Chemistry 1B
General Chemistry
Spring 2015

Instructor:	Dr. Emily F. Chu 334 Latimer Hall Office Hours: Monday 11AM-12PM Wednesday 9-10AM chu_e@berkeley.edu; 510-642-4899		
GSIs	Tu 1-5	Leela Velautham	leela.velautham@berkeley.edu
	Wed 1-5	David Garfield	david.garfield@berkeley.edu
	Th 8-12	Muller Gomes	muller.gomes@berkeley.edu
	Th 1-5	Elizabeth Grossman	egrossman@berkeley.edu
	Th 6-10	Julia Oktawiec	joktawiec@berkeley.edu
Class Meetings	MW 10:10-11:00 AM in 120 Latimer Hall		
Required Materials	(1) Principles of Modern Chemistry, by Oxtoby, Gillis and Campion, 7th edition (2) Selected chapters from Harris' Quantitative Analysis, 8th edition, custom ebook available online (version number: 1660063) (3) Subscription to Sapling Learning, see directions on bCourses (4) Lab Manual, available as downloads on bCourses (5) Student Lab Notebook (or equivalent lab notebook with carbon copies) (6) TI-30X IIS Calculator (or equivalent simple non-graphing scientific calculator)		
Course Coordinator	Mark Jenkinson, 213 Lewis, mjenkinson@berkeley.edu		
Course Website	http://bcourses.berkeley.edu		

EXPECTATIONS: In this course, the main goal is for you to develop your critical thinking skills in chemistry by learning about a wide variety of applications. Specifically, we will be building knowledge of chemistry, but also about the scientific process in general.

CLASS ACTIVITES: Class time will consist of lecture, demonstrations, discussions, and short 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 bSpace as an online management tool for the grading database. You will be able to check your grades online throughout the semester.

EXAMS: There will be two midterm exams in this course administered during class on the following dates: March 2nd and April 13th. If you cannot be present to take the exams at these times, you cannot take Chem 1B. 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 13th, from 8:00-11:00 AM. More details about the exam policies for Chem 1B can be found on our course website. The GSIs will be hosting exam review sessions on Thursdays the week before the midterms from 6-8PM in 120 Latimer. These sessions are mini-lectures with time for question and answer at the end and will likely involve some practice problems.

HOMEWORK: There will be two types of homework assignments: written homework graded by your GSI and online homework through the Sapling system. Paper homework is due when you get to class on Wednesdays. The first paper homework is due January 28th. Each homework assignment will be worth 4 points. The GSIs will spot check four problems, so be sure to attempt to answer all the questions. You must show your own work to receive credit. Online homework will be administered through the Sapling system. Sapling homework will be due by Friday night at 10PM. The week of an exam, homework will not be assigned. No late homework will be accepted.

LAB: There will be twelve experiments total, some of which will be multi-week experiments. 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 and collect data. Students must always turn in their own work, even when collaborating with lab partners. Consult the schedule listed in the lab manual. Late lab reports will incur a 20% per day penalty. Attendance and completion of all lab experiments is mandatory.

In order to earn points for any given experiment, the following conditions must be met:

- You must attend lab.
- Prior to attending any given laboratory period you must have completed all of the reading assignments and prelab assignments.
- You must prepare your notebook with a flowchart of the procedure prior to coming to lab.
- You must **arrive to lab on time**, which means no later than 8:10 AM for morning labs, 1:10 PM for afternoon labs and 6:10 PM for evening labs. 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 GSI is authorized to ask you to leave** the lab for the day if you are not wearing such clothing or eyewear. Refer to the lab manual introduction for details.
- You must record detailed **observations** about the experiment. Do not just make a checklist of what you are supposed to do and then check off the procedures as you carry them out without making observations as to what actually happened. All observations must be written in your lab notebook during, not after, the laboratory period.
- You must record all expected data during, not after, the laboratory period. This includes mass of things weighed, volume dispensed, yields, etc.
- Before leaving lab, you must meet with your GSI who will ask you to confirm that certain data is present in your notebook. Upon confirmation, the GSI will initial the notebook. At this point, you are to provide them with the perforated pages of your notebook that were used in lab that day.
- You must turn in the lab report at the beginning of the lab period it is due (typically the next lab period after the experiment was completed). The lab reports will be collected as your GSI checks prelabs. Late lab reports will incur a 20% per day penalty. Lab reports cannot be submitted to the GSI using e-mail or any other type of electronic format.
- Any questions you have regarding a lab report grade must be resolved with your GSI within one week of having received the graded lab report. All regrades are subject to final approval by the course instructor.

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

- If you receive one zero during the semester, this will be your dropped lab score.
- If you receive two zeros during the semester, you not only will lose the points associated with one experiment – as one lab score will be dropped –, but your course grade will also be lowered by one third of a grade. For example, if you earn enough points to get a B+ in the class, but you have two zeros, you will receive a B.
- If you receive three zeros you will receive a failing grade in the course.

CHEATING AND PLAGIARISM: The honor code for UC-Berkeley states, "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 available. When you collaborate, discuss thoroughly until you understand, then write brief notes. Do the bulk of your writing by yourself.

