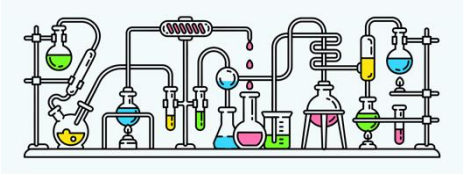
Chemistry 1C: General Chemistry III

Term: Winter 2024
Instructor: Dr. Brophy



Class Schedule

Section 11 CRN 37910	Lab	MW 8:30 am – 11:20 am in SC2208	
	Lecture	MW 3:30 pm – 4:45 pm in MLC103	
Section 12 CRN 32208	Lab	MW 11:30 am – 2:20 pm in SC2208	
	Lecture	MW 3:30 pm – 4:45 pm in MLC103	

School Holidays

January 15	*MLK, Jr. Day*
February 16	*President's Day*
February 19	*President's Day*

Sections 11 and 12 will meet simultaneously for the "double" lecture; however, you must attend the lab section that you are registered for. The lab and lecture components of the class cannot be taken separately under any circumstances.

Course Webpage

The course webpage is through De Anza Canvas. You will be automatically added to the Canvas shell as a student when you enroll in the course. Students on the waitlist do not have access to Canvas. This course webpage is designed to be viewed on a web browser rather than the student app. ***Turn on Canvas notifications*** *to receive class announcements, Inbox messages, and comments/feedback on assignment submissions.*

Community Statement

Every person in this class, regardless of personal history or identity categories, is a welcome and important member of this group. Your experiences are important, and you are encouraged to share them as they become relevant. No person in this group is ever expected or believed to speak for all members of any group(s).

You have the right to determine your own identity, to be called by whatever name you wish, and to be referred to by your pronouns. You have the right to adjust these things at any point. If you find any aspects of facilitation, instruction, subject matter, or program environment that result in barriers to your inclusion, please let me know right away, privately without fear of reprisal. We are all learning. It is my goal to continue learning and improving to support everyone in this class and, by extension, all my current and future students.

About Your Instructor

Instructor: Dr. Megan Brunjes Brophy
Office: SC1220
E-mail: brophymegan@fhda.edu
Phone Number: 408-864-8338 (*not preferred*)
*Please note that **Canvas Inbox** is the most reliable ways to get in touch with me outside of class. I do not reply to messages on evenings and weekends. In general, you can expect a reply from me in 2–3 business days.*

Study Hall Study hall time (aka office hours) are an opportunity for you to come talk to your instructor outside of regular class time. Please bring you homework, notes, reading, or any other assignments. You are welcome to come talk to me about the course, questions that you have about the material or practice problems, and your educational path. Each of my office hours are open to all my students; please come say hi!

Day	Time	Location
Tuesday	10:30 am – 12:00 pm	S43
Thursday	10:30 am – 12:00 pm	S43

My Teaching Philosophy

My hope is that every student who takes one of my classes gains an appreciation for the power of chemistry and the beauty of the natural world. It is important to me to design a course that is accessible to students of varying educational, cultural, and socioeconomic backgrounds while mainting high intellectual and academic standards. I strive to reward consistent, sustained effot throughout the quarter, and my goal is for everyone who takes this class to pass with a C so that you can move on to the next stage of your educationaal or career pathway.

Official Course Description

This is the third and final quarter in the year-long General Chemistry sequence. In this class, advanced equilibrium concepts pertaining to solubility and buffers will be discussed. This will be followed by an introduction to electrochemistry, the chemistry of transition metals, and nuclear chemistry.

What is this class about?

Chemistry 1C is the capstone course of the general chemistry curriculum at De Anza College. Throughout Chemistry 1C, we will build on and expand on the concepts that were introduced in the first quarter quarters of general chemistry 1C. Through the successful completion of this course, I hope that you will build confidence in quantitative chemical calculations and feel empowered to apply a molecular-level understanding to your future studies and aspects of your everyday life. You will hone your information literacy skills by reading a scientific research paper from the primary literature and analyzing its merits and results.

In terms of content, we will cover many topics within the key general chemistry themes of (i) physical properties of matter, (ii) atomic structure and reactivity, (iii) transforming and harnessing energy, and (iv) atomic structure. The lab portion of the class will give you the opportunity to utilize the lab skills that you built in Chem 1A and Chem 1B and apply those skills to complex physical problems. We will also use the lab to introduce real-world examples of concepts that are covered in more detail in lecture.

The homework is designed to help you master molecular concepts and quantitative problem solving, and that mastery will be assessed through three midterm exams and a cumulative final. You will develop practical lab skills as well as information literacy in the lab section of the course.

