

CHEM 8B: Organic Chemistry II, Summer Session I 2020
UCSC Department of Chemistry & Biochemistry

M-F (10am-Noon)

June 22 – July 24

Instructor: Gabriella Amberchan, gamberch@ucsc.edu
(Please address me by my first name. Pronouns: she/her/hers)

Office Hours: Tuesday and Thursdays, 2-4pm, through Zoom (link in **Canvas**) or by appointment

Teaching Assistants: TBD

Required Materials

- David Klein, Organic Chemistry, 3rd Ed, Wiley 2017
- Student Study Guide & Solution Manual – Organic Chemistry, 3rd Ed, Wiley 2017

Course Description

Organic chemistry is the study of carbon-containing compounds and CHEM 8B will explore how these molecules are synthesized. Utilizing the principles learned in CHEM 8A, this course asks students to apply previous knowledge to new concepts, including nucleophiles and electrophiles, for the preparation and synthesis of aromatic compounds, alcohols, carbonyls, amines, and epoxides. The analysis of those functional groups will provide the chemical foundation necessary to understand biomolecules, such as carbohydrates, amino acids, and lipids.

Course Learning Outcomes

- Students will study the synthesis and reactions of the major functional groups as they relate to electrophilic aromatic substitution, nucleophilic acyl substitution, oxidation, and reduction reactions. They will illustrate how these reactions occur by analyzing the movement of electrons *via* arrow-pushing mechanisms.
- Students will build upon previous knowledge, such as acid-base principles and electronegativity, and combine it with new content to explain how molecules are synthesized.
- Students will develop their critical thinking skills by identifying key structural patterns in a molecule, then logically construct a synthesis pathway that combines individual reactions into a viable multi-step synthesis. By combining their critical thinking skills with the fundamentals of the course, students will be able to predict the outcome of an unknown reaction or deduce a likely reaction mechanism.
- Students will appreciate to organic chemistry found in everyday life, such as in the body (biomolecules), medicine (drug design), and food (terpenes, lipids), and through these examples they will appreciate the interdisciplinary nature of organic chemistry.
- Students will create reaction worksheets after each chapter, thereby helping them to stay organized, prepare for exams, and provide structure for their studying.

Communication Guidelines

Please contact me primarily through email. I rarely check my email after 7pm or on the weekends so please contact me during the week if you want a speedy response.

Lecture

All lectures will be held online through **Zoom** (link posted in **Canvas**) at the scheduled class time. Lectures will be recorded and posted in a **Google Drive folder**. Feel free to ask questions or use the chat feature. There will be in-class problem-solving activities. If for some reason my internet cuts out and I can't reconnect to the class in 10 minutes, you can leave the meeting and I will record the lecture and post it later that day.

Discussion Sections

Discussion sections are optional, and you can attend any section of your choice. It is highly encouraged to attend section as they are a great resource for you to practice and apply the lecture material through homework, worksheets, and activities. Individual TAs will set up specific **Zoom links**, which will be posted on **Canvas** for you to access.

Lecture Schedule

Monday	Tuesday	Wednesday	Thursday	Friday
June 22 EArS (mono-substituted) (18.2, 18.4-18.9)	23 EArS (di-substituted) (18.10-12)	24 Alcohols (12.1-4) Quiz 1	25 Alcohols (12.5-6, 12.9-10)	26 Ethers & Epoxides (13.2-3, 13.5-6, 13.8, 13.10) Quiz 2
29 Aldehydes & Ketones (19.1-19.5) Quiz 3	30 Aldehydes & Ketones (19.6, 19.9, 19.10, 19.12)	July 1 Q&A Quiz 4	2 Exam 1 Ch. 18, 12, 13	3 Holiday – No Class
6 Carboxylic Acids & Nitriles (20.2-5, 20.13)	7 Acid Derivatives (20.6-8, 20.10-13)	8 Alpha Carbon (21.1, 21.2) Quiz 5	9 Alpha Carbon (Aldol Reactions) (21.3)	10 Q&A Quiz 6
13 Exam 2	14 Carbohydrates (24.2-5)	15 Carbohydrates (24.6) Quiz 7	16 Amines (22.1-4)	17 Amines (22.5-6, 22.10-11) Quiz 8

