

Chemistry 3A (Remote)
CHEMICAL STRUCTURE AND REACTIVITY (Organic Chemistry 1)
UC Berkeley – Summer 2020
Dr. Pete Marsden – 323 Latimer – petermarsden@berkeley.edu

Location and time: Zoom (link provided on bCourses): M-Th 9:30 - 11:00 AM

General Information:

Chemistry 3A is the first semester of a two-semester survey of organic chemistry. The main learning goals for this course are 1) to understand and apply Coulomb's Law with respect to chemical reactions, 2) to qualitatively apply the concept of resonance to reactivity, and 3) to use the concepts of molecular orbital theory to understand and even predict the way certain reactions occur with respect to their three dimensional outcomes (stereochemistry) and multiple products (regiochemistry).

Course Website: <https://bcourses.berkeley.edu>

The course website will be used for announcements throughout the semester, as well as for periodically posting selected resources. You are responsible for checking the site on a regular basis. All homework will be posted under the Files tab.

Email: petermarsden@berkeley.edu

All e-mail concerning Chemistry 3A should have "Chem3A" as the first part of the subject. Use e-mail for asking simple questions about the course or if you would like to make an appointment to see me.

Recommended Materials (NOT required, even a little bit):

- David Klein; "Organic Chemistry : As a Second Language. First Semester Topics. 4th edition," Wiley and Sons Publishing.
- Any molecular modeling kit
- Either a tablet capable of editing a pdf directly OR a printer and a phone scanning app.

Grading: The course will be graded on the basis of **700 points**, distributed as follows:

- 25 best of 28 Post-Lecture worksheets (4 points each for 100 total points)
- 5 best of 9 quizzes (15 points each for 75 total points)
- Each exam is worth 150 points (total of 300 points).
- The final exam will be worth 225 points.

Exams (150 pt per exam, 225 pt final, total 525 pts):

- Exam #1 will be held on Thursday, July 9 from 9:30 – 11:30 AM (time flexible).
- Exam #2 will be held on Thursday, July 30 from 9:30 – 11:30 AM (time flexible).
- The Final Exam will be held on Thursday, August 13 from 9:30 AM – 12:30 PM (time flexible).

Quizzes (75 points total):

Every Wednesday, there will be a 10 minute, 15 point quiz administered during the lecture. The quizzes will be closely related to the homework problems and **lecture material**. The best way to prepare for these is to go through the lectures and post-lecture worksheets and practice any of the problems that we did together in class, or that I assigned for homework during the lecture notes.

Post-Lecture worksheets (best 25, at 4 points each for 100 total points)

Each lecture, there will be a document that will serve to solidify the content learned. After each lecture, you should be able to go through that worksheet and answer all of the questions. It is intended to be similar to Chem 1A discussion handouts. These are designed as study aides, and to help students stay up-to-date with material. They will help you retain the information from lecture and solidify the concepts in a small amount of time.

Course Grade

Final letter grades in this course will be based on the total points in the course. Grade cutoffs will be approximately:

A+/A/A-	: 100% - 85%
B+/B/B-	: 84% - 70%
C+/C/C-	: 69% - 55%
F	: <54%

These are only approximate cutoffs. I might lower them (good thing for you), depending on the actual distribution of scores throughout the semester.

There will be no additional curving of assignments. This means it is possible for every single student to earn an A in the course. To reach this goal, it is imperative that you help each other with the material, and work conceptually whenever possible.

The final exam percentage can be used to replace your lowest exam score (if that benefits your grade). I will do this automatically, and give you the highest possible points that I can.

Homework (not graded):

Homework sets will be posted regularly on the course website. The homework will not be graded, but is extremely important for understanding the material. Due to the fast pace of this course, it will be easy to get behind. To ensure that this does not happen, I suggest you use the lecture examples as a "warm-up". If you are struggling, be sure to go through them and the lecture material so that you will have a set of problem solving skills to apply to the more difficult problems on my homework sets.

When attempting my homework sets, be sure to go through your notes at the same time. Many of the strategies outlined during lecture are directly applicable to the completion of the homework questions.

Lecture attendance (can be asynchronous, but recommended synchronous):

Organic chemistry is a concentrated and fast-moving subject. It is not inherently more difficult than other science courses, but you will probably find it different from anything you have studied previously because there is a great deal of new conceptual material to assimilate. An important aspect of the subject is that it is very **cumulative**, with each new topic building upon and using concepts developed in the previous one. Because of this close interrelationship of topics, this is not a course in which it is possible to learn some topics but ignore others, especially in the first semester. It is also very difficult to wait until a few days before an exam to begin learning the course material, especially during the accelerated pace of the summer course. Therefore, the single factor that gives students the most trouble is **falling behind**. To avoid this problem, I strongly recommend that you **work problems as soon as they are assigned**. **Lecture attendance/familiarity is particularly important, since all exams in this course will be based on the material covered in lecture.**

Office Hours:

Dr. Pete Marsden:

- To be determined and posted on bCourses.
- Email – You can set up meetings with me via email. Be sure to have “Chem 3A” in the subject of the email (petermarsden@berkeley.edu).