Enrollment Requirements

Recommended Preparation

I generally assume that students enrolled in Chemistry 1C have taken Chemistry 1A and Chemistry 1B in-person at De Anza College within the previous year. Chemistry 1C covers multiple disparate topics that each draw on different concepts from Chem 1A and Chem 1B. Because of this, it is particularly important for students to proactively review prior material and reach out early and often for help. The college provides multiple spaces and services for academic support, including the MSTRC, the PSME Village, and the MESA center.

Prerequisites

Chemistry 1B or 1BH with a grade of C or better.

Advisory

EWRT 1A or EWRT 1AH or ESL 5

Late Adds and Add Codes / Drops

I will only give out add codes if space is available by the second lab session. If you are interested in joining the class, *you must attend lab and lecture this week*. Students who miss the lab safety meeting will not be permitted to enroll in the course under any circumstances. Similarly, if you are enrolled in the course and miss the safety lab, you will be dropped from the course during the lab period. ***I do not give out add codes after the first week of class***, and I strongly encourage you to enroll in an open section if you are on the waitlist.

Students who miss two labs during the first two weeks of class will be dropped from the course.

Course Objectives and Learning Objectives

Course Objectives

- Investigate the behavior and characteristics of solutions.
- Examine advanced concepts in equilibrium pertaining to buffers and solubility.
- Explore transition metal chemistry.
- Apply fundamental principles of equilibrium to electrochemical systems.
- Investigate nuclear chemistry.

Learning Objectives

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

Dr. Brophy's Summary of Learning Objectives

In Chemistry 1C, we seek to deepen our understanding of core chemical concepts including molecular structure, chemical reactivity and transformations, and energy changes in chemical processes. We will start with an in-depth study of the properties of solutions and colligative properties—e.g. why do pure water and saltwater have different properties? How can you make ice cream without refrigeration? What are the intermolecular forces involved in solution formation? – as well as solubility equilibrium. We will further study aqueous solutions by studying buffer systems and reactions between weak acids and weak bases. We will turn our attention to electrochemistry– how do batteries work? Why do some substances corrode in oxygen? How do we get energy from reduction-oxidation reactions? We will then study transition metals and coordination complexes, building on your understanding of quantum chemistry to describe new models of bonding. Finally, we finish the course with an exploration of nuclear chemistry and delve into the physical properties of the nucleus as well as real-world applications.

Important Dates

College Dates

First Day	January 8, 2024	First day of class! In-person attendance is expected.
Withdraw	March 1, 2024	Last day to *withdraw* from the course.

For a full list of important dates, please see https://www.deanza.edu/calendar/

If circumstances beyond your control prevent you for completing the course, you may qualify for an excused withdrawal. Please see the following website for more information. https://www.deanza.edu/admissions/withdrawals.html

Supplies and Materials: Lecture

- **Computer and printer access** You will require internet access and a printer throughout this course. The Library West Computer Lab is located on the lower level of Learning Center West in LCW 102. Printing can be found around campus: https://www.deanza.edu/students/printing.html
- **Textbook** *OpenStax Chemistry*, 2nd edition. Available *free* online at https://cnx.org/contents/f8zJz5tx@9.18:DY-noYmh@9/Introduction or on the OpenStax app (iPhone/iPad).
- **Calculator** A scientific calculator with base-10- and natural-log functionality is necessary and sufficient for this class. If you have already purchased a graphing calculator for another class, you may use it on exams and quizzes; however, *we will not use the graphing functionality.* Recommended models:
  https://www.amazon.com/Texas-Instruments-MultiView-Scientific-Calculator/dp/B000PDFQ6K
  https://www.amazon.com/dp/B005QXO8J0/ref=dp_cerb_3
- **Molecular Modeling Kit** We will use a molecular modeling kit in class when we study transition metal complexes. I recommend one of the following options:
  - Duluth Labs modeling kit
  - Old Nobby modeling kit
- Stapler and staples. Most of the classrooms do not have a stapler. Please bring one with you to class.

Supplies and Materials: Lab

- **Personal Protective Equipment** PPE is required for each wet-lab day and is essential to keep you and your colleagues safe and healthy. *You may not participate in lab without PPE.*
  - Approved laboratory safety goggles (not safety glasses), available from the De Anza College Bookstore. Safety goggles must carry a ANSI Z87.1 shatter rating. If you purchase safety goggles from another retailer you must present the packaging with verification of ANSI rating to your instructor.
  - Disposable latex or nitrile gloves.
  - Long pants/skirt and closed-toe shoes must be worn in lab.
  - A lab coat or lab apron is optional and recommended.
- **Lab Manual** Lab procedures and assignments for Chemistry 1C will be posted on Canvas. You must print the lab manual and bring it with you to lab. *Electronic devices may **not** be out and in use during lab experiments.*
- **Lab Notebook** A dedicated bound composition notebook to use as a laboratory notebook. Notebooks with metal spiral binding are *not* permitted. *You do not require a lab notebook with carbon copies.* You may reuse or continue a lab notebook from a previous course.

