

CHEM 109: Intermediate Organic Chemistry with Biological Applications**Instructor:** Caitlin Binder, Ph.D.**Email:** cambinde@ucsc.edu**Office hours:** Thursdays 1 – 2 pm in PSB 240 or email to set up an appointment TuW afternoons

Extra office hours before exams: M 4/24 & 5/15 1-2pm in PSB 240

No CB office hours on exam days (4/25 & 5/18)

Lecture: TuTh 9:50 – 11:25 a.m. in E&M B206**Course Prerequisites:** CHEM 8B**Teaching Assistants** - office hours and discussion schedule posted online

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Discussions (begin 2nd week of class, 4/10): Consistent attendance to discussion sections is vital to your success in organic chemistry. Plan on preparing for discussion by re-reading lecture notes and attempting, if not completing the most recent HW assignment beforehand. You must attend your enrolled section each week. If you are absolutely unable to attend section (illness or otherwise), you must email your discussion TA *before* section starts and a make-up quiz will be arranged if there was a quiz that week. This offer expires the minute section is over, no exceptions (more on quizzes on the next page).

NO DISCUSSIONS 4/25, 4/26, 5/18, & 5/22.**Required Materials**

- McMurry, *Organic Chemistry 8th Edition*, Wiley: New York, **2012**.
- Access to **Course Website** (<https://acrochem.sites.ucsc.edu/chem-109/>): Print out “lecture blanks” before class (template for note-taking). HW assignments, keys, practice exams, updated syllabi, and other course materials are on this site as well.
- **Separate notebook for HW only** – allowed during quizzes

Course Description: CHEM 109 is the third quarter of the organic chemistry series and builds upon the fundamental principles of organic chemistry students acquired in CHEM 108A/B, including **acid-base chemistry, resonance, and arrow-pushing**. This is a three-unit course and thus includes a scaleable amount of material and homework than the five-unit organic chemistry classes at UCSC. The course begins with an overview of the structures and common mechanisms in biomolecules, including carbohydrates, lipids, and amino acids. The biosynthesis of lipids and natural products, including antibiotics and alkaloids, will be explored. Students will be introduced to the connection between these natural processes and advances in synthetic organic chemistry.

Students with Disabilities: If you qualify for classroom accommodations because of a disability, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me as soon as possible, preferably within the first week of class (electronic letter is OK). Please email me to set up a brief one-on-one meeting by the second week of class to discuss your needs (give 2-3 time options, MTuW afternoons). If you have extra time on exams, please check your schedule to ensure this does not create conflicts with other classes (or let me know if it does and we will work around it). Contact DRC by phone at [831-459-2089](tel:831-459-2089) or by email at drc@ucsc.edu for more information.

Academic Integrity: *Students will take individual exams without additional resources (cheat sheets, etc). Communication between students during exams in any form will not be tolerated. Students may refer to their own HW notebooks during quizzes, no one else's.* Students who participate in such forms of academic dishonesty may face academic sanctions. For more information, visit http://www.ue.ucsc.edu/academic_integrity.

Learning Resources**LSS Tutoring** – free tutoring services provided on campus, details TBA.**Webcasts** (<https://webcast.ucsc.edu/>) – audio and anything projected in lecture is posted online after class. This is not a substitute for attending lecture, as it may take several days to update lectures. Instead, use this to review material, supplement your notes, and/or help with homework.**Username:** chem-109**Password:** pain51wool

Course/Classroom Protocol

Students are expected to treat their instructor, TA, and fellow students respectfully!

Attendance at all class sessions is necessary for successful completion of this course. It is 100% your responsibility to be present for lecture material and in-class announcements.

The use of electronic devices is not permitted in the classroom while lecture or discussion is in session, unless prior permission is obtained from the instructor in writing. This includes using a computer, ipad, tablet, smartphone, etc. If permitted by the instructor, it is important that these devices are used only for course-related material. You will no longer be allowed to use your electronic device in class if you take advantage of your privilege. Calls, texting, and any other use of electronic devices during lecture are prohibited. You will be asked to leave class if you cannot follow these rules.

