**Chemistry 3B (Remote)**
**CHEMICAL STRUCTURE AND REACTIVITY (II) (Organic Chemistry 2)**
**UC Berkeley – Fall 2020**
**Dr. Pete Marsden – 323 Latimer – petermarsden@berkeley.edu**

**Location and time:** Tu, Th 8:00-9:30 AM (Zoom link provided on bCourses)
Tu, Th 3:30-5:00PM (Zoom link provided on bCourses) (recorded)

**General Information:**
Chemistry 3B is the second semester of a two-semester survey of organic chemistry. The learning goals of this course are to familiarize the students with aromatic systems, carbonyl chemistry and various biologically relevant molecules. We will focus on their mechanisms of formation as well as reaction coordinate energy diagrams.

**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 assignments will be found in their relevant modules, as well as posted in the Files section. Quiz and exam grades will be found on Gradescope at https://gradescope.com.

**Email:** petermarsden@berkeley.edu
All e-mail concerning Chemistry 3B should have "Chem3B" at the start of the title with a reasonable description about what the email entails. Use e-mail for asking simple questions about the course or if you would like to make an appointment to see me. Do not expect detailed answers to chemical questions since organic chemistry is a very visual science and generally requires structures to explain concepts. These questions are more appropriate for Piazza.

**Recommended Materials (NOT REQUIRED!!!!):**
- HGS Maruzen Molecular Structure Models
- D. Klein, "Organic Chemistry as a Second Language Second Semester Topics" 4th Edition, Wiley Publishing.

**Academic Honesty:**
For all college courses, especially those that are run remotely, academic honesty in integral to the learning process and future success. I promise you that I will give you the tools you need to succeed with the materials I provide. Students found using Chegg during exams will receive a failing grade in the course and be reported to the Center of Student Conduct. I will also request the harshest available repercussions for these students, though it is up to the Center of Student Conduct to make that judgement.

Students found using sources disallowed based on the given assignment will receive a 0 on that assignment and be reported to the Center of Student Conduct.

Trust in me as an educator when I say that you have the tools necessary to succeed. Then build trust in yourself by working hard throughout the term. If you ever feel like you need more time for an assignment, just ask me. Don't resort to academic dishonesty.

**Post-Lecture worksheets (best 25, at 5 points each for 125 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. 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. They are due at the end of the day of that lecture.

**Quizzes (150 points total):**
Every Tuesday, there will be a 30 minute, 15 point quiz administered via gradescope and due before noon. The quizzes will be closely related to the suggested homework problems, post lecture worksheets and **lecture material**. I will take the best 10 quizzes for a total of 150 points.

Allowed resources: 1. You may use your notes and any resources posted on bCourses help you with your quiz.
2. You may work with your friends who are currently enrolled in the class on the quiz. Make sure your answers ARE YOUR OWN. Do not copy answers from each other, that is still plagiarism. You may discuss the questions and answers with words, then come up with your own way of representing that on your own quiz.

**Exams (150 pt per midterm, 225 pt final, Total 525 pts):**
- Exam #1 will be held on Friday, October 2 (2.5 hour window to be announced)
- Exam #2 will be held on Friday, November 6 (2.5 hour window to be announced)
- The Final Exam will be held on Monday, December 14 (3.5 hour window to be announced)

Allowed resource: a study guide prepared and submitted before the date of the exam.

You may not use the internet while taking the exam.
You may not talk to each other while taking the exam.
You should refrain from talking about the exam with each other until the day after the exam (it's tempting to go to your friends and say, "OMG! WTF was up with question 4.N.!?", but they might not be done taking the exam yet. Don't accidentally collaborate).

**Exam Analysis**
After the first and second exam, you will be given the opportunity to earn points back. The amount of points is different on each exam, depending on how well the class does overall. In the Fall 2019 course, the first exam analysis allowed the opportunity to earn 5 points back and the second exam analysis allowed the opportunity to earn 10 points back. The purpose of these assignments is to help you figure out which resources you might be neglecting while studying and to help you analyze your errors critically to learn from them.

**Extra points possible:**
It is possible to earn over 100% on many of these assignments. Those extra points are simply added to your score (no scaling, no point cap). A few students each year get over 100% in the course, even though they don't get 100% on any of the exams.

**Grading:** The course will be graded on the basis of **800 points**, distributed as follows:

- 25 best Post-Lecture worksheets (5 points each for a total of 125 points)
- 10 best quizzes (15 points each for 150 total points)
- Each exam is worth 150 points (total of 300 points).
- The final exam will be worth 225 points.

**Course Grade**

Final letter grades in this course will be based on the total points in the course. Grade cutoffs will be as delineated below, with every 5% bin corresponding to a different grade (A+ will be ≥95%, A will be 94%-90% and A- will be 89%-85%, etc.).

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

***Here is the approximate distribution of grades from Fall 2019***:

A (40%); B (30%); C (20%); F (10%)

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 (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.