TAs: Zoom (schedule will be posted on bCourses)

The TA office hours are spread out throughout the week, and are available on a check-in basis to all enrolled students in **both Chem 3A and Chem 3AL (lab)**. You may visit any TA during scheduled office hours. This is a very valuable resource and you are highly encouraged to bring questions regarding topics covered in lecture, lab lecture, lab, homework assignments, practice exams, etc. here on a regular basis. Access to the room links can be found on bCourses.

Piazza:

In addition to office hours, there will be a piazza site set up, accessible through bCourses. This will give you a chance to ask questions when they come up, and give your fellow students, and we instructors, a chance to craft careful responses with images or videos if necessary. We will try a few different ways of staffing the Piazza site, perhaps to have live office hours through Piazza instead of just using zoom. This wouldn't necessarily be a face-to-face digital experience, but your questions would be answered in near real time during these pre-determined times (to be announced on bCourses).

Course Outline:**Unit 1 Material**

Lecture	Day	Date	Topic(s)
1	Mon	22-Jun	Review, Bond-Line Notation, Formal Charges
2	Tue	23-Jun	Resonance introduction
3	Wed	24-Jun	<u>Quiz 1</u> and Resonance and acid-base chemistry
4	Thurs	25-Jun	Resonance and Nucleophiles and Electrophiles
5			Watch background webcasts from Chem 1A Spring 2019 https://www.youtube.com/watch?v=VGvAbva2K9c https://www.youtube.com/watch?v=nVPaqQs66Kk https://www.youtube.com/watch?v=EW08eZ_Cw54 https://www.youtube.com/watch?v=OSciMnY4x44
5.5	Mon	29-Jun	<u>Quiz 2</u> and Molecular Orbitals practice
6			Watch webcast from Chem 3A Fall 2018 on nomenclature https://www.youtube.com/watch?v=wZKh4wOCXNQ
6.5	Tue	30-Jun	Nomenclature practice and Conformational analysis
7	Wed	1-Jul	<u>Quiz 3</u> and Ring strain and Chair cyclohexane
8	Thurs	2-Jul	Substituent effects on chair flips
9	Mon	6-Jul	Decalin system and Exam 1 review

Unit 2 Material

Lecture	Day	Date	Topic(s)
10	Tues	7-Jul	Radical Chemistry Introduction, BDEs, Reaction Coordinate Diagrams
11	Wed	8-Jul	<u>Quiz 4</u> and Radical Chemistry Mechanisms
	Thurs	9-Jul	<u>Exam 1: Unit 1 material 9:30am-11:30am</u>
12	Mon	13-Jul	Reactivity and Stereochemistry introduction
13	Tues	14-Jul	Stereochemistry
14	Wed	15-Jul	<u>Quiz 5</u> and R&S Nomenclature
15	Thurs	16-Jul	Predicting Products with Stereochemistry
16	Mon	20-Jul	Introduction to Substitution Chemistry, focus on Sn2
17	Tues	21-Jul	Sn1 chemistry
18	Wed	22-Jul	<u>Quiz 6</u> and Sn1 and Sn2 comparison, mechanism practice
19	Thurs	23-Jul	Carbocation rearrangements

Unit 3 Material

Lecture	Day	Date	Topic(s)
20	Mon	27-Jul	Elimination Chemistry (E1 and E2)
21	Tues	28-Jul	Kinetic Analysis of E2
22	Wed	29-Jul	<u>Quiz 7</u> and Alkene stability, naming, and stepwise reactivity (rxn with acids)
	Thurs	30-Jul	<u>Exam 2: Unit 2 material 9:30am-11:30am</u>
23	Mon	3-Aug	Alkenes reacting as nucleophiles, and concerted mechanisms
24	Tues	4-Aug	Alkene reaction review and introduction to synthesis
25	Wed	5-Aug	<u>Quiz 8</u> and Epoxides, carbanions and carbonyls
26	Thurs	6-Aug	Carbonyl reactivity
27	Mon	10-Aug	Alkyne reactivity and Review
28	Tues	11-Aug	More Review
29	Wed	12-Aug	<u>Quiz 9</u> and Yet more Review
	Thurs	13-Aug	<u>Final Exam: (9:30am-12:30pm)</u>