Optional Materials

- *Calculations in Chemistry an Introduction*, 2nd edition by Dahm and Nelson. This **optional** resource provides additional examples of common problem-solving techniques. I particularly recommend this resource if you haven't taken 1A or 1B in some time or you would like to build confidence in quantitative chemistry. Available at many online retailers.

- *Chemistry: The Molecular Nature of Matter and Change*, any edition by Silberberg and Amateis, available at the De Anza College Bookstore or from multiple online retailers. The MSTRC also has copies of this book available to use.

Campus 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. I strongly recommend that you study in the MSTRC early and often. They have computers and it is a great place to study for your STEM classes. 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. Please reach out to them directly if you have questions. 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/ . If you need additional resources, I can put you in touch with support services through De Anza Connect. Please give me explicit permission to share your information with them.
- **Student Help Hours** Instructor office hours are the best time to ask questions related to course content in-person. This time is *for you, the student*. Please come!

I expect you to use the resources available to you, share high-quality resources with your classmates, and ask for help when needed.

Syllabus Statement

This course syllabus is a living document. Please read it carefully and completely in its entirety before asking me any questions regarding the course schedule, content, requirements, grading, etc. You are expected to adhere to the De Anza College Student Code of Conduct Administrative Policy 5510 at all times. All corrections and changes to this syllabus will be announced through Canvas.

This class is divided into two separate instructional periods: a lecture period devoted to the primary course material and a lab period for conducting lab experiments. Everyone will have the same lecture period, but a different lab period depending on which section you are enrolled in. At De Anza College, the lab and lecture may not be taken as separate courses under any circumstances.

Time Commitment

This is a five-unit course. Three hours lecture and six hours laboratory will be spent in class. You should expect to spend an additional **20 hours a week** studying and working on class assignments to excel in this class.

Attendance Policy

Your punctual attendance is expected at *all* lecture and laboratory sections of the course. *Plan to arrive 5-10 minutes early.* If you will have to miss lecture or lab for any reason, let me know through Canvas or by email as soon as possible. Notifying your instructor of absences or tardiness shows that you take your responsibility towards your fellow students seriously. If you miss either lab or lecture, please arrange a time to meet with a fellow student so that you can get notes and find out what you missed. (*Note: Punctuality is very important to me, personally. I understand that things happen, and traffic can be unpredictable; however, your habit should be to arrive at class on time. I do notice if you are routinely late.*) You do not need to tell me why you are missing class. I think that is your personal, private business.

The De Anza College Chemistry Department does not offer make-up labs under any circumstances. ***If you miss 3 lab periods you will fail the course.*** This is non-negotiable. You should consider if this is the best quarter for you to commit to this class.

Grading Policies

To succeed in this course, you will need to exhibit ***consistent and sustained effort*** throughout the quarter. This will be demonstrated through in-class participation, laboratory preparation and data analysis, and assessments. Assignment types are assigned a weight; not all points are created equally!

Lecture	65% of total grade

Final %	Grade[1,2]

Lecture homework	15%
Assessments	50%
Lab	35% of total grade
Pre-lab	5%
Literature Activity	5%
Lab assignments	25%

>100.00	A+
≥ 90.00	A
88.00 – 89.99	A–
85.00 – 88.99	B+
80.00 – 84.99	B
78.00 – 79.99	B–
75.00 – 77.99	C+
68.00 – 74.99	C
63.00 – 67.99	D+
55.00 – 62.99	D
< 55.00%	F

[1]A+ grades will be given to students who demonstrate excellence in the following three areas: lecture, lab *and* class participation. A+ grades will be granted only at Dr. Brophy's discretion for extraordinary effort and work.

[2]Please note that I do not typically round grades or adjust the grade scale for passing grades. It is important to me to keep a consistent and fair grading scale. Do not ask me to artificially raise your grade at the end of the quarter.

Note that grades will be entered in Canvas; however, the gradebook and assignment types may not be finalized until the end of the quarter. I make an effort to make sure that the grade that you see in Canvas is close to "real-time"; however, there are some quirks of the platform that may create delays. If it looks like I haven't released grade for an assignment or it has been more than one week since something was due, feel free to remind me about the assignment. *Note that it may take me longer than a week to grade late assignments.* I also encourage you to make your own spreadsheet to keep track of your letter grade throughout the quarter.