Assignments and Grading Policy

Textbook reading assignments are given in the lecture schedule and are to be completed before that day's lecture for maximum lecture involvement.

Homework is your most pivotal assignment to aid in your understanding of organic chemistry. You absolutely need to complete your homework in a timely manner if you expect to pass CHEM 109! **Homework sets are given for each lecture online.** *Homework is not turned in or checked for credit but this will be the focal point in discussion sections and quizzes.* Work through the assigned homework problems to get a more complete understanding of the concepts presented in lecture.

Quizzes (25%) are brief assessments of recently presented material to be given periodically in discussion sections. Content is directly from the previous week's homework. You may use your HW notebook during quizzes. If you are absolutely unable to attend section due to illness or other emergency, you must email your discussion TA before section starts and a make-up quiz will be arranged if there was a quiz that week. **This offer expires the minute section is over, no exceptions.** *Please do not take advantage of this exception, as it becomes cumbersome to keep track of quiz scores.* There are no quizzes during exam weeks. Memorial Day falls on a Monday – if there is a quiz that week, students in that section will take that quiz the following week.

Midterm Exams (50%) are comprehensive assessments that review in detail recently covered topics. Each exam builds on material found on previous exams. Exam questions will be similar, if not identical, to the homework and in-class examples. Please arrive to class between 9:40 - 9:45 a.m. on exam days as midterms will start at exactly 9:50 a.m.

The final exam (25%) is **Tuesday, June 13, 4-7pm** and cumulative(ish) with a focus on material not covered on the first two exams. This is written as a two-hour exam, but I will give students the three-hour time block provided. Principles learned earlier in the course will be applied. Please pay attention to in-class announcements about exams and arrive at least 5-10 minutes early to the final.

A typical distribution of letter grades is as follows:

A: 90.00-100%; B: 75.00-87.99%; C: 60.00-74.99%
C-: 55.00-59.99%; D: 50.00-54.99%; F < 50%

Do not rely on the curve. I typically do not curve exams anyway, as a typical exam average is 70+%. Instead just do your best!

Plus (+) and minus (-) grades also used in special cases based on final exam scores (examples from previous courses given below, subject to change based on this quarter's grade distribution)...

- Ex 1.** Overall course grade 88.00-89.99%, final exam grade 95+% = A-
Ex 2. Overall course grade 85.00-87.99%, final exam grade 90+% = B+

Study Tips and Requirements

An easy way to make CHEM 109 a more pleasurable experience is to establish good study habits early and stick to them. The learning process is fluid and changes often need be made based on other commitments. Many of these changes can be anticipated by staying organized to compensate for lost time.

Follow these points and you can expect to excel in my class:

- **DO NOT FALL BEHIND!**
- *Maintain a positive attitude*
- *Do the reading assignment and review previous class notes before each lecture*
- **Bring printed lecture blanks for every class (online)**
- *Take thorough lecture notes & participate in lecture*
- *Review your notes and start HW assignments soon after lecture*
- *Attend office hours regularly*
- *Actively prepare for and participate in discussion sections*
- *Re-do HW problems without “cheating” to study for tests ON YOUR OWN*
- *Keep an organized, working record of concepts/problems that are difficult for YOU*
- **Practice arrow-pushing mechanisms for 10 minutes every day!**

Before lecture:

Check the syllabus for the reading assignment and take *between 20-45 minutes to skim the assigned text sections*, paying special attention to bold-faced words, **figures**, equations, and example problems. Print out and skim the lecture blanks posted online to get a better idea of what will be specifically covered in class. It is easier to conduct a lively class discussion when both the students and instructor are prepared. I do not expect you will understand everything that you read at first, but you will derive far more benefit from lecture and will be able to participate more fully in class discussions by reading ahead of time.

