De Anza College

Chemistry 1C: General Chemistry and Qualitative Analysis

CHEM 1C - Section 25

Lab MTWR - 11:30 AM to 2:20 PM (Room SC2208)
Lecture MTWR - 2:30 PM to 3:45 PM (Room SC32)

Instructor: Dr. Semere Bairu
Office hrs. On Fridays through zoom (8:00 am to 9:00 am)
Office hrs. link: https://fhda-edu.zoom.us/j/87803369407

Course Description

General Chemistry 1C, being an advanced course in the general chemistry sequence at De Anza, typically covers a range of topics that build upon foundational concepts introduced in earlier courses. The specific topics you can expect to encounter in General Chemistry 1C may include:

1. **Solutions**: Understanding properties that depend on the number of solute particles in a solution, including boiling point elevation, freezing point depression, vapor pressure lowering, and osmotic pressure.

2. **Advanced Equilibrium Concepts**: Exploring the principles governing the dissolution and precipitation of compounds, followed by solutions that resist changes in pH, including the Henderson-Hasselbalch equation and buffer capacity.
3. **Electrochemistry**: An introduction to the principles of electrochemistry, which connects chemical reactions to the flow of electric current, including relationship between these electrochemical principles to Gibbs free energy and equilibrium constants.
4. **Transition Metals Chemistry**: Studying the unique properties and behaviours of transition metals.
5. **Nuclear Chemistry**: Exploring the chemistry of radioactive elements and nuclear reactions, including radioactive decay, nuclear reactions and their applications.

Course Materials

1. **Lecture Text (free)**: OpenStax Chemistry, 2nd Edition. This is a free, online textbook and we will follow chapters 11, 14, 17, 19, and 21 in this course.

2. **Aktiv Learning Platform**: Aktiv will be your primary online platform for various course activities, including homework, quizzes, and class activities this quarter. Subscribing to Aktiv through Canvas, as indicated in the initial announcements, will be necessary. Your instructor will provide further instructions on how to subscribe to and effectively utilize this platform during the first day of class. This approach ensures that everyone is familiar with the tools and resources available through Aktiv, facilitating a smooth and productive learning experience throughout the quarter.

3. **Supplementary Lecture Text:** "The Molecular Nature of Matter and Change" by Silberberg and Amateis is a solid choice for your studies. It's noted for its quality content and can serve as a valuable reference not just during your current course but also for future studies or professional endeavors in chemistry.

4. **Supplementary Calculation Practice:** Having a dedicated resource like "Calculations in Chemistry" for additional practice is highly beneficial for mastering chemistry concepts. This book likely offers a variety of problems and exercises that can supplement the homework assignments and worksheets provided through Aktiv.

5. **Lab Equipment:** To safely complete the experiments, please adhere to the following lab safety requirements:

5.1 Safety is a top priority for the entire lab! **Goggles**, long pants, and closed-toe shoes are crucial for protecting yourself during lab work. Make sure to pay close attention during that first day orientation and review the lab safety sheet thoroughly - it will give you all the details you need to stay safe and prepared throughout your experiments.

5.2 It's important to have a **proper lab notebook** that meets the specified requirements. A permanently bound notebook ensures that your recorded data and observations are securely kept together and won't get lost. This approach helps maintain clarity and organization in your work, which is crucial for scientific research and experimentation.

5.3 Having a **scientific calculator** with logarithm and exponential functions is essential for performing calculations integral to your lab work. Bringing your calculator daily ensures you can actively participate in examples and calculations presented during the lab sessions. Additionally, it's important to note that during tests, the use of phones for calculations will not be permitted.

5.4 The class requires you to **submit pictures of your work to CANVAS**, and using a camera linked to the internet, such as a smartphone, is perfectly acceptable for this purpose. This flexibility allows you to conveniently capture and upload your work directly to the course platform. A highly recommend you use a scanner instead of a camera.

Class Registration

The class has strict limitations due to space constraints in the lab. Here's how the registration and waitlist process will work:

1. **Registration Limit**: Each section of the class is limited to 30 students due to space limitations in the lab.
2. **Official Roster**: The class roster will be based on the official list provided by De Anza Admissions and Records. This roster will determine who is officially enrolled in the class.
3. **Waitlist**: Students who are on the waitlist may attend the lecture sessions during the first two weeks of the quarter. However, due to space restrictions in the lab, they will not be permitted to participate in lab activities until they are officially enrolled.
4. **Access to Canvas**: Students on the waitlist will not have access to the class Canvas page initially. To ensure you receive course materials, including lecture slides and assignments, the instructor will email these resources to you until your registration is finalized.
5. **Finalization of Registration**: Registration will be finalized at the end of the second week of the quarter. At this point, students who have been officially enrolled can fully participate in both lecture and lab components of the class.

