

CHEM 1B, Section 40Z: General Chemistry II

COURSE SYLLABUS

Schedule:

- Lecture MW (Synchronous) - 6:00pm – 7:15pm
- Laboratory MW (Asynchronous/Synchronous) – 7:30pm – 9:20pm

Zoom Classroom ID: 852 9404 1687 (password: 533323)

Instructor: Dr. Edward Pizzini

eMail: pizziniedward@fhda.edu

Office Hours Friday 12:00 - 2:00 pm

Office: <https://csueb.zoom.us/j/8319525796> (NOT the same as the Zoom Classroom)

Course Description and Objectives

General chemistry II (CHEM 112) is the second quarter of a year-long series covering general chemical principles and basic inorganic chemistry. This class will cover the principals of chemical kinetics, intermolecular forces, chemical equilibrium, and thermodynamics. (NOT the same as the Classroom)

This course is divided into two separate instructional periods, the lecture and laboratory sections. The lecture portion is primarily devoted to the material discussion while the laboratory portion gives a chance for students to practice chemical experimentation. One registration code will enroll for the lecture and lab sections. Lecture and lab sections must be taken together to pass Chem 1B and will both go towards a single grade.

IMPORTANT NOTES for REMOTE DELIVERY

Synchronous Sessions

All synchronous lecture and lab sessions will be held through Zoom during the indicated time period (synchronous), so please download this free application. The meeting ID and password are shown above. A direct link to the ZOOM lecture conference room will be posted to CANVAS.

Laboratory

There will be live, synchronous lab meeting times each week, where I will explain the safety of the experiment and discuss the procedures. You will not be required to complete these labs during a set time period (meaning asynchronous). Since you will be doing these labs at your house, you are free to complete the experiment when is most convenient, as long as it is completed by the due date.

First Day of Class

You **MUST** attend lecture and lab the first day (1/4) which will be used to explain to everyone how the class will proceed this quarter and to make sure everyone enrolled is still planning to take the classes. There are people on the waitlist, and I want to make sure those enrolled are serious about taking the class.

Course Materials

The following materials are essential for the course:

Text: **CHEMISTRY: The Molecular Nature of Matter and Change, 9th Ed.**
by Silberberg and Amateis

Other editions will be essentially the same and will work great to study, but practice problems given in this syllabus correspond to the 9th edition. Although there are online text options, we will NOT be using CONNECT or ALEKS this quarter.

Lab Materials: This quarter, we will use Science Interactive (which used to be Hands On Labs, HOL) to perform laboratory experiments at home. These kits contain all of the chemicals and lab equipment you will need and are integrated with an online cloud platform that will introduce you to the experiment, guide you through the procedure, and provide a post-lab assessment.

The cost for the lab kit and shipping will be covered by De Anza and will be available to order around 1/18/21 (Week 3). When we get closer to this date, I will post a pdf with specific dates and instructions on how to order the kit on Canvas. Please do this as soon as they become available since shipping will take time and we will begin using the kits during Week 5.

Other Resources: **Scientific Calculator** – Logarithm and exponential functions required, NO GRAPHING CALCULATORS. Have this available for each synchronous session to work through examples as they are presented. Use of phones or tablets for calculations will not be allowed for calculations during tests.

Computer and printer access – As this is an online class, you will require a computer with internet access and a printer throughout this course.

Camera access – You should be able to broadcast video from your computer or phone. If this is not possible for you, please talk to me during the first week of class so we can discuss accommodations.

A document scanner or PDF App – Throughout the quarter you will be expected to turn in handwritten assignments by creating a PDF and uploading it to Canvas. Recommended apps include GeniusScan and CamScanner.

Class Registration

Although we are not limited by the space in the lab, the registration limit is strictly set at 30 per section since the kit 1B. The class will be filled based on the official roster provided by the De Anza Admissions and Records, including an official waitlist. Students on this waitlist may come for the lecture. Since these will be through Zoom, I will make sure to create a waitlist mailing list to give invites to lecture the first two weeks.

Lecture

General Information: CHEM 1B will cover chapters 5, 12, 16, 17, 18, and 20 from the assigned textbook.

We will be using the “flipped classroom” concept this quarter. A direct link to the synchronous lecture sessions can be found in the “Course Policies” module on CANVAS.

