Welcome to Chemistry 3BL at UC Berkeley

Instructor: Pete Marsden, petermarsden@berkeley.edu, 323 Latimer

Course Information: Monday, Wednesday Lecture, 12-1 PM in 1 Pimentel

Pre/Corequisites: C- or higher in Chem 3A and 3AL.
Concurrent enrollment in Chem 3B or a C- in Chem 3B.

Lab Exam Date: Wednesday August 9 during lab lecture (12-1 PM)

Lectures

The lectures on Monday will prepare students for the labs occurring on Wednesday and Thursday. The lectures on Wednesday will prepare students for the labs occurring on Monday and Tuesday. This is because there are labs that occur the morning before each lab lecture, therefore these lectures will seem very far ahead of what you are completing in lab. The lab lecture will help students with the pre-lab assignments as well as serve as a "what happened" and feedback cycle. Throughout the summer, I will try and add interesting topics about different drug molecules relevant today. They may or may not be related to what is happening in the lab periods, but will DEFINITELY be awesome.

Chem 3BL Lecture Schedule Summer 2017

Dates	Lecture Topic
6/19	NMR Review #1
6/21	NMR Review #2 and alpha pinene oxide intro
6/26	Alpha pinene oxide finish and Exp. 17 transfer hydrogenation intro
6/28	Exp. 17 wrap up and Exp. 20 Diphenylethanol intro
7/3	**NO LECTURE!** FIREWORKS AND BBQ! **AND 'MURICA!**
7/5	Exp. 20 more intro and fun facts!
7/10	Exp. 20 wrap up and Exp. 13 $NaBH_4$ reduction of benzoin intro.
7/12	Exp. 13 wrap up and Exp. 21 Wittig intro
7/17	Exp. 21 wrap up and Exp. 23 Aldol intro / allylic NMR splittings
7/19	Exp. 23 wrap up and Exp. 24 dimedone intro
7/24	Exp. 24 wrap up and fun facts!
7/26	Exp. 27 Perkin intro. (mechanisms)
7/31	Exp. 27 wrap up and Exp. 30 introductions tetrahydrocarboline
8/2	Exp 30 wrap up and review
8/7	Review 1
8/9	**Lab Exam**

Course Website

The course website is http://bcourses.berkeley.edu . If you are enrolled in the course, you will have access to this site. Announcements, spectra and other items will be posted on this website. It is recommended that you check this site daily to see if there are any relevant announcements that you might have missed in class.

Office Hours

- *Pete Marsden*: Monday and Tuesday, 9-11 AM in the chemistry library (Hildebrand). You may come to my office hours for lecture material as well as for lab material. Lab questions will be answered first, followed by lecture questions.
- *Teaching Assistants*: All TA office hours will be held in Bixby Commons. The schedule will be posted on the course website. You may attend the office hours held by any TA, not only the ones held by the TA for your lab section. These office hours are for both 3B and 3BL.

Email

Pete Marsden: petermarsden@berkeley.edu. All emails concerning Chemistry 3BL should have "Chem 3BL" in the subject line.

Required Texts

- Understanding the Principles of Organic Chemistry. A Laboratory Course. 1st Edition. Steven F. Pedersen and Arlyn M. Myers. ISBN 978-1-1114-2816-7
- Organic Chemistry Laboratory Notebook. Steven F. Pedersen and Jesse H. Pedersen. Hayden-McNeil ISBN 978-0-7380-3587-1

Ethics

It is assumed that all work you do for this laboratory class is original. This includes the prelab, in-lab observations and data and spectral analyses. You should not attempt to bring any data or notes that are not specifically allowed to the in-lab lab report periods or lab exam.

All of this falls under a behavioral category I refer to as Ethical Common Sense. Unethical behavior in this class will result in an F in the course and you will be reported to the Office of Student Conduct.

End of semester Lab Exam during lab lecture (30 points) (August 9, noon to 1pm)

There will be one written lab exam worth 30 points. **The exam will take place during the last week of lab lectures during the 50 minute Wednesday August 9th lecture period**. The exam will focus on material that has been covered in both lab lecture and lab. This exam MUST be taken in order to complete the class.

Note: If you already have three zero's in the course at the time of the lab exam, you do not need to take the lab exam as you have already failed the course.

Laboratory (135 total points)

Laboratories are 4 hours long. You should plan on being in lab for this period of time. There are 9 graded experiments and one graded worksheet. Each assignment is worth 15 points. Your lowest lab score will be dropped leading to a total of *135 points* for lab attendance and lab reports. **See the section in this handout on lab report grades to determine what is necessary for the successful completion of a lab report.** It is your responsibility to read this information. As you will see, there are important consequences associated with not attending lab and/or not turning in completed laboratory reports.

NMR spectroscopy is a very important tool in determining the structures of products isolated from reactions. Thus, we will make considerable use of NMR spectroscopy in this course. Additionally, almost all experiments make use of thin layer chromatography (TLC) as an analytical tool for both monitoring reaction progress and qualitatively assessing the purity of products.

A tentative lab schedule is provided below. It is subject to change and any updates will be announced on the course website.

