

Chemistry 3B - Chemical Structure and Reactivity – Spring 2020

Dr. MaryAnn Robak, 327 Latimer Hall, mrobak@berkeley.edu

Syllabus

General Information

Chemistry 3B is the second semester of a two-semester survey of organic chemistry.

Email mrobak@berkeley.edu

Please use e-mail to ask questions that require a private response, or to make an appointment to see me. Bring course content questions to office hours or post them on Piazza instead of emailing me.

Lectures

You may attend either lecture section, regardless of enrollment.

Section 1: Tuesdays and Thursdays 8:00 - 9:30 am, Wheeler Auditorium

Section 2: Tuesdays and Thursdays 3:30 – 5:00 pm, 1 Pimentel

Review Sessions (Head GSI, Michael Baird, mbaird@berkeley.edu)

Wednesdays, 7:00 – 9:00 pm, 212 Wheeler Hall

Course Calendar (includes lectures, quizzes, exams, office hours, etc.)

<https://tinyurl.com/Chem3B-Calendar>

Course Websites

- **Piazza Q&A** (instructor announcements and student Q&A message board)
<https://piazza.com/class/k4h9ui1w78a5u0>
- **Piazza “Resources” (Files)** (lecture notes, problem sets, answer keys, etc.)
<https://piazza.com/berkeley/spring2020/chem3bspring2020/resources> (or click on the “resources” link at the top of the screen while logged in to the Q&A screen)
- **bCourses** will only be used for limited gradebook functions, and access to course captures (webcast). No files or announcements will be posted on this site.

Office Hours

Office hours are a walk-in, informal, group setting. You are highly encouraged to bring questions on a regular basis. In addition, office hours are a great place to review your notes, work on practice problems, and meet other students to study with even if you do not have specific questions before coming.

All **GSI Office Hours are held in Bixby North** (first floor of Latimer Hall - the entrance door is to your right if you are outside facing the main Latimer Hall lobby entrance with Pimentel Hall behind you). Any student in Chem 3B or 3BL (lab) is welcome to attend the office hours of any 3B/3BL GSI. See the course calendar (link above) for times.

Problem Sets (ungraded homework)

Problem sets (and answer keys) will be posted on Piazza. These problem sets will not be collected or graded, but these are a critical part of the learning process for this class and you should aim to complete them promptly (before the next quiz each week). Many of these practice problems will be in the same format and at the same level of difficulty as quiz and exam problems. You are responsible for all content covered in these problem sets.

Quizzes (12 quizzes, 20 pt each, highest 10 grades counted)

There will be a 1-page quiz at the start of each Thursday lecture, focused primarily on the topics covered in the previous week's lectures and problem sets. There will be no makeup quizzes, but only the 10 highest scores will be counted toward the final grade. Take the quiz in either section, regardless of your enrollment.

Exams (2 midterms, 200 pt each; cumulative final 350 pt)

You are responsible for checking the exam dates and times at the start of the semester to make sure that you do not schedule any conflicts. There will be no makeup exams. Students with academic conflicts (e.g. an exam for another class at the same time) should email Dr. Robak with details as soon as possible, at least two weeks in advance of the exam.

Missing one midterm exam for any reason (e.g. illness, family emergency, travel, etc.) will result in the course grade being calculated as described in "Alternate total" below, and therefore does not require any documentation. Any student who misses more than one exam should contact Dr. Robak immediately to discuss course completion.

- Midterm 1: **Friday, Feb. 28** from 7:00 – 9:00 PM.
- Midterm 2: **Tuesday, March 31** from 7:00 – 9:00 PM.
- Final Exam: **Wednesday, May 13** from 8:00 – 11:00 AM (Exam Group 9)

Participation Credit (50 pt maximum counts toward course grade)