- Two to four re-recorded lecture videos (between 2 to 3 hours of total viewing time) per week covering the weekly lecture content. These will go up on Saturday night (assuming no technical difficulties) before the week begins.
- The Monday lecture time will be a required (meaning attendance taken) synchronous session incorporating focused discussion and problem-solving skills regarding the material in the posted videos.
- The Wednesday lecture session will be synchronous Q&A time to get help with the lecture material and assigned worksheet but attendance will not be recorded.
- There are TWO holidays on Mondays this quarter in weeks 3 and 7 during which the mandatory problem solving session will occur on Wednesday instead of Monday.

To be a successful learner in this course, please consider the following things:

- Behave as you would during an in-person college class.
- Be an active communicator. Few issues or conflicts in an online class cannot be resolved if discussion of the issue occurs in a timely, courteous manner.
- Review as much of the material as possible *before* the first lecture session of the week. This will allow you to get the most out of the synchronous sessions.
- Don't fall behind. Work a little each day to complete assignments for this class, even when you feel the due dates are well in the future. Before you know it, the future will be TONIGHT!.
- Get help! If it doesn't make sense, *ask*. Unlike an in-person class where I can see and read facial expressions and body language, online classes put the burden on the *student* to indicate when something does not make sense. I promise that if you are confused, so are others in the class... in fact, the more it seems the rest of the class gets it when you don't, the more likely it is that many other people *don't* get it.

Worksheets: After the Monday lecture section each week, a worksheet covering the lecture material for the week will be posted. These worksheets will be a mixture of short answer and calculation problems (for which all work must be shown). These worksheets are due by 11:59pm on Friday nights and are worth 10 points each. These worksheets must be submitted in pdf format to the appropriate assignment on CANVAS.

Lecture Quizzes: In lieu of midterm exams, there will be a 5-6 question quiz on the material from the previous week. These quizzes will be available on Mondays between noon and 11:59pm and you will receive 35 minutes to complete the quiz. Each quiz will be worth 25 points. Much like the worksheets, the quizzes will be a mixture of problem types, which will include randomization of question content to prevent cheating during the quiz. You will be required to scan and upload your work for any calculation on the quiz as a pdf; the final 5 minutes of the quiz should be reserved for scanning and uploading any calculations needed for the quiz.

Lecture Final: The lecture final is worth 200 points and will cover all chapters. The format will be similar to the weekly quizzes. The exam will be given on March 22nd from 6:15pm – 8:30 pm, as shown in the campus final exam scheduled. An additional 15 minutes is being given to ensure students have sufficient time to scan and upload proof of all work.

Suggested Practice Problems: The following additional practice problems from the textbook are suggested for each chapter but **will not be collected or graded**. Please check your answers with the key in the back of the book. If you cannot determine how the problem is solved, either check the solutions manual or make arrangements to come to an office hour for assistance.

Chapter 5:	2, 7, 8, 9, 11, 14, 20, 23, 24, 27, 30, 33, 37, 45, 49, 55, 73, 74, 77, 82, 84, 87, 92, 98, 116
Chapter 12:	1, 4, 10, 11, 13, 15, 18, 24, 32, 38, 39, 40, 42, 49, 52, 63, 70, 72, 81, 88, 89, 96
Chapter 16:	1, 3, 8, 10, 15, 20, 25, 26, 35, 44, 48, 49, 51, 56, 61, 70, 73, 74, 78, 79, 85, 90, 94, 112
Chapter 17:	2, 3, 4, 7, 12, 13, 18, 22, 29, 31, 35, 42, 45, 50, 51, 57, 59, 67, 68, 72
Chapter 18:	3, 5, 10, 13, 22, 24, 25, 30, 43, 44, 48, 49, 60, 63, 70, 72, 84, 99, 111
Chapter 20:	2, 4, 5, 9, 13, 14, 17, 22, 23, 33, 38, 44, 49, 52, 54, 58, 63, 68, 75, 89, 104

Laboratory

The synchronous time scheduled for laboratory will be used to present and discuss background information and safety for each experiment. You are required to view this before starting the experiment. We will be having four physical laboratory experiments and two virtual simulation/worksheets so the remainder of the available lab sessions will be used as open lab time and additional office hours during which I will be available online in the Zoom classroom to assist and answer questions. I **highly** recommend that you use this extra lab time to either perform the experiments or work on the calculations and questions as I will be available to actively assist and clarify as needed.

A tentative schedule for the laboratory activities is included below.

Science Interactive (SI) Experiments: As mentioned previously, we will be using Science Interactive experiments. You may have worked with these kits before under their previous name, Hands On Labs. During the second lab session, we will be getting everyone signed in to accounts so that you can begin to explore the system.