****Eat breakfast before coming to class****

During lecture:

Be on time and stay for the duration (this three-unit lecture sometimes ends early). Please ask questions. Don't be shy! It can be difficult at times to write and listen so feel free to let me know if things are moving too quickly (just be nice about it please). Communication is key! *Bring the lecture blanks or you are likely to fall behind in note-taking.*

After lecture/discussion:

Put your notes side by side with the text. Re-write, or at least **re-read your notes** while supplementing your class notes with the textbook material on the **same day as lecture**. Re-do problems we did as a class that were challenging or confusing and come to office hours to clear things up. **Begin homework promptly** so you will have time get help if needed.

Stay organized. Be a nerd about this. Seriously.

Studying for exams:

Studying with groups is great, but it has to be in addition to studying alone. Your classmates cannot help you during the exam! Reading your notes and re-doing problems we do as a class is key. **Re-do as many homework problems as you can, as many times as you can. Don't just look at a problem and say, “I know how to do that.” Actually write it out again (wasting paper is an unfortunate drawback, but necessary).** Keep a record of the problems you want to ask about in office hours (and actually come to office hours to clear them up before exams!).

Pro-tips: Stay healthy, especially with exercise and sleep. Be patient with yourself. The above may sound like a lot, but the idea is to *spread out the work evenly to avoid cramming as well as limiting stress and anxiety!* Remember everyone learns differently. **Try not to compare yourself to others!**

CHEM 109 LECTURE SCHEDULE

Dates	Reading (McMurry)	Lecture Topic	Lecture No.
4/4	*M&B Ch 1.1-1.4 *posted online	Acids & Bases; Mechanisms: Electrophilic Addition, Nucleophilic Substitution	1
4/6	*M&B 1.5-1.6	Mechanisms: Addition to Carbonyl Compounds	2
4/11	*M&B 1.7-1.9	Mechanisms: Condensation; Elimination; Redox	3
4/13	McMurry 26.1-2	pKa: Polyprotic Acids, Electrophoresis	4
4/18	26.3, 29.9	Amino Acid Synthesis	5
4/20	26.4, 26.9-11	Peptides & Enzymes	6
4/25		EXAM 1	1-6
4/27	26.7, 25.1-5	Peptide Synthesis; Carbohydrate Nomenclature	7
5/2	25.8-9	Carbohydrates & Polysaccharides	8
5/4	29.1,5	Carbohydrates Catabolism: Glycolysis Phase 1	9
5/9	29.6	Glycolysis Phase 2 & Fates of Pyruvate	10
5/11	27.1-3,5	Lipids: Structure, Terpenoid Biosynthesis	11
5/16	-	Lipids: Special Topics	12
5/18	-	EXAM 2	7-11
5/23	28.1-3	Nucleic Acids & Nucleotide Structure	13
	14.7-9	UV-vis and Conjugated Systems	
5/25	28.7	RNA & DNA Synthesis	14
5/30	*Palleros	Introduction to Medicinal Chemistry	15
6/1	-	β-Lactam Antibiotics: Penicillins & Cephalosporins	16
6/6	-	Morphine and Its Derivatives	17
6/8	-	Q&A Session	-

FINAL EXAM Tuesday, June 13th, 4 – 7 p.m. in E&M B206

Cumulative(ish), ~50% from Lecture 12-17 Material

NO MAKE-UPS, NO EXCEPTIONS

McMurry = *Organic Chemistry 8th Edition* (text from 8A&B)

*M&B = McMurry & Begley, *The Organic Chemistry of Biological Pathways*
– PDF of Chapter 1 posted on the CHEM 109 website

*Palleros = PDF posted on CHEM 109 website

Permission numbers required to add: **April 21**

Add/drop/swap ends: **April 21**

Deadline to petition for Withdraw: **May 12**