

Course Syllabus

Chemistry 31B, Winter 2017: Chemical Principles II: Reactivity & Energetics Professors Karunadasa & Schwartz-Poehlmann

Course Overview:

The science of chemistry evolves through a process of observation, hypothesis, and experimentation. This course is structured to develop your skills to participate in this process while building your understanding of how chemical phenomena shape our world.

Course Objectives:

- *Develop your ability to analyze and solve chemical problems through improved critical thinking.*
- *Improve your ability to use conceptual models to qualitatively explain a wide range of chemical phenomena and to make quantitative estimations focusing on the following areas:*
 - *Kinetics:* Determine what forces influence the rate of a chemical reaction.
 - *Equilibria:* Determine the direction of a reaction and the changes in concentration that will occur as a reaction comes to equilibrium.
 - *Thermodynamics:* Predict whether a reaction is likely to be spontaneous and describe the relationship between free energy, temperature, and equilibrium constants.
 - *Electrochemistry:* Identify redox reactions and calculate their reduction potentials based on their conditions. Describe how to build a voltaic cell.
- Be prepared to study how structure influences chemical reactivity and equilibria in Chem 33.

General Information

Instructors: Professor Hema Karunadasa
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office: Lokey 334
OH: Tue. 12 - 1:30 PM
(Lokey 334)

Dr. Jennifer Schwartz-Poehlmann
jks425@stanford.edu
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office: Mudd 235
OH: Tues. 2:30-4pm (STLC 212D)

Course Coordination and Development:

Dr. Will Pfalzgraff
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phone: (650) 723-4530
office: STLC 308

Office hours Office hours are available to further clarify lecture concepts or assist students in developing an approach towards tackling chemistry problems. Students are highly encouraged to rework misunderstood problems from returned exams and Mastering Chemistry and discuss them during office hours.

TA OHs: Sun 3-6 pm STLC 115
Tue 7-10 pm STLC 115
Thu 7-10 pm STLC 115

MWF 12:30-1:30 pm STLC 105
MW 7:00-8:30 pm STLC 114 (after Outreach)

Course Structure

Lectures: Lecture attendance is compulsory. The same lecture is given at each of the three times; attend the section in which you enrolled on Axess.

Times: MWF 9:30am – 10:20am STLC 114
 or 11:30am - 12:20pm STLC 114
 or 1:30pm – 2:20pm STLC 114

Lab Safety: To minimize risk associated with working in a chemical lab, all students must complete the online safety training course. If you have already completed the Safety training for Chem31A in 2017, then you do not need to retake the online course until next academic year. We advise you to review the safety information posted on Canvas. If for any reason a student has not completed the safety training from last quarter, they must complete the Safety Training module on Canvas in the first week of class.

PPE: Students entering the teaching laboratories must wear appropriate Personal Protective Equipment (**PPE**), which includes laboratory glasses and a laboratory coat, in addition to appropriate street clothes (long pants, solid shoes that cover your entire foot). If you need a replacement coat or glasses from Chem31A (or if you do not have a coat or glasses for any other reason), you can purchase PPE in STLC during the first week. An announcement will be made in class regarding the location.. A \$50 charge will appear on your university bill to cover the cost of the Lab coat + glasses if you purchase a replacement. **Students must wear their glasses and lab coat during section at all times!**

Outreach: Outreach workshops help students build basic problem-solving skills through practice exercises. Guided by an advanced instructor, Outreach provides a structured environment to go over material at a slower pace and discuss questions with peers. Attendance is optional.
Times: Mon 6:00–7:00pm (STLC 114); Wed (on non-exam nights) 6:00–7:00pm (STLC 114)

Web Sites: There are two primary websites associated with the course:

1. <http://canvas.stanford.edu> - After registering for Chem 31B on Axess you will have access to the full Chem 31B Canvas website, where you will find course materials, course announcements, your section assignment and your scores on graded work. This is also where you will access “Mastering Chemistry”, where you will complete and turn in problem sets for the course. For “Mastering Chemistry” registration instructions, see the document “Stanford Mastering Chemistry Instructions” which can be found in the “Files” section of the canvas site in the “General Course Information” folder.
2. <https://piazza.com/stanford/winter2018/31b/home> - All course questions should be directed to Piazza.com. This website will allow you to ask and answer questions for the course in a wiki format, so that all students can benefit from the answers! Piazza can also be accessed through our Canvas site.

Required Items – NOTE these are the same as Chem31A so you should NOT need to purchase anything new!

