Chemistry 3AL – Spring 2021

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Office Hours: TBD (see bCourses for updates)

Enrollment Issues: Lucia Briggs (luciab@berkeley.edu)

GSIs: See bCourses for GSI contact info, office hours schedule, and Zoom links. You may attend office hours held by any GSI, not just the GSI foryour lab section; tehse office hours are for both 3B and 3AL.

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

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.

Required Materials: Understanding the Principles of Organic Chemistry: A Laboratory Course 1st ed., Steven F. Pedersen & Arlyn M. Myers, ISBN 9780357730140 (accompanying OWLv2 online platform ***NOT*** required)

Expectations

We applaud you for making the courageous leap into an online learning environment during these unprecedented times! Evidence shows that remote students benefit from a structured schedule and real-time interaction so we have designed a "synchronous" course that incentivizes attendance. We also recognize, however, that each one of you is joining our "classroom" from a different set of circumstances. All that we ask is that you participate in the course to the greatest extent that is reasonable given your personal situation.

If you can turn on your webcam, please do! It's fun to see your face ☺. If you can only type your thoughts in the chat, that's okay too. If you need to miss class to grocery shop for your grandma, we get it; as you will read in the following pages, we have built in allowances for occasional absences into the course policies. If you are concerned that your time zone, work schedule, or familial obligations will affect your participation beyond what can be covered by our generic course policies, please reach out. We will work with you!

Above all, your health is the most important thing. This includes mental health as well. With all that is going on, it is okay to be "not okay". If you are struggling to keep up with the class or need someone to talk to, just ask. We will not judge you or be disappointed – it is literally our job to help students. And if we can't help you ourselves, we probably know someone who can.

Ethics

Research says that chemistry is best learned in collaboration with others. With the exception of the lab exam, we encourage you to actively engage with your classmates on any and every assignment. That being said, all final submissions must be your own original work that reflects your own understanding of the material. So what counts as "cheating" in this class?

- Communicating with other humans via Zoom, instant message, Google doc, etc. during the lab exam.
- Accessing answer keys or other students' (graded or ungraded) assignments from previous semesters of the course
- "Faking" your presence in a lab or lecture session by logging on and walking away from your device.
- Presenting another human's work as your own by
    - Paying someone to complete an assignment for you
    - Copying and pasting answers from Chegg posts, Piazza discussions, other students, etc.
    - Re-phrasing answers from Chegg posts, Piazza discussions, other students, etc.
    - Using your own words to communicate answers from Chegg posts, Piazza discussions, other students, etc. that you don't really understand yourself

This last point is pretty tough. To avoid accidental unethical conduct, we suggest instating a "waiting period" between when you talk to someone about an answer and when you write your own answer down.

Studies show that there are three main reasons that students cheat: (1) stressful external circumstances, (2) lack of confidence in their abilities, and (3) perception that the risk of being caught is low or that the consequences are mild. We are all operating under stressful circumstances right now, some of you especially so. If you are feeling overwhelmed to the point of considering cheating, please get in touch. We are here to help and we want you to succeed.

As for the perception that cheating is a low risk activity, this is simply false. Many cheaters get caught. If you're sole purpose is to get points and not learn, you're missing out on some of the coolest stuff that organic chemistry has to offer.

Remember that you are bound by the UC Berkeley Honor Code:

> *"As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others."*

Unethical behavior in this class will be reported to the Office of Student Conduct and will result in a 0 on the relevant assignment (that cannot be dropped) which may lead to a failing grade in the course.

