Chem 1A, Fall 23 Syllabus

Lecture: TTh 6:00 pm - 7:15 pm - Room SC1102
Lab: TTh 07:30 pm - 10:20 pm - Room SC2202 (Semere Bairu)
Lab: MW 07:30 pm - 10:20 pm - Room SC2202 (Stepp Stephanie)

Course Instructor: Dr. Semere Bairu, Mobile phone: (269) 365 - 8814, email (Best): bairusemere@fhda.edu
Office Hours: Wednesday: 12:00 am - 1:00 pm, online via zoom.

Course Description: This course offers an introduction to chemistry as the first of a three-quarter general chemistry series. This course will cover how we measure the properties of matter and describe the structure of atoms in the context of basic quantum mechanics. We discuss the types of chemical bonds that atoms undergo to form more complex molecules, the ratios in which atoms combine, and the shapes these molecules assume in space. Additionally, we will cover important models for covalent bonding and explore the many types of chemical reactions. The way in which molecules react to form new bonds, and thus new molecules, will be connected to the transfer of heat energy and bond stability.

This course is divided into two separate instructional periods, the lecture and laboratory sections. The lecture portion is primarily devoted to course 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 1A and will both go towards a single grade. The course website is on CANVAS and access to it will be discussed on the first day of class.

Course Materials

1. **Primary Lecture Text**: CHEMISTRY: The Molecular Nature of Matter and Change, Silberberg and Amateis, 9e. Other editions will be essentially the same and will work great to study. There are multiple options to obtain the text for this course depending on your specific needs.

   A. Option 1 – 90-day access to electronic text specifically for CHEM 1A. This is a great, cheap option that will give you 90-day access to an electronic text for the chapters in this class (CHEM 1A) only. This can be purchased via our Course Canvas by hitting on M-H Connect on the left panel. **Required.**
   B. Option 2 – Hard copy text. This can be used and any edition. This option is the way to go if you prefer hard copies and is a great choice if you want a quality chemistry textbook to reference in the future. IMPORTANT NOTE: This text will likely NOT be used by your CHEM 1B and 1C instructors, as we are transitioning to a zero textbook cost model. **Optional**

2. **McGraw Hill Online Homework Platform**: This quarter, we will use the online platform M-H Connect for homework. A subscription to M-H Connect is available through Course Canvas (see Option 1 above).

Lab Equipment: There are a few things needed to safely complete the experiments.

   A. Goggles are required for the entire lab, in addition to appropriate clothing for lab work, such as long pants and closed-toe shoes. The specifics of all the required safety gear will be discussed on the first day of lab and are described more in lab safety sheets at the end of the syllabus.
   B. lab notebook will also be needed. This notebook cannot be pocket size and must be permanently bound. Other than that, the type doesn't matter.
   C. **Scientific Calculator.** Logarithm and exponential functions required. You are encouraged to bring your calculator each day to work through examples as they are presented. Phones will not be allowed for calculations during tests.

Class Registration

Registration limit is strictly set at 30 since we are limited by the space in lab. 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 attend the lecture within the first week but will not be allowed to come to lab until officially enrolled due to space restrictions. Since students on the waitlist will not have access to the class CANVAS site, I will create a waitlist mailing list to send assignments and lecture slides up until the registration is finalized at the end of the first week.

Resources: Academic support can be found at the 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/studentsuccess/mstrc/.

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 during an exam/quiz or copying/using work other than your own for assignments will result in a 0 for the entire assignment, regardless of what percentage of the work is from cheating. Worse than a 0 on an exam, I am required to report such incidents to the disciplinary committee, who will make a note of the incident on your transcript, which then becomes visible to 4-year colleges upon reviewing your transfer application.

Disability Service Support: De Anza is committed to providing support for all students. 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 Disability Service Support at https://www.deanza.edu/dss/

Classroom Conduct: I want to be very clear that this class is a place where everyone can feel safe to be themselves and to learn at their own pace. It is important to me that you feel comfortable to ask questions, and I hope you all will help me create a supportive atmosphere.