Text: Tro, “Principles of Chemistry: A Molecular Approach” Stanford Custom Version, 2nd Edition

Problem Set: All Chem 31B students must have a valid license for the web-based

Software “*Mastering Chemistry*” program (based on our Tro textbook).**

License

*You may purchase the required access code as part of a package with an electronic version of the textbook for **\$116.60** (for Mastering Chemistry and the e-book together), or you may purchase the standalone access code for **\$70.00**. You can get the access code and/or the e-text through the MyLab and Mastering link on the Chem 31B Canvas site. Detailed instructions on purchasing and registering a *MasteringChemistry* access code and/or e-text are available as a handout on the Chem 31B Canvas site. You may also purchase an access code bundled with your textbook in the bookstore.

i-Clicker All Chem 31B students must have a hand-held *i-Clicker2* (available at the Stanford Bookstore) or the original *i-Clicker* to answer in-class questions drawn from assigned readings. Questions on the lecture material will also be posed during lecture to provide immediate feedback as to your understanding of the current material. You may only click and respond with your own personal i-Clicker. **Before lecture on Monday (1/8), register your i-Clicker in Canvas.**

1. Course Engagement: Course participation points can be accumulated through any combination of clicker questions, and problem sets *to a maximum* of 120 pts. Details of course engagement components are below:

- **Lecture Participation: Clicker & IF-AT questions: (at least 70 pts. available)**
In-lecture clicker questions will be posed throughout the quarter, related to the assigned reading, Pre-Lecture Problems, section, and lecture discussion. Each correct answer is worth 1 pt. There will also be occasional group quizzes scored through scratch-off cards during lecture.
- **Pre-Lecture Problems: (3 pts. each; max. 75 pts. available)**
The night before each lecture, you must complete your Pre-Lecture Problems (PLP) through the web-based *MasteringChemistry* system by 11:59pm. You are allowed and encouraged to work on the problems with others, but you must compose your final answers to each problem set on your own.

2. Labs: Each week there is a lab that will engage with the material discussed in lecture through prelab assignments, attendance and participation, and write-ups. You can count a *maximum* of 120 points.

Prelab: (3 pts. each; 30 pts available):

Before each lab, students are expected to read the pre-lab assignment and answer any questions posed. A typed PDF must be uploaded to Canvas by 11:59 pm the Sunday BEFORE lab.

Section: Attendance and Safety Adherence: (5 pts. per week; 50 pts available)

Because sections are based on participation in groups and will begin with important safety information, it is critical to arrive on time. Students who are more than 5 minutes late will forfeit their participation points, as will students who are dismissed from lab for not adhering to safety policies, or failing to help clean up after the experiment.

Lab Write Ups: (15 pts. each, 45 pts. available)

There will be three short reports (1-3 pages) on activities in section. Feel free to discuss section with others, but **the actual report must be solely of your own composition.** Reports must be submitted as a PDF to Canvas at 12pm the Saturday directly following lab.

3. Midterm exams (Total of 360 pts.): There are three midterm exams (180 pts. each) on Wednesday evenings 6:00-7:15pm, held on Jan. 24, Feb. 14, and Mar. 7. We will count your top two scores in your final grade. Therefore, **if you are unable to take the exam that same evening for any reason, that exam will count as your lowest exam score and be dropped.**

4. Final exam (Total of 400 pts.): The final exam will be given only on Wednesday, March 21, from 7:00pm to 10:00pm and will be worth 400 pts. Make sure that you are available for this time before enrolling.

Exceptions: Chemistry 31B is a large, quickly moving class with nearly 400 students. Special exceptions that are accommodated include documented disabilities, University sanctioned absences and extraordinary life events. Such accommodations should be requested from the Course Coordinator **at least one week** in advance if at all possible. The teaching team has decided to limit incidental accommodations (*e.g.* late problem set, late arrival at sections or absences due to travel/illness, exam conflicts) so that we can focus on our educational mission in the course. The grading scheme is constructed with deliberate flexibility to allow for unexpected illnesses or travel. Our best advice is to be prompt in arriving at lectures, sections and exams, be prompt in delivering PLPs, and to prepare for and participate in lab section.

Grade: Your grade is determined according to the total number of points you have accumulated for course engagement & labs (max 240 pts.), midterm exams (360 pts.) and the final (400 pts.):

≥950	A+	≥800	B+	≥650	C	≥500	D+	<400	NP
≥900	A	≥750	B	≥600	C+	≥450	D	≥550	CR
≥850	A-	≥700	B-	≥550	C-	≥400	D-	<550	NC

Return of Work: The most recently graded lab write-up will be posted on Canvas by your next lab section.

Problem Sets are automatically graded and solutions shown on *MasteringChemistry*.

All exams are returned via Gradescope by the Friday following the exam.

Regrades: Regrade requests must be submitted via Gradescope no later than 2:30pm on the Wednesday following the exam. When an exam is submitted for a regrade, the entire exam will be reevaluated, with the possibility of a net gain or loss of points.

Students with Documented Disabilities Students who may need an academic accommodation based on the impact of a disability must initiate the request with the Office of Accessible Education (OAE). Professional staff will evaluate the request with required documentation, recommend reasonable accommodations, and prepare an Accommodation Letter for faculty dated in the current quarter in which the request is being made. Students should contact OAE (<http://studentaffairs.stanford.edu/oae>) as soon as possible since timely notice is needed to coordinate accommodations. In addition, please inform the Course Coordinator as soon as possible, at least one week in advance of the first exam.

As part of our ongoing efforts to make this course an even better experience for students, our teaching team continually conducts research to improve our teaching methods. In this course, new teaching methods may be used and various aspects of student performance analyzed on an ongoing basis. Information about you and your performance in this course will be held strictly confidential. If you would like to opt out of participating in any new teaching methods or having your performance analyzed as part of this research, you may do so without penalty. For more information please contact Dr. Jennifer Schwartz Poehlmann (jks425@stanford.edu).