Chemistry 1A
General Chemistry
UC Berkeley – Spring 2018
Dr. Pete Marsden – 323 Latimer – petermarsden@berkeley.edu

Location and time: 1 Pimentel MWF 9:00-10:00AM and 1:00-2:00pm. The afternoon section will be a repeat of the morning section.

General Information:

Chemistry 1A is a one semester course that surveys the fundamentals of general chemistry. The learning goals of this course are to familiarize the students with the basic chemical concepts that are present in their lives. There will be a stronger focus on concepts than on pure mathematical problem solving. Most questions will have an explanation component as well as mathematical component to reinforce an understanding of chemical concepts as well as quantitative skills. The course material is quite diverse and difficult to unify with a cohesive story, therefore there are four separate units. The first unit will have periodic trends as the fundamentals of bonding. The second unit will cover matter and equilibrium with a focus on acid and base reactions. In the third unit, we will learn about the different ways we categorize energy in chemistry. Finally, the fourth unit will introduce the class to light and how we use it to study different properties of chemicals, including a review on what we know about bonding and molecular shapes.

Course Website: http://bcourses.berkeley.edu

The course website will be used for announcements throughout the semester, as well as for periodically posting selected resources. Homework sets will be posted regularly along with their keys, pictures of the lecture notes from class, links to the webcast, as well as other resources for your convenience. You are responsible for checking the site on a regular basis. Exam and quiz grades will be posted under the Gradebook, but will also be available at http://gradescope.com.

Email: petermarsden@berkeley.edu

All e-mail concerning Chemistry 1A should have “Chem1A” in the title. Use e-mail for asking simple questions about the course or if you would like to make an appointment to see me. Be aware that I will hold a total of six office hours each week, so I may not be able to answer longer questions via email, nor will it be likely to have a long one-on-one meeting with me on a recurring schedule.

Recommended Materials:

- Tro, Chemistry: A Molecular Approach 3rd edition. (recommended, not required) (I suggest finding a used copy on amazon or a digital copy as those are cost effective options)

Exams (150 pt per midterm, 225 pt final, Total 675 pts):

- Exam #1 will be held on Tuesday, February 6 (8-10 pm)
- Exam #2 will be held on Tuesday, March 6 (7-9 pm)
- Exam #3 will be held on Tuesday, April 10 (7-9 pm)
- The Final Exam will be held on Wednesday, May 9 (8:00 am – 11:00 am)

Homework:

Homework sets will be posted regularly on the course website. The homework will not be graded, but is extremely important for understanding the material. Each set may contain suggested book problems from the 3rd edition of the Tro text as well as problems that I have written. Due to the fast pace of this course, it will be easy to get behind. To ensure that this does not happen, I suggest you use the text problems as a "warm-up". If you feel comfortable with the material, skip them entirely. If you are struggling, be sure to go through them so that you will have a set of problem solving skills to apply to the more difficult problems on my homework sets.

When attempting my homework sets, be sure to go through your notes at the same time. Many of the strategies outlined during lecture are directly applicable to the completion of the homework questions.

Quizzes (100 points total, best 10 scores of 14 quizzes):

Every Friday, there will be an 8 minute, 10 point quiz administered during the lecture. You **MUST** attend the lecture you are registered for in order to receive credit for your quiz. The quizzes will be pulled directly from the homework assignments for the first half of the course, and will be closely related to the homework problems for the second half of the course. The best 10 quizzes of the total 14 will be included in your final score for the course. **Because of this, there will be no make-up quizzes**.

Lecture attendance:

General chemistry is a concentrated and fast-moving subject. I hope to give you a different angle on general chemistry than you may have seen in high school. If you have not taken chemistry in a while, this course will still be approachable. I will be using the chalkboard as my main source of conveying information, therefore it is imperative that you attend lecture and diligently take notes and participate.

Lecture attendance is particularly important, since all exams in this course will be based on the material covered in lecture. The textbook should be used as a supplement to the lectures. There may be many topics covered in lectures that are not in the text and you will be responsible for knowing this material.

Discussions (150 Points, best 30 scores of 40 assignments):

Each week, you must attend your discussion section. During the hour, you will be with your graduate student instructor, solving problems associated with the previous 3 lectures. To be prepared for these discussions, go to lecture each week and briefly review the material before attending your section. At the beginning of the semester, and again after each exam, there will be a lag on how many lectures will be covered during discussion; this is okay and we have planned for it. Your discussion handouts will be collected after each session, scanned, and graded. You will receive a link to your worksheets by the end of the day following your discussion. The discussions will be graded partially for completion, and partially for correctness. The rubrics will take into account the length of the given worksheets and will scale appropriately. Trust me, I want you to receive the vast majority of these points. Each worksheet will be worth 5 points, with the best 30 scores counting toward your final grade for a total of 150 points.

Grading: The course will be graded on the basis of 925 points, distributed as follows:

- 10 best of 14 quizzes (10 points each for 100 total points)
- 30 best discussions of 40 assignments (5 points each for 150 total points)
- Each exam is worth 150 points (total of 450 points).
- The final exam will be worth 225 points.