Course Schedule. **All exam dates, lecture topics/dates, lab topics/dates are listed on page 9** including the **Final Exam.**

Class Assignments:

Lecture Assignment	Points	Percent
Homework	100.0	11.6
Quiz 1	30.0	3.5
Quiz 2	30.0	3.5
Quiz 3	40.0	4.6
Exam 1	100.0	11.6
Exam 2	100.0	11.6
Final Exam	150.0	11.6
Total Lecture Assignments	**550.0**	**63.6**

Class Total (Lec. + Lab)	**865.0**	**100.0**

Lab Assignment	Points	%
No Pre-Labs required for the highlighted Laboratories; attendance required to complete the assignment		
Measurements Prelab	5.0	0.6
Measurements Full Report	15.0	1.7
Nomenclature Full Report	15.0	1.7
Hydrate Prelab	5.0	0.6
Hydrate Full Report	15.0	1.7
Precipitation Prelab	5.0	0.6
Precipitation Full Report	15.0	1.7
Types of Reactions Prelab	5.0	0.6
Types of Reactions Full Report	15.0	1.7
Conductivity Prelab	5.0	0.6
Conductivity Full Report	15.0	1.7
Acid/Base Titration Prelab	5.0	0.6
Acid/Base Titration Written Report	25.0	2.9
Calorimetry Prelab	5.0	0.6
Calorimetry Full Report	15.0	1.7
Redox Titration Prelab	5.0	0.6
Redox Titration Full Report	15.0	1.7
Line Spectra Worksheet	15.0	1.7
Molecular Model Worksheet	15.0	1.7
Lab Final	100.0	10.99
Lab Total	**315.0**	**36.4**

Lecture and Laboratory Descriptions and Assignments

A. Lecture Description

This class will cover chapters 1-4 and 6-11 from the assigned textbook. All lectures will be held in-person from 6:00 PM to 7:15 PM Tuesdays and Thursdays. The power point lecture slides will be posted before the lecture on CANVAS under modules for that week.

My general philosophy toward lecture is that I am looking to give a deep description of the concepts as well as a thorough review of the associated mathematics. The marriage of these two independent ways of understanding is ultimate goal. This means I will spend a significant amount of time in lecture describing the atomic scale dynamics as well as going over calculations.

Below are some helpful tips that make learning much easier this quarter.

1. **Review the material *before* attending the lecture**. This review could include reading the section in the textbook, reviewing the lecture slides, or even glancing at the homework. This preview will help you develop a stronger and more personal connection to the topics and make the presented material easier to understand.
2. **Don't only copy the words from the slides during lecture.** Since I will post pdfs of the lecture slides before the lecture, you will not need to copy down everything on the presentation. Many of the slides are very dense with info, and it would take you too much time to copy all the words down. Furiously copying the words on slides is not the best way to learn during a lecture, so instead, writing down what I am saying and/or what you are thinking will be a much more successful method. This can be done with a tablet, printing out the slides before, or writing in a notebook using the slide numbers.

3. **Complete all homework problems**. Extensive practice is the best way to ensure concept mastery. The more you practice, the more comfortable you will be, and the better you will perform on exams. Beyond the minimum of the assigned problems, you are encouraged to use the calculation textbook and do the extra M-H Connect problems sets. I am serious when I say that I sometimes use homework questions on exams.

4. **Don't fall behind.** In chemistry, each new topic will build on the previous one, so it is essential to understand the topics as they are presented. Following a lecture when you do not understand the previous material is not an effective method for learning and will lead to further problems. To avoid falling behind……

5. **Get help when you need it.** If you are having a difficult time with a topic, it is your responsibility to get help. There are plenty of resources, including myself, for aiding in material comprehension. You are also encouraged to find a study group and/or come to office hours.

B. **Lecture Assignments**

Homework

Homework assignments are worth 11.6 % of the overall grade and are given through the online platform M-H Connect. There are a total of 10 chapters covered so each chapter assignment will be about 1.16 %. Scoring is on accuracy and overall completion. I will discuss how to subscribe to and utilize this platform on the first day of class.

Doing all the listed problems is highly recommended and represents the minimum needed to practice the topics. To give more practice, there will also be extra problem sets through M-H Connect that will not be worth points but will provide extended practice. You are strongly encouraged to try these extra M-H problems and try others throughout the textbook.

Lecture Quizzes

Quizzes will be given between the exams to make sure everyone is keeping up with the material throughout the quarter. The quizzes are worth **30 points** each, will take about 40 minutes, and will be given during the beginning of the lecture. The days of the quizzes are given on page 9 and reminders will be sent by email.

Lecture Exams

There will be two lecture exams throughout the quarter. Exams will cover material from lectures, homework, quizzes, and book chapters. If you are having difficulty completing the homework questions for that chapter, you are urged to get help *before* taking the test. Questions will range from easy to difficult and may require solving problems that have not been explicitly demonstrated before. I will post a study topic guide before each exam.