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

	Percent of Grade
Lab	20%
Homework, both hand written and online (Sapling)	10%
Exams (2 midterms, 1 final)	70%
Course Total	100%

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 I am grading on a straight scale, everyone has the chance to succeed and students are encouraged to help each other understand the material to maximize learning. The ranges for 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)** (*Ox* for Oxtoby and *H* for Harris)
19 Martin Luther King Day	**20**	**21** Course intro and review of 4A concepts	**22**	**23**	**R1:** *H* Ch 0 **H1:** Green chemistry questions posted on bspace **(due Jan. 28)** **L1:** Check In, N_2 tire discussion
26 Titrations	**27**	**28** Green chemistry, chemical principles of chromatography	**29**	**30**	**R2:** *Ox* Ch 3.6-3.11, 7.1-7.7, 10.1-10.3, 11.2, 11.5; *H* Ch 22.1-22.2, 23.1 **H2:** *Ox* 3.60, 10.16, 10.18, 14.72, 14.105 **(due Feb. 4)** **L2:** Vitamin C Analysis
2 Gas chromatography	**3**	**4** Calibration curves	**5**	**6**	**R3:** *Ox* Ch 14.8, *H* Ch 5.1-5.4, 23.1 **H3:** *H* 5-23, 5-24, 5-30, 22-2 **(due Feb. 11)** **L3:** Extraction and Quantitative Analysis by Gas Chromatography, part 1
9 HPLC	**10**	**11** Interpreting chromatograms, chromatography theory	**12**	**13**	**R4:** *H* Ch 24.1-24.3 **H4:** Ox Ch 10.22, 10.24; *H* 22-45, 24-A, 24-15, 24-19 **(due Feb. 18)** **L4:** Analysis of GC data from previous week and Thin Layer Chromatography of Thyme Leaf Extracts
16 President's Day No Class	**17**	**18** Intro to spectroscopy	**19**	**20**	**R5:** *Ox* Ch 4.6, 20.1, 20.2, 20.3 **H5:** *Ox* 20.38, 20.40 and questions posted on bCourses **(due Feb. 25)** **L5:** Analysis of HPLC data from previous week and Antibacterial Properties of Thyme
23 Molecular Spectroscopy	**24**	**25** New material and Exam Review	**26** Exam Review 6-8PM 120 Latimer	**27**	**R6:** *Ox* 18, 20.5 **H6:** no homework due Mar. 4 **L6:** no lab, exam review in lab
2 **Midterm #1** (in class)	**3**	**4** Intro to kinetics	**5**	**6**	**R7:** TBA **H7:** TBA **(due Mar. 11)** **L7:** Iodine Clock

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

Unit 2 Syllabus

Mon	*Tue*	*Wed*	*Thu*	*Fri*	**Weekly Reading (R), Homework (H), and Lab (L)** (*Ox* for Oxtoby and *H* for Harris)
2 **Midterm #1** (in class)	**3**	**4** Intro to kinetics	**5**	**6**	**R7:** none **H7:** none **(no homework due Mar. 12)** **L7:** Iodine Clock
9 Rate laws, rate constants, Eact	**10**	**11** Integrated Rate Laws	**12**	**13**	**R8:** *Ox* Ch 18.1, 18.2, 18.5 **H8:** *Ox* Ch 18: 4, 5, 7, 36, 40 **(due Mar. 18)** **L8:** Bleach Kinetics
16 Enzyme Kinetics	**17**	**18** Mechanisms	**19**	**20**	**R9:** *Ox* Ch 18.3, 18.4 and sections posted *Lehninger* Ch 3, Ch 6 **H9:** *Ox* Ch 18: 9, 10, 13, 16, 18, 25, 28, 48 **(due Apr. 1)** **L9:** Protein Folding
23 Spring Break, no class	**24**	**25** Spring Break, no class	**26**	**27**	
30 Mechanistic theories	**31**	**1** Atmospheric Chemistry and Catalysis	**2**	**3**	**R10:** *Ox* Ch 18.6, 18.8, 20.6 **H10:** Ozone kinetics questions posted on bCourses **(due Apr. 8)** **L10:** Enzyme Kinetics
6 Catalysis and Exam Review	**7**	**8** Intro to electrochemistry	**9** Exam Review 6-8PM 120 Latimer	**10**	**R11:** *Ox* Ch 3.12 **H11:** **(no homework due on Apr. 15)** **L11:** no lab, exam review

Unit 3 Syllabus

13 Midterm 2 (in class)	**14**	**15** Electrochem in various conditions	**16**	**17**	**R12:** *Ox* Ch 17.1-1.4 **H12:** *Ox* Ch 17: 2, 5, 6, 14 **(due on Apr. 22)** **L12:** Electrochem I
20 Fuel Cells	**21**	**22** Electrochemistry applications	**23**	**24**	**R13:** *Ox* Ch 17.5-17.9 **H13:** *Ox* Ch 17: 21, 31, 34, 35, 40, 41, 81 **(due on Apr. 29)** **L13:** Electrochem II, fuel cells
27 Nuclear Chemistry	**28**	**29** Nuclear Chemistry	**30**	**1**	**R14:** *Ox* Ch 19.1-19.7 **H14:** *Ox* Ch 19: 3, 13, 15, 25, 33, 41 **(suggested but not collected)** **L14:** Electrochem III, solar cells and lab check out
4 Final Exam Review by GSIs	**5**	**6** Final Exam Review by GSIs	**7**	**8**	**R15:** none **H15:** none **L15:** No Lab
11	**12**	**13** Final Exam 8-11am	**14**	**15**	