Once census day has passed (Week 3), and there can be no more adds or drops, you will be able to order these HOL lab kits. I will post specific instructions and dates on CANVAS as we get closer to this time. Please make sure to order your kit as soon as it is available, as it will need to be mailed to you. Our first experiment requiring the kit occurs in Week 5. Inside the kit will be (almost) all of the chemicals and equipment needed for the experiments. The remaining materials required are simple around the house items like paper and pencils. It is important to check the inventory of the kit as soon as you receive it so that any broken or missing items can be replaced. Communication is key to work through any issues, so please let me know if you anticipate any issues with shipping. In any case, I am committed to working with you to find the best solution.

If you don't think you will have a space to do this in your current house, please let me know as soon as possible, and we can figure out a solution.

Lab Safety: Maintaining safety when performing experiments is a primary concern. There are many hazards associated with chemistry laboratory experiments. Now that you will be experimenting in your own home, it is even more important to recognize these hazards and understand how to avoid them. With proper technique and care, the risk drops significantly. There are a few very simple steps students should take to execute safe lab techniques:

- Always wear personal protective equipment (PPE) when performing lab experiments. Such items include, but are not limited to, safety goggles, long pants, sleeved shirts, and closed-toe shoes. All of this safety equipment must remain on until you complete the experiment, including cleanup.

- Read the lab procedure for details BEFORE starting the lab procedure. Notes, facts, or some recognition of the hazards are required as part of your prelab to ensure the section on safety has been read. Reading the procedure ahead of time will also help the experiment go smoothly.
- Listen carefully to (and take notes on) the directions provided by the instructor. Many techniques can be performed safely and easily with the proper technique but become a safety hazard when performed improperly.

A detailed list containing safe lab procedures and general practices is given on the next and must be reviewed and signed before starting experiments.

Lab Assignments

All activities and worksheets should be submitted to the appropriate

SI Getting Started – This activity is found on the Science Interactive platform and will help get you familiarized with the SI cloud platform and will be due Friday January 15 by 11:59 PM. This activity is worth 10 points.

SI Laboratory Safety – This activity, also found on the SI platform, will help reinforce safe laboratory techniques, which are especially important now when experimenting in the household. Completing this module is required to start any experiments! This activity is also due Friday January 15 by 11:59 PM and is worth 20 points.

Gas Law Exploration Activity – You will be using a free simulation by PhET to explore how gases respond to changes in pressure, temperature, volume, or amount. A worksheet with instructions will be posted on CANVAS. Complete the worksheet and submit it on or before Friday January 22 by 11:59 PM. This activity is worth 15 points.

Molecular Shapes Review – Much of chapter 12 material relies on knowing molecular shapes and polarity. This worksheet will be due on or before Friday January 29 by 11:59 PM and is worth 15 points.

SI Experiments - After the synchronous lab introduction for each SI experiment, you will need to complete the following items for each experiment. The points assigned for the SI-specific portion of each experiment will vary based on the specific experiment. The due dates for each experiment are listed below. Submit the SI portion of the experiment by downloading a pdf of the final report and uploading it to the appropriate assignment on CANVAS.

Kinetics SI Lab	Friday February 12 by 11:59pm
Equilibrium SI Lab	Friday February 19 by 11:59pm
Boyle's Law SI Lab	Friday March 12 by 11:59pm
Beer's Law Formal Report	Friday March 19 by 11:59pm

1. *SI Cloud Exploration and Questions*

On the SI cloud, once you click on an experiment, you will get a dropdown menu, and one of the sections is "Exploration". The goal of this section is to familiarize students with the concepts and equations used in that experiment. Look through all sections under "Exploration" and answer all associated questions. These questions are worth points with the amount varying for each lab.

2. *Read the lab procedure and write a prelab*

In the SI cloud, select the tab "Experimentation" and read through the entire lab procedure before experimenting. Also read through the materials section to make sure you have everything needed.

To ensure each student has read the experiment and can perform the experiment safely, a written prelab must be completed before every laboratory experiment, ideally in a specifically designated lab notebook. **This is not a cloud HOL assignment, but rather an additional assignment to complement and enhance the lab experience.**

Before each experiment is performed, you will need to complete the prelab and submit to CANVAS. Each prelab is worth 8 points and must be completed and a scanned copy should be submitted before the laboratory experiment is performed. Include the following information should be included in your prelab:

- **Title/date** – These should be at the top of the page and serve to easily determine what experiment has been conducted and when you collected the data.
- **Abstract** – The abstract is your summary of the experiment. It should include the main purpose of the experiment, the laboratory procedures you will use, and the relevant mathematical equations. This should be more than a restatement of the objectives from the lab manual and should demonstrate you have read the entire lab and understand what you will be doing.
- **Hazards** – You will also need to read and summarize the hazards for the chemicals required for each lab. Write the chemical, the associated hazards, and any special steps needed for all of the chemicals you will use for the experiment. Understanding how to properly use chemicals is the best way to stay safe and is essential, especially when not in a real laboratory with full safety equipment.

