CHEM 1C DeAnza College Chemistry Department Summer 2025

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Lecture (S56) M-Th at 11:30 am – 12:45 pm
Lab (SC2208): M-Th at 7:30 pm – 10:20 pm

Required Material

- *Chemistry: A Molecular Approach*, 6th edition by Nivaldo Tro. Available through Pearson eBooks and on reserve in the library

URL: https://www.bkstr.com/deanzastore/course-materials-results?shopBy=course&divisionDisplayName=&departmentDisplayName=CHEM&courseDisplayName=D001C&sectionDisplayName=66&programId=5120&termId=100087862&cm_mmc=Test241219

- General Chemistry Laboratory (DeAnza 2015 edition) – see lab PDFs at https:// www.deanza.edu/chemistry/Chem1C.html
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- 8.5 x 11 permanent bound laboratory notebook with ǃcarbon" copies. It can be a used lab notebook from a prior lab.
- Safety Goggles (must be approved by instructor)
- Scientific calculator

CHEM 1C **De Anza College Chemistry Department Spring 2025**

Course Description:

Lecture: This third-quarter of a three-quarter sequence covers several aspects of the reactivity of aqueous solutions, including the application of equilibrium to investigate colligative properties, such as boiling point elevation and freezing point depression; buffer solutions, which are solutions able to resist changes in pH due to small quantities of acid or base; solubility and the formation of precipitates, including the calculation of solubility through equilibrium constants; electrochemistry. The course will also cover the fundamentals of nuclear structure and radioactive decay, a survey of the chemical and physical properties of the main group elements, and a brief introduction to the structure of organic molecules.

Lab: To complement the lectures, a series of experiments will introduce key lab techniques used in general chemistry, focusing heavily on qualitative analysis. Key experiments include measuring the effects of freezing point depression, observing the common-ion effect gravimetrically, measuring voltage in an electrochemical cell, forming a transition metal complex, and identifying a series of unknown ions through a qualitative analysis scheme.

Grade Distribution:

		Grade distribution	
Lecture Exams	Labs	Homework	Final Exam
40%	40%	10%	10%
		Grading scale	
Grade	Percentage	Grade	Percentage
A+	95 – 100 %	C+	73 – 76%
A	90 – 94 %	C	70 – 71%
A–	87 – 89 %	D+	66 – 69%
B+	84 – 86 %	D	63 – 65%
B	80 – 83 %	D–	60 – 62%
B–	77 – 79 %	F	0 – 59%

Lecture Assessment:

Homework • Homework is posted in Access Pearson. Go to https://mlm.pearson.com/enrollment/martinovic57713

Exams • Exams are comprehensive assessments that review topics the lecture covers in detail. Exams will last the entire class period and consist of fill-in-the-blank, short essay, mechanism, or synthesis questions.

Final exam • The final exam is identical in format to regular exams, except that the final is cumulative, covering material from the entire quarter. Do not fall into the trap of cramming for each test only to forget everything before the final. Reviewing the quizzes and tests from the quarter is one of the best ways to prepare for the final.
Note: The final will also include material presented after the last regular exam.

Attendance - Attendance is required for **all** laboratory sessions and highly encouraged for lectures. The course is impacted; there is neither make-up time in the course nor space for you to work in other sections. If you miss a lab, you must discuss the issue with the instructor (valid reason and written documentation will be required).

The 1st and 2nd unexcused missed labs will result in zeros.

The 3rd unexcused missed lab will result in failing the course.

Chemistry 1C: Lecture Room (S46) 6:00 pm – 7:20 pm

	Topic	**Chapter ***
1	Solutions and Colloids Chapter 14 Quiz	14
2	Aqueous Ionic Equilibrium Chapter 18 Quiz	18
3	Electrochemistry Chapter 20 Quiz	20
4	Nuclear	21
5	Transition Metals	26
	Final Exam on the last day of lecture class	

Laboratory

Pre-labs • Before beginning a new experiment, you must complete a pre-lab. Some experiments comprise multiple parts; in those cases, a pre-lab must only be prepared for the parts indicated in the schedule unless otherwise announced.

Before each new experiment, you are required to prepare a pre-lab. On the first day of a new experiment, I will verify whether you have completed the pre-lab satisfactorily. If your pre-lab is incomplete, you will not be allowed to experiment and receive a zero for that lab. There are four reasons why I insist you complete a pre-lab ahead of time:

Safety • If you have not even bothered to read the procedure for an experiment before coming to class, you are not aware of the hazards you might encounter. Therefore, you are a danger to yourself and the other students in class.

