

Section 20 CRN 00210	Lab	MTWTh 11:30 am – 2:20 am in SC2202
	Lecture	MTWTh 2:30 pm – 3:45 pm in MLC105

The course webpage is through De Anza Canvas - <https://deanza.instructure.com/courses/35658>
You will be automatically added to the Canvas shell as a student when you enroll in the course.

Office Hours: MW - 3:45- 4:15 in MLC105

Instructor: Dr. Valeria Martinovic **E-mai:** martinovicvaleria@fhda.edu

This course provides an introduction to the structure and reactivity of matter at the molecular level, as well as an application of critical reasoning to modern chemical theory and structured numerical problem-solving. Students will learn the development of molecular structure from rudimentary quantum mechanics, including an introduction to ionic and covalent bonding; chemical problem solving involving both formula and reaction stoichiometry employing the unit analysis method, and be introduced to thermochemistry and a discussion of the first law of thermodynamics.

Chemistry 1A is the first quarter of the year-long college-level chemistry course. This sequence course is designed for students pursuing a bachelor's degree in chemistry and other STEM-related fields. This class moves quickly through a brief review of foundational topics (significant figures, mathematical methods, chemical nomenclature) and into more advanced stoichiometry calculations and types of chemical reactions. We will examine the role of energy transfer in quantum models of the atom, and then build upon the Schrodinger model of the atom to molecular structure and covalent bonding models.

This is a fast-paced course that contains both lecture and lab components. In the lecture portion of the course, your growth and learning will be measured through daily problem sets and in-class practice problems. Your mastery of the material will be assessed through three midterm exams and one cumulative final exam. In the lab portion of the class, you will apply concepts learned in the lecture and grow your practical skills through hands-on experimentation. Your understanding of the labs will be assessed through a series of quizzes.

I assume students enrolled in Chemistry 1A took Chemistry 25 (or equivalent) in person at De Anza College within the previous year. Chemistry 1A requires strong math and study skills. 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.

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 during the first week*. Students who miss the first lab session 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:

- Examine contributions by investigators of diverse cultures and times to the body of chemical knowledge, with an emphasis on physical and chemical conceptual frameworks.
- Investigate the critical aspects of measurement.
- Explore the historical development of understanding the structure of the atom.
- Assess the development of the Periodic Table of Elements in light of modern atomic theory.
- Differentiate the causes and types of molecular bonding.
- Appraise the effect of quantum mechanics on the formulation of molecular structure.
- Employ systematic nomenclature to the identification of molecules.
- Utilize the principles of stoichiometry to analyze compounds, chemical mixtures, and reactions.
- Examine the prominent characteristics of solutions.
- Classify the major types of chemical reactions.
- Apply the essential principles of thermodynamics to chemical systems.

Learning Objectives:

- 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.

Important Dates:

First Day **July 1st, 2024** First day of class! In-person attendance is expected.
Last Day **August 9th, 2024**
Holiday **July 4th, 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 from 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://openstax.org/books/chemistry-2e/pages/1-introduction> on the OpenStax app (iPhone/iPad). You may also purchase a printed copy from Amazon for ca. \$55 new.
- 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

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 the lab without PPE.
 - Approved laboratory safety goggles (not safety glasses), available from the De Anza College Bookstore. Safety goggles must carry an 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/skirts and closed-toe shoes must be worn in the lab.
 - A lab coat or lab apron is optional and recommended.
- **Lab Manual** Lab procedures and assignments for Chemistry 1A will be posted on Canvas. You must print the lab manual and bring it to the lab. *Electronic devices may **not** be out and in use during lab experiments.*
- **Pen** You must bring a non-erasable pen with blue or black ink to the lab.
- *Calculations in Chemistry an Introduction, 2nd edition by Dahm and Nelson. This **optional, recommended** resource provides additional examples of common problem-solving techniques. I strongly recommend this workbook if you would like extra practice on calculations.*

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/studentuccess/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/>.
- **Student Help Hours** Instructor office hours are the best time to ask questions about course content in person. This time is *for you, the student*. Please come!

Time Commitment:

This is a five-unit course. Each week you will spend six hours of lecture in class and twelve hours of laboratory. You should expect 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 miss a lecture or lab, let me know as soon as possible. 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 important. 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.

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 Policy:

To succeed in this course, you need to exhibit **consistent and sustained effort that will be** demonstrated by your participation, laboratory preparation, data analysis, and assessments.

Grade Distribution:	
Homework Assignments	35%
Lab Reports	10%
Participation	5%
Exams	50%

All grades will be assigned according to the following percentage scale set up in Canvas:

A+ \geq 98% A \geq 92% A- \geq 89% B+ \geq 85% B \geq 82% B- \geq 79% C+ \geq 75% C \geq 68% D \geq 64% D- \geq 58%
F < 58

Exam Policies (read carefully). If you violate our honor code, you will be reported to the Office of Student Conduct and receive an F for the course.