20 Amino Acids (25.2-3)	21 Amino Acids (25.4-6) Quiz 9	22 Lipids (26.1, 26.3-4, 26.6)	23 Q&A Quiz 10 Rxn Workbook	24 Final Exam Cumulative
-------------------------------	---	---	--	---------------------------------------

Learning Resources

Online learning requires more websites and online tools than a traditional course and it can be a challenge to keep track of each course's particular learning resources. I will be using the following websites and modalities to communicate information:

- Lectures will be given through **Zoom** (link posted in **Canvas**). The recorded lectures are then posted in a **Google Drive Folder "CHEM 8B Session 1"**
- TA sections will be through **Zoom** (link posted in **Canvas**). These are not recorded
- Handouts, practice exams, exams, and keys are posted in **Canvas**
- Assignments are to be uploaded to **Gradescope** (www.gradescope.com). Login to the course using the **course code: 97NXZ2**. When uploading assignments, assign your pages to the correct problem in the given outline. Through Gradescope you can submit regrades and find your exam score

Small Group Tutoring. Small Group Tutoring (SGT) supports students academically to advance educational equity by designing inclusive learning environments outside of the classroom. In SGT, you can expect the Tutor to facilitate cooperative group activities designed to have students work together on the course content and develop study skills for the course. SGT is offered at least 3 times each week for the entire quarter. The Tutor is an undergraduate student who took the class, did well, and is trained to facilitate group sessions to focus on students' needs to succeed in the course. SGT is open to all students enrolled in the class and they must sign up on their online system: TutorTrac. Find more information for SGT at <https://lss.ucsc.edu/index.html>

Assignments and Grading Policy

Homework. Homework will not be collected or graded. It is there for the students to practice the topics and to apply the concepts taught in lecture. Students are encouraged to complete the homework and get clarification either from the instructor or from the TA's. Homework problems may appear in the exams. The list of homework problems is found at the end of this document and as a single PDF in the Canvas Module "Homework."

Post-Class Quiz (12.5%). Each quiz is worth 5pt. They are found in Gradescope and are due on the assigned day at 11:59pm (PDT) to Gradescope. The schedule for the quizzes is highlighted in purple in the above lecture schedule. Quizzes are open note but I would suggest using them as a study tool and try to take them without having your homework or study aides with you. Quizzes will never have content from that day's lecture.

Workbook (12.5%). This learning tool is to help keep the many reactions organized. More detailed instructions are given in the "Reaction Worksheet" handout in Canvas. All the worksheets are due at 11:59pm (PDT) on July 23rd.

Exams (50%). There will be 2 exams for this course, each worth 100 points. No make-up exams will be given. On the day of the exam, the exams will be posted on **Canvas**, you will have from 10am-1pm to download, complete, and upload the exam to **Gradescope**.

- If you have a tablet you can complete the exam on it and upload your completed exam as a PDF.
- If you have access to a printer, print the exam out and handwrite your answers. Scan the completed exam as a PDF and upload.
- If you do not have access to a printer, you can write on separate plain white paper (not binder/lined/graph paper). Limit the number of problems per page to mimic the exam.
- Scanning the exam allows for the highest resolution and makes our lives easier. If you do not have a scanner there are various scanning apps available (see chart below). If none of those options work, you can take a picture of your exam and upload the images, but please make sure the quality is good.

OS	Name
Android	Tiny Scanner, Simple Scan
iOS	FineScanner, CamScanner
Android & iOS	Adobe Scan, Microsoft Office Lens

Cumulative Final Exam (25%). In addition to amino acids and lipids, the final exam will allow you to show off your synthesis abilities. About 70% of the exam will consist of multi-step synthesis questions. Students may submit multi-step synthesis questions of their own design (**Google Doc**) and some of them will appear on the final exam. The final exam is mandatory.

Grading. This course is not curved. Don't compete with others, do your best on each exam. Letter grades will be decided based on the following percentages:

A	100-90%
B	89-80%
C	79-60%
D	59-45%
F	<45%

Tips and Tricks

- **Be proactive.** Because of the quick-paced nature of the course it is imperative that each night you complete the homework associated with that lecture.
- **Be prepared** when attending office hours, section, or the reviews by completing the homework ahead of time and asking specific questions.
- **Be organized.** I remember my organic chemistry professor predicting that we would at some point become overwhelmed with the number of reactions (she was right) and so being organized at the beginning is key.
- **Be collaborative.** Study with a group! Explain a homework problem to your classmate, test your knowledge by designing your own problem. Study for the exams by doing the homework without using notes/solutions manual.
- **Be courageous.** Ask questions!

