

**Chemistry 3B**  
**CHEMICAL STRUCTURE AND REACTIVITY (II)**  
**UC Berkeley – Fall 2017**  
**Dr. Pete Marsden – 323 Latimer – [petermarsden@berkeley.edu](mailto:petermarsden@berkeley.edu)**

**Location and time:** 100 Lewis Tu, Th 8:00-9:30 AM  
1 Pimentel Tu, Th 3:30-5:00PM (webcast)

**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:** <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. Exam and quiz grades will be posted under the Gradebook.

**Email:** [petermarsden@berkeley.edu](mailto:petermarsden@berkeley.edu)

All e-mail concerning Chemistry 3B should have "Chem3B" 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. 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 office hours.

**Recommended Materials (NOT REQUIRED!!!!):**

- K. P. C. Vollhardt, N. E. Schore; "Organic Chemistry, 7th Edition," Freeman, New York.

**Grading:** The course will be graded on the basis of **675 points**, distributed as follows:

- 10 best quizzes of 13 (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.

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

- Exam #1 will be held on Wednesday, September 27 (7-9 pm)
- Exam #2 will be held on Friday, November 3 (7-9 pm)
- The Final Exam will be held on Wednesday, December 13 (8-11 am)

**Quizzes (150 points total):**

Every Tuesday, 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**. You must attend the lecture section you are signed up for according to CalCentral.

## Course Grade

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

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

I create two separate histograms for the course, assign letters based on each histogram, and give students the higher of the two letter grades. One histogram is based on a pure points scale, the other gives more weight to the final exam.

## 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. Each set will contain suggested book problems from the 7<sup>th</sup> edition of the Vollhardt text as well as problems that I have written. 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 text problems as a “warm-up”. If you feel comfortable with the material, skip them entirely. If you are struggling, be sure to go through them 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 the exams and final examination 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 come to lecture regularly, and above all **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.** The textbook should be used as a supplement to the lectures. There may be many topics covered in lectures that are not in the text and you will be responsible for knowing this material.

## 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:*

- Monday, 10AM-Noon Bixby North. Tuesday 10AM-Noon in 100E Hildebrand (the chemistry library).
- Open door policy – Feel free to stop by my office in 323 Latimer and ask your questions. If the door is closed, I am either not in the office or I am busy.
- Email – You can set up meetings with me via email. Be sure to have “Chem 3B” in the subject of the email (petermarsden@berkeley.edu).

*Teaching Assistants:* Bixby Commons (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 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 here on a regular basis. Access to the room can be found on the southwest face of Latimer Hall.

*Head GSI – Jakob Dahl (jakobd@berkeley.edu)*

- Thursday, 11AM-Noon in Bixby Commons. Friday 2-3PM in Bixby Commons.
- Weekly Reviews from 7-9 pm in 100 Lewis on Wednesday Evenings.

**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 | 24-Aug | Allylic Systems   |
| 2       | Tue   | 29-Aug | <u>Quiz 1</u> and Conjugated Pi systems                         |
| 3       | Thurs | 31-Aug | Cycloadditions (Diels Alder) Stereochem                         |
| 4       | Tue   | 5-Sep  | <u>Quiz 2</u> and Diels Alder Rate effects                      |
| 5       | Thurs | 7-Sep  | Electrocyclizations and Aromaticity                             |
| 6       | Tue   | 12-Sep | <u>Quiz 3</u> and Electrophilic Aromatic Substitutions Mechs    |
| 7       | Thurs | 14-Sep | EAS directing groups  |
| 8       | Tue   | 19-Sep | <u>Quiz 4</u> and Nucleophilic Aromatic Substitution and Review |

## Unit 2 Material

| Lecture | Day   | Date   | Topic(s)  |
|---------|-------|--------|---|
| 9       | Thurs | 21-Sep | Exam 1 Half Review and Carbonyl Synth and Electrophile                        |
| 10      | Tue   | 26-Sep | <u>Quiz 5</u> and Wittig and Acetals  |
|         | Wed   | 27-Sep | <b><u>Exam 1 (7-9 pm)</u></b>   |
| 11      | Thurs | 28-Sep | Acetals and Sugars pt. 1  |
| 12      | Tues  | 3-Oct  | <u>Quiz 6</u> and Sugars pt. 2  |
| 13      | Thurs | 5-Oct  | Amines, Imines, Wolff-Kishner Reduction                                       |
| 14      | Tues  | 10-Oct | <u>Quiz 7</u> and Reductive Amination, Hydrides, pKas, Enolates Introduction  |
| 15      | Thurs | 12-Oct | Enolates Alkylation, halogenation, aldol intro                                |
| 16      | Tues  | 17-Oct | <u>Quiz 8</u> and Aldol, retroaldol, betadecarboxyls                          |
| 17      | Thurs | 19-Oct | Aldol Condensation and 1,2 vs 1,4 additions                                   |
| 18      | Tues  | 24-Oct | <u>Quiz 9</u> and 1,4 Additions (Conjugate Additions) and Robinson Annulation |
| 19      | Thurs | 26-Oct | Unit 2 Review   |

## Unit 3 Material

| Lecture | Day    | Date   | Topic(s)   |
|---------|--------|--------|--|
| 20      | Tues   | 31-Oct | <u>Quiz 10</u> and Carboxylic Acid Introduction                                  |
| 21      | Thurs  | 2-Nov  | Carboxylic Acid Derivatives Interconversion                                      |
|         | Friday | 3-Nov  | <b><u>Exam 2 (7-9 pm)</u></b>  |
| 22      | Tues   | 7-Nov  | <u>Quiz 11</u> and Lithiates attacking derivatives and Reductions of derivatives |
| 23      | Thurs  | 9-Nov  | Enolates of Carboxylic Acid Derivatives  |
| 24      | Tues   | 14-Nov | <u>Quiz 12</u> and Fatty Acid Synthesis and Amino Acid Introduction              |
| 25      | Thurs  | 16-Nov | Peptide Sequencing   |
|         | Tues   | 21-Nov | <b><u>HOLIDAY FOR TURKEY!</u></b>  |
|         | Thurs  | 23-Nov | <b><u>HOLIDAY FOR TURKEY!</u></b>  |
| 26      | Tues   | 28-Nov | <u>Quiz 13</u> and Review pt 1   |
| 27      | Thurs  | 30-Nov | Review pt. 2   |
|         | Wed    | 13-Dec | <b><u>Final Exam (8-11 am)</u></b>   |