

Chemistry 1B: General Chemistry

Lecture:	M/W	4:30 – 5:45 PM	MLC 105
LL/Lab-3	M/W	11:30 – 2:20 PM	SC 2204
LL/Lab-4	T/Th	11:30 – 2:20 PM	SC 2204

Instructor: Dr. Erik Woodbury **Phone:** 408.864.5633 **E-mail:** woodburyerik@fhda.edu
Office Hours: M/W: 3:30-4:30 PM T/Th: 10:30 – 11:30 AM **Office:** SC 1228
Class website: <http://sites.google.com/site/woodburychem1b/home>

This course syllabus is a contract:

One purpose of this syllabus is to provide you with the guiding principles upon which the class runs. Another purpose is to make sure that you have, at your fingertips, answers to common questions that might arise. This document is available at all times on the class website. Make sure you read it in its entirety before you ask me any questions about the course schedule, requirements, grading, etc... It is also a contract between you the student, and I, the instructor of record. Make sure that you understand its contents fully, especially the parts that pertain to testing and the computation of your grade, because so long as you remain enrolled in the course, you are implicitly agreeing to abide by these terms.

Course Description: Chemistry 1B is the second quarter of a year-long general chemistry class for science and engineering majors. The course covers the physical aspects of chemistry with a heavy emphasis on problem solving. Topics: gas laws, intermolecular forces, liquids and solids, solutions, colligative properties, kinetics, equilibrium theory, acid-base chemistry and equilibrium, spontaneity and entropy.

Prerequisites: A “C” or better in Chem 1A

Course Materials (Required):

- Text Book:** *Chemistry: The Molecular Nature of Matter and Change, 7e*, by Silberberg
 - You may purchase only the online edition if you want.
- Connect Plus Software (for online homework):** An access code is provided at no additional cost with the purchase of a new text from the college bookstore otherwise you must purchase access separately at <http://connect.mcgraw-hill.com>.
- A scientific or graphing calculator** (Must have log and exponential functions. Graphing is not necessary. You **may not** use your phone as a calculator for any quizzes, exercises, or exams.)
- Lab Materials:** See the lab syllabus for additional information.

Course Materials (Optional):

- Student Solutions Manual and Student Study Guide for lecture text. Silberberg.
- Lab Coat

Resources

Tutoring: De Anza’s tutorial center is in S43. This and many other campus services can be found as part of the student success center: <http://www.deanza.edu/studentsuccess>

Disability Support Program and Services: DSPS can help you get the right tools to succeed. Their website is <http://www.deanza.edu/dsps/>

Grading Scheme:	Percentage
Online Homework	15
In Class Quizzes	5
Laboratory Work	30
Chapter Exams (3)	27
Final Exam	18
Subjective Lab and Lecture	5
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Total	100%

Homework (15%): There will be online homework assignments facilitated through a program called Connect. Homework is due on the date posted, and late assignments are penalized. There is built-in extra credit to help correct for software error or confusion. A separate handout is posted online at <http://sites.google.com/site/woodburychem1b/home> that details the McGraw-Hill Connect registration and enrollment instructions plus some helpful tips for success in using the program. Additionally, uncollected recommended problems will be assigned from your text. As we learn by doing, "practice makes perfect" and as exam questions may be similar to the homework, it is obviously to your advantage to take the homework seriously. Completing another student's online homework problems is grounds for receiving a score of zero on **ALL** homework assignments for the quarter for all involved students.

Quizzes (5%): There will generally be 2 quizzes per week, given at the beginning of the lecture period. There will never be a quiz on an exam day. Quizzes will be distributed at the beginning of class and you will be given 5 minutes to complete them. Students arriving after the quiz period will NOT have an opportunity to make up the quiz. Your 3 lowest quiz scores will be dropped at the end of the quarter.

Laboratory Work (30%): You will be expected to participate in lab, complete lab worksheets and reports, and pass lab quizzes. More details on these items can be found on the laboratory handout.

Chapter Exams (27%): There will be 3 chapter exams worth 9% of your grade each. Exams will be a combination of any of the following: multiple choice, short answer/calculation problems, and vocabulary questions. Early and late exams are not administered. Missing an exam **will result in a zero** for that exam without proof of an excused absence (doctor's note, police report, etc...)

Final Exam (18%): The Final Exam is cumulative and will have the same format as the chapter exams. The exam will be given **Thursday, March 26th from 4:00 – 6:00 PM**. If you cannot make this time, you should not enroll in this class.

Subjective Grade (5%): A subjective evaluation will be assessed by your instructor at the end of the quarter to reward you for: your good and punctual attendance; active participation, preparedness for the lecture and laboratory, ability to follow written and verbal instructions, adherence to the safety rules, cleanliness practices, and overall respect for the laboratory through the proper care and use of all laboratory apparatus and instruments. These are NOT free points and must be earned.