DO NOT LOOK AT THE ANSWER KEY UNTIL YOU’VE THOROUGHLY CHECKED YOUR WORK. Students frequently trick themselves into thinking they understand a concept because the answer key makes sense. The only way to learn organic chemistry is through practice. Lots and lots and lots, and just in case you weren’t sure, lots of practice.

**Lecture attendance (can be asynchronous, but recommended synchronous):**
An important aspect of organic chemistry is that it is very **cumulative,** with each new topic building upon and using concepts developed previously. Because of this close interrelationship of topics, this is not a course in which it is possible to learn some topics but ignore others. It is also very difficult to wait until a few days before the exams 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/familiarity is particularly important, since all exams in this course will be based on the material covered in lecture.**

Though you *can* watch the lectures after the fact, I strongly recommend attending them in real time. This gives you a sense of normalcy by structuring your learning each week. It also gives you the chance to ask questions in real time, and to experience what it is like to try and work problems in real time. A large portion of the lecture time is devoted to letting students work through examples, which is where most of the concept assimilation takes place.

**Office Hours:**
*Dr. Pete Marsden*:

- To be determined and posted on bCourses. (4 hours each week)
- Email – petermarsden@berkeley.edu
  For any questions not related to course material (those should be posted to Piazza), please email me. The subject of your email must contain "Chem 3B" at the beginning, followed by a regular subject (this is for my email sorting benefit).

*Graduate Student Instructors (GSIs)*: 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 3B and Chem 3BL (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.

*Head GSI – Kerry Jones <kerryjones@berkeley.edu>*

- Weekly Reviews via Zoom to be determined and posted on bCourses.

**GSI "discussion" sections:**
In addition to their weekly office hours, GSIs will be holding separate "discussion sections" for one hour each week. You'll be signing up for them based on your timing availability. The goal is to give you a smaller section of peers to work with each week and to help build some community and peer-accountability.

**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.

**Course Outline:** The following topics will be discussed in the order shown below (subject to change).

**Unit 1 Material**

| Lecture | Day | Date | Topic(s) |
|---|---|---|---|
| 1 | Thurs | 27-Aug | Acid/Base Review |
| 2 | Tue | 1-Sep | *Quiz* 1 and Allyl Systems and Conjugated Pi systems pt 1 |
| 3 | Thurs | 3-Sep | Conjugated pi systems pt 2 |
| 4 | Tue | 8-Sep | *Quiz 2* and Conjugated pi systems pt 3 and Diels Alder pt 1 |
| 5 | Thurs | 10-Sep | Diels Alder pt. 2 |
| 6 | Tue | 15-Sep | *Quiz 3* and Electrocyclizations and Aromaticity Intro |
| 7 | Thurs | 17-Sep | Electrophilic Aromatic Substitutions pt. 1 |
| 8 | Tue | 22-Sep | *Quiz 4* EAS directing groups and SnAr intro |
| 9 | Thurs | 24-Sep | SnAr and Review |

**Unit 2 Material**

| Lecture | Day | Date | Topic(s) |
|---|---|---|---|
| 10 | Tue | 29-Sep | *Quiz 5* and Ketones and Aldehydes as electrophiles |
| 11 | Thurs | 1-Oct | Hemiacetals and acetals |
| | Fri | 2-Oct | ***Exam 1*** |
| 12 | Tues | 6-Oct | *Quiz 6* and Sugars pt. 1 |
| 13 | Thurs | 8-Oct | Sugars pt. 2 |
| 14 | Tues | 13-Oct | *Quiz 7* and Amine nucleophiles |
| 15 | Thurs | 15-Oct | Enolates introduction |
| 16 | Tues | 20-Oct | *Quiz 8* and Enolates alkylation, halogenation and aldol |
| 17 | Thurs | 22-Oct | Beta dicarbonyls as well as aldol condensations |
| 18 | Tues | 27-Oct | *Quiz 9* and Carbonyl vs beta carbon electrophiles |
| 19 | Thurs | 29-Oct | Cuprates and Robinson Annulation |
| 20 | Tues | 3-Nov | *Quiz 10* and Review ****AND VOTE**** |

**Unit 3 Material**

| Lecture | Day | Date | Topic(s) |
|---|---|---|---|
| 21 | Thurs | 5-Nov | Carboxylic Acids Introduction |
| | Friday | 6-Nov | ***Exam 2*** |
| 22 | Tues | 10-Nov | *Quiz 11* and Carboxylic Acid Derivatives |
| 23 | Thurs | 12-Nov | Lithiates attacking derivatives and Reductions of derivatives |
| 24 | Tues | 17-Nov | *Quiz 12* and Enolates of derivatives and enolates attacking derivatives and decarboxylation |
| 25 | Thurs | 19-Nov | Fatty acid synthesis and amino acid introduction |
| | Tues | 24-Nov | ***HOLIDAY FOR TURKEY!*** |
| | Thurs | 26-Nov | ***HOLIDAY FOR TURKEY!*** |
| 26 | Tues | 1-Dec | Peptide Sequencing |
| 27 | Thurs | 3-Dec | Edman Degradation and Review |
| | Mon | 14-Dec | ***Final Exam*** |