Each exam is worth **100 points,** and the dates are given on page 9. No late or early exams will be administered. If you feel the grading of any exam is incorrect, please let me know and I will be happy to talk about talk with me. I will release a key after the exam, and I am very open to hearing what you have to say about the grading, but you must do so within **one week** of the day the exam key is released.

Lecture Final

The lecture final is worth **150 points** and will cover all chapters but will have more from chapters 6,10, and 11 since there will not yet have been any testing on those chapters. The date and time for the final are given on page 11 and will not change.

A. Laboratory Description

While lab work is very exciting, it is important to be clear about the proper precautions for chemical hazards and how to complete lab assignments. The chemical safety document can be found on the last page of the syllabus. I will go over this sheet in lab and you will read, sign, and turn it in to the CANVAS assignment before performing any experiments. Additionally, there is an online module for lab safety that we will do the first week of lab and I will talk about it on the first day class. Completion of this module will give a chemical safety certificate and is worth **5 points (bonus).**

What follows below are descriptions of the policies and assignments required for each experiment.

Absence Policy

If you are feeling sick before coming to lab, please, stay home. While you cannot make up the experiment due to time restrictions, there will be a way for you to make up the points so you won't lose any for staying home. We are all counting on each other to make responsible decisions and I don't want you coming to lab in fear of losing points if you are not well enough to do so.

Lab Assignments

There will be a total of 11 lab-based exercises this quarter that will loosely correspond to the topics we are covering in lecture. Depending on the lab, the assignments will slightly vary. For eight of the labs, which I will refer to as **full labs**, you will read the procedure, complete a prelab, attend the lab introduction at the beginning of the lab period, perform the procedure, answer the follow-up questions/calculations, and write a conclusion.

For **two of these**, which I will call **half-labs**, (Measurements and Types of Reactions), the preparation and lab work will be the same as for full labs, but there will be an associated worksheet rather than a complete analysis and conclusion.

Three lab exercises will not involve chemicals and are more aimed at using lab resources, such as molecular model kits, for hands-on learning. These will not require the same preparation and will only require attending the lab period and completing a worksheet. What follows are the steps to complete each lab experiment and the associated assignments.

Instructions for Full Labs
(Hydrate, Precipitation, Conductivity, Acid/Base Titration, Calorimetry, Redox Titration)

Step 1: The first thing to do to prepare for the lab is to *read the entire experiment*. It is essential to become familiar with the experimental design and procedures before starting with the lab work, and this starts with a thorough read-through of the methods. The lab documents can be found on the De Anza chemistry website and will also be available as pdfs on CANVAS under "modules".

Step 2: Once you have familiarized yourself with the lab, the next step is to write a **prelab worth 5 points**. There are three parts to the prelab that are equally important.

The first part of the prelab is the **lab introduction**, where you will describe the goals of the experiment, introduce the scientific principles that form the basis of the study, and summarize the process by which you obtain the experimental data. This should not be a list of procedural steps but rather 1-3 paragraphs of writing in your own words.

The second part is a recognition of the **hazards** associated with each chemical in the procedure. This does not need to be everything on the SDS but should convey the hazards of working with that chemical and the proper precautions for safe usage. The third part of the prelab is to write **tables** to hold the data you will collect.

All parts of the prelab must be completed before coming to lab. Write them in your notebook and your lab instructor will walk to your bench to see completion of your prelab. Write a pre-lab for each day's lab even though it is a continuation of the previous part (most labs have two parts).

Step 3: After the pre-lab check, I will give an introduction at the beginning of the lab session that will typically include a discussion of the theory behind the experiment as well as a walkthrough of the harder aspects of the procedure. Missing this time will result in a loss of points and may prevent you from performing the experiment that day.

Step 4: While performing the experiment, collect data and transfer it to the worksheet (report sheet). With the collected data, you will now need to perform calculations and follow-up questions. Typically, there will be part of a lab period, or even an entire lab period, dedicated to helping with the calculations. The required calculations and follow-up questions will be available as a pdf at the beginning of each experiment under the calculation assignment for that lab. Due dates are on the canvas assignments. IMPORTANT NOTE: While the questions may be similar, the questions for the full labs are NOT the questions listed at the end of the lab manual.

