

## CHEM 8M – Organic Chemistry II Lab

🌹 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 responsible for 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). Continue your ochem journey to learn the behind-the-scenes magic that make life possible!

**Instructor:** Caitlin Binder, Ph.D.

**Lab Lecture:** Fridays 1:20-2:25pm, Humanities Lecture Hall

**Email:** [cambinde@ucsc.edu](mailto:cambinde@ucsc.edu)

**Office Hours:** Tues & Wed 2 - 3 pm & by appointment

Caitlin's office hour Zoom link is in the Canvas intro module, along with a calendar link to schedule 1-on-1 appointments ☺

**Teaching Assistants:** Lab & office hours schedule

Ivette Mora, <a href="mailto:igmora@ucsc.edu">igmora@ucsc.edu</a>	Guillermo Chacaltana, <a href="mailto:gchacalt@ucsc.edu">gchacalt@ucsc.edu</a>
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Jason Guerrero, <a href="mailto:jguerr37@ucsc.edu">jguerr37@ucsc.edu</a>	Skyler Thayer, <a href="mailto:sthayer@ucsc.edu">sthayer@ucsc.edu</a> – stockroom support

**Course Description:** CHEM 8M (2 units) builds on the isolation and purification techniques learned in 8L, including liquid-liquid extraction, chromatography, and distillation. Synthetic organic chemistry is a broad and exciting field that requires careful analysis of compounds, many of which are clear liquids and white solids (maybe not so exciting color-wise!). Students will become proficient in compound characterization *via* thin-layer chromatography (TLC), infrared (IR) spectroscopy, and nuclear magnetic resonance (NMR) spectroscopy. Proper technical writing is emphasized.

**Prerequisites:** CHEM 8L and previous or concurrent enrollment in 8B

### HOW THIS COURSE WORKS – it's all on Canvas!

- **8M Workbook & 8M Lab Manual** – digital copies on Canvas ☺ Option to order from UCSC Copy Center
- **Intro Assignments:** GradeScope Practice, Academic Integrity Form, Cool Chemistry Apps, & Lab Basics

Experiments and three (3) assignments per lab are organized in Canvas **Modules**

### Before Lab

- Read the **lab PDF** – background, procedure, safety, pre-lab and in-lab questions
  - **Podcast option** = Caitlin & friends read the **lab PDF** ☺
- Attend and/or watch **Friday lab lecture** as you fill in the **Class Notes** \*\*\*\*\* your #1 source for success!!!\*\*\*\*\*
- Practice the lab online *via* **Slugs@home** - <https://sites.google.com/ucsc.edu/slugshome/home>
- Complete the **pre-lab questions** from the lab PDF - incorporated into the Canvas quiz ☺
- **Pre-lab quiz** on Canvas - due midnight on the Monday before labs
- Complete the **purpose, reagent table, & procedure diagrams** in the **Worksheet**
  - **Procedure Diagrams must be completed before you can start the lab**
    - **Labeled equipment, chemical names with amounts, & safety notes**
    - Reference **class notes & Slugs@home platform** - Equipment & Safety, pictures & videos

### During Lab (TuWTh)

- Show your TA: **Lab Notebook** with complete purpose, reagent table, & **procedure diagrams** (see above)
- Perform the lab with a partner as you record data/observations and perform calculations

### After Lab

- Upload completed **Lab Notebook Pages** to Canvas by midnight on lab day
- Submit the **Lab Report** on GradeScope (GS): Exp 1-3 are individual; Exp 4-6: *option* to submit with a partner

**If you do not turn in 2 reports or do not participate in 2 lab days without communication, you cannot pass 8M ☹**

**CHEM 8M Spring '23 Schedule****Friday Lab Lectures:** 1:20-2:25pm, Humanities Lecture Hall**TuWTh Labs:** Thimann Labs 261-271