This approach ensures fairness and safety in the lab environment while accommodating students who may initially be on the waitlist. It's important for waitlisted students to attend lectures and stay informed through emailed resources until your enrolment status is confirmed.

Resources

For academic support related to your General Chemistry 1C course at De Anza College, you can access resources through the Learning Resources Division and the Math, Science, and Technology Resource Center (MSTRC):

1. **Learning Resources Division**: This division provides a range of resources to support student learning. You can visit their website at Learning Resources Division for information on tutoring services, workshops, study skills development, and academic success resources.
2. **Math, Science, and Technology Resource Center (MSTRC)**: The MSTRC specifically offers tutoring services and academic support for courses in mathematics, sciences, and technology. You can find information about their tutoring hours, locations, and how to schedule tutoring sessions at MSTRC.

These resources are valuable for enhancing your understanding of chemistry concepts, preparing for exams, and improving your overall academic performance in General Chemistry 1C. Whether you need help with homework, clarification on course material, or study strategies, these support services are designed to assist you throughout your academic journey at De Anza College.

Academic Integrity

Maintaining academic integrity is crucial at De Anza College, and it's important for all students to understand and adhere to the policies outlined. Here are key points regarding academic integrity.

1. **Policy Agreement**: By enrolling in classes, students agree to the academic integrity policy of De Anza College.
2. **Standards and Expectations**: The policy sets clear standards for ethical behavior in academic work, including exams, quizzes, and assignments.
3. **Consequences of Violations**: Any form of cheating during exams or quizzes, or using work that is not your own for assignments, will result in a zero for the entire assignment. This applies regardless of the percentage of the work that was obtained through cheating.
4. **Disciplinary Action**: Incidents of academic dishonesty are reported to the disciplinary committee. A note of the violation may be placed on your transcript, which can impact your transfer application to four-year colleges.
5. **Resources for Understanding**: Detailed information about academic integrity policies and guidelines can be found in the De Anza College Student Handbook, specifically at https://www.deanza.edu/policies/academic_integrity.html.

It's essential for students to uphold these standards to maintain a fair and respectful academic environment. Familiarizing yourself with the policies and conducting yourself ethically in your coursework will contribute to your success at De Anza College and in your future academic endeavors.

Disability Service Support

De Anza College is dedicated to supporting all students, including those who may require accommodations due to disabilities. Here's how you can access support:

1. **Accommodation Requests**: If you require accommodations to support your learning needs, please contact me as soon as possible. I am committed to assisting you and facilitating the necessary accommodations.
2. **Disability Support Services (DSS)**: For more detailed information about available accommodations and how to request them, visit the Disability Support Services webpage at De Anza DSS. This resource provides comprehensive information on services, accommodations, and the process for requesting support.
3. **Contact Information**: I'll work with you to ensure that any necessary accommodations are implemented effectively. It's important to initiate contact early to allow sufficient time for accommodations to be arranged and implemented.

By proactively engaging with Disability Support Services and me, you can ensure that your learning experience at De Anza College is accessible and supportive of your individual needs.

Classroom Conduct

I want to emphasize that this class is a safe space where everyone can feel comfortable being themselves and learning at their own pace. Your questions and contributions are valuable and encouraged. I hope we can all work together to foster a supportive atmosphere where everyone feels respected and supported in their learning journey.

Late Work Policy

Labs require mandatory preparation for safe work, so late prelabs cannot be accepted. However, late submissions for other assignments are allowed, but once an assignment has been graded, late submissions will receive a maximum of half credit. If you anticipate missing a deadline for an assignment, please contact me in advance. We can work together to arrange an alternative schedule that accommodates your needs.

Course Schedule

All exam dates, lecture topics, lab topics, and their corresponding dates are detailed on page 8 of this syllabus. Additionally, the final exam date is specified on page 8 and can also be accessed through the De Anza College website.

Course Overview:

- **Textbook Coverage**: Chapters 11, 14, 17, 19, and 21 will be covered.
- **Lecture Schedule**: In-person lectures will be held on MTWR from 2:30 PM to 3:45 PM in room SC32.
- **Lecture Slides**: PowerPoint lecture slides are posted on CANVAS. If lecture slides are modified you will be informed as soon as possible.
- **Teaching Philosophy**: Emphasis on providing a deep understanding of concepts and thorough review of associated mathematics.
- **Lecture Approach**: Spend significant time describing atomic scale dynamics and practicing calculations.
- **Preparation Tips**: Review material before lectures to strengthen understanding and make learning easier.

