Chemistry 3A
CHEMICAL STRUCTURE AND REACTIVITY (Organic Chemistry 1)
UC Berkeley – Summer 2019
Dr. Pete Marsden – 323 Latimer – petermarsden@berkeley.edu

Location and time: 1 Pimentel: 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: http://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" in the title. 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

Grading: The course will be graded on the basis of **600 points**, distributed as follows:

- 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 11 from 9:30 – 11:30 AM.
- Exam #2 will be held on Thursday, August 1 from 9:30 – 11:30 AM.
- The Final Exam will be held on Thursday, August 15 from 9:30 AM – 12:30 PM.

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.

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 raise or lower them, depending on the actual distribution of scores throughout the semester. Traditionally, the percentage of students receiving each type of grade are as follows:

A (30-35%); B (30-35%); C (25-30%); D, F (5-10%)

This is a straight points class. The cutoffs are predetermined. There will be no additional curving of exams or quizzes. 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:
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:
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. 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 is particularly important, since all exams in this course will be based on the material covered in lecture.**

Lecture Homework/Handout/Review page

Each lecture, there will be a one-page document that will serve as a "Cliff's Notes" style handout. After each lecture, you should be able to go through that one page and answer all of the questions. It is intended to be similar to Chem 1A discussion handouts, only they are not collected. These are designed as study aides, but are by no means necessary to complete. They will definitely help you retain the information from lecture and solidify the concepts in a small amount of time (please read as minimum needed to pass quizzes).

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: Bixby North (schedule will be posted on bCourses)

The TA office hours are spread out throughout the week, and are available on a walk-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 n lecture, lab lecture, lab, homework assignments, practice exams, etc. here on a regular basis. Access to the room can be found on the northwest face of Latimer Hall. Exit Pimentel from the top, and turn to your left. The large glass windows are Bixby North.

Course Outline:

Unit 1 Material

Lecture	Day	Date	Topic(s)
1	Mon	24-Jun	Review, Bond-Line Notation, Formal Charges
2	Tue	25-Jun	Resonance introduction
3	Wed	26-Jun	*Quiz 1* and Resonance and acid-base chemistry
4	Thurs	27-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=EWO8eZ_Cw54 https://www.youtube.com/watch?v=OScjMnY4x44
6	Mon	1-Jul	*Quiz* 2 and Molecular Orbitals practice
7			Watch webcast from Chem 3A Fall 2018 on nomenclature https://www.youtube.com/watch?v=wZKh4w0CXNQ
8	Tue	2-Jul	Nomenclature practice and Conformational analysis
9	Wed	3-Jul	*Quiz 3* and Ring strain and Chair cyclohexane
	Thurs	4-Jul	**NO CLASS! YAY 'MURICUH!**
10	Mon	8-Jul	Substituent effects on chair flips

Unit 2 Material

Lecture	Day	Date	Topic(s)
11	Tues	9-Jul	Radical Chemistry Introduction, BDEs, Reaction Coordainte Diagrams
12	Wed	10-Jul	*Quiz 4* and Radical Chemistry Mechanisms
	Thurs	11-Jul	***Exam 1: Unit 1 material 9:30am-11:30am***
13	Mon	15-Jul	Reactivity and Stereochemistry introduction
14	Tues	16-Jul	Stereochemistry
15	Wed	17-Jul	*Quiz 5* and R&S Nomenclature
16	Thurs	18-Jul	Predicting Products with Stereochemistry
17	Mon	22-Jul	Introduction to Substitution Chemistry, focus on Sn2
18	Tues	23-Jul	Sn1 chemistry
19	Wed	24-Jul	*Quiz 6* and Sn1 and Sn2 comparison, mechanism practice
20	Thurs	25-Jul	Carbocation rearrangements

Unit 3 Material

Lecture	Day	Date	Topic(s)
21	Mon	29-Jul	Elimination Chemistry (E1 and E2)
22	Tues	30-Jul	Kinetic Analysis of E2
23	Wed	31-Jul	*Quiz 7* and Alkene stability, naming, and stepwise reactivity (rxn with acids)
	Thurs	1-Aug	***Exam 2: Unit 2 material 9:30am-11:30am***
24	Mon	5-Aug	Alkenes reacting as nucleophiles, and concerted mechanisms
25	Tues	6-Aug	Alkene reaction review and introduction to synthesis
26	Wed	7-Aug	*Quiz 8* and Epoxides, carbanions and carbonyls
27	Thurs	8-Aug	Carbonyl reactivity
28	Mon	12-Aug	Alkyne reactivity and Review
29	Tues	13-Aug	More Review
30	Wed	14-Aug	*Quiz 9* and Yet more Review
	Thurs	15-Aug	***Final Exam: (9:30am-12:30pm)***