Special Note: If your average percentage is failing (<55%) in any **ONE** or more of the following portions of the course, you will not receive a passing grade:
exams, homework, or lab reports/assignments.

Class Policies.

- A. Time Requirement:** This class includes appx. 3 hours of lecture and appx. 6 hours of lab per week. In order to receive a "C" or better grade, you should allow 10-15 hours of studying, reading, and preparing outside of class **PER WEEK**. Help yourself to do your best by making time to keep up with the reading and homework. *If this time commitment is not possible given your current situation, please consider taking this class at a later date when you do have more time available.*
- B. Lecture Attendance:** Attendance is a critical component of the learning process, and the lecture will cover material that may not appear in your text and help clarify the material that is. Learning Chemistry effectively depends on building up from a base of knowledge. If you do not set a firm foundation, you will not be able to build your understanding of the field effectively. In other words, miss too many classes and you'll likely fail the class.
- C. Class Behavior:** Be ready to start class at the scheduled time. Please arrive on time and plan on staying the entire session as late arrivals and early departures distract everyone. If you are unavoidably late, please enter quietly and find your seat as quickly and quietly. Please do not disrupt class with irrelevant conversations, either in the form of inappropriate comments or private conversations. I would always prefer you show up a little late as opposed to skipping the class entirely.
- D. Please turn OFF your cell phone when you enter the class or lab.** You may **NOT** take calls or texts during either, except for emergencies. Students caught abusing this rule may be docked points or expelled from class or lab.
- E. Academic Dishonesty:** Cheating or plagiarizing another student's work, in whole or part, will result in a zero for the assignment, a referral to the dean and my immense displeasure. Any case where you attempt to gain unfair advantage over other students or attempt to pass off another's work as your own **is cheating**. Please see me if you have any questions. You implicitly agree to abide by the Honor Code as a condition of enrollment in this class: <http://www.deanza.edu/studenthandbook/academic-integrity.html>
- F. Grading:** This class is not graded on a curve. Grade cut offs are as follows:
A+ (97), A (93), A- (90), B+ (87), B (83), B- (80), C+ (76), C (69),
D+ (65), D (60), D- (56), F (56-0)
- G. Extra Credit:** Extra credit assignments are not offered in this class on an individual basis. It is unfair to allow some students to improve their grade while not allowing others that same opportunity. Some extra credit problems may appear at the end of exams and in homework.
- H. Dropping the Class:** If you wish to drop the class after the first 2 weeks, it is your responsibility to do so. If you fail to drop the class you will be assigned a grade in keeping with your submitted work, usually an F.
- I. Questions/Help:** I am available to answer questions during office hours, by email, or by appointment. Please feel free to contact me with any problems or concerns that you have. Also remember that your fellow students are great resources.

Attendance Note

You are responsible for all the material covered in this course, and it is expected that you attend and participate in all of the lecture and laboratory sessions. *If you must be absent, then it is in your best interest to contact your instructor as soon as possible in order to find out what work you have missed.*

****Due to the high number of students wishing to enroll in this class, any unjustified absences during the
first two weeks of class will result in you being dropped.

Tips for Success

- **Come to class having read the assigned chapter** and be ready with questions about the concepts you didn't understand.
- In case you didn't read the first one, really, come to class with the assigned chapter already read. I cannot stress how big a difference this will make for you.
- **Take notes during class and reread your notes before the next class.** If something is still unclear, write down your question so you can ask about it during the next class or in office hours.
- **Work every day.** The longer the time that passes between doing chemistry problems, the more knowledge you have to rebuild. Do some homework problems and some problems from the book every day as this will help you understand where you need help, and it will help prepare you for the exams. Schedule some time each day to work on chemistry. Treat this subject like a foreign language. Use it or lose it.
- **Do the suggested chapter problems in the book,** particularly for concepts you're having trouble with.
- **Don't try to memorize EVERYTHING.** This is a common trap that many students fall into. While there are certain topics that must be committed to memory, strive to develop an intuitive understanding of the underlying framework of the material. Once you have that you will often be able to derive answers from a much smaller pool of "memorized" data.
- **Join a study group,** exchange phone numbers of classmates whom you can call for help. In the group, take time to present concepts to one another. The BEST way to solidify a topic in your mind is to have to teach it to someone else.
- **Don't wait** until the night before to finish that lab report or homework assignment. You'll get more out of it (and do better) if you give yourself the time to understand the concepts and ask questions when you get stuck.
- Start studying for the exams **at least a week before.** Cramming for an exam is like playing Russian Roulette! Cramming is superficial knowledge only, and when you are nervous, superficial knowledge is very unreliable.
- Work through old quizzes and homework problems before exams.
- **Give yourself TIME!** Plan on spending at least 2 hours studying outside of class for each hour we spend together in class or lab lecture. Do this every week, not just the week before the exam. Start early and it will be much easier later.
- If you consider yourself a poor test-taker, then you should complete and turn in all of the homework and labs on time in order to pass the class. Also, utilize any practice exams or chapter reviews as they contain the same types of questions which you will encounter on the exams.
- **Stay well rested and healthy.** This is always a challenge in college, but do not neglect your basic needs. Poor sleep and diet have been shown to have a temporary negative impact on I.Q. Schedule study breaks as needed to keep up your mental health as well. Sometimes a night off is the right answer. Just don't make blowing off your studying a habit.
- As you listen, take notes, read, or work problems, try to keep an open mind, be curious, and think about the implications of the concepts and problems. Chemistry makes the world around us work and understanding why the world works will impress your friends at parties and help you grasp the material. The more connections you can make between the material in the book and the world around you, the more sense this class will make.

