CHEMISTRY 1B De Anza
Fall 2024

Dr. Stephanie Stepp **Email: steppstephanie@fhda.edu**
Lecture: MW 06:00 PM-07:15 PM G7 **Office Hours: MW 5:00-6:00pm**
Lab Sec 01: MW 07:30 PM-10:20 PM
SCI2204

This course syllabus or "green sheet" is a contract
One purpose of this "green sheet" is to provide you with the guiding principles upon which the class runs, and another is to make sure that you have at your fingertips, answers to any questions which might arise. Please put this document in a safe place where you can easily refer to it. Make sure you read it in its entirety before you ask me any questions about the course. 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.

PREREQUISITES: Chemistry 1A with a grade of C or better. EWRT 211 and READ 211 (or LART 211), or ESL 272 and 273.

COURSE DESCRIPTION
Continuation of an introduction to the principles of chemistry. Investigation of intermolecular forces and their effects on chemical and physical properties. Investigation of reversible reactions from the standpoints of kinetics, thermodynamics, and equilibrium. Investigation and application of gas laws and kinetic molecular theory.

STUDENT LEARNING OUTCOME:
Evaluate the principles of molecular kinetics.
Apply principles of chemical equilibrium to chemical reactions.
Apply the second and third laws of thermodynamics to chemical reactions.

COURSE OBJECTIVES
- Evaluate how intermolecular forces influence solids, liquids and phase changes
- Calculate the rate of a reaction and assess the mechanism of action
- Utilize the fundamental principles of equilibrium to probe reaction dynamics.
- Differentiate between acids and bases and evaluate their reactivity.
- Employ the principles of equilibrium in an expanded discussion of thermodynamics.
- Analyze the behavior of gases

REQUIRED MATERIALS:
- **Text**: *Chemistry: The Molecular Nature of Matter and Change* Silberberg 9th ed, McGraw Hill.
- **Supplies**: a scientific calculator
- **Homework**: Available through Canvas
- **A scientific or graphing calculator**: TI–83, –84 or –86 recommended for lecture and lab. The chemistry stockroom has calculators available for checkout during lab time only, not for your use during the quarter.

- **1B experiments and handouts**. These are downloaded and printed by you. See website for link.
- **Laboratory Notebook by Hayden-McNeil** CARBONLESS. (Bookstore). **Do not purchase a notebook with BLUE pages - too hard to read!**
- **Safety goggles (not glasses) or Visorgogs®** (Bookstore)**.**

LECTURE EXAMS (60%):

There will be three lecture lecture exams and one comprehensive final exam. All are closed book, and no notes are permitted. The exams will focus on the (1) key course concepts, (2) lecture notes, (3) online homework assignments, and (4) additional recommended practice problems. The exams will test your problem solving skills and also your conceptual understanding of the material and your ability to integrate concepts. For this reason, it is highly recommended that you discuss the key course concepts and problems with the instructor during office hours and also with your study group. **Make-up exams will NOT be generally given. All exams are required and will count towards your grade.** Exams will not be rescheduled to accommodate your personal schedule. Accommodations will be made ONLY for VERIFIED illness or VERIFIED legitimate emergencies.

YOU MUST BRING A PICTURE ID TO ALL EXAMS, INCLUDING LAB QUIZZES.

ONLINE HOMEWORK (10%):

At the end of each chapter there will be an open-ended quiz on Canvas to determine your knowledge on the material just covered. No make-ups for missed quizzes. Do not miss the due dates! The quizzes will be posted on your Chem 1B Canvas account, and you will need to finish them online before the due dates. More information will be given in lecture meetings before the due dates.

Once you submit your quiz on canvas, you cannot access it again so make sure you print a hard copy of the quiz for your reference. The quizzes will help you prepare for the exams.

(see Calendar in syllabus for deadlines.)

PRACTICE PROBLEMS:

In addition, practice problems will be suggested for you to complete at the end of the chapter in our textbook as well as others suggested by the instructor. See course website for details. Chemistry is all about practice, practice, practice! Doing these problems is invaluable experience for you to grasp the concepts presented.

COURSE GRADE:

Your course grade will be determined according to the following percentages:

60%	Three exams (20% each)
10%	Chapter quizzes (Canvas)
30%	Laboratory work (see lab syllabus for details)

IF your WEIGHTED AVERAGE in class EXAM PERCENTAGE, including the three lecture exams and the final exam, IS LOWER THAN 50% YOU WILL NOT EARN A PASSING GRADE IN THIS COURSE.

If you FAIL THE LABORATORY PORTION of this course, you will NOT EARN A PASSING GRADE.