Lectures: Monday 12pm-1pm or Wednesday 12pm-1pm (Pacific Time)

The Wednesday lecture will be an exact repeat of the Monday lecture. The Zoom recordings will be posted to bCourses after the Wednesday lab lecture. The lab lecture will help students with the pre-lab assignments as well as serve as a "what happened" and feedback cycle. Throughout the semester, 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 3AL Lecture Schedule Spring 2021

Dates	Lecture Topic*
Jan 18/20	**NO LECTURES**
Jan 25/27	Exp. 2 Solubility and Acid/Base introduction
Feb 1/3	Exp. 2 wrap-up and Exp. 3 mixed melting points introduction
Feb 8/10	Exp. 3 wrap-up and Exp. 5/6 Recrystallization introduction
Feb 15/17	**NO LECTURES**
Feb 22/24	Exp. 5/6 wrap-up and Exp. 7 Thin layer chromatography introduction
Mar 1/3	Exp. 7 wrap-up and Exp. 8 TLC herbs and spices introduction
Mar 8/10	Exp. 8 wrap-up and Excedrin Column (handout) introduction
Mar 15/17	Excedrin Column wrap-up and Excedrin extraction (handout) intro
Mar 22/24	**NO LECTURES (spring break)**
Mar 29/31	Excedrin extraction wrap-up and Exp. 9 Naproxen intro and NMR intro
Apr 5/7	Exp. 9 wrap-up and Exp 10. Nucleophilic reactions intro with NMR
Apr 12/14	Exp. 10 wrap-up and Exp 13 $NaBH_4$ reduction and NMR
Apr 19/21	Review and NMR
Apr 26/28	**NO LECTURES (lab exam week)**

*All "Exp. ##" refer to the corresponding experiment in the Pedersen lab text.

End of semester Lab Exam (30 points) (During week of Apr 26-30, time TBD)

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.

Worksheets (4 worksheets, 15 points each, 60 total points)

There are four worksheets throughout the semester. One at the beginning as a review on bonding and in introduction to bond-line notation, and three at the end of the semester about nuclear magnetic resonance (NMR). You'll be looking at spectra, learning to analyze structures.

Laboratory (10 total experiments, 15 points each, best 8 scores max 120 total pts)

Laboratories are 4 hours long. You should plan on being in lab for this period of time. There are 10 graded experiments. Each assignment is worth 15 points. Your two lowest lab scores will be dropped leading to a maximum total of *120 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 2021

Dates	Experiment*
Jan 18-22	No labs during first week of classes
Jan 25-29	A: Bonding Worksheet
Feb 1-5	B: Exp 2 Solubility and Acid/Base
Feb 8-12	C: Exp 3 Mixed Melting Points
Feb 15-19	**NO LABS**
Feb 22-26	D: Exp 5/6 Recrystallization
Mar 1-5	E: Exp 7 Thin Layer Chromatography
Mar 8-12	F: Exp 8 TLC of herbs and spices
Mar 15-19	G: Excedrin Column (Handout)
Mar 22-26	**NO LABS**
Mar 29-Apr 2	H: Excedrin Extraction (Handout)
Apr 5-9	I: Exp 9 Naproxen
Apr 12-16	J: Exp 10 Nucleophilic Reactions AND NMR wksht 1
Apr 19-23	K: Exp 13 $NaBH_4$ with benzil AND NMR wksht 2
Apr 26-30	L: NMR wksht 3
	Lab Exam (Time and Date TBD during this last week before RRR Week)

*All "Exp. ##" refer to the corresponding experiment in the Pedersen lab text.

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 2 posted on bCourses that will show you ways to predict when you will need to make observations.

Data-Anlysis 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.

Remote Lab specifics

Since the labs will be experienced through a Google site, it is possible to complete many of the observations before coming into the lab. The lab session will run in a Zoom call, where the GSI will create breakout rooms allowing students to self-select depending on how far along in the lab they are at the beginning of the lab period. Some example room names might be: "I just finished the pre-lab", "Did a quick pass through the site but haven't done any recording yet", "basically finished and want to use these four hours to chat with new friends"

By the end of the four hour lab session, your completed lab (observations and data analysis) must be scanned and uploaded to Gradescope.

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-analysis handout.

Grades

The point total for this course is 210. These are broken down as follows:

- 120 points for lab assignments (including two dropped scores)
- 60 points for worksheets
- 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	Percentage
A	A and A-	210-189	100-90
B	B+, B, and B-	188-157	89.9-75
C	C+, C, and C-	156-126	74.9-60
F	F	125-0	<59.9