and Teaching Assistants are required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Office should they become aware that you or any other student has experienced sexual violence or sexual harassment.

Land Acknowledgement

"The land on which we gather is the unceded territory of the Awaswas-speaking Uypi Tribe. The Amah Mutsun Tribal Band, comprised of the descendants of indigenous people taken to missions Santa Cruz and San Juan Bautista during Spanish colonization of the Central Coast, is today working hard to restore traditional stewardship practices on these lands and heal from historical trauma."

CHEM 8L Winter '23 Schedule

Friday Lab Lectures, 1:20-2:25pm, Thimann Lecture 3 **TuWTh Labs,** THIM 249, 257, or 261

Week	Date	Topic	Due – Canvas
0	Fri 1/6	`	Read Canvas Intro Module
1 LAB	**TuWTh Jan 10-12**	**TA Meet & Greet (Zoom)**	Read Experiment 1 Module
Lecture	Fri 1/13	Experiment (Exp) 1: Recrystallization	
2 LAB	**TuWTh Jan 17-19** * 1st in-person meeting*	**Safety Scavenger Hunt** & **Lab Basics**	Scavenger Hunt & Lab Basics Worksheets
Lecture	Fri 1/20	Exp 1: % Recovery, Melting Points Exp 2.1: Citrus Distillation	Academic Integrity & GradeScope Test
3	Mon 1/23	(Pre-Lab Quiz due)	Exp 1 Quiz Due
LAB	**TuWTh Jan 24-26**	**Experiment 1 - Recrystallization of Acetanilide**	Exp 1 Notebook
Lecture	Fri 1/27	Exp 2.2: Gas Chromatography (GC)	-
4	Mon 1/30	(Pre-Lab Quiz due)	Exp 2.1 Quiz
LAB	**TuWTh Jan 31 – Feb 2**	**Exp 2.1 - Citrus Oil Distillation** ** Bring fresh, finely Chopped Citrus Peels **	Exp 2.1 Notebook
Lecture	Fri 2/3	Exp 3: Extraction of Spinach Pigments	**Exp 1 report**
5	Mon 2/6	(Pre-Lab Quiz due)	Exp 2.2 Quiz
LAB	**TuWTh Feb 7-9**	**Exp 2.2 - GC Analysis of Citrus Oils**	Exp 2.2 Notebook
Lecture	Fri 2/10	Exp 3: Thin-Layer Chromatography (TLC) Exp 4: Infrared (IR) Spectroscopy	-
6	Mon 2/13		Exp 3 quiz
LAB	**TuWTh Feb 14-16**	**Exp 3 – Spinach Pigment Extraction & TLC** Spinach provided in lab	Exp 3 notebook
Lecture	Fri 2/17	Exp 4: Infrared (IR) Spectroscopy	**Exp 2 report**
7	Mon 2/20	President's Day (Pre-Lab Quiz due)	Exp 4 quiz
LAB	**TuWTh Feb 21-23**	**Exp 4 – Infrared (IR) Spectroscopy**	Exp 4 notebook
Lecture	Fri 2/24	Exp 5: Dehydration Reactions	**Exp 3 report**
8	Mon 2/27	(Pre-Lab Quiz due)	Exp 5 quiz
LAB	**TuWTh LAB Feb 28 – Mar 2**	**Exp 5 - Dehydration of Methylcyclohexanols**	Exp 5 notebook
Lecture	Fri 3/3	Exp 6: Substitution Reactions	**Exp 4 report**
9	Mon Mar 6	(Pre-Lab Quiz due)	Exp 6 quiz
LAB	**TuWTh Mar 7-9**	**Exp 6 – Synthesis of t-Pentyl Chloride** *** Required – assignments NOT dropped ***	Exp 6 notebook
Lecture	Fri 3/10	Exp 6: Substitution Reactions & Analysis	**Exp 5 report**
10	**Mar 14-16**	**No labs**	
Lecture	Fri 3/17	Last class – Q&A for Exp 6 report	**Exp 6 report due**