At the end of the semester you will receive a single grade for the course. The following grade scale is for the full course, including lab.

above 97.0 % A+	**79.9 - 77.0 % B-**	**56.9 - 54.0 % D**
96.9 - 92.0 % A	**76.9 - 72.0 % C+**	**52.9 - 50.0 % D-**
91.9 - 89.0 % A-	**71.9 - 61.0 % C**	**Below 50.0% F**
88.9 - 85.0 % B+	**60.9 - 57.0 % D+**	
84.9 - 80.0 % B		

Attendance and Incomplete Grades:

This is a fast-paced and challenging course, attending the class regularly will help you to understand the material and pass the class. 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 the instructor.* You should also exchange phone numbers with a few classmates who you can contact regarding material missed if you must be absent. Since this is an experimental course, your presence in the laboratory is essential for the understanding of the materials covered. Excessive, unexcused lab absences are cause for dismissal from the course. Allowances may be made, at the instructor's discretion, for emergencies and other complications in life.

It is entirely YOUR responsibility to drop this course in a timely manner. Any student that has <u>TWO (or more) unexcused lab absences</u> prior to the end of the 8th week will be advised to drop. Absences after the week of the 8th may result in a non-passing course grade.

Incomplete grades *are only given for extenuating circumstances*; for example, VERIFIED illness or legitimate emergencies. If an incomplete is given all exams and lab work prior to the incomplete are still counted in your grade, only material that has not yet been completed can be made-up in the future. **YOU MUST BE PASSING THE COURSE TO RECEIVE AN INCOMPLETE GRADE.**

ACADEMIC DISHONESTY:

Academic dishonesty includes:

- Plagiarism (copying or allowing someone to copy) lab exercises or reports.
- During an exam, communicating or transferring information to another student, receiving information from someone else, looking at another person's exam, and/or using unauthorized materials such as text books, notes, etc.
- Having another person complete and submit work in your name.
- Lying to an instructor to improve your grade.
- Altering a graded work after it has been returned and then submitting the work for regarding.

Consequences of academic dishonesty may include:

- A report of the violation to the Dean of Student Affairs and Activities; this office keeps a record of students who have engaged in academic dishonesty. Repeated violations may result in administrative action including probation, suspension or expulsion from the college.
- You may receive an F grade on the work involved; this may also result in an "F" in the course.

• Verified cheating on the online homework will result in a score of 0% being given for the homework grade.
• For incidences of lab exercise or report plagiarism, all parties involved will receive a reduced grade or grade of zero for the exercise or report.

CLASS RULES AND REGULATIONS-Professional behavior is expected.

• **Arrive on time**. The classroom is an academic environment where students come to focus and learn. Those students who arrive on time, ready to learn, should not be disturbed by students coming in late. If you arrive late to lecture, enter quietly from the back of the classroom, sit in the back and look guilty. Students who are habitually late or arrive more than 5 minutes late may be asked to leave instead of being allowed to join the class. The instructor may resort to locking the doors after the start of class if habitual lateness becomes an issue. **Students who are more than 10 minutes late for lab lecture will not be allowed to do the experiment.**
• **Be polite** to your instructor and fellow students. Any type of vulgar or rude language toward the instructor or another student may result in dismissal from the course. This rule applies to emails and phone messages as well as face-to-face exchanges!
• **Remain quiet during lecture**. Talking to fellow students during lecture is disruptive to other students. Raise your hand if you have a comment or question.
• **Turn off or turn to silent mode all cell phones and electronic messaging devices**. ***DO NOT talk on the phone or receive/transmit text messages during lecture or lab.*** If you receive a *truly* urgent call or message, quietly leave the classroom to respond to it.
• **Lap top computers** may be used during class **ONLY** for class business. For instance, you may use your lap top computer to view and/or take class notes, but please do not disrupt/distract your fellow classmates by using your lap top during class for other business and/or activities that do not pertain to the class.
• **Clean up your mess in lab.** This includes cleaning and organizing your immediate lab bench area, as well as shared areas such as hoods, balances, the bench tops around the balances, etc.
• **Follow** all written and **VERBAL** instructions.

Any student who, in my judgment, is habitually disruptive or rude may be dismissed from the class.