Step 5: The last task is to write a **conclusion**. This section is the most important and often the most difficult because it requires deep consideration of the experiment as a whole. The conclusion should contain at least these three sections.

1. The first is a summary of the experiment, including the main goal and the methods used to collect/analyze data. This part should not be more than a paragraph and will be very similar to some of the content in the intro.
2. For the next section, **present the final values**. Many of the experiments require collecting a large amount of raw data, but including all these values is not the point of this section. Only include the values or conclusions that directly relate to the experimental goal. Additionally, **compare** one trial to the next and/or compare the average value to literature values.
3. Finally, provide a source of error that may have resulted in discrepancies between trials or between experimental averages and accepted values. This description should go beyond simple factors like human error and should connect an aspect of the experimental design or procedural step to any discrepancies between the experimental and expected values. That is, explain how an error could have affected your result by following this error through the calculation process.

Instructions for Half Labs (Measurements, Types of Reactions)

For these two labs, you will do steps 1-3 from the Full Lab instructions section. After performing the experiment, you will do a worksheet that you will turn in before leaving lab that day, but no extended calculation sheet or conclusion required.

Instructions for Hands-On Lessons (Nomenclature, Line Spectra, Molecular Models)

No preparation is needed for these, but attending the lesson during the lab period and completing the associated worksheet is required.

Formal Laboratory Report. For the acid/base titration experiment, you will do a formal, typed report worth **30 points** that will contain all parts of the lab together in one document, rather than individual parts turned in separately, as in the other labs.

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. It may feel like something completely new if you have not done a scientific report, and that is okay. We will not be doing everything that a manuscript would require but rather looking to gain familiarity with presenting an experimental study. Your lab instructor will talk about thespecifics. During the introduction for this lab, and I will provide an instruction sheet to help with the structure of this report.

Lab Final

The lab final will test your understanding of the theories utilized in lab sections this quarter as well as the calculations implemented to yield meaningful data. This exam will be during your in-person lab time during the last week of class and is worth **100 points**. You will be allowed to use any notes you have taken throughout the entire quarter during this test, so it is beneficial to organize your work and pay attention during the lab introductions. No early or late exams will be allowed. No working with chemicals required.

Grade Assignment. This rubric is subject to change throughout the quarter.

Grade	Percentage
A+	>95
A	90-95
A-	88-90
B+	86-88
B	76-86
B-	74-76
C+	68-74
C	60-68
D	50-60
F	<50

Lecture Schedule

Lecture topics are in black, quizzes are highlighted in bold, exams are highlighted in bold and underlined, and holidays are in yellow. The dates for lecture topics may change but the exam dates will not.

Week of	Week #	Tuesday	Thursday
9/25/23	1	Chapter 1	Chapter 1 / Chapter 2
10/2/23	2	Chapter 2 / Chapter 3	Chapter 3
10/9/23	3	Chapter 4	Chapter 4
10/16/23	4	**Quiz 1** / Chapter 7	**Exam 1** (Ch. 1-4)
10/23/23	5	Chapter 7	Chapter 8
10/30/23	6	Chapter 8	Chapter 9
11/06/23	7	Chapter 9	**Quiz 2** / Chapter 6
11/13/23	8	Chapter 6	**Exam 2** (Ch. 4, 7-9)
11/20/23	9	Chapter 6	Thanksgiving Holiday
11/27/23	10	Chapter 10	Chapter 10 / Chapter 11
12/4/23	11	**Quiz 3 /** Chapter 11	Final Exam Review
12/11/23	12	**Final Exam:** Dec. 12, 2023, from 6:15 pm to 8:15 pm	