Student Learning Outcomes for the General Chemistry Course of Studies

Chem 1A

1. Identify and explain trends in the periodic table.
2. Construct balanced reaction equations and illustrate principles of stoichiometry.
3. Apply the first law of thermodynamics to chemical reactions.

Chem 1B

1. Demonstrate knowledge of intermolecular forces.
2. Evaluate the principles of molecular kinetics.
3. Apply principles of chemical equilibrium to chemical reactions.
4. Apply the second and third laws of thermodynamics to chemical reactions.

Chem 1C

1. Apply the principles of equilibrium and thermodynamics to electrochemical systems.
2. Apply the principles of transition metal chemistry to predict outcomes of chemical reactions and physical properties.
3. Evaluate isotopic decay pathways.

BEFORE the beginning of Chemistry 1B, I expect students to KNOW OR BE ABLE TO DO the following:

The following metric prefixes:

mega	M	10^6
kilo	k	10^3
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}

Units:

mass-gram (g) length-meter (m) time-second (s) volume-liter (L) Density

(g/mL for liquids and solids, g/L for gases)

Solution Concentration (M = moles solute/L solution)

1 mL = 1 cm³

°C to K conversions: $K = 273.15 + ^\circ C$ or $^\circ C = K - 273.15$

- The difference between precision and accuracy and how to calculate percent error.
- Record a measurement to the correct digit (precision) based upon the limitation of the measuring device.
- Determine the correct number of significant figures allowed in the result of a calculation.
- The basic nuclear structure of the atom (protons, neutrons and electrons).
- Locate metals and nonmetals, alkali metals, alkaline earth metals, halogens and noble gases, periods and groups, atomic numbers and atomic weights on the Periodic Table.
- The difference between ionic and covalent bonding (Be able to recognize if a substance is ionic or molecular in nature.).
- Name and write formulas for ionic compounds, binary molecular compounds and acids. You should know the names and formulas of the polyatomic ions listed on the handout provided.
- The strong acids: HCl, HI, HBr, HNO₃, HClO₄, HClO₃, H₂SO₄
- The strong soluble bases (Group 1A Hydroxides and Ba(OH)₂) and strong slightly soluble bases (Ca(OH)₂ and Sr(OH)₂)
- Ammonia (NH₃) is a weak base.
- Write ionization equations for strong and weak acids and bases in water.
- Selected solubility rules for ionic salts (see handout).
- Convert between mass and moles. Balance chemical equations. Perform stoichiometric calculations including those needed for titration, limiting reactant and percent yield problems. Carry out dilution calculations.
- Recognize types of chemical reactions (precipitation, acid-base and redox). Write net-ionic equations for reactions.
- The First Law of Thermodynamics and the definition of ΔH .
- Standard states for thermochemistry: 1 atm for gases, 1M for aqueous solutions, most stable form for pure substances.
- Hess' Law: $\Delta H^\circ_{\text{rxn}} = \sum \Delta H^\circ_f(\text{products}) - \sum \Delta H^\circ_f(\text{reactants})$ (This will also be used for ΔS° and ΔG°)
- The shapes of atomic orbitals (s and p).
- Write electron configurations.
- Periodic Table: trends in atomic size, ionization energy, electron affinity and ion sizes.
- Draw Lewis structures for molecular compounds and polyatomic ions.
- Determine shapes of molecules and ideal bond angles using the VSEPR Model.
- Understand the concepts of bond polarity and dipole moments and be able to determine if a molecule is polar or nonpolar.
- Understand the Valence Bond Theory description of covalent bond formation: orbital overlap, orbital hybridization, sigma and pi bonds, single and multiple bonds.