Resources

- **Math, Sciences, and Technology Resource Center (MSTRC) Tutoring**. The MSTRC offers tutoring for the Chemistry 1 sequence and is located in room S43 in the S-quad.
  https://www.deanza.edu/studentsuccess/mstrc/
- **Disability Support Programs Services** The mission of DSPS is to ensure access to the college's curriculum, facilities, and programs. In particular, DSPS can help you get extended time on examinations.
  https://www.deanza.edu/dsps/
- **De Anza College Library** The library houses the Library West Computer Lab and group study rooms that may be reserved online.
  https://www.deanza.edu/library/index.html
- **Resources for Students** Additional resources may be found at
  https://www.deanza.edu/services/
- **Office Hours** Instructor office hours are the best time to ask questions related to course content in-person. This time is for you, the student.

STUDY STRATEGIES:

1. Read (or skim) the corresponding chapter in the text BEFORE lecture. Jot down any questions you have and talk with your peers and the instructor to get them answered as you work through the material.
2. Don't fall behind! Keep up with the reading and the recommended textbook problems!
3. Ask questions! Come to office hours, tutoring, or form a study group to get them answered! It's YOUR responsibility to take charge of your learning; there are many resources to help you succeed!

LECTURE CONTENT

Text Coverage	Key Concepts	Notes
Chapter 5	Gas Behavior; Ideal Gas Equation; Kinetic Molecular Theory; Behavior of "Real Gases"	This chapter is a good example of the Scientific Method: observations, laws, hypothesis and theory. Conceptual understanding AND mathematical problem solving will be emphasized.
Chapter 12	Intermolecular Forces; Properties of Liquids; Properties of Water; Classification; Structure; Types and Properties of Solids; Advanced Materials	Specifically, concepts of ionic and covalent bonding, Lewis Structures, molecular shapes, molecular polarity. Some of this will only be covered in lab.
Chapter 16	Chemical Kinetics; Factors Effecting Reaction Rates; Rate Laws; Collision Theory; Mechanisms	Conceptual understanding AND mathematical problem solving will be emphasized. You will need to be able to use/manipulate logarithms and antilogarithms.
Chapter 17	Introduction to Chemical Equilibria; Equilibrium Constants; Factors Effecting Equilibria	Prior understanding of stoichiometry is a MUST. Conceptual understanding AND mathematical problem solving will be emphasized. You will need to be able to solve quadratic equations.
Chapter 18	Acids & Base; pH Scale; Acid/Base Equilibria; Chemical Structure and Acid/Base Behavior	Prior understanding of acid/ base definitions/reactions and of chemical equilibria is a MUST. Conceptual understanding AND mathematical problem solving will be emphasized.
Chapter 20	Introduction into Chemical Thermodynamics; Concepts of Entropy, Gibbs Free Energy and Spontaneity; Connection Between Thermodynamics and Equilibria.	You will need to read this Chapter more than once! Reading ahead of lecture is a MUST! Prior to this chapter you should review the concepts of ΔH, state functions, Hess's Law and the First Law of Thermodynamics

BEFORE the beginning of Chemistry 1B I expect you to KNOW OR BE ABLE TO DO the following: (Adapted from Dr. Daley)

- Units: mass-gram (g) length-meter (m) time-second (s) volume-liter (L); 1 mL = 1 cm3
- Density (g/mL for liquids and solids, g/L for gases)
- Solution concentration in molarity, M = moles solute/L solution; Dilution calculations. C1V1 = C2V2
- °C to K conversions: K = 273.15 + °C and °C = K – 273.15
- MEMORIZE the common metric (SI) prefixes and convert between them quickly and efficiently.
- 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 formulas for ionic compounds, binary molecular compounds and acids. You should know the names and formulas of the common polyatomic ions.
- The 6 strong acids: HCl, HI, HBr, HNO3, HClO4, 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.
- Convert between mass and moles. Balance chemical equations. Perform stoichiometric calculations, including those needed for titration, limiting reactant and percent yield problems.
- Recognize types of chemical reactions (precipitation, acid-base and redox). Write net-ionic equations for various types of reactions.
- Standard states for thermochemistry: 1 atm for gases, 1M for aqueous solutions, most stable form for pure substances.
- The First Law of Thermodynamics and the definition of ΔHsys; Hess' Law: $\Delta H°rxn = \Sigma \Delta H°f$ (products) – $\Sigma \Delta H°f$ (reactants)
- Write electron configurations. Know the shapes of atomic orbitals (s and p).
- 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 (VSEPR)
- 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.