Course Grade

Final letter grades in this course will be based on the total points in the course. Plusses and minuses will also be assigned. Distribution of letter grades will be approximately:
A (30-35%); B (30-35%); C (20-25%); D, F (5-10%)
Percentage cutoffs are ***approximately*** (I reserve the right to lower these cutoffs if needed. This helps you ☺):
A+/A/A- (100%-90%); B+/B/B- (89%-71%); C+/C/C- (70%-45%); F (<44%)

Office Hours:

Dr. Pete Marsden:

- Wednesdays from 4:00 pm-6:00 pm in 433 Latimer
- Thursdays from 9:00 am-11:00 am in 100E Hildebrand (Chem Library)
- Email – You can set up meetings with me via email. Be sure to have "Chem 1A" as part of the subject of the email (petermarsden@berkeley.edu).

Graduate Student Instructors: Bixby Commons (schedule will be posted on bCourses)

The GSI office hours are spread out throughout the week, and are available on a walk-in basis to all enrolled students in both Chem 1A and Chem 1AL (lab). **You may visit any GSI** (not just your discussion GSI) during scheduled office hours. This is a very valuable resource and you are highly encouraged to bring questions here on a regular basis. Access to the room can be found on the southwest face of Latimer Hall.

Weekly Review (Tuesdays 8-10 pm in 120 Latimer):

Our head GSI, Derek Popple (derek_popple@berkeley.edu), will be holding a 2 hour review each week on Tuesday night in 120 Latimer from 8pm to 10pm. He will cover concepts from the previous lectures and provide a slightly different take on the material as well as some more practice problems. I recommend attending those reviews; Derek has a great grasp on the material and is extremely approachable.

Course Outline: The following topics will be discussed in the order shown below (subject to change). The number of lectures per topic will vary. Topics not found in the text will be inserted when appropriate.

Exam 1 Material (8 lectures)

Lecture	Day	Date	Topic(s)
1	Wed	17-Jan	Introduction
2	Fri	19-Jan	*Quiz 1* and Atoms, electrons, electron shells and subshells
3	Mon	22-Jan	Electronic configurations and periodic trends
4	Wed	24-Jan	Periodic trends (continued)
5	Fri	26-Jan	*Quiz 2* and Lewis dot structures (part 1)
6	Mon	29-Jan	More Lewis Dot Structures and Bonding
7	Wed	31-Jan	VSEPR and electronegativity
8	Fri	2-Feb	*Quiz 3* and Atomic orbitals, hybrid orbitals, shapes

Exam 2 Material (11 lectures)

Lecture	Day	Date	Topic(s)
9	Mon	5-Feb	Exam 1 review
	Tue	***6-Feb***	***Exam 1, 8-10 pm***
10	Wed	7-Feb	Gas laws (Part 1: temperature and kinetic energy)
11	Fri	9-Feb	*Quiz 4* and Real gasses and Van Der Waals equation
12	Mon	12-Feb	Intermolecular forces and vapor pressure
13	Wed	14-Feb	Vapor pressure and boiling points
14	Fri	16-Feb	*Quiz 5* and Equilibria (physical and solubility)
	Mon	19-Feb	***HOLIDAY NO LECTURE!***
15	Wed	21-Feb	Acid / Base 1: Definitions and analysis of acid/base rxns
16	Fri	23-Feb	*Quiz 6* and Acid / Base 2: Analysis and RICE tables
17	Mon	26-Feb	Acid / Base 3: More RICE tables and pH calculations
18	Wed	28-Feb	Acid / Base 4: Titrations/indicators
19	Fri	2-Mar	*Quiz 7* and Acid / Base 5: Le Chatelier's Principle, Review

Exam 3 Material (12 lectures)

Lecture	Day	Date	Topic(s)
20	Mon	5-Mar	Vocabulary Day
	Tue	***6-Mar***	***Exam 2 – 7-9 pm***
21	Wed	7-Mar	Heat and Phase changes
22	Fri	9-Mar	*Quiz 8* and Bond energies and Heats of reactions pt. 1
23	Mon	12-Mar	Heats of reactions pt. 2 and Heats of formation
24	Wed	14-Mar	Entropy and Spontaneity
25	Fri	16-Mar	*Quiz 9* and Hess's Law and Delta G introduction
26	Mon	19-Mar	Gibbs Free energy pt. 1
27	Wed	21-Mar	Gibbs Free energy pt. 2 (return to equilibria)
28	Fri	23-Mar	*Quiz 10* and Intro to redox chemistry
	Mon	26-Mar	***SPRING BREAK!***
	Wed	28-Mar	***SPRING BREAK!***
	Fri	30-Mar	***SPRING BREAK!***
29	Mon	2-Apr	Simple batteries (galvanic cells)
30	Wed	4-Apr	Kinetics part 1
31	Fri	6-Apr	*Quiz 11* and Kinetics part 2

Exam 4 Material (9 lectures)

Lecture	Day	Date	Topic(s)
32	Mon	9-Apr	Unit 3 review
	Tue	***10-Apr***	***Exam 3 – 7-9 pm***
33	Wed	11-Apr	Intro to electromagnetic spectrum
34	Fri	13-Apr	*Quiz 12* and Spectroscopy part 1
35	Mon	16-Apr	Spectroscopy pt. 2
36	Wed	18-Apr	Emission
37	Fri	20-Apr	*Quiz 13* and Molecular orbitals pt. 1
38	Mon	23-Apr	Molecular orbitals pt. 2
39	Wed	25-Apr	Molecular orbitals pt. 3
40	Fri	27-Apr	*Quiz 14* and Molecular orbitals pt. 4
	Wed	***9-May***	***Final Exam – 8-11 AM***