3. *Perform the experiment and record your data*

Follow the instructions to safely and efficiently complete the experimental procedures. While performing the experiments, you will record the data in the provided table on the SI cloud platform. Entering data into these tables will earn you points with the amount depending on the complexity of the table.

4. *Perform associated calculations*

To prove that you have completed the work, you will need to show the calculations you performed to fill out these tables. One handwritten example for each type of calculation should be submitted to CANVAS. I understand that for multiple trials, you may just enter the data straight into your calculator or even use a computer program, so I do not need to see every single calculation. Please give the results from all the calculations, but I only need to see one handwritten example of each type of calculation.

Additionally, to ensure that you are actually completing the experiment, you will need to take photographs of key steps in the experiment. These need to be submitted alongside the calculations.

Your calculations (and photographs of the experiment) are worth 4 points and are an assignment separate from SI cloud work. Failure to submit this proof will be considered evidence that the answers have been copied from the internet and you will receive a zero for the experimental work.

5. *HOL Cloud Exercise Questions*

After the experiment is complete, there are follow up questions to help with content retention. These are worth points with the amount varying for each lab.

6. *SI Cloud Evaluation Questions*

The last section is the evaluation section where you are tested on the knowledge you have gained from this lab. Once the evaluation is started, it cannot be restarted or paused, so be sure you are ready to take this when you start.

7. *Write a discussion*

This section is the most important and often the most difficult because it requires deep consideration of the experiment as a collective. The conclusion should contain at least these three sections.

The first is a summary of the experiment, including a clear statement of the main goal and brief summary of methods used to collect/analyze data. This should not be more than two sentences and should be specific to each experiment.

The second section should present **ONLY** the key values and conclusions that directly relate to the experimental goal. Additionally, compare one trial to the next and/or compare the average value to literature values if possible.

Finally, provide a specific source of error that may have resulted in discrepancies between trials or accepted values. This should be more specific than oversimplified categories like “human error” and should connect an experimental design or procedural step to an error in your value. Explain how that error could have affected your result by following this error through the calculation process.

This discussion will be submitted in pdf format through CANVAS and will be worth 10 points. Handwritten or typed is accepted.

Formal Laboratory Report: In scientific research, conveying what you have discovered in a clear, concise manner is essential to making your new ideas accessible to others and allowing your contributions to help the world. For the Beer’s Law lab, you will be required to write a formal, typed report worth 50 points.

This is very likely something completely new to you so we will not be doing everything that a manuscript would require. Instead, the report format will be designed for you to gain familiarity with presenting an experiment starting from the established scientific ideas that prompt such experimentation to the analysis and conclusion of the collected data. A more complete guide will be posted to CANVAS as we approach this activity.

The due date for this report is Friday March 19th by 11:59 PM, so there is plenty of time to get help both with the calculations and with the writing process. **DO NOT** procrastinate on this one, as it will take substantial time to complete.

Lab Final: The lab final will test your understanding of the theories and calculations utilized in lab activities this quarter as well as the practices implemented to yield meaningful data. This exam is worth 50 points and will be administered on Monday March 15th (the last week of instruction) during the synchronous lab time. You will be allowed to use any notes during this test, so it is beneficial to efficiently organize your work. No early or late exams will be allowed. The format of the lab final will be similar to the lecture quizzes. No working with chemicals or other lab equipment will be required.

Grading Policy

The grading for the course is based on an accumulation of points based on the worksheets, quizzes, and laboratory work as follows:

Lecture Activity	Points	Laboratory Activity	Points
Scanning/Uploading Assignment	10	Getting Started SI	10
Worksheets (11)	110	Lab Safety SI	20
Weekly Quizzes (10)	250	Gas Law Exploration	15
Final Exam	200	Molecular Shapes Review	15
		Kinetics Prelab/Calcs/Discussion	22
		Kinetics SI	30
		Equilibrium Prelab/Calcs/Discussion	22
		Equilibrium SI	40
		Beer's Law Formal Report	50
		Beer's Law SI	40
		Boyle's Law Prelab/Calcs/Discussion	22
		Boyle's Law SI	30
		Lab Final	50
Total	570	Total	366

Total Course Points	936
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Final grades are assigned based on total points accumulated. Students earning similar point totals will receive similar letter grades based on the following **approximate** distribution. **The instructor reserves the right to adjust the grade distribution as needed based on the class average to ensure parity in grading.**