Chemistry 1B –Lab Syllabus

REQUIRED LABORATORY MATERIALS

1. Chem 1B Laboratory Experiments and Handouts: available CANVAS
2. Laboratory Notebook by Hayden-McNeil CARBONLESS (Bookstore). Do not purchase a notebook with BLUE pages – too hard to read!
3. A scientific or graphing calculator
4. Safety goggles (not glasses) or Visorgogs® - available at bookstore

OPTIONAL LABORATORY MATERIALS:

Lab Coat (available from bookstore)

LABORATORY CHECK-IN

For this course, you must check-in to your chemistry locker (Details will be given during the first week). If you drop this course, then you must arrange to check-out of your locker with your instructor during your regularly scheduled lab period or office hours. The stockroom technician WILL NOT check-out lockers for any student.

LABORATORY SAFETY

Laboratory safety is an everyday assignment. **Being safe in the lab is a top priority**. The importance of safety in the laboratory will be focused upon during the first day of classes. **Students who are absent for this essential lab period will be dropped from the course unless they arrange, at the discretion of the instructor, to make it up**. During the quarter, any unsafe behavior, intentional or not, will be noted and may be cause for dismissal from the course For your protection, **safety goggles or Visorgogs** with indirect ventilation and an ANSI minimum rating of Z87 **must be worn AT ALL TIMES** in the laboratory. ONE warning will be issued to any student that is observed wearing their goggles/Visorgogs on their forehead, hanging them around their neck, etc. instead of wearing over their eyes. If the warning is disregarded or ignored repeatedly, points will be deducted or expulsion from the lab may result.

CHEMICAL DISPOSAL

As a concern for the environment and to follow county, state and federal law, proper chemical disposal is essential. Check with the instructor if you have any questions. A student who repeatedly fails to comply with directed safety and/or chemical disposal procedures may be dropped from this course.

LABORATORY LECTURE:

All students are expected to arrive to lab on time and to come to lab prepared to carry out the experiment scheduled for that session. This means that you have studied the experiment for the day, have a basic understanding of its purpose and procedure, the chemistry involved and **have prepared your laboratory notebook for the experiment prior to the start of lab.** We ask that all students do a conscientious and thorough job of cleaning up after themselves, whether it is in their own work area in the lab, or shared areas such as the chemical supply table and balance room. The beginning of each laboratory session is designated as a laboratory lecture period for which you must be on time in order to perform the scheduled experiment. The instructor will use this lecture period to outline important details of the procedure, overview theory and calculations, and to emphasize safety hazards and proper chemical disposal. If you are more than 15 minutes late for the start of lab lecture, you will not be allowed to perform the experiment

for that day. This will be recorded as an unexcused absence. **ALL Lab attendance days are MANDATORY**, and missing days will lower your lab grade.

ATTENDANCE:

You will be dropped if more than 1 unexcused absence is counted. I may allow for emergencies and other complications in life, so if you know that you will be absent, contact me AHEAD of time. **Tardy Policy**: You are counted as tardy if you arrive 5 minutes or more late to class. Each tardy will deduct 2 points from your grade or you will receive 2 points reduced credit for your laboratory notebook preparation. If you are more than 15 minutes late for the start of lab lecture, you will not be allowed to perform the experiment for that day. Four tardies will count as one unexcused absence.

LABORATORY GRADE:

Your laboratory work will comprise 30% of your overall grade in this course. These points will come from the Lab Notebook and Report Sheets for each EXPERIMENT or WORKSHEET. You will be deducted 2 points for every tardy to lab section (5 minutes or more late to class). **If you fail the laboratory portion of this course, then you will not receive an overall passing grade.**

LAB QUIZZES:

These will be written quizzes administered either during the Lecture or Lab Period. They will cover the theory, concepts and analysis presented in the laboratory experiments.

Dates for these quizzes will be announced during the quarter.

LABORATORY NOTEBOOK AND REPORT SHEETS and GRADING CRITERIA

1. Notebook Prep (Duplicate Pages): For all EXPERIMENT activities you will submit the duplicate of your Pre-Lab notebook preparation BEFORE lab lecture begins, no later than 5 minutes into the laboratory for full credit. This will be one page maximum that includes: a title, background information, reagents, safety and a brief summary of the procedure. I will stamp or initial these pages if they are on time. More details will be provided in lab.

2. Data Pages (Duplicate Pages): In lab, after data collection is complete, **you will STAPLE the LAB DATA duplicate pages to your Notebook Prep Duplicate pages as you exit.** I will be looking for overall organization, correctness, and completeness of your lab data. Mistakes during data collection should be indicated out with a single line through the data. All writing must be legible. INCLUDE UNITS on all data, graphs, calculations, etc… Late data pages will be not be accepted.

Due dates and Late Policies:

The due date of each activity will be specified during the laboratory lecture and on the course calendar. For some experiments, you may be collecting and sharing data with a partner, however you must do your own calculations, formulate your own conclusions and turn in your own report for each experiment. If students are found to have copied from one another, points will be deducted from the grade or a grade of zero will be given for ALL students involved!

