Welcome to Chemistry 3AL: Organic Chemistry Laboratory

Instructor: Michelle Chang, mcchang@berkeley.edu, 125 Lewis

Course Information: **Spring 2017**
Mon: 12pm-1pm (1 Pimentel)
Wed: 12pm-1pm (1 Pimentel)

Please note that the two lectures are identical. Please see below for more information.

Pre/Corequisites: C- or higher in Chem 1A and 1AL.
Concurrent enrollment in Chem 3A or a C- in Chem 3A.

Lab Exam Date: Th April 27, 7pm-8pm (50 minute exam)

Chem 3AL Lecture Schedule (*dates are approximate)

The lectures on Wednesday will be repeated on the following Monday. They will prepare students for the labs occurring the following week. The lab lecture will help students with the pre-lab assignments as well as serve as a "what happened" and feedback cycle for the previous week's experiment.

Dates	Lecture Topic
1/18 and 1/23	Class introduction, review
1/25 and 1/30	Exp. 2 Solubility
2/1 and 2/6	Exp. 3 Mixed Melting Points
2/8 and 2/13	Exp. 6 Recrystallization and Decolorization
2/15 and 2/20	**MONDAY HOLIDAY (NO LECTURE)**
2/22 and 2/27	Exp. 7 Thin Layer Chromatography
3/1 and 3/6	Exp. 8 TLC of Herbs and Spices
3/8 and 3/13	Column Chromatography of Excedrin
3/15 and 3/20	Liquid-Liquid Extraction
3/22	Exp. 9 Naproxen
3/27 and 3/29	**SPRING BREAK (NO LECTURE)**
4/3	Exp. 9 Naproxen
4/5 and 4/10	Exp. 13 $NaBH_4$ with Benzil
4/12 and 4/17	NMR I
4/19 and 4/24	NMR II and Review
Th 4/27	**Lab Exam (7-8 pm)**

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
- *Michelle Chang*: **Wed 1-3 pm.** 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 3A and 3AL.

Email
All emails concerning Chemistry 3AL should have "Chem 3AL" in the subject line. Please note that it may be more effective to come to office hours or speak to me before or after class since emails to me often get lost.

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 lab exam. 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 (30 points) (Th April 27, 7pm to 8pm)
There will be one written lab exam worth 30 points. 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. A score of ≥10 points will warrant completion of the course.

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 (170 total points)
Laboratories are 4 hours long. You should plan on being in lab for this period of time. There are 9 graded experiments (Weeks B-J) and 4 graded worksheets (Weeks A, K, and L). Each assignment is worth 15 points. Your two lowest lab scores will be dropped leading to a total of *170 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.

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

Chem 3AL Lab Schedule Spring 2017

Labs will run for most of the semester on a Tuesday through Monday Schedule. The first week, as well as the last two weeks, run on a Monday through Friday schedule. Please be aware of when your lab is meeting, and which experiment you must prepare for.

Dates	Experiment
1/17-1/20	**MONDAY HOLIDAY (NO LAB)**
*1/23-1/27	A. Lab Check-In and Bonding Worksheet
1/30-2/3	B. Exp. 2 Solubility and acid/base chemistry
2/6-2/10	C. Exp. 3 Mixed melting points
2/13-2/17	D. Exp. 6 Recrystallization and decolorization of brown sugar
2/20-2/24	**MONDAY HOLIDAY (NO LAB)**
2/27-3/3	E. Exp. 7 TLC of Analgesics (modified)
3/6-3/10	F. Exp. 8 TLC of Herbs and Spices
3/13-3/17	G. Column Chromatography of Excedrin components (handout)
3/20-3/24	H. Liquid-liquid extraction of Excedrin components (handout)
3/27-3/31	**SPRING BREAK (NO LAB)**
4/3-4/7	I. Exp. 9 Analysis of Sodium Naproxen in Aleve
4/10-4/14	J. Exp. 13 Sodium Borohydride Reduction of Benzil and Benzoin
4/17-4/21	K. NMR Worksheets #1 and #2
4/24-4/28	L. Lab Check-Out and NMR Worksheet #3

Please note:

- **Laboratory classes begin on the first Monday of the semester, Jan 23**
- **There are no laboratory classes in a week with a Monday holiday**

Lab Experiments: 15 points total. Broken down below.

Pre-Labs (Augmented Prelabs) (2-3 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 purpose of the lab
2) A numbered list of steps outlining the procedure of the experiment.
3) Predictions for any purification steps performed during a lab period.
4) A reasonable attempt at an arrow-pushing mechanism for any reactions. 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 (8-9 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.

Data-Analysis Handouts (2-4 points)
There will be a data-analysis handout that contains questions to answer regarding your results. These handouts will be designed to finish during the lab period and must be turned in BEFORE YOU LEAVE LAB. On occasion, I will allow for these handouts to be turned in at the beginning of the following week's lab section.

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 data-anlysis handout.

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 15 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 200. These are broken down as follows:

- 170 points for lab assignments (including two dropped scores)
- 30 points for the end of semester lab exam

Grades at the end of the semester will be assigned as follows. If it is necessary, the curve may be lowered but will not be higher than listed below (*i.e.* it will only help!):

Grade	Includes	Points
A	A and A-	160-200
B	B+, B, and B-	145-159
C	C+, C, and C-	110-144
F	F	0-109