Courtesy • If you are not prepared for an experiment and constantly ask people around you for help, you are a nuisance – and a hazardous distraction – to those who did take the time to prepare for their experiments properly.

Efficiency • If you do not review an experiment at least once before coming to the lab, you will waste a lot of time trying to figure out how to conduct that experiment, which means you may run out of time to finish your experiment.

Learning • Whether or not chemistry is your favorite subject, you have signed up for this course, so you might as well take the time to benefit from it and learn something. If you do not read the experiment before lab, you have little chance of retaining anything meaningful from the lab experience.

Lab Notebook Format

General • Never erase, write in pencil, or use white-out in a lab notebook! In legal cases, even the slightest hint of alteration or omission of data could be considered forgery. Always write in pen. Any data collected should be immediately recorded in your lab notebook, not stored on post-it notes or scraps of paper (or the back of your hand) for later transfer. Mistakes should be corrected by drawing a single thin line through the original data, leaving them still legible; this way, the correction can be readily seen – and you can recover your original result if you discover the change itself was a mistake!

Experiment Format

General format • As mentioned, the pre-lab for each experiment must include any information relating to chemical hazards or chemical disposal mentioned in the lab procedure. You must also include a complete procedure for the experiment, as described below. Optionally, you may want to include a reaction scheme or a table of reagents, as described below.

Reaction scheme (optional) • Each notebook entry should ideally begin with an abstract (a brief overview) of the experiment to be performed. In some cases, this might be a flowchart of the steps to be followed, a diagram of the experimental equipment, or a summary of the results to be monitored. You should list the key chemical reaction reagents, solvents, and environmental conditions. In real life", these schemes can allow future readers of your notebook to understand the intent of an experiment without reading the entire entry. Although this section is optional, it is particularly recommended for students in the organic chemistry (Chem 12) sequence as a way of practicing writing synthetic schemes.

Reagents (partly optional) • Preparing a table of reagents before beginning an experiment can be a huge time-saver for complex experiments. Reagent preparation alone can often consume large quantities of time, since some reagents may be air- or water-sensitive. For each reagent you are going to use, it is optionally suggested you include the following: name of the reagent; molecular mass; mass or volume to be used and/or actually used (with units!); and moles (if appropriate or useful) or molarity (for solutions). You are required to make note of any chemical hazards for the reagents you will use and to determine how each chemical will be properly disposed of at the end of the experiment. Although such a table may seem overkill in undergraduate lab classes, it is enormously beneficial in a research environment in which a particular experiment may be repeated frequently.

Procedure (required) • Without question, the two most crucial aspects of a laboratory notebook are the procedures used and the data obtained. To highlight the connection between the two, I suggest you use a two-column format for writing your experimental procedures. In the first column, you should list step-by-step each task of the experiment you are performing; in the second column, you should record any numerical data or empirical observations you make, as well as any deviations from the planned procedure. This way, when you walk into the lab to perform your experiment, you already have a list prepared in your own writing style that clearly shows what you need to do at each step in the experiment. Since your results would be written next to each of these steps, you can more easily find and transfer your results into your calculations when writing your lab reports. Since the space needed to write your data is likely much smaller than the space needed for writing the procedure, you may wish to make the first column wide and the second column narrow in comparison if you are following the suggested format.

The experiment's purpose or goal is clearly expressed, along with a detailed description of the experimental procedure used. All pertinent results obtained during the experiment are presented, along with all relevant calculations and interpretations. Finally, all conclusions drawn from the data are stated, along with any helpful comparisons to previously conducted experiments and references to related or future research.

General notes • Unless otherwise instructed, please answer post-lab questions found in your lab text for your lab report.

Typed reports • For this class, all lab reports must be typed (except in cases in which an academic accommodation has been approved). All tables and graphs in your report must also be electronically generated; graphs hand-written on graph paper will not be accepted. If you do not have regular access to a computer, the Library West Computer Lab (also known as the Open Media Lab) is available for any De Anza student to use. There is no charge for the time spent using the campus computers, although there is a small fee for printing below regarding electronic lab report submission).

Lab Report Sections

Title • The title should be a short statement alerting the reader (me) to which experiment you are presenting. If you number your experiments, please do so chronologically instead of using the experiment numbers in your text – meaning that the report on the
first lab should be titled Experiment #1: ”, the report on the second lab should be
titled Experiment #2: ”, and so on.

