Course Syllabus

Jump to Today

Chemistry 4B

General Chemistry

Spring 2017

Instructors:	Professor Ronald Cohen	Professor Jamie Cate
Office Hours	Wednesday 4-5 PM and Friday 11-12 PM in B68 Hildebrand	Fridays 3:00-4:30 PM 621 Stanley Hall
Email:	rccohen@berkeley.edu	jcate@lbl.gov
	lecturing the first half on measurements and uncertainties, separations, spectroscopy, electrochemistry, mass analysis, kinetics, air pollution and climate	lecturing the second half on introductory organic chemistry and chemical biology
Class Meetings	MWF 10:10-11:00 AM in 1 Pimentel Hall	
Required Materials:	Two textbooks are required, plus a laboratory manual (1) General Chemistry, by Petrucci *et al.*, 11th edition, Pearson 2017 (2) Quantitative Chemical Analysis, by Harris, 9th edition, Freeman 2016 (3) Lab Manual, available as downloads on bcourses	
Course Website	http://bcourses.berkeley.edu	

EXPECTATIONS: In this course, the main goal is for you to develop your critical thinking skills in chemistry. This will include survey material on the topics listed above and learning to design an effective experiment to answer a research question. We will be building knowledge of chemistry, but also about the scientific process in general.

CLASS ACTIVITIES: Class time will consist of lecture, demonstrations, discussions, and group activities/problem solving. Participation in discussion is expected and will maximize your learning.

bCourses: You can log on to bCourses using your Calnet ID. In addition to posting relevant course information, we will be using bCourses as an online management tool for the grading database. You will be able to check your grades online

throughout the semester.

WEEKLY REVIEWS: The GSIs will be hosting weekly review sessions on Tuesdays from 6-7:30PM in 120 Latimer. These sessions will likely focus on the chemistry and report writing of the laboratory portion of the course.

HOMEWORK: Homework will be assigned weekly. Answers will be posted after class Monday. These problems will be helpful to you in learning the material.

LAB: Detailed information about the laboratory portion of the course can be found on bCourses. There will be seven experiments that span the first nine weeks of the semester. The lab period lasts for 4 hours beginning with a brief prelab discussion facilitated by your GSI. The rest of the lab time will be devoted to performing the experiment and writing up your lab report. In most instances, lab reports are due the week after you complete lab. In some cases we allow an extra week to work around exams. Students must always think for themselves and turn in their own work, even when collaborating with lab partners. Consult the schedule listed on bCourses. Late lab reports will incur a 20% per day penalty. The last five weeks will be devoted to planning and executing a longer research project. Students will work in pairs for their research project. At the end of the semester on **Saturday, May 6th**, students will present posters on their work. Attendance and completion of all lab experiments is mandatory. If you miss a lab session, you will fail lab and earn no higher than a D for your course grade. If you miss lab due to illness or family emergency, please contact the ISF supervisor, Phil Ly, to reschedule.

CHEATING AND PLAGIARISM: We expect you to follow the Berkeley Honor Code: “As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others.” Incidences of cheating will be taken seriously and paperwork will be filed with the Office of Student Conduct. Resist the temptation to copy answers from solutions manuals or your peers.

EXAMS: There will be two midterm exams in this course administered during class on the following dates: **February 24**, and **April 17**. If you cannot be present to take the exams at these times, you cannot take Chem 4B. Exam questions will be taken from material covered in the course from lecture, lab, discussion, demonstrations, and applications. The final exam for this course will be cumulative and will be on **Wednesday, May 10th**, from 8:00-11:00 AM. More details about the exam policies for Chem 4B can be found on our course website.

GRADING POLICY: The different aspects of the course will be graded as follows.*

	Percent of Grade
Lab	45%
Exams (2 midterms, 1 final)	55%

Course Total	100%

*Note: these proportions may change slightly during the semester.

OVERALL GRADE FOR THE COURSE:

Your overall grade for the course will be determined by the number of points you earn in the course. The intended grade ranges for the course are listed below. Since we are grading on a straight scale, everyone has the chance to succeed and students are encouraged to help each other to maximize learning. The +/- cutoffs will not be published or released to students (not even at the end of the semester). Grade cutoffs may be lowered in extreme circumstances, but they will not be raised. If you earn greater than 87.5% in this class, you are guaranteed to fall in the 'A' range. For example if you earn 88% of the course points you will earn an A- in the class.

Grade	**Percentage Range**
A	87.5-100
B	75.0-87.4
C	60.0-74.9
D	45.0-59.9
F	<45.0

Unit 1 Syllabus*

Mon	***Tue***	***Wed***	***Thu***	***Fri***	**Weekly Reading (R), Homework (H), and Lab (L)** (*P* for Petrucci and *H* for Harris)
16 Martin Luther King Day	17	18 Course intro	19	20 Measurements and uncertainties	**Reading and HW due in advance of first lecture** **R1:** *H* Ch 0-5 **H1:** *H 1-30, 1-36, 3-15, 3-22, 4-E, 4-H, 4-12, 4-35*