- The exams will be conducted on Canvas during our regular class time.
- You must bring your laptop to class to take the exam on Canvas.
- You can NOT use online resources, and you are NOT permitted to talk to

EXAM DATES:
Summer 2024

MIDTERM EXAM: 7/25/2024

SUMMER SEMESTER FINAL EXAM: 8/8/2024

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 students, 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 the preparation and completion of assignments and examinations

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 resources, 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 10% 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 harm 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.

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

Lecture Schedule:

Lecture Topic Readings from OpenStax. See Canvas for additional recommended reading.
Lecture 1: Tools of the trade OpenStax Chapter 1 (all)
Lecture 2: The nuclear atomic model OpenStax Chapter 2
Lecture 3: Molecules, Compounds, and Mixtures OpenStax Chapter 2 sections 6 and 7 OpenStax Chapter 3 sections 1 and 2
Lecture 4: Chemical Reaction Stoichiometry OpenStax Chapter 4 sections 1, 3–5
Lecture 5: Solutions and solubility OpenStax Chapter 3 sections 3 and 4
Lecture 6: Chemical reaction types OpenStax Chapter 4 section 2
Lecture 7: The wave nature of light and atomic spectra OpenStax Chapter 5 section 1 OpenStax Chapter 6 sections 1 and 2
Lecture 8: Wave-particle duality and the Schrodinger model of the atom OpenStax Chapter 6 sections 3
Lecture 9: Many-electron atoms and electron configurations OpenStax Chapter 6 and 4
Lecture 10: Periodic trends OpenStax Chapter 6 section 5
Lecture 11: Bond Types and Bond Energies OpenStax Chapter 7 sections 1, 2, and 5 •Calorimetry introduction OpenStax Chapter 5 section 2
Lecture 12: Thermochemistry OpenStax Chapter 5 section 2 and 3
Lecture 13: Lewis Dot Structures I OpenStax Chapter 7 section 3
Lecture 14: Lewis Dot Structures II OpenStax Chapter 7 section 4
Lecture 15: VSEPR and Molecular Polarity OpenStax Chapter 7 section 6
Lecture 16: Valence Bond Theory OpenStax Chapter 8 sections 1 – 3
Lecture 17: Molecular Orbital Theory OpenStax Chapter 8 section 4

Laboratory:

The total lab grade constitutes 20% of the final grade. Do not miss labs, there are no makeup labs will be allowed! We will conduct 11 experiments and will turn in 11 **Lab Reports**. The format for each lab report will be discussed in the lab. LABORATORY REPORTS generally include lab notebook preparation (pre-lab), recording of data in the notebook, and the laboratory report sheets. The signed pre-lab must be attached to each lab report. Each lab report will be worth 10 points and is due at the start of the lab lecture on the day it is due.

Pre-Labs: Before beginning a new experiment, you are required to complete a pre-lab for that experiment. I will sign your prelab at the start of the lab lecture on the day it is due. Late pre-labs will not be accepted! Pre-labs should be prepared directly in your lab notebook and must be handwritten. Unless otherwise directed, you do not need to answer any pre-lab or post-lab questions in the laboratory manual. Your pre-lab should include at a minimum the following three items:

- a) **Chemical hazards** • List any important safety information about the chemicals you are using that is given in your experimental procedure. If the procedure does not give any specific chemical safety information for a particular compound, you can find more information online by searching for that compound's Safety Data Sheet (SDS).
- b) **Chemical disposal** • List each substance or mixture generated during the experiment and the appropriate waste container – acidic aqueous, basic aqueous, or organic – should be disposed of. If you are unsure how a substance or mixture should be properly disposed of, leave space so that you can fill in that information during the lab lecture.
- c) **Procedure** • You must rewrite the full procedure in your own words with enough detail that you can perform the lab successfully without referring to lab textbook. Do not simply copy the procedure verbatim. You do not have to include any portions of the experiment that are related only to theory, only the procedure itself.

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.

