

Course Syllabus

Chemistry 31A, Autumn 2019: Chemical Principles I: Structure & Energetics Professors Waymouth & Cox

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. Content assumes no background in college level chemistry, therefore enrollment will be prioritized for students without IB or AP credit and the enrollment is limited by the Registrar to a total of 320 students. Students with AP/IB scores >4 or strong chemistry background (passing the placement exam) should instead enroll in Chem31M. Those students who do not meet the criteria for enrollment but wish to enroll can petition by signing up on the course waitlist: (<https://forms.gle/YnyaW4feoTDYa8Js9>) and we will do our best to accommodate you during the first week.

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.*
- *Deepen your understanding of atomic and molecular structure: Identify the interactions among nuclei, electrons, atoms and molecules, and how they determine the structures and properties of pure substances and mixtures.*
- *Deepen your understanding of energetics: Determine the types and amounts of energy change accompanying reactions and phase changes*
- Be prepared for the study of chemical dynamics in Chem 31B: Chemical Principles II.

General Information

Instructors: Professor Bob Waymouth
waymouth@stanford.edu
phone: 650-723-4515
office: Stauffer I - 205
OH: Tue. 1:00pm-2:30pm
(Stauffer I -205)

Dr. Charlie Cox
ctcox@stanford.edu
phone: 650-485-1041
office: STLC 205
OH: Tuesday 11:00am-12:30pm
(Sapp 212D)

Head TA: Danny Marron – dmarron@stanford.edu

Outreach TA: Austin Bargmann – austin98@stanford.edu

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 6-9 pm STLC 114 MWF 12:30-1:30 pm STLC 119
Tue 7-10 pm STLC 115 MW 7:00-8:30 pm STLC 114 (after Outreach)
Thu 7-10 pm STLC 115

Course Structure

Lectures: Lecture attendance is compulsory. The same lecture is given at each of the two times. Because we will be working in groups, we ask that you attend the section in which you enrolled on Axess.

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

Sections: **In addition to lecture, you must enroll for one lab section on Axess by Monday, Sept. 23rd.** Section provides hands-on, guided-inquiry labs to build your conceptual understanding and problem-solving skills with group learning. The first section will focus on pertinent safety aspects of laboratory work. Any student who misses the first section must complete an online safety course and quiz and present the resulting certificate to their section TA at the start of the second week. Attend the section time that you sign up for on Axess. Room assignments are posted on Canvas. Due to lab availability and logistics, we cannot hold make-up sections.

Personal Protective Equipment (PPE): Students entering the Sapp teaching laboratories must wear appropriate **Personal Protective Equipment (PPE)**, which includes department-specific laboratory glasses and a laboratory coat, in addition to appropriate street clothes (long pants, solid shoes that cover your entire foot). The required glasses and laboratory coats **must be picked up before you come to your first lab section.** Pick up times will be announced via Canvas.

See PPE Guidelines on Canvas for more detail about picking up your PPE. **Bring your student ID with you when you come to pick up your PPE.** A one-time charge will appear on your university bill to cover the cost of the PPE. A handout regarding the PPE has been posted to Canvas under the administration folder. Please review the document carefully for information about PPE fees. Please note that the PPE fee is different than the \$55 lab fee charged to all introductory level laboratory-based courses. **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 31A on Axess you will have access to the full Chem 31A 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 2019” which can be found in the “Files” section of the canvas site in the “General Course Information” folder. Given the size of the course, we will use Canvas announcements as a primary form of communication. Students are responsible for reading all announcements.
2. <https://piazza.com/stanford/fall2019/chem31a/home> - All course questions should be directed to the Chem 31A Piazza site. 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! You can access Piazza directly from canvas as well.

Required Items

Text: Tro, "Principles of Chemistry: A Molecular Approach" 4th Edition

Problem Set: All Chem 31A students must have a valid license* for the web-based
Software "**Mastering Chemistry**" program (based on our Tro textbook). You can access (and purchase) Mastering Chemistry through Canvas.

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

i-Clicker: All Chem 31A 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. We will pose i-clicker questions during lecture to provide immediate feedback as to your understanding of the current material. **Register your i-Clicker in Canvas by Monday (9/23).**

Honor Code Reminder: Click only your own personal i-clicker! It is an Honor Code violation to click i-clickers for others. Students found using multiple i-clickers will be referred to the Office of Community Standards.

Assignments and Graded Work: All due dates can be found on the course calendar.

Graded Work: The grading scheme for Chem 31A is designed to reward students who engage actively with the course. There are many opportunities to earn credit. This course is graded on a 1000-point basis in 4 components: Course Participation (max of **120 pts.**), Labs (**120 pts.**), Midterm Exams (**360 pts.**), and Final Exam (**400 pts.**). Details of these components are below:

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 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.
- **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.
NOTE: Total points on each PLP may vary in Mastering, however, each individual PLP will be normalized maximum total of 3 points at the end of the quarter.

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. While you may discuss section with others, **the actual reports must be solely of your own composition.** Individual reports must be submitted as a PDF to Canvas at 11:59pm 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 Oct. 9th, Oct. 30th, and Nov. 20th. 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, December 11, from 12:15pm-3:15pm and will be worth 400 pts. Make sure that you are available for this time before enrolling.

Exceptions: Chemistry 31A 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 Head TA **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 assignments, 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 120pts. each), top two 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, through Canvas by the Friday following the exam.

Regrades: A regrade request clearly explaining what was overlooked in grading should be made on 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.

Dept. Policy It is the policy of the Department of Chemistry that exams and quizzes are not given earlier than the scheduled time for the whole class. Similarly, problem sets and other instructor-defined assignments should not be released to any student earlier than they are released to the class as a whole.

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/oea>) 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. Charlie Cox (ctcox@stanford.edu).