Chem 3BL Lab Schedule Summer 2017

Dates	Experiment
6/19-6/20	A. Lab Check-In
6/21-6/22	B. NMR worksheet
6/26-6/27	C. #16 Some Chemistry of α-Pinene Oxide
6/28-6/29	D. #17 A Dehydrogenation/Hydrogenation**.**
7/3-7/4	**No Lab – 'murica.**
7/5-7/6	**No Lab (Chem 3B has an exam on 7/6)**
7/10-7/11	E. #20 Diphenyl ethanol and clay
7/12-7/13	F. #13 Sodium Borohydride Reduction of Benzil and Benzoin
7/17-7/18	G. #21 The Wittig Reaction
7/19-7/20	H. #23 The Crossed Aldol Condensation
7/24-7/25	I. #24 Identifying the Structure of an Aldehyde by Qualitative Analysis
7/26-7/27	**No lab (Chem 3B has an exam on 7/28)**
7/31-8/1	J. #27 The Synthesis of an α,β-Unsaturated Carboxylic Acid Derivative
8/2-8/3	K. #30 Synthesis of Tetrahydro-beta-carboline
8/7-8/8	L. Lab Check-Out
8/9-8/10	**No lab (Chem 3BL lab exam in class on 8/9 and Chem 3B exam 8/10)**

Pre-Labs (Augmented Prelabs) (3-5 points)

There will be a document posted to bCourses each week outlining information to add to your prelab for any given experiment. A representative amount of information required each week is shown below:

1) a reagent table and reaction equation, including the amount of each reagent used (ie. milligrams, milliliters, mmoles, etc.) as well as a calculation for the theoretical yield of the reaction.
2) A numbered list of steps outlining the procedure of the experiment.
3) ^{1}H and ^{13}C NMR predictions for the product of the reaction. If the product is unknown, a prediction of the starting materials will be required.
4) A reasonable attempt at an arrow-pushing mechanism for the reaction. If the product is not known, a prediction of a possible product with an accompanying mechanism.
5) At least one question regarding the PURPOSE of any given experimental procedure.

Pre-lab Handouts (1 point)

There will also be a 1 page pre-lab question sheet worth 1 point that must be completed BEFORE LAB STARTS.

Observations and Data collection (4-6 points)

During each lab, you must record accurate data. How much of each compound did you actually measure, what solvent did you run your TLC plate in, exactly which compounds/mixtures are in each lane of the TLC plate, what different ways did you visualize the TLC plate, and where did those different spots appear, what is the melting point (if required), what is the yield (crude), what is the appearance (crude), what is the yield after purification (pure), what is the appearance after purification (pure). All of these types of observations are required for each lab. There is a sample pre-lab for experiment 16 posted on bCourses that will show you ways to predict when you will need to make observations.

Post-lab Handouts and spectra (5 points)

There will be a post-lab handout that contains questions to answer regarding your results, as well as NMR spectra to analyze. This will be due at the beginning of the following lab period. **If even one spectrum is not fully attempted, you will receive 0/15 for the entire lab report.**

For each spectrum, you must:

1) Draw the structure of the compound.
2) Clearly and correctly label how many different types of the nuclei (either ^{1}H or ^{13}C) are present on the structure. Label using letters, starting at “A”.
3) Assign each peak on the spectrum with the appropriate label on your structure.
4) If present, indicate which peak or peaks correlate to the solvent
5) Complete any extra tasks described on the spectrum itself.

Lab Attendance and Lab Scores

In order to receive points for any given lab, the following conditions must be met:

- You must attend lab.

- You must prepare a prelab following the instructions posted for each experiment.
- You must arrive to lab on time, which means no later than Berkeley time (10 minutes after the hour). In general, the first 10-15 minutes of every laboratory period are dedicated to a safety discussion, which is an important part of the experiment. Therefore, if you show up late you will not be allowed to participate in lab for that day.
- You must wear protective clothing and eyewear during the laboratory period. Your TA can ask you to leave the lab for the day if you are not wearing such clothing or eyewear.
- You must record all expected data during, not after, the laboratory period. This includes melting points, TLC plates, yields, etc.
- You must turn in the assigned spectra and post-lab worksheet at the beginning of the lab period it is due. These will be collected as your TA checks prelabs. Late spectral data will not be accepted.

If you do not complete all of the above conditions for any given lab, you will receive a 0 for that experiment. The consequences of a 0 are as follows:

- If you receive two zeros during the semester, you not only will lose a total of 12 points, but your course grade will also be dropped by one third of a grade. For example, if you earn enough points to get a B+ in the class, you will receive a B.
- If you receive three zeros you will receive a failing grade in the course.

Grades

The point total for this course is 165. These are broken down as follows:

- 135 points for lab assignments (including one dropped score)
- 30 points for the end of semester lab exam

Grades at the end of the semester will be assigned as follows. I reserve the right to lower these cutoffs (that helps you ☺):

Grade	Includes	Points
A	A and A-	140-165
B	B+, B, and B-	122-139
C	C+, C, and C-	93-121
D	D	82-92
F	F	0-81