Learning Strategies:

- **Note-taking**: Avoid copying verbatim from slides; focus on understanding concepts and writing down key points or personal insights.
- **Homework**: Complete all assigned problems for mastery; additional practice is encouraged using the calculation textbook and extra Aktiv problem sets.
- **Staying Current**: Understanding builds sequentially, so stay engaged and seek help promptly if needed.
- **Support Resources**: Utilize office hours, study groups, and other resources for assistance with challenging topics.

Assignments:

- **Homework**: Assigned via Aktiv, focusing on accuracy and completion, with additional non-graded practice sets available.

Lecture Quizzes

- **Frequency and Timing**: Quizzes will be administered before exams to assess ongoing comprehension of course material. They will serve as a practice question for the upcoming exam.
- **Value**: Each quiz is worth 50 points and is expected to take approximately 45 minutes to complete.
- **Notification**: Quiz dates are specified on page 8 of the course materials. Additionally, reminders will be sent via email to ensure students are informed.

Lecture Exams

- **Frequency**: There will be two lecture exams throughout the quarter.
- **Coverage**: Exams will encompass material from lectures, assigned homework, and practice quizzes.
- **Preparation**: It is recommended to seek assistance if you encounter difficulties with homework questions related to exam chapters.
- **Question Types**: Questions will vary in difficulty and may include problem-solving scenarios not explicitly demonstrated before.
- **Study Guides**: Before each exam, a study topic guide will be posted to assist in preparation.
- **Grading and Feedback**:
    - Each exam is worth 100 points.
    - Exam dates are detailed on page 8 of the course materials; no late or early exams will be administered.

- If you have concerns about exam grading, please communicate them promptly after the exam key is released, within one week.

Lecture Final

- **Weight**: The lecture final exam is worth 150 points.
- **Coverage**: It will cover all the chapters with majority questions from the last two chapter.
- **Date and Time**: The final exam date and time are specified on page 8 of the course materials and will remain unchanged.
- **Preparation**: Review all chapters and topics including previously taken quizzes and exams.

Lab Safety and Assignments Information:

- **Chemical Safety Document**:
  - Located on the last page of the syllabus.
  - Will be reviewed in lab sessions.
  - You must read, sign, and submit it via CANVAS before participating in any experiments.
  - Worth 5 points.
- **Online Lab Safety Module**:
  - Scheduled during the first week of lab.
  - Details will be discussed on the first day of class.
  - Completion of this module grants a chemical safety certificate.
  - Worth 5 points.
- **Experiment Policies and Assignments**:
  - Detailed descriptions will be provided for each experiment.
  - Follow specific guidelines and safety protocols outlined in the lab safety document and module.

Illness and Lab Attendance Policy:

- **Prioritizing Health**: If you feel unwell before a lab session, please stay home.
- **No Experiment Makeup**: Due to time constraints, experiments cannot be made up.
- **Making Up Points**: There will be an alternative way to make up the points missed from the lab.
- **Communication**: Notify the instructor as soon as possible if you are unable to attend due to illness.
- **Responsibility and Support**: Emphasize the importance of responsible decision-making and assure students that they will not lose points for prioritizing their health.

Lab Assignments *(adapted from Dr. Chris Deming)*

There is a total of 7 experiments this quarter that will loosely correspond to the topics we are covering in lecture. Below you will find instructions on how to complete each lab

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 manuals will be available as pdfs on CANVAS under "modules" as well as attached to the prelab assignment.

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 safety.

The third part of the prelab is to write tables to hold the data you will collect. These can't be print outs of tables from the lab manual but should be something you make after reading the procedure and envisioning the data collection.

All parts of the prelab must be completed before coming to lab. Scan/take pictures of the work and upload them to the appropriate CANVAS assignment before the start time of the lab.

Step 3: At the beginning of the lab period, for the first day of each experiment, there will be a quiz to test how well the experimental design and procedural steps are understood, worth 3 points. These will only take about 15 minutes, and you can reference your prelab and lab notebook during the quiz.

Step 4: After the quiz, 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 may prevent you from performing the experiment that day since I may not be able to redo the intro while still watching over the class during the experiment.

Step 5: After performing the experiment, take a picture of your data (in the tables you made for the prelab) and load it to the appropriate assignment before leaving the lab room for 5 points. You will not be graded on how accurate or precise your data are, but rather that all the trials are complete, and the appropriate number of figures are recorded for each measurement.

Step 6: With the collected data, you will now need to complete a worksheet with calculations and follow-up questions and turn it in to CANVAS. Included in the calculation worksheet will be questions on the result's accuracy and precision, as well as any sources of error, so this will also effectively cover what would be in a typical conclusion/summary assignment.

Generally, there will be part of a lab period, or even an entire lab period, dedicated to helping with the calculations. For the more complicated calculations, I will make a video to help guide through the process. The required lab 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: Some labs may have questions and calculations throughout or at the end of the lab manual. While these questions may be similar, the real calculations for each lab are instead given on a pdf attached to the "calculations and questions" assignment for that lab.

