Chemistry 4A: General Chemistry & Quantitative Analysis
Fall Semester 2020

This series is intended for majors in physical and biological sciences and in engineering. It presents the foundation principles of chemistry, including stoichiometry, ideal and real gases, acid-base and solubility equilibria, oxidation-reduction reactions, thermochemistry, entropy, nuclear chemistry and radioactivity, the atoms and elements, the periodic table, quantum theory, chemical bonding, molecular structure, chemical kinetics, and descriptive chemistry. Examples and applications will be drawn from diverse areas of special interest such as atmospheric, environmental, materials, polymer and computational chemistry, and biochemistry. Laboratory emphasizes quantitative work.

Note: All dates and time are Pacific Time. Daylight saving time ends on Nov 1.

Lectures: **Mondays, Wednesdays, and Fridays 12-1 pm**

Synchronous Zoom lectures (**Requires sign-in with your Berkeley account**):

Link for 8/26-10/14

https://berkeley.zoom.us/j/93659993934?pwd=RlBtVkkrRnRnTXdjaGoybU4wS212QT09

(Zoom Meeting ID: 93659993934 Password: 692583)

Link for 10/16-12/4

https://berkeley.zoom.us/j/93154011332?pwd=WEtWQXJWNTVSdG5uZnJKREpwSWVHZz09

(Zoom Meeting ID: 93154011332 Password: 139109)

Lectures will also be recorded and uploaded to bCourses as MP4 files and will be available within 24h of the live lecture.

First lecture: Wednesday, Aug 26, 2020.

Note: Lectures start at "Berkeley time", i.e. **10 minutes past the hour**.

Office hours: **Mondays 4-5 pm** (or by appointment; **sign in with your Berkeley account**)

https://berkeley.zoom.us/j/94959726655?pwd=eDdnRDg2Q2ZrYldFTFhUVlV1bDFYQT09

(Zoom Meeting ID: 94959726655 Password: 747494)

Note: No office hour in the week Sep 23rd, see additional information below.

Instructors:

Lecture: Professor Michael Zuerch
E-Mail: mwz@berkeley.edu
Research Group: www.zuerchlab.org

Lecture: Professor Ke Xu
E-Mail: xuk@berkeley.edu
Research Group: www.cchem.berkeley.edu/xuklab/

Lab: Professor Richard Saykally
E-Mail: saykally@berkeley.edu
Research Group: http://www.cchem.berkeley.edu/rjsgrp/

Prerequisites: High School Chemistry, Calculus (concurrent)
Understanding of Material in Oxtoby Chapters 1, 2, and Appendices A, B, C Assumed

Texts(2): Oxtoby, Gilles and Campion, Principles of Modern Chemistry (8th Edition), Cengage; **Required**

Daniel C. Harris, Quantitative Chemical Analysis (10th Edition), W.H. Freeman and Company; **Required**

Instructions for online textbook discounts provided separately

Course Content: To the maximum extent possible, this course will be a survey of modern topics in chemistry. It will include basic principles as well as contemporary applications. The lecture material is divided into four sections. Each section is followed by an exam. An outline of the lectures for each section will be provided separately. Lecture material is designed to complement, not to repeat, the recommended reading in the text. *Hence, your reading should be completed before the lectures.*

Laboratory: Laboratory material is coordinated with the lectures to the maximum extent possible, although they are ultimately independent and complementary parts of the course. *Laboratories will be an entirely remote/virtual experience and you are not required to perform labs at your domestic location*. The tentative lab schedule and the lab manual are available on bCourses.

PART I: **I: Quantum Mechanics and Spectroscopy**
EXAM: Monday, September 21
(In preparation for this mid-term, the office hour for the week of Sep 21 is moved to Friday, September 18 at 4pm.)