- **Mentimeter** (in-class polls)
 - o Participation questions will be posed several times during most lectures, so that you can practice applying the concepts as they are discussed.
 - o Use the Mentimeter app or website <https://www.menti.com/> (no account/purchase required).
 - o Two points per lecture of participation credit:
 - 1 pt for registering a response to at least one Mentimeter question in the lecture (use your Berkeley email address for gradebook matching)
 - 1 pt additional credit for at least one correct answer in the lecture
 - o There will be 28 lectures (56 pt), but only the first 50 pt will be counted (3 dropped scores).
 - Credit may be earned in either lecture (but only one lecture per day)
 - There will be **no** individual score adjustments (e.g. for excusable absences or technical difficulties), however an alternative option for earning credit is listed below (Piazza).
 - o *Credit will be posted after each lecture for the first three weeks, and then will not be tabulated/posted until the end of the semester.*
- **Piazza** (answer questions from peers)
 - o 1 pt credit per instructor-endorsed answer on Piazza.
 - o To earn this credit, you must use a Piazza account linked to your Berkeley email address. Anonymous posting is acceptable.
 - o *Credit will not be tabulated/posted until the end of the semester.*

Students with Disabilities

- If you need disability-related accommodations in this class, please contact the Disabled Students Program (<http://dsp.berkeley.edu>) to request services. If you already have an accommodation letter from DSP, please check to make sure that the letter is submitted through the DSP system (there is no need to email a separate copy).
- Quiz and exam accommodations (extended time, separate rooms, etc.) are coordinated by the department scheduler, Sara Russell (sararussell64@berkeley.edu). Students with exam accommodations will receive an email from her with details approximately one week prior to each exam. Please respond promptly to her emails.
- If you would like to set up an individual meeting with me to discuss your accommodations, please email Dr. Robak (mrobak@berkeley.edu).

Grading

Both the “Standard” and “Alternate” total points will be calculated for each student as listed below. The higher of the two totals will be used to assign the final letter grade according to the grading scale on the right:

“Standard” Total Points

Description	Points
Midterm 1	200
Midterm 2	200
Quizzes (best 10 out of 12 scores)	200
Participation (best 50 points)	50
Final Exam	350
Total	1000

“Alternate” Total Points

The lowest 200-pt score (Midterm 1, Midterm 2, or Quizzes) will be dropped, and the Final Exam score will be multiplied by 1.57 (scaled up to a maximum of 550 points).

Description	Points
Highest 200-pt score (Midterms/Quizzes)	200
Middle 200-pt score (Midterms/Quizzes)	200
Lowest 200-pt score (dropped score)	0
Participation	50
Final Exam (score multiplied by 1.57)	550
Total	1000

Grading Scale

Letter Grade	Point Total (best score out of “standard” and “alternate total points)
A+	950 - 1000
A	900 - 949
A-	850 - 899
B+	800 - 849
B	750 - 799
B-	700 - 749
C+	650 - 699
C	550 - 649
C-	450 - 549
D	400 - 449
F	0-399

Extra Credit

Extra credit opportunities will be announced throughout the semester, including an error analysis assignment for each midterm exam.

Recommended Reading (optional books and other resources)

Recommended reading assignments will be posted for each topic, primarily from the following sources. These reading assignments are optional. Quizzes and exams will be based on material covered in the lectures and problem sets.

- **Master Organic Chemistry** (website) <https://www.masterorganicchemistry.com/>
This site includes both free and paid resources. Recommended reading links will be free content.
- **Organic Chemistry with a Biological Emphasis**, by Tim Soderberg. (*a free online textbook*)
[https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Book%3A_Organic_Chemistry_with_a_Biological_Emphasis_v2.0_\(Soderberg\)](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Book%3A_Organic_Chemistry_with_a_Biological_Emphasis_v2.0_(Soderberg))
- **Organic Chemistry as a Second Language: Second Semester Topics**, 4th Edition, by David Klein (Wiley, ISBN 978-1-119-11065-1)
This is a small paperback book with review-style descriptions of topics, study suggestions, and many practice problems.
- **Organic Chemistry: Structure and Function** by Peter Vollhardt and Neil Schore. W.H. Freeman, New York. (Section references will correspond to the 8th edition, but any recent edition is sufficient.)