Objective • You should clearly state the key ***qualitative*** or ***qualitative*** result(s) you seek in the experiment; for example, “this experiment aims to determine the concentration of acetic acid in household vinegar”. The fact that you learned from the experiment (while important) ***should not*** be mentioned in the objective since the report is not about you.

Procedure • Since you have already written a complete procedure for any experiment as part of your pre-lab exercise, ***do not include the procedure in your lab report***; it would simply be repetitive and a waste of time and paper (physical or otherwise).

Data and calculations • Please see the following page (***Page 15***) for more detailed information on these crucial sections.

Conclusion • To maintain symmetry in your report, your conclusion should exactly parallel your objective – meaning you should state precisely those qualitative or quantitative results that were the experiment's focus. This sometimes means that
the conclusion is just a one-sentence statement, such as: !The concentration of acetic
acid in the unknown solution is 0.0270 *M*.”

Discussion • To help justify your conclusion, you should include a brief discussion of how your calculations led you to your stated results. For example, for a lab involving the synthesis of a compound, the discussion section could contain your interpretation of any spectra used to identify the compound. You may also describe anything unusual during the experiment or any significant sources of error. You should compare your results to known results in the chemical literature whenever possible.

LAB MEETS EVERYDAY					
WEEK OF		MONDAY	TUESDAY	WEDNESDAY	THURSDAY
6/30/2024	**1**	CHECK-IN	FREEZING POINT (1)	FREEZING POINT (2)	Pka OF INDICATOR (1)
7/7/2024	**2**	Pka OF INDICATOR (2)	BUFFERS (1)	BUFFERS (2)	BUFFERS (3)
7/14/2024	**3**	Ksp & COMMON IONS EFFECT (1)	Ksp & COMMON IONS EFFECT (2)	ANIONS (1)	ANIONS (2)
7/21/2024	**4**	ELECTROCHEM (1)	ELECTROCHEM (2)	CATIONS (1)	CATIONS (2)
7/28/2024	**5**	CATIONS (3)	CATIONS (4)	CATIONS (5)	CATIONS (6)
8/4/2024	**6**	CATIONS (7)	CHECK-OUT	LAB FINALS	FINALS

Laboratory Safety

Laboratory safety is an everyday assignment. Being safe in the lab is a top priority. The importance of safety in the laboratory will be reviewed on the first day of class. Any unsafe behavior, intentional or not, will be noted and may result in dismissal from the class. Under no circumstance are shorts and sandals allowed in the laboratory.
You will be dismissed from the laboratory if you are not wearing appropriate protective clothing.
For your protection, safety goggles with indirect ventilation and an ANSI minimum rating of Z87 must be worn at all times in the laboratory. One warning will be issued to any student who is observed wearing their goggles on their forehead, hanging them around their neck, or otherwise not wearing them over their eyes. If the warning is disregarded, expulsion from the lab and a zero on the lab work may result.
Latex gloves will be provided for those experiments using hazardous chemicals to the skin.

Chemical Disposal and Clean-up
Proper chemical disposal is essential for the environment, and following county, state, and federal law is vital. Students who do not comply with directed procedures may be expelled from the lab or fail the course for repeated offenses. Check with the instructor if you have any questions. All students are requested to do a conscientious and thorough job of cleaning up after themselves, whether in their work area in the lab or shared areas such as the chemical supply table and balance room.

Rules for Safe and Efficient Chemistry Laboratory Operations

Safety Rules:

1. Prepare for each experiment by reading all of the directions before lab starts.
2. *Locate the Safety Equipment.* Know the locations of the eye wash, safety shower, fire extinguishers, fire blankets, first aid kit, fume hoods, telephone and all exits that are to be used in an emergency. Your laboratory instructor will describe the use of the safety equipment.
3. *Protect your eyes.* Wear approved eye protection at all times. Your laboratory instructor will inform you which of these you must have. Goggles provide maximum safety. Prescription glasses, if you need them, must be worn under approved eye protection. Contact lenses should not be worn in the laboratory because fumes may accumulate under the lenses and injure your eyes and the lenses make it difficult to flush chemicals from your eyes.
4. *Tie long hair back.* This precaution will keep your hair out of burner flames and harmful chemicals.
5. *Do not wear clothing with loose, flowing sleeves.* This precaution will keep your sleeves out of burner flames and harmful chemicals.
6. *Wear shoes that cover all of