Grade	Approx. Range	Grade	Approx. Range
A	> 92%	C+	80 – 78%
A-	92 – 90%	C	78 – 72%
B+	90 – 88%	C-	72 – 70%
B	88 – 82%	D	70 – 60%
B-	82 – 80%	F	<60%

Tentative Lecture Schedule

Week #	Week of..	Monday	Wednesday
1	1/3	Course Introduction	Chapter 5 (Gases) Problem Solving (Review, Ch. 5)
2	1/10	Chapter 5 (Gases) Problem Solving (Mandatory)	Chapter 5 (Gases) Open Discussion
3	1/17	NO CLASS MLK Jr Holiday	Chapter 12 (IMFs) Problem Solving (Mandatory)
4	1/24	Chapter 12 (IMFs) Problem Solving (Mandatory)	Chapter 16 (Kinetics) Open Discussion
5	1/31	Chapter 16 (Kinetics) Problem Solving (Mandatory)	Chapter 16 (Kinetics) Open Discussion
6	2/7	Chapter 16 (Kinetics) Problem Solving (Mandatory)	Chapter 16 (Equilibrium) Open Discussion
7	2/14	NO CLASS President's Day Holiday	Chapter 17 (Equilibrium) Problem Solving (Mandatory)
8	2/21	Chapter 18 (Acids and Bases) Problem Solving (Mandatory)	Chapter 18 (Acids and Bases) Open Discussion
9	2/28	Chapter 18 (Acids and Bases) Problem Solving (Mandatory)	Chapter 18 (Acids and Bases) Open Discussion
10	3/7	Chapter 18 (Thermodynamics) Problem Solving (Mandatory)	Chapter 20 (Thermodynamics) Open Discussion
11	3/14	Chapter 20 (Thermodynamics) Problem Solving (Mandatory)	Chapter 20 (Thermodynamics) Open Discussion
Final	Comprehensive Final Exam – Monday, March 22 nd from 6:15pm - 8:30pm		

Tentative Laboratory Schedule

Week #	Week of..	Monday	Wednesday
1	1/3	Lab Introduction/Syllabus (Mandatory)	SI Setup and Lab Safety (Mandatory)
2	1/10	Gas Law Activity (Mandatory)	Open Lab Time (Optional)
3	1/17	NO CLASS	Molecular Shapes Review (Mandatory)
4	1/24	Open Lab Time (Optional)	Open Lab Time (Optional)
5	1/31	Kinetics Lab (SI; Mandatory)	Kinetics Lab (if needed; Mandatory)
6	2/7	Equilibrium Lab (Mandatory)	Equilibrium Lab (if needed; Mandatory)
7	2/14	NO CLASS	Open Lab Time (Optional)
8	2/21	Beer's Law Lab (SI; Mandatory)	Beer's Law Lab (if needed; Mandatory)
9	2/28	Boyle's Law Lab (SI; Mandatory)	Open Lab Time (Optional)
10	3/7	Open Lab Time (Optional)	Open Lab Time (Optional)
11	3/14	Lab Final (Mandatory)	Final Exam Review (Optional)

An Important Note about Lecture and Laboratory Schedules

While the instructor will make every attempt to keep to the schedules given in this syllabus, unanticipated circumstances, may require changes to the schedule shown. Should the date of an exam, experiment, homework assignment, or quiz need to be changed, the instructor will inform the class by email and in the next lecture class, including an explanation of the need for such a change.

General Policies

Disability Service Support: De Anza is committed to providing support for students with disabilities. Please contact me as soon as possible if you require special accommodations and I will be happy to do what I can to help. For more information, visit the De Anza Disability Service Support website at <https://www.deanza.edu/dss/>

Academic Integrity: By enrolling in classes at De Anza College, you are agreeing to the academic integrity policy and are held to all standards. Specifics can be found at <https://www.deanza.edu/studenthandbook/academic-integrity.html>. Cheating will not be tolerated and will result in a zero score for that quiz or assignment. I am also required to officially report such incidents to the college, which become visible to 4-year colleges upon reviewing your transfer application.

Academic Resources: Your **first** stop for academic assistance should be me during lectures, open lab time, and office hours. But if you need additional assistance or are uncomfortable working with me, additional academic support can be found at:

- Learning Resources Division (<https://www.deanza.edu/learningresources/>).
- Information about tutoring can be found at the Math Science and Technology Resource Center (<https://www.deanza.edu/studentuccess/mstrc/>).

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.