Schedule

Day	Date	Lec #	Quizzes/Exams (content emphasis)	Lecture Topics with letter codes (<i>subject to updates</i>)
Tues	Jan 21	1		A. Acids and Bases B. Nucleophiles, Electrophiles, Leaving Groups: Acyl Substitution C. Introduction to Carboxylic Acid Derivatives D. Reactions with Carbanion (Grignard) Nucleophiles E. Reactions with Hydride Nucleophiles F. Enzyme Catalyzed Oxidation and Reduction G. (Reversible?) Substitutions with Carboxylic Acid Derivatives H. Peptide and Lipid Structure and Hydrolysis I. Peptide and Lipid Biosynthesis J. Peptide Synthesis in the Lab: DCC and Boc
Thurs	Jan 23	2		
Tues	Jan 28	3		
Thurs	Jan 30	4	Quiz 1 (Lec 1, 2)	
Tues	Feb 4	5		
Thurs	Feb 6	6	Quiz 2 (Lec 3, 4)	
Tues	Feb 11	7		
Thurs	Feb 13	8	Quiz 3 (Lec 5, 6)	
Tues	Feb 18	9		
Thurs	Feb 20	10	Quiz 4 (Lec 7, 8)	
Tues	Feb 25	11		K. Imines and Enamines: Condensation and Hydrolysis L. Imines and Iminium Ions as Intermediates M. Hydrates, Hemiacetals, and Acetals N. Carbohydrates (Sugars): Cyclic Hemiacetals/Acetals O. Enols, Enolates and Enamines as Nucleophiles P. Enolates with Aldehyde/Ketone Electrophiles (Aldol) Q. Enolates with Ester/Thioester Electrophiles (Claisen)
Thurs	Feb 27	12	Quiz 5 (Lec 9, 10)	
Fri	Feb 28		Exam 1 (Lec 1-10)	
Tues	Mar 3	13		
Thurs	Mar 5	14	Quiz 6 (Lec 11, 12)	
Tues	Mar 10	15		
Thurs	Mar 12	16	Quiz 7 (Lec 13, 14)	
Tues	Mar 17	17		
Thurs	Mar 19	18	Quiz 8 (Lec 15, 16)	
Tues	Mar 24		Spring Break	
Thurs	Mar 26		Spring Break	
Tues	Mar 31	19	Exam 2 (Lec 11-18)	R. Conjugate Addition S. Allylic Reactivity T. Conjugated Pi Systems: Molecular Orbitals and Reactivity U. Aromaticity – Molecular Orbitals and Stability V. Nucleophilic Aromatic Substitution W. Electrophilic Aromatic Substitution 1: Mechanism and Electrophiles X. Electrophilic Aromatic Substitution 2: Effects of Substituents on Regioselectivity and Rate Y. Cycloadditions (Diels-Alder)
Thurs	Apr 2	20		
Tues	Apr 7	21		
Thurs	Apr 9	22	Quiz 9 (Lec 19, 20)	
Tues	Apr 14	23		
Thurs	Apr 16	24	Quiz 10 (Lec 21, 22)	
Tues	Apr 21	25		
Thurs	Apr 23	26	Quiz 11 (Lec 23, 24)	
Tues	Apr 28	27		
Thurs	Apr 30	28	Quiz 12 (Lec 25, 26)	
M-F	May 4-8		RRR Week	
Wed	May 13		Final Exam (cumulative)	(cumulative final exam, with extra emphasis on most recent material)

Lecture numbers vs. letters and course organization

The lecture dates are numbered in the schedule above. The lecture notes are titled with letter codes (Organized by topic). There will NOT be a 1:1 correspondence of numbers to letters. The recommended reading and problem sets will be titled with letter codes to match the corresponding lecture notes by topic.

Is it cumulative?

The schedule above shows which content will be emphasized on each quiz/exam, based on when that content was discussed. The content emphasis includes the problem sets that correspond to those lectures. However, the course material is inherently cumulative (topics discussed later build upon topics discussed earlier), so ALL topics previously covered are subject to inclusion on any quiz or exam.