Week	Date	Lecture or Lab Topic Please see Module Overview pages for resources	Assignment Due Canvas - details
<b>1 LAB</b>	<b>TuWTh April 4-6</b>	TA Meet & Greet (Zoom)	Read Intro & Exp 1 Modules
Lecture	Fri 4/7	FUNctional Groups & Intermolecular Forces (IMFs) Experiment 1 Intro - Silica Chromatography	Academic Integrity & GradeScope Test
<b>2 LAB</b>	<b>TuWTh April 11-13 *1<sup>st</sup> in-person meeting*</b>	<b>Safety Scavenger Hunt &amp; Lab Basics</b>	<b>Scavenger Hunt &amp; Lab Basics Worksheets</b>
Lecture	Fri 4/14	Exp 1 – Column Chromatography Experiment (Exp) 2 Intro - Acid-Base Extraction	-
<b>3 LAB</b>	Mon 4/17	(Pre-Lab Quiz due)	Exp 1 Quiz Due
<b>LAB</b>	<b>TuWTh April 18-20</b>	<b>Exp 1 - Column Chromatography - Excedrin</b>	Exp 1 Notebook
Lecture	Fri 4/21	Exp 2 - Acid-Base Extraction of Excedrin	-
<b>4 LAB</b>	<b>TuWTh April 25-27</b>	<b>Exp 2 - Acid-Base Extraction of Excedrin, Day 1</b>	-
Lecture	Fri 4/28	Exp 0 – Nuclear Magnetic Resonance, <sup>1</sup> H NMR	<b>Exp 1 report</b>
<b>5 LAB</b>	Mon 5/1	(Pre-Lab Quiz due)	Exp 2 Quiz
<b>LAB</b>	<b>TuWTh May 2-4</b>	<b>Exp 2 - Acid-Base Extraction of Excedrin, Day 2</b>	Exp 2 Lab Notebook
Lecture	Fri 5/5 🇲🇽 Cinco de Mayo	Exp 0 - NMR Splitting/Coupling – friendly neighbors!	<b>Exp 2 report</b>
<b>6 LAB</b>	Mon 5/8	(Pre-Lab Quiz due)	Exp 0 (NMR) Quiz
<b>LAB</b>	<b>TuWTh May 9-11</b>	<b>Exp 0 - <sup>1</sup>H NMR Worksheet *Required – NOT dropped*</b>	<b>Exp 0 – NMR Worksheet, Part 1</b>
Lecture	Fri 5/12	Exp 3 - Oxidation of Benzhydrol	<b>Exp 0 – NMR Worksheet, Part 2</b>
<b>7 LAB</b>	Mon 5/15	(Pre-Lab Quiz due)	Exp 3 quiz
<b>LAB</b>	<b>TuWTh May 16-18</b>	<b>Exp 3 - Oxidation of Benzhydrol</b>	Exp 3 notebook
Lecture	Fri 5/19	Exp 4 – Synthesis of Fruity Fragrances - Esters	-
<b>8 LAB</b>	Mon 5/22	(Pre-Lab Quiz due)	Exp 4 quiz
<b>LAB</b>	<b>TuWTh 23-25</b>	<b>Exp 4 – Synthesis of Fruity Fragrances</b>	Exp 4 notebook
Lecture	Fri 5/26	Exp 5 – Synthesis of Aspirin – another ester!	<b>Exp 3 report</b>
<b>9 LAB</b>	Tues 5/30	(Pre-Lab Quiz due)	Exp 5 quiz
<b>LAB</b>	<b>TuWTh May 30 – June 1 🇺🇸</b>	<b>Exp 5 - Synthesis of Aspirin</b>	Exp 5 notebook
Lecture	Fri 6/2	Exp 5 – Carbon ( <sup>13</sup> C) NMR Exp 6 – Colorful Chemistry with Organic Dyes	<b>Exp 4 report</b>
<b>10 LAB</b>	Mon 6/5	(Pre-Lab Quiz due)	Exp 6 quiz
<b>LAB</b>	<b>TuWTh June 6-8</b>	<b>Exp 6 – Colorful Chemistry * Required – NOT dropped *</b>	Exp 6 notebook
Lecture	Fri 6/9	Exp 6 & Course Wrap-up	<b>Exp 5 Report</b>
<b>11</b>	Mon 6/12	<b>Exp 6 report due Monday, June 12<sup>th</sup></b>	

**Safety First!!**

Please find the full **Safety Rules** on Canvas, highlights below...