Canvas Gradebook Settings

With a few exceptions, all student assignments will be submitted on Canvas. Late work will be accepted until March 17th at 11:59 pm– this is a hard deadline and will not be extended. The Canvas gradebook is set up such that any work submitted late will receive a 2% deduction per day or fraction thereof. The lowest grade you can get on an assignment that you complete and turn in is 50%. Each Canvas assignment allows ***one*** submission. Pay careful attention to the assignment to make sure that you upload the correct file! If you make a mistake, you may upload the correct file as a submission comment. Once you submit an assignment and it is graded, your score is ***final***, even if submitted before the deadline. I will only regrade assignments in cases of obvious errors (e.g. I missed a page and marked something incomplete. Altogether, be intentional and careful when you upload assignments. The work that you submit should represent your best effort.

Assignment Tokens

This quarter, I will not make manual adjustments to late work penalties or assignment extensions. Instead, each student will have a set number of tokens that you can redeem before the end of the quarter for missed lab days, late homework assignments, or missed lecture activities. You may not use a token to redeem a missing assessment (quiz, midterm exam, or final) or the lab literature activity. Assignment tokens will open March 18th and must be submitted no later than March 21st.

Tips for Learning Chemistry

Like many introductory survey courses in STEM fields, chemistry has a reputation for being a hard subject. I expect you to find this class challenging; however, putting the time and energy in to learning the material can be extremely rewarding. This class will utilize many resources in concert to help you gain skills, knowledge, and understanding for you to apply chemical principles to multiple areas of study. The lectures will provide organization and context for the topics that we cover, and you should use the assigned reading and homework to fill in the details.

1. Know where to find relevant information for the course, in particular the assigned reading for both the labs and the lectures.
2. Complete the assigned reading before coming to class. Review 1A topics that are unfamiliar. Write down any vocabulary words that you do not understand as well as their definitions *from the textbook*.
3. Practice and develop your critical reading skills.
4. Take *handwritten* notes during class and review your notes regularly. Cognitive science tells us that we learn new information better when we write rather than type.
5. Review your notes early and often. Use the assigned reading to fill in details and redraw important figures.
6. Write down any questions you have. Bring these questions with you to office hours or the drop-in tutoring center.
7. Most of the "rules" that you learn in chemistry are guidelines. There are exceptions. You will recognize these exceptions more as your chemical intuition builds.

8. Do a little bit every day. After every lecture, review the reading assignment and complete in-chapter and end-of-chapter exercises. Spend at least an hour on chemistry every day.
9. Seek conceptual understanding. Memorization will follow.
10. Join a study group. Work on problem sets together. The best way to learn the material is to teach it to somebody else.
11. Utilize the free tutoring services on campus and online through the MSTRC.
12. Turn in and finish assignments as soon as you are able. Don't assume that you'll have time to do it later, or immediately before the deadline. Life is unpredictable.
13. Take care of yourself! Stay well-rested and drink water. Your physical health and safety are your priority. If you need assistance with any basic needs, please reach out to me to referrals to campus resources.
14. Technology will betray you at the worst possible moment, and there is no reliable support for Canvas or other online systems in the evening or on weekends. Start your assignments when they are available and upload them well before the official deadline.

Academic Integrity

The process of learning requires physical changes to occur in your brain. Cognitive research demonstrates that consistent practice and learning to recognize mistakes are key aspects of the learning process. As such, all students should be aware of the De Anza College policy on academic integrity outlined at https://www.deanza.edu/policies/academic_integrity.html The following text is reproduced from the De Anza College manual:

> *…the college is committed to providing academic standards that are fair and equitable to all students in an atmosphere that fosters integrity on the part of student, staff and faculty alike. The student's responsibility is to perform to the best of his or her potential in all academic endeavors. This responsibility also includes abiding by the rules and regulations set forth by individual faculty members related to preparation and completion of assignments and examinations.*

I expect that all work submitted for this class will represent your own understanding of the material and must be written in your own words. Cheating, copying, plagiarizing, etc. will not be tolerated. Due to the "online" nature of the class, students must take extra care to abide by the policies and expectations set forth for each assignment. While it is tempting to use the full weight of the internet, some sources may provide misleading or corrupt information. Students should focus on the required reading and recommended resources for the class, and any other sources must be vetted by the instructor. Tutoring resources are allowed for homework assignments; however, using a paid, static resource is forbidden. This can be particularly challenging as some websites that profess to provide tutoring services are destructive to the learning process. A good rule-of-thumb is that any tutoring service will help you solve a problem and arise at an answer *on your own*—this means that your brain is making new physical connections between neurons, and you are learning! If an online source professes to offer tutoring, but instead provides you with answers, this is cheating. The websites Chegg, CourseHero, Reddit, as well as any similar site are explicitly forbidden for all class assignments. Posting class assignments on these websites is considered intent to cheat and a violation of the academic integrity policy. I am happy to discuss appropriate resources with you, and I encourage you to ask for permission rather than forgiveness.