The activities will often be due and collected BEFORE the start of a laboratory lecture. If you miss an experiment during your scheduled laboratory session, then you may only make-up the experiment during an alternate laboratory session of the SAME experiment with the instructor's permission beforehand. If you are absent for an experiment and are unable to make it up, then you may turn in the lab report/worksheet for partial credit. For grading purposes, lab activities can be turned in a maximum of one lab period late. One lab period late is a 15% penalty. The report or worksheet cannot be turned-in for credit after this time unless an arrangement is made with the instructor beforehand.

CHECK LIST FOR COMPLETED PRELABS and LABORATORY ASSIGNMENTS/REPORTS

- Write your name on the first page. All loose papers must be stapled together! (No paper clips, no bent corners, etc.) Loose papers will not be accepted. Turn-in only what is asked for, no extra pages.

- The lab report or assignment should be neat. Use pen to record all data during an experiment. Mistakes during data collection should be crossed out with a single line (not erased!). Pen or Pencil can be used for data analysis, graphs and follow-up questions. INCLUDE UNITS on all data, graphs, calculations, etc…! All writing must be legible.

- Unless otherwise notified by your instructor, all exercises and problems in a lab report or assignment must be completed for full credit. If you are having trouble solving a problem see your instructor or go to the PSME center for help. Do not copy another students work, both you and the other student will be penalized!

- In all calculations show the set-up with units! If multiple trials are performed, you only need to show the set-up for the first trial.

- All data must be recorded to the precision of the instrument. If you are unsure of the precision ask your instructor or refer the Measurements Lab (completed in class). For example, a buret reading where the meniscus falls exactly on 15 mL is recorded as 15.00 mL not 15 mL. The trailing zeros in the 15.00 mL reading are significant!

- In your calculations use the rules of significant figures to determine how many significant figures your answer should contain. Review the rules for significant figures! Points will be deducted for every significant figure error.

- For all assignments it is essential that you give correct scientific answers to questions where you are to define and/or explain terms. Your textbook and the assigned background reading for the experiment are reliable resources.

week		Lecture	Lab Activity
1 9/23- 9/25	Mon	Introduction/ 1A review	**Intro to Lab/Safety/check in**
	Wed	Ch 5	**MOLAR VOLUME (1)**
2 9/30- 10/2	Mon	Ch 5	**STRUCTURE REVIEW**
	Wed	Ch 5	**HEAT OF VAPORIZATION (1)**
3 10/7- 10/9	Mon	Ch 12	**HEAT OF VAPORIZATION (2)**
	Wed	Ch 12	**GREEN SALTS (1) (lab quiz)**
4 10/14- 10/16	Mon	Ch 16	**GREEN SALTS (2)**
	Wed	**Exam #1 (Ch 5, 12)**	**GREEN SALTS (3)**
5 10/21- 10/23	Mon	Ch 16	**GREEN SALTS (4)**
	Wed	Ch 16	**GREEN SALTS (5)**
6 10/28- 10/30	Mon	Ch 16	**IODINE CLOCK REACTION (1) (lab quiz)**
	Wed	Ch 17	**IODINE CLOCK REACTION (2)**
7 11/4- 11/6	Mon	Ch 17	**IODINE CLOCK REACTION (3)**
	Wed	Ch 17	**IODINE CLOCK REACTION (4)**
8 11/11- 11/13	Mon	No class	**No class**
	Wed	**Exam #2 (Ch 16, 17)**	**Ka OF A WEAK ACID (1)**
9 11/18- 11/20	Mon	Ch 18	**Kc BY SPECTRO 20 (1) (lab quiz)**
	Wed	Ch 18	**Kc BY SPECTRO 20 (2)**
10 11/25- 11/27	Mon	Ch 20	**CALCIUM HYDROXIDE (1) (lab quiz)**
	Wed	No class	**No class**

11 12/2- 12/4	Mon	Ch 20	**CALCIUM HYDROXIDE (2)**
	Wed	Ch 20	**CHECK-OUT (lab quiz)**
12 12/9- 12/11	Mon	**Exam #3 (Ch 18, 20) Monday December 9th 6-8pm**	
	Wed		

Student Learning Outcome(s):

• Evaluate the principles of molecular kinetics.
• Apply principles of chemical equilibrium to chemical reactions.
• Apply the second and third laws of thermodynamics to chemical reactions.

Office Hours:

M,W	05:00 PM	06:00 PM	In-Person	upstairs SC2 building office suite