					L1: Check In, including brainstorming for special projects
23 Introduction to separations	24	25 Chromatography	26	27 Intro to Spectroscopy	**Reading and HW due Jan 23** **R2:** 23-24 **H2:** *H* 23-14, 23-51, 24-26, 24-28, 24-33 **L2:** Quantitative Analysis of a Solution Containing Co and Cu (separation by chromatography) **Projects:** Two project ideas due (2 copies)
30 Spectroscopy	**31** Spectroscopy	1	**2**	**3** Mass spectrometry	**Reading and HW due Jan 30** **R3:** *H* Ch. 18-21 **H3:** *H* 18-4, 18-20, 18-38, 20-11, 20-12, 21-4, 21-21, **L3:** Quantitative Analysis of a Solution Containing Co and Cu (analysis of Cu by AES) **Projects:** One page outline (2 copies)
6 Kinetics	**7**	8 Kinetics	**9**	**10** Kinetics	**Reading and HW due Feb 8** **R4:** *P* Ch. 20 **H4:** P 20-22, 20-23, 20-37,20-38,20-45,20-48,20-49,20-53, 20-87 **L4:** Flash Kinetics **Projects:** Revise based on feedback from ISF and GSI

*A complete syllabus for the whole semester will be available on the course website as we proceed.

Mon	***Tue***	***Wed***	***Thu***	***Fri***	**Weekly Reading (R),** **Homework (H), and Lab (L)** (*P* for Petrucci and *H* for Harris)
13	14	15	16	17	**Reading and HW due Feb 13** **R5:**

Air pollution		Air pollution		TBD	Chapter 11.3 (pages 206-210) and Chapter 12.1 and 12.2 (pages232-240) from the following: **http://acmg.seas.harvard.edu/people/faculty/djj/book/ (http://acmg.seas.harvard.edu/people/faculty/djj/book/)** **H5:** *TBD* **L5:** Thin Layer Chromatography and HPLC of Thyme Leaf Extracts **Projects:** Detailed plan with two relevant journal articles (2 copies)
20 President's Day Holiday	21	22 Exam review	23	24 **Exam #1**	**L6:** Analysis of HPLC data from previous week and Antibacterial Properties of Thyme, measuring zones **Projects:** Materials Requests (in lab); a short activity on elevator pitch
27 Electrochemistry	**28**	1 Electrochemistry	**1**	**3** Electrochemistry	**Reading and HW due Feb 29** **R7:** *P* Ch 19 **H7:** *P* 19-2,19-8, 19-10,19-20,19-27,19-43,19-55, 19-102, 19-110 **L7:** Electrochemistry **Projects:** Instrument request forms, late materials requests
6 Introduction to Chemical Biology/Organic molecules	7	8 Organic molecules	9	10 Proteins: Primary and secondary structure	**R8:** *P* Ch 26 **H8:** *P* 26.9, 26.10, 26.13-16, 26.21-22, 26.59, 26.89, 26.91 **L8:** Extraction and Quantitative Analysis of Limonene by Gas Chromatography **Projects:** Finalized plan, NRC quiz (in lab)

13 Proteins: Protein folding	**14**	15 Enzymes	**16**	**17** In-class Special Projects presentations (Elevator pitches)	**R9:** *P* Ch 26, 28 **H9:** *P* 28.27, 28.30, 28.39a, 28.58 20.27a, 20.28, 20.34, 20.43, 20.59, 20.63, 20.64, 20.92, 20.93 **L9:** prep for projects, elevator pitches
20 Enzymes	**21**	22 Nucleic acids: Nucleosides and nucleotides	**23**	24 DNA properties	**R10:** *P* Ch 28 **H10:** *P* TBD, Posted problems **Projects:** Week 1
27	**28**	29	**30**	31	**Spring Break**
3 RNA properties	**4**	5 RNA properties	**6**	**7** Polymerase chain reaction	**R11:** *P* Ch 28 **H11:** Posted problems **L11:** Special Project **Projects:** Daily plan
10 CRISPR-Cas9 & genome engineering	**11**	12 TBD	**13**	**14** TBD	**L13:** Special Project **Projects:** Daily plan
17 **Midterm #2**	**18**	19 Chemistry Spectroscopy and Climate	**20**	**21** Chemistry Spectroscopy and Climate	**R14:** *P* Ch 28 **H14:** Posted problems **L14:** Special Project **Projects:** Daily plan, Poster outline due
24	**25**	26	**27**	**28**	**R15:** TBA

Fossil fuels		Biofuels		In-Class Special Projects presentations	**H15:** (none) **L15:** Special Project, check out **Projects:** Sample submission, data analysis only
1 RRR, final exam review, Pimentel	**2**	**3** RRR, final exam review, Pimentel	**4**	**5** RRR	**R16:** (none) **H16:** (none) **L16:** RRR **Projects:** RRR **Saturday May 6th, poster session**
8	**9**	10 **Final Exam** **8-11 AM**	**11**	**12**	

GSI Office Hours

Note: All GSI Office Hours are held in Latimer 106 and begin the second week of classes.

GSI	**Office Hour**
Sally	Monday 11:30am-1:30pm
Rachel	Monday 1-3 pm
Michael	Monday 5-6pm Thursday 5-6pm
Wojciech	Monday 9-10am Tuesday 9-10am
Caleb	Wednesday 1-2pm Friday 3-4pm
Tom	Wednesday 3-5pm