Lab Final

The lab final will test your understanding of the theories utilized in lab this quarter as well as the calculations implemented to yield results from the raw data. This exam will be during your 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 is required.

Score Distribution (matches Canvas)

Lecture Assignment	Points	Percent
Homework	100.0	11.1
Quiz 1	50.0	2.8
Quiz 2	50.0	2.8
Exam 1	100.0	11.1
Exam 2	100.0	11.1
Final Exam	150.0	13.3
Lecture Total	**550.0**	**64.4**
Lab Total	**304.0**	**35.6**
Overall TOTAL = 100.0 %		

Lab Assignment	Points	Percent
Chemical Lab Safety Sheet	5.0	0.59
ACS Essentials of lab Safety Certificate	5.0	0.59
Lab Safety and Cleanliness (group cleaning)	10.0	1.17
Freezing Point Depression Prelab	5.0	0.59
Freezing Point Depression Lab Quiz	3.0	0.35
Freezing Point Depression Experimental Data	5.0	0.59
Freezing Point Depression Worksheet	10.0	1.17
pKa of an Indicator Prelab	5.0	0.59
pKa of an Indicator Lab Quiz	3.0	0.35
pKa of an Indicator Experimental Data	5.0	0.59
pKa of an Indicator Worksheet	10.0	1.17
Buffers Prelab	5.0	0.59
Buffers Lab Quiz	3.0	0.35
Buffers Experimental Data	5.0	0.59
Buffers Worksheet	10.0	1.17
Common Ion Prelab	5.0	0.59
Common Ion Lab Quiz	3.0	0.35
Common Ion Experimental Data	5.0	0.59
Common Ion Worksheet	10.0	1.17
Anions Prelab	5.0	0.59
Anions Lab Quiz	3.0	0.35
Anion Experimental Data	5.0	0.59
Anions Worksheet	10.0	1.17
Electrochemistry Prelab	5.0	0.59
Electrochemistry Lab Quiz	3.0	0.35
Electrochemistry Experimental Data	5.00	0.59
Electrochemistry Worksheet	10.0	1.17
Cations Prelab	10.0	1.17
Cations Lab Quiz	6.0	0.70
Cations Worksheet	30.0	3.51
Lab Final	100.0	11.7
Lab Total	**304**	**35.6**

Letter Grade	Percentile (%)		Letter Grade	Percentile
A+	>95		C+	80 - 77
A	95 - 92		C	77 - 72
A-	92 - 90		C-	72 - 65
B+	90 - 87		D	65 - 60
B	87 - 84		F	< 60
B-	84 - 80			

Lab Schedule

Week (Sunday)	Monday	Tuesday	Wednesday	Thursday
6/30	Chapter 11	Chapter 11	Chapter 11	**July 4 – No Class**
7/07	Chapter 14	Chapter 14	Chapter 14	**Quiz # 1**; Ch. 14
7/14	**Exam # 1**	Chapter 14	Chapter 17	Chapter 17
7/21	Chapter 17	Chapter 17	Chapter 19	Chapter 19
7/28	Chapter 19	**Quiz # 2**; Ch. 19	Chapter 21	**Exam # 2**
8/04	Chapter 21	Chapter 21	**Final Exam Review**	**Final Exam: Aug 8 2:30 pm – 4:30 pm**

Lab Schedule

WEEK	Monday	Tuesday	Wednesday	Thursday
6/30	Check-In	Freezing Point (day 1)	Freezing Point (day 2)	July 4 - Holiday
7/07	Pka of Indicator (day 1)	Pka of Indicator (day 2)	Buffers (day 1)	Buffers (day 2)
7/14	Ksp & Common Ion Effect (day 1)	Ksp & Common Ion Effect (day 2)	Anions (day 1)	Anions (day 2)
7/21	Electrochem (day 1)	Electrochem (day 2)	Cations (day 1)	Cations (day 2)
7/28	Cations (day 3)	Cations (day 4)	Cations (day 5)	Cations (day 6)
8/04	Cations (day 7)	**LAB Final Exam**	**Check-Out**	**No Lab.**

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.

De Anza Community College – Summer 2024 (Jul 01-Aug 09)

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 lectures.

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.

10. Students are required to know the locations of the eyewash stations, emergency shower, and all exits

11. 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

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Student Learning Outcome(s):

• Apply the principles of equilibrium and thermodynamics to electrochemical systems.
• Apply the principles of transition metail chemistry to predict outcomes of chemical reactions and physical properties.
• Evaluate isotopic decay pathways.
• Demonstrate a knowledge of intermolecular forces.

Office Hours:

F	08:00 AM	09:00 AM	Zoom