Tentative Laboratory Schedule CHEM 1A LAB SCHEDULE – SUMMER 2024

WEEK OF	WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
6/30/2024	1	CHECK-IN	MEASUREMENT (NO PREP)	NOMENCLATURE (NO PREP)	HOLIDAY
7/7/2024	2	HYDRATE (1)	HYDRATE (2)	TYPES OF REACTIONS (1)	TYPES OF REACTIONS (2)
7/14/2024	3	PRECIPITATION (1)	PRECIPITATION (2)	CONDUCTIVITY (1) (VERNIER)	CONDUCTIVITY (2) (VERNIER)
7/21/2024	4	ACID-BASE TITRATION (1)	ACID-BASE TITRATION (2)	CALORIMETRY (1) (VERNIER)	CALORIMETRY (2) (VERNIER)
7/28/2024	5	REDOX TITRATION (1)	REDOX TITRATION (2)	LINE SPECTRA	MOLECULAR MODEL
8/4/2024	6	MOLECULAR MODEL *	CHECK-OUT	LAB FINALS	FINALS

Partial List of Laboratory Safety Procedures

- Students must comply with all safety procedures and precautions when attending a laboratory session.
- There are no provisions for making up a lab; therefore, you are expected to attend all scheduled lab sessions.
- You must have your laboratory procedures written prior to starting an experiment. Lab notebooks will be checked during lab and will be awarded between 1-5 points depending on completeness.
- Laboratory notebooks **must be written in ink** and all data must be written in the laboratory notebook. Scraps of paper containing data will be confiscated. Do not use “white-out.” Use one line to cross out incorrect data. Cgem 1
- Lab lecture will consist of a discussion concerning safety for the experiment being conducted that day as well as information regarding experimental techniques.
- Eating and drinking is not permitted in the lab. **Do not** bring food or drinks to the lab even if they are in closed/sealed containers.
- If you are pregnant or think you are pregnant, it is your responsibility to consult with your physician before taking this course and performing the laboratory experiments.
- You must wear OSHA approved safety goggles and gloves at **all times** while in the laboratory. Failure to comply with this rule will result with your being expelled from the course and receiving a grade of “F.”
- Appropriate attire must be worn in the laboratory. Shorts, open toed-shoes, and sleeveless shirts (“spaghetti straps”) are **not** considered safe clothing for the laboratory. Clothing made of natural fibers are less of a hazard than those made of synthetic fibers.
- Do not begin the laboratory experiment (e.g. place any chemicals or glassware on the lab benches, turn on

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Bunsen burners, etc.) until the safety introduction is complete and everyone is wearing their goggles and gloves. The instructor will let you know when it is time to begin the experiment.

- In some cases it will be necessary for the instructor to examine your “set up” before you begin the experiment. In these instances, the instructor will inform you of proper procedures at the beginning of class.
- If you come into contact with a chemical flush the affected area with water immediately for 15 minutes. Depending on the degree of contact with the chemical and the location on the body you may need to do this in the sink or safety shower. When using the safety shower you must remove the clothing over the area that has come into contact with the chemical. The instructor will ask the other students in the class to leave the room for privacy.
- You will be wearing safety goggles at all times, but should you get a chemical in your eye, flush your eyes in the eye wash for at least 15 minutes.
- If your clothing or hair catches on fire use the safety shower immediately. If this is not possible “stop-drop- and –roll.”
- If you are hurt or think you have come into contact with a chemical, notify the instructor immediately (or send a lab partner to fetch the instructor) while following proper safety procedures.
- Know where the eyewash, safety shower, and fire extinguishers are located. (You should be able to do this with your eyes closed!)
- Chemicals should never be taken back to your lab bench. They must be kept in the fume hood in their proper storage containers. All chemicals and waste bottles must be capped after use. **Never** leave a chemical bottle or waste container uncapped.
- If a chemical spill occurs, notify your instructor so that she may help you follow the proper measures for cleaning up chemical spills. All waste must go into appropriate waste containers. Never throw anything down the sink or in the regular trash receptacles.
- Never pick up broken glass with your hands. Always use a brush and dust pan to sweep up broken glassware.
- If at any time the instructor feels that you are being unsafe and have not followed proper safety precautions and procedures, you will be asked to leave the lab, and you will receive zero credit for the laboratory report and notebook. You may also be expelled from the course and receive a grade of “F.”
- After completing an experiment clean up your lab space as well as glassware. Return all cleaned glassware and other equipment (e.g. Bunsen burners, clamps, steel rods, etc.) to the appropriate cupboards or stockroom.
- After you have completed an experiment and cleaned up your bench space and glassware, check out with the instructor.
- Remember to wash your hands immediately after completing the experiment and checking out. Also, change your clothes as soon as possible. This is especially important if you have children.
- Lab reports (except for the last one) are due **the Monday after the wet chemistry is complete. No makeup labs are allowed and no late lab reports will be accepted. All lab reports must be typewritten.**

Student Learning Outcome(s):

- Analyze and synthesize the concepts of limits, continuity, and differentiation from a graphical, numerical, analytical and verbal approach, using correct notation and mathematical precision.
- Evaluate the behavior of graphs in the context of limits, continuity and differentiability.
- Recognize, diagnose, and decide on the appropriate method for solving applied real world problems in optimization, related rates and numerical approximation.

Office Hours:

Zoom,Canvas,Email,In-Person,By Appointment MLC105 M,W 3:45 PM 4:15 PM