- No food or drink in the lab; Wear proper attire and arrive to lab on time
- **Goggles, gloves, and lab coats** are to be properly worn when anyone is using chemicals in the lab
- 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 workstation 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
- **DISPOSE OF ALL GLASS IN GLASS WASTE BOXES, NOT IN TRASHCANS**

**Assignments & Attendance Policies**

- **Absences, Lateness, Makeups, and Extensions**

- Everyone gets one absence from lab: option to do the experiment remotely OR use it as the one dropped lab.
- Email your TA for extensions on **assignments** before the due date.
  - Check Canvas assignments for due dates.
  - Note: Canvas automatically enters a '0' on **late assignments** until they're graded; don't worry, we fix!
- Email your TA (and cc Caitlin) to arrange a **makeup lab** if you're unable to attend or know you'll be 5 or more minutes late. Check the TA schedule on Canvas.
  - Due to room restrictions, lab makeups are not guaranteed so give **as much notice as possible**.
  - *In-Person makeups*: performed only during that same week (labs run only TuWTh)
  - *Remote lab makeups*: request instructions to complete using the Slugs@home platform within one week
- Email your TA if you will be late to the section. It may be more appropriate to schedule a makeup lab.
- *Please communicate with us 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 do not participate in 2 lab days without communicating with instructors, you will have to re-take this course.**

- **Email your TA (cc Caitlin) ASAP if you have any issues with attendance, submitting assignments, etc. We're open to new policies and accommodations for students in need but we need to know what's going on!**

- *Help us help you!* Incorporate feedback from graded reports into future assignments.
  - Instructions for reviewing feedback on assignments – Canvas Intro Module – How 2 Digitize Your Work.
  - We are happy to discuss any grading concerns in a kind & compassionate manner.
  - *Don't understand how your work was graded? Do you think we made a mistake?*
    - Submit brief **Regrade Requests** directly in the question(s) in GradeScope within 1 week.

**Strict Grade Distribution**

Keep track in the Canvas GradeBook – includes dropped scores

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%

### Helpful Info about Quizzes & Lab Reports

**PRE-LAB QUIZZES** – Experiments PDFs containing pre-lab questions are posted on Canvas. Take the Canvas pre-lab quiz before your enrolled section. The quiz includes pre-lab questions that may be reworded, in a different order, or otherwise be presented differently than the pre-lab questions. This is due to the Canvas quiz format, not to confuse you!

- **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.
- The lowest pre-lab quiz grade is dropped.
- **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 Reports

Reports are **typed** with the exception of figures, structures, mechanisms, and calculations (ok to write by hand). The components are described below and additional **writing guidelines** are on Canvas. ***Talk through the report components during lab or at least several days before the due date!***

Reports are completed **individually (Exp 1-3)** with the *option* to complete Exp 4-6 reports with ONE partner. The NMR (Exp 0) Worksheet is submitted individually as well. 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 the lab to determine how you'll share responsibilities. Meet to exchange and proofread each other's work several days before the due date. One student uploads the final assignment to GradeScope, "Select Pages", then "Add Group Member" so both students get the same grade – video tutorials are in the Canvas Intro Module. The idea is to incentivize collaboration and hold each other accountable.

### **I. IN-LAB QUESTIONS**

- Type the responses to in-lab questions in complete sentences.
- Calculations, structures, and mechanisms may be hand-written.
- Tables should be given clear labels (**Table 1**, etc.) and a descriptive title.

### **II. EXPERIMENTAL DETAILS AND CHARACTERIZATION**

- This section applies to Exp's 3-5 reports. No experimental section in Exp's 1-2 reports.
- A worksheet is provided to guide you in writing your first experimental section during Exp 3
- Use the writing guidelines and specific notes in each experiment PDF

**Academic Integrity** - [https://www.ue.ucsc.edu/academic\\_integrity](https://www.ue.ucsc.edu/academic_integrity)**Week 1: Complete the Academic Integrity 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 Exp 4, 5, and/or 6 report together, include the **Partner Agreement** in your notebook pages – discuss this on the day of the lab to determine how you'll share responsibilities. One student submits the final assignment to GradeScope and “add group members” so both students get the 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; quizzes; lab notebook pages; Exp 0-3 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:**

- 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 **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 Slugs@home online 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.
- **I recommend not emailing reports to anyone outside of your group** unless it's to proofread and you know the other group has completed their work too.

### 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](tel:831-459-2089) or by email at [drc@ucsc.edu](mailto:drc@ucsc.edu).

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."