WEEK OF	WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
9/25/2023	1	CHECK-IN	CHECK-IN	MEASUREMENT (NO PREP)	MEASUREMENT (NO PREP)
10/2/2023	2	NOMEMCLATURE (NO PREP)	NOMEMCLATURE (NO PREP)	HYDRATE (1)	HYDRATE (1)
10/9/2023	3	HYDRATE (2)	HYDRATE (2)	TYPES OF REACTIONS (1)	TYPES OF REACTIONS (1)
10/16/2023	4	TYPES OF REACTIONS (2)	TYPES OF REACTIONS (2)	PRECIPITATION (1)	PRECIPITATION (1)
10/23/2023	5	PRECIPITATION (2)	PRECIPITATION (2)	PRECIPITATION (3)	PRECIPITATION (3)
10/30/2023	6	CONDUCTIVITY (1) (VERNIER)	CONDUCTIVITY (1) (VERNIER)	CONDUCTIVITY (2) (VERNIER)	CONDUCTIVITY (2) (VERNIER)
11/6/2023	7	ACID-BASE TITRATION (1)	ACID-BASE TITRATION (1)	ACID-BASE TITRATION (2)	ACID-BASE TITRATION (2)
11/13/2023	8	CALORIMETRY (1) (VERNIER)	CALORIMETRY (1) (VERNIER)	CALORIMETRY (2) (VERNIER)	CALORIMETRY (2) (VERNIER)
11/20/2023	9	REDOX TITRATION (1)	REDOX TITRATION (1)	REDOX TITRATION (2)	**THANKSGIVING**
11/27/2023	10	REDOX TITRATION (3)*	REDOX TITRATION (2)	LINE SPECTRA	LINE SPECTRA
12/4/2023	11	MOLECULAR MODEL	MOLECULAR MODEL	CHECK-OUT	CHECK-OUT
12/11/2023	12	FINALS	FINALS	FINALS	FINALS

Lab Safety/Preparedness

Maintaining safety when performing experiments is a primary concern. There are many hazards associated with chemistry labs, so it is essential to recognize these hazards and understand that with proper techniques, the risk drops significantly. There are a few very simple steps students should take to execute safe lab techniques.

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

Second, read the lab procedure BEFORE executing the lab procedure. Notes, facts, or some recognition of the hazards is required for the prelab to ensure the section on safety has been read. Reading the procedure ahead of time and knowing what tasks are at hand will also help the experiment go smoothly.

Finally, listen carefully to 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. What follows is a list from the American Chemical Society Safety In Academic Laboratories Guidelines, 7th Ed., the following mandatory minimum safety requirements must be followed by all students and be rigorously enforced by all Chemistry faculty:

From the American Chemical Society Safety In Academic Laboratories Guidelines, 7th Ed., the following mandatory minimum safety requirements must be followed by all students and be rigorously enforced by all Chemistry faculty:

1. Chemistry Department-approved safety goggles purchased from the De Anza College bookstore (NOT safety glasses) must be worn at all times once laboratory work begins, including when obtaining equipment from the stockroom or removing equipment from student drawers, and may not be removed until all laboratory work has ended and all glassware has been returned to student drawers.
2. Shoes that completely enclose the foot are to be worn at all times; NO sandals, open-toed, or open-topped shoes, or slippers, even with socks on, are to be worn in the lab.
3. Shorts, cut-offs, skirts or pants exposing skin above the ankle, and sleeveless tops may not be worn in the lab: ankle-length clothing must be worn at all times.
4. Hair reaching the top of the shoulders must be tied back securely
5. Loose clothing must be constrained.
6. Wearing "...jewelry such as rings, bracelets, and wristwatches in the laboratory..." should be discouraged to prevent "...chemical seepage in between the jewelry and skin...".
7. Eating, drinking, or applying cosmetics in the laboratory is forbidden at ALL times, including during lab lecture.
8. Use of electronic devices requiring headphones in the laboratory is prohibited at ALL times, including during lab lecture.
9. Students are advised to inform their instructor about any pre-existing medical conditions, such as pregnancy, epilepsy, or diabetes, that they have that might affect their performance.

11. Students are required to know the locations of the eyewash stations, emergency shower, and all exits. Students may not be in the lab without an instructor being present.

12. Students not enrolled in the laboratory class may not be in the lab at any time after the first lab period of each quarter.

13. Except for soapy or clear rinse water from washing glassware, NO CHEMICALS MAY BE POURED INTO THE SINKS; all remaining chemicals from an experiment must be poured into the waste bottle provided.

14. Students are required to follow the De Anza College Code of Conduct at all times while in lab: "horseplay", yelling, offensive language, or any behavior that could startle or frighten another student is not allowed during lab;

15. Strongly recommended: Wear Nitrile gloves while performing lab work; wear a chemically resistant lab coat or lab apron; wear shoes made of leather or polymeric leather substitute.

By signing below, I,_____,

First Name Family Name

acknowledge that I fully understand and agree to abide by the laboratory safety rules listed above. Further, I acknowledge that my failure to abide by these rules will result in my being dropped from this chemistry class immediately.

_____ _____

Signature Date

Student Learning Outcome(s):

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

Office Hours:

W	12:00 PM	01:00 PM	Zoom