PART II: **II: Bonds and Molecular Structure**
EXAM: Wednesday, October 14

PART III: **III: Ideal Gases and Laws of Thermodynamics**
EXAM: Friday, November 6

Part IV: **IV: Thermodynamics in Chemistry: Equilibria, Acids and Bases, and Phases**
EXAM: Final Exam (comprehensive): Monday, December 14 (3-6 pm Nominal)

Grading: The approximate composition of your course grade will be:

Midterms (3)	30%
Final Exam (Cumulative)	30%
Laboratory	35%
Problem Sets	5%

Letter grades will be assigned as follows (cutoffs may be lowered but they will not be raised!):

A: 90–100%
B: 75–90%

C: 55–75%
D: 35–55%
F: 00–35%

Homework: Homework will be assigned and graded using the online platform OWLv2. There will be an introduction to this format and practice problems in the first week. No late homework will be accepted.

Exams: We will inform about the mode and format of midterms and exams during the first week of instruction and will post details on bCourses.

No makeup exams will be given. If you miss an exam, you will receive a grade of zero, except in cases of *documented* emergencies.

Discussion**:** The GSIs will be hosting weekly discussion sessions on Wednesdays 8:00-10:00 pm. They will be recorded and uploaded to bCourses.

https://berkeley.zoom.us/j/98530825007?pwd=S2tCK1k0VnBicGFleUhGaE5tOVBFUT09

(Zoom Meeting ID: 98530825007 Password: 108567)

Legal disclaimer:

We reserve the right to record the live interactions in this course including video, audio, or other content that can be facilitated by Zoom. By joining these live interactions, you explicitly acknowledge consent to be recorded.

IT Disclaimer:

While we try our best to provide live interactions and a live-streamed lecture, we would like to inform that in case of technology issues (e.g., power outages, internet connection losses, computer failure) unlike in a classroom setting, we will not have a back-up option to provide live content. While we will try to promptly inform using bCourses announcements, please be aware that it may happen that a class cannot take place synchronously or abruptly ends without prior warning. In these cases, we will record the lecture and upload to bCourses as soon as technically possible.

Zoom Etiquette:

Providing live content and the possibilities for live interactions depends on the ability to provide a safe, inclusive, and supportive learning environment the same way we would assure it in a classroom setting. In a fully remote learning environment, it comes down to each of you to contribute positively to this remote learning experience. We reserve the right to cease live interactions if we find that a safe learning environment cannot be provided in the Zoom format.

Here are a few guidelines we would like you to follow during live interactions on Zoom:

- **While it is your freedom to use any screen name you wish to use to protect your privacy, we will not tolerate any offensive names and ask each student to be considerate about their choices.**

- **If activated, use the chat feature only to ask insightful questions or make important remarks. We will not tolerate using the chat for any sort of distractive chatting or offensive behavior. Note that meeting hosts record chat activity even directed between individuals.**
- **During lectures, please make sure you are muted and your camera is turned off to conserve bandwidth for everyone. If breakout rooms are used, instead we recommend using audio and video to interact within your peers.**
- **When interacting, please be as considerate as you would be in a classroom environment. We will not tolerate offensive language or behavior. As hosts we will be able to relate screen names to verified berkeley.edu logins and will hold individuals accountable the same way as we would do in a classroom setting.**

Cheating:

We expect every student to follow the Berkeley Honor Code: "*As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others*". This explicitly includes only using allowed means of help during exams, no plagiarism in lab reports and explicitly condemns any form of cheating. As instructors, we take this very seriously and will report any incidence of cheating during exams (midterm or final exams) or plagiarism in lab reports. Please note that not only the person caught cheating but also the person providing materials for others to cheat (for example uploading exam sheets or answers) will be held accountable to the full extent possible. During exam periods we will monitor the internet closely and use a plethora of tools at our disposal to track cheating. Please note, that popular websites like Chegg cooperate with instructors and in many instances in the recent semester and the summer session enabled identifying individuals. The consequences for cheating are quite harsh and we will report all instances of cheating to campus to be noted in the student's record. We will also assign zero points for exams of cheating students including those helping to cheat. We also reserve the right to give a "fail" grade for the whole course. Please be aware that past instances of cheating have led as far termination from the university. In short, it is not worth it! We are highly supportive of fair grading to honor achievements. As we indicate above, we will use a pre-fixed grading scale that enables everyone to achieve best marks based on their performance and not relative to other students' performance.