You may collaborate with your classmates on lecture homework assignments; however, the final work that you submit must reflect your own understanding of the material. Do not allow any other student to copy your work under any circumstance. If a student asks if they can copy your work or "just see it as an example", ask them to reach out to the instructor for help. If two students turn in the same work, both students will have participated in academic dishonesty.

Class assessments are used to measure an individual student's mastery of the material. They are all closed resource, and you will be provided with any physical constants or additional information as necessary. A common mistake that past students have made is to Google a question and copy an answer from the internet—this behavior is forbidden, and the consequences are described below. If I suspect cheating on a quiz, you will be required to meet with me face-to-face.

Any incident of cheating or plagiarism, no matter how minor, will be reported to the Dean of Student Development and the Dean of the Physical Sciences, Mathematics, and Engineering division. Administrative consequences are summarized in the college manual. Additional consequences will be applied to your course grade. **The first incident of academic dishonesty will result in zero points on the assignment, a potential grade penalty of up to 8% to be deducted from your final grade, and loss of any extra credit points for the quarter.** Any subsequent instances of academic dishonesty *no matter how minor* will result in failing the class. In short, academic dishonesty will have a negative impact on your grade and may result in disciplinary probation or expulsion. If academic dishonesty is discovered within two-years of your completion of the course, your official grade will be changed.

I recognize that these consequences may sound scary. Unfortunately, I have had students who did not pass this class as a direct result of academic dishonesty. I *am* committed to supporting you and your learning process, and I expect you to display high ethical standards. If you are not sure if a resource is allowed, or if something feels "off" to you, alert your instructor right away. I do reserve the right to make major changes to the class structure—including requiring an oral exam / exit interview—if there are class-wide violations of the academic integrity policy.

Lecture

Your attendance and active participation are expected at every lecture period. If you know that you will not be able to attend lecture for any reason, let me know by email right away (even if only 5 minutes before class or 5 minutes after the start of class). ***You are responsible for communicating with a classmate to get notes and missed information***. Late arrivals and early departures are distracting for the whole class (and me!), so arrive on time and stay for the whole class period. I

strongly encourage taking your own notes in lecture. We will sometimes use computers or other electronic devices; however, do not use your computers for non-course related activities during lecture. Put your phone on silent or Do Not Disturb while you are in class. If you must take a phone call in case of emergency, quietly leave the room before answering the phone.

Problem Sets (3 points each)

Consistent practice is an essential component of learning, and exam questions will often be like the assigned homework problems and/or recommended practice problems. Homework problems from the textbook will be posted for each lecture, submitted on Canvas, and graded based on completion. I expect you to make an honest effort and turn in homework in a timely manner. In general, the answers to these questions may be found in the back of the textbook and solutions are readily available online. It is your responsibility to keep up with suggested practice problems ***every day.*** You should expect to spend 2-3 hours on each problem set. *Productive collaboration with classmates is expected and encouraged; however, any work that you submit must represent your own understanding and contributions.*

Additional Lecture Assignments (1-3 points each)

Several additional assignments will fall under the umbrella of lecture assignments. These may include lecture tickets, in-class practice problems, rapid recall, Scientist Spotlights, real world applications, and bridge assignments to introduce new topics. Some lecture assignments will be collected and graded for completion. Bring loose leaf paper and a writing utensil to class with you as well as an electronic device that you can use to access Canvas. Canvas submissions for in-class assignments are due in-class but will generally be open until 11:59 pm of the class day.

Assessments (points vary)

There will be a total of three midterms and one cumulative final exam this quarter; however, only your top three scores will be used to calculate your final grade. The midterms will cover material related to the assigned reading and course objectives. The final exam will be a comprehensive, cumulative final exam.

Midterm 1 *100 points (75 minutes)*
- Investigate the behavior and characteristics of solutions.
- Demonstrate a knowledge of intermolecular forces.
- Examine advanced concepts in equilibrium pertaining to buffers.

Midterm 2 *100 points (75 minutes)*
- Examine advanced concepts in equilibrium pertaining to solubility.
- Apply fundamental principles of equilibrium to electrochemical systems.
- Apply the principles of equilibrium and thermodynamics to electrochemical systems.

Midterm 3 *100 points (75 minutes)*
- Explore transition metal chemistry.
- Apply the principles of transition metal chemistry to predict outcomes of chemical reactions and physical properties.
- Investigate nuclear chemistry.
- Evaluate isotopic decay pathways.