Learning Accommodations

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, please submit your Academic Access Letter from the Disability Resource Center (DRC) to me *via* email, preferably within the first week of the Summer quarter. At this time, I would also like us to discuss ways we can ensure your full participation in the course. I 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.

Registration

Summer is unique. **You will not be dropped for non-attendance or non-payment.** You must drop yourself. Dropping before the deadline results in a full-tuition reversal/refund. Withdraw posts a W for the grade and full tuition is charged (no refund). For all dates and deadlines, including 'change of grade option' (P/NP) and grades due, here is the summer academic calendar: <https://summer.ucsc.edu/studentlife/index.html>. For questions about dropping, requesting a W grade for a course, or withdrawing from the summer quarter, email summer@ucsc.edu. Drop date – June 29. Deadline to request a “W” – July 10

Title IX

My intention is to make this class comfortable for anyone to ask questions and learn chemistry. Chemistry can be puzzling, and remote learning is a unique pedagogical method that has its own challenges. I hope to be a resource for your learning, and I am available if you need to talk science, study strategies, food ideas, recipes, or whatever you need to excel in this class. This support comes with the understanding that there is mutual trust and a zero tolerance for disrespect towards your peers, TAs, or me.

If you do feel uncomfortable and you don't feel able to confide in me, UC Santa Cruz has avenues set up to disclose the information through the Title IX office. 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.

Academic Integrity

Students are expected to take their own exams. Yes, the exams are online but communication between classmates or others (except for TAs or me) during the exam will not be accepted. Specific exam instructions are detailed on each exam. Students found in violation of these policies will repercussions, such as a failing grade and academic sanctions. UC Santa Cruz's full policy on academic misconduct can be found at <https://ue.ucsc.edu/academic-misconduct.html>.

Assigned Homework Problems

Chapter 18: 18.5, 18.7, 18.11, 18.15, 18.18, 18.24, 18.26, 18.41, 18.46, 18.52, 18.55, 18.62, 18.63; Nomenclature worksheet (**Canvas**)

Chapter 12: 12.7, 12.8, 12.13, 12.17, 12.19, 12.20 (a, b, c), 12.22 (c-f), 12.24, 12.25 (a, c, d, f), 12.28 (a-d, f), 12.34, 12.35, 12.40, 12.57

Chapter 13: 13.2, 13.5, 13.7, 13.8, 13.10, 13.16 (a, b, d), 13.22 (a, e), 13.24, 13.29, 13.31, 13.40, 13.59

Chapter 19: 19.2, 19.5 (a, b, e, f), 19.8, 19.13, 19.15, 19.28, 19.30, 19.31, 19.38, 19.50, 19.55, 19.57 (a, b), 19.75, 19.77

Chapter 20: 20.9, 20.10, 20.11, 20.16 (a, b, d-f), 20.17, 20.18, 20.21, 20.22 (a-c, f), 20.27, 20.28, 20.35, 20.41, 20.42, 20.44; Nomenclature worksheet (**Canvas**)

Chapter 21: 21.3, 21.4, 21.9, 21.10, 21.11, 21.14, 21.15, 21.17, 21.18, 21.19, 21.21, 21.66

Chapter 24: 24.3, 24.9, 24.16, 24.17, 24.23, 24.24, 24.34, 24.36, 24.38, 24.42, 24.45, 24.47, 24.51, 24.60, 24.61, 24.67

Chapter 22: 22.2, 22.6, 22.7, 22.10, 22.14, 22.16, 22.18, 22.26, 22.35, 22.37, 22.38, 22.46, 22.54, 22.61, 22.65 (for (a) use H_2/Pd ; for (b) use $NaBH_4$), 22.66, 22.68

Chapter 25: 25.4, 25.7, 25.10, 25.12, 25.21 (a), 25.22, 25.30, 25.34, 25.41, 25.43, 25.46, 25.49, 25.59 (a, b), 25.63, 25.73, 25.77

Chapter 26: 26.3, 26.9, 25.10, 26.11, 26.21, 26.25, 26.30, 26.32, 26.49, 26.52, 26.54, 26.55