Final Exam *100 points (120 minutes)*
- All of the above

Early and late exams will not be administered, and missing an exam will result in a zero. You should arrive to class on time for the exams. I do ***not*** guarantee that you will be able to take the exam if you arrive late. I am unable to accommodate make-up exams under any circumstances. If you require any accommodations for exams, you must be approved by DSPS. For extended-time or reduced-distraction exams, please schedule your exam in the DSPS office to start with the rest of the class.

Exams will consist of both multiple-choice questions and short answer questions with the opportunity for partial credit. You must show your work to receive credit for any answer. Detailing any mathematical steps in a clear fashion will communicate your understanding of the material. *I am more interested in how you think about a problem than your final answer*. You will be asked to demonstrate your conceptual understanding of the material and apply those concepts in an algebraic context and solve quantitative problems.

You should bring a scientific or graphing calculator with you to each exam. ***Phones, smart watches, and other computers are not permitted in any circumstances***. If I see you on your phone or other electronic device (besides a regular calculator), you will receive a zero on the exam and I will file an academic dishonesty report.

The first three exams will be administered during the scheduled lecture time. The final exam will be administered during the designated final exam time on **Monday, March 25th from 4:00 – 6:00 pm in MLC103**. This date and time are determined by De Anza College and cannot be moved under any circumstances. If you cannot take the exam at this time, you will receive a zero. You may verify the designated final exam on the De Anza College website, and please notify me immediately on any errors on this syllabus.

Canvas Gradebook Note While your lowest assessment will be dropped from final grade calculations, I do not set up the Canvas gradebook to do this until the final exam day. Once all assignments are graded and assignment tokens have been processed, the grade that you see in Canvas prior to the final should be the *lowest* grade that you can receive in the class. If you do better on the final than your other tests, it can raise your grade, if you do worse on the final (or don't take it), it will be dropped and won't impact your grade.

Lecture Schedule and Assigned Readings

Chemistry 1C will cover material presented in chapters 11, 14, 15, 17, 19, and 21 of OpenStax Chemistry. We will also review Chemistry 1A and Chemistry 1B topics throughout the quarter.

Detailed reading related to each lecture will be announced on Canvas. In the schedule below, chapter reading is given for the required OpenStax OER textbook as well as Silberberg (9e). Additional, required reading will be posted on Canvas.

I will make every effort to keep to the lecture schedule below; however, exam dates may change due to unforeseen circumstances. Any changes to exam dates or content will be announced in Canvas.

Week	Date	Day	Lecture Topic *Readings*
1	1/8	M	**Lecture 1** **Welcome to Chem 1C!** **Properties of Solutions** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/11-introduction • https://openstax.org/books/chemistry-2e/pages/11-1-the-dissolution-process • https://openstax.org/books/chemistry-2e/pages/11-2-electrolytes
	1/10	W	**Lecture 2** **Solubility** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/11-3-solubility • https://openstax.org/books/chemistry-2e/pages/11-4-colligative-properties
2	1/15	M	**No Classes – MLK Jr. Day**
	1/17	W	**Lecture 3** **Colligative properties** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/11-4-colligative-properties **Acid-base chemistry** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/14-1-bronsted-lowry-acids-and-bases • https://openstax.org/books/chemistry-2e/pages/14-2-ph-and-poh • https://openstax.org/books/chemistry-2e/pages/14-3-relative-strengths-of-acids-and-bases • https://openstax.org/books/chemistry-2e/pages/14-4-hydrolysis-of-salts • https://openstax.org/books/chemistry-2e/pages/14-5-polyprotic-acids
3	1/22	M	**Lecture 4** **Buffers** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/14-6-buffers
	1/24	W	**Lecture 5** **The Henderson-Hasselbalch Equation** **Acid-base titrations** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/14-7-acid-base-titrations
4	1/29	M	**Lecture 6** **Solubility Equilibria and the Common Ion Effect** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/15-1-precipitation-and-dissolution
	1/31	W	**Midterm 1 (Lectures 1–5)** **3:30 pm – 4:45 pm**
5	2/5	M	**Lecture 7** **Coupled equilibria** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/15-2-lewis-acids-and-bases • https://openstax.org/books/chemistry-2e/pages/15-3-coupled-equilibria

	2/7	W	**Lecture 8** **Electrochemistry** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/4-2-classifying-chemical-reactions • https://openstax.org/books/chemistry-2e/pages/17-1-review-of-redox-chemistry
6	2/12	M	**Lecture 9** **Electrochemistry** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/17-2-galvanic-cells • https://openstax.org/books/chemistry-2e/pages/17-3-electrode-and-cell-potentials
	2/14	W	**Lecture 10** **Electrochemistry** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/17-4-potential-free-energy-and-equilibrium • https://openstax.org/books/chemistry-2e/pages/17-5-batteries-and-fuel-cells • https://openstax.org/books/chemistry-2e/pages/17-6-corrosion • https://openstax.org/books/chemistry-2e/pages/17-7-electrolysis
7	2/19	M	**No Classes – President's Day**
	2/21	W	**Midterm 2 (Lectures 6–10)** **3:30 pm – 4:45 pm**
8	2/26	M	**Lecture 11** **Transition metals: coordination compounds** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/19-2-coordination-chemistry-of-transition-metals
	2/28	W	**Lecture 12** **Transition metals: spectroscopic and magnetic properties** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/19-3-spectroscopic-and-magnetic-properties-of-coordination-compounds
9	3/4	M	**Lecture 13** **Transition metals: Reactivity** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/19-1-occurrence-preparation-and-properties-of-transition-metals-and-their-compounds
	3/6	W	**Lecture 14** **Nuclear chemistry** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/21-1-nuclear-structure-and-stability • https://openstax.org/books/chemistry-2e/pages/21-2-nuclear-equations • https://openstax.org/books/chemistry-2e/pages/21-3-radioactive-decay
10	3/11	M	**Lecture 15** **Nuclear chemistry and radioactive decay** *Required Reading* • https://openstax.org/books/chemistry-2e/pages/21-4-transmutation-and-nuclear-energy • https://openstax.org/books/chemistry-2e/pages/21-5-uses-of-radioisotopes • https://openstax.org/books/chemistry-2e/pages/21-6-biological-effects-of-radiation
	3/13	W	**Lecture 16** **Stellar nucleosynthesis** *Required Reading* • *TBD*
11	3/18	M	**Midterm 3 (Lectures 11–16)** **3:30 pm – 4:45 pm**
	3/20	W	**Lecture 17** **General chemistry wrapper**

12	3/25	M	**Final Exam** **4 pm – 6 pm in MLC103** *The final exam is cumulative*

Final grades will be available through MyPortal by the second Sunday after finals week. For more information, please see https://www.deanza.edu/apply-and-register/register/grades.html. If there is a problem with your final grade, please come see me at the beginning of the following quarter.

Lab (35% of total grade)

Chemistry is an experimental science, and the laboratory is a major component of the course. De Anza College does not offer make-up labs, and ***you must attend the laboratory section that you are registered fo****r* to complete the required labs. Everyone gets one excused absence with no grade penalty. A second absence, regardless of the circumstances of your first absence, will result in a zero for the lab and all associated assignments. After a third lab absence, you will automatically receive an "F" in the course.

Your timely attendance is expected at every lab. The beginning of each lab period is reserved for lab lecture. The lab lecture is a required component of the laboratory section and will include essential safety information. ***If you miss lab lecture, you will not be permitted to complete that lab and you will receive a zero for all related assignments***.

You must clean up your work area before leaving each lab. Failure to do so will result in a loss of points for that lab. Before you leave lab, ***check-out with me***. You will not receive credit for the lab unless I have signed your data in your lab notebook.

Lab assignments will consist of pre-labs, completion of laboratory experiments and mindful data collection, and analysis of data.

Lab Tickets (5% of total grade)

Lab tickets, or pre-lab assignments, will vary by lab; however, they will generally include assigned reading, safety preparation, and an introduction to the lab experiment. ***All lab procedures for this quarter are posted on Canvas. Do not refer to the lab manuals on the department webpage.*** I expect you to come to lab prepared to complete each experiment with minimal delays. Pre-lab assignments will be submitted on Canvas as file uploads (PDF or JPG) and will generally be due the day before the lab at 9 pm; however, they may be submitted for late credit up to the start of your lab period. ***Lab tickets must be submitted on Canvas before the lab starts to receive credit.***

Pre-labs will generally be graded out of 3 points. As a rough rubric, scoring 3/3 points on a pre-lab means that you have completed the lab to a high standard (e.g. detailed and unambiguous schematic of the procedure, answer all questions in full sentences, reagents/supplies/and amounts are listed); 2/3 indicates the pre-lab is good but there is room for improvement; 1/3 indicates that the pre-lab is incomplete or lacks detail.

Note that lab tickets are front-loaded; that is, there are more at the beginning of the quarter than the end of the quarter. Make sure that you start strong!

Laboratory Assignments (25% of total grade)

Lab assignments will make up a total of 25% of your grade in the class. This assignment category will include lab participation, data collection and recording, analysis, and assessments. Please continue reading for details on the types of assignments that will be included.

ACS Laboratory Safety Course

The ACS Laboratory Safety Course must be completed by the third lab meeting and before you will be allowed to perform any lab experiments. *You will be dismissed from lab and a receive a zero for the day if you have not completed the lab safety course.*

Lab Participation and Completion

You will receive credit for coming to lab and completing the experiment with your lab group, and you will upload a verified copy of your data to Canvas to receive credit. ***Data collected during the lab period must be recorded directly in your laboratory notebook in pen***. You will not receive credit for any data written on a worksheet or separate piece of paper. Before you leave lab for the day, have me check off on your data in your lab notebook for the available points.

The entire class is responsible for the lab housekeeping. If the lab or balance room are left messy, or the equipment is not correctly stored, the entire class will lose points.

Arrive on time	1 point
Complete the lab safely	1 point
Record data in your lab notebook	1 point
Clean up your station and equipment before the end of class	2 points
total	**5 points**

Analysis Worksheets

Data analysis worksheets will be posted on the course webpage. The precise nature of the assignment and the number of points available will vary. Analysis worksheets should be printed or completed on a tablet. The analysis worksheet should be the final version of what you turn in—I recommended doing at least one set of calculations in your lab notebook for later reference.

Lab Assessments

There will be one lab midterm and one quiz in this class. The lab midterm is scheduled for **February 14th during your lab session** and it will cover material from the following labs:

- ❑ Lab 1: Freezing point depression
- ❑ Lab 2: pK_a of a pH indicator
- ❑ Lab 3: Buffers and acid-base titrations
- ❑ Lab 4: K_{sp} and common ion effect

The lab quiz, currently scheduled for **March 20th during your lab session**, will cover material from the qualitative analysis labs on anions and cations.

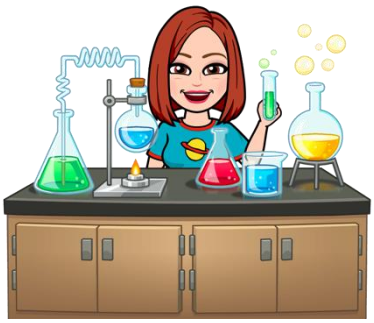
The lab assessments are "open lab notebook"– you may use any notes that you have handwritten in your lab notebook. Lab manuals, worksheets, and additional printouts are not permitted. I will do a lab notebook check before we begin assessments.

Literature Activity (5% of total grade)

As part of your lab grade this quarter, you will strengthen your information literacy and critical skills by reading a scientific research article from the primary literature. Additional details will be announced on Canvas.

Laboratory Safety

All chemistry laboratories inherently come with associated risks and hazards. It is inevitable that some accidents will occur during your chemistry course work. When an accident occurs, ***inform your instructor immediately*** and ***do not attempt to clean-up any broken glassware or spilled chemicals by yourself.*** In order to ensure that the lab is as safe as possible, we must (1) ***Recognize hazards***, (2) ***Assess the risks of hazards***, (3) ***Minimize the risks of hazards***, and (4) ***Prepare for emergencies***.



You have the right to advocate for yourself. If you feel a particular procedure or chemical is unsafe, or a specific accommodation will enhance your lab experience, I welcome your feedback. I may not have an answer or solution for you right away, but I will work on your behalf to make sure that you can complete the labs safely.

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.** *Food and drink containers are not allowed in lab at any time. If I see them, I will put them outside.*
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.

Reckless behavior will not be tolerated. If your actions endanger the health and safety of yourself or another person, you will be asked to leave and you will receive a zero for the lab and related assignments. In extreme cases, you may lose your lab privileges for the remainder of the quarter and/or fail the course.

Lab Schedule

The expected laboratory schedule for Winter 2024 is given below. Pre-lab and post-lab assignments will be submitted through Canvas.

Week	Monday	Wednesday
1	**Check-In** Complete lab safety assignment at home	***Freezing Point Depression Day 1*** Background Information and Review
2	***No Class for Martin Luther King Jr. Day***	***Freezing Point Depression Day 2*** Data collection and analysis
3	***pKa of Bromocresol Green Day 1*** Part 1	***pKa of Bromocresol Green Day 1*** Part 2
4	***Buffers Day 1*** Systems of equations Buffer preparation	***Buffers Day 2*** ***(Lecture Midterm 1)***
5	***K_{sp} and Common Ion Effect Day 1***	***K_{sp} and Common Ion Effect Day 2***
6	***Qualitative Analysis of Anions*** Anion tests and unknowns	***Lab Midterm*** Freezing point depression, pKa of bromocresol green, buffers, common ion effect
7	***No Class for President's Day***	***Electrochemistry Day 1*** ***(Lecture Midterm 2)***
8	***Electrochemistry Day 2***	***Qualitative Analysis of Cations***
9	***Qualitative Analysis of Cations***	***Literature Activity***
10	***Qualitative Analysis of Cations***	***Qualitative Analysis of Cations***
11	***Finish Qualitative Analysis***	***Check Out*** ***Qualitative Analysis Quiz***

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:

T,TH	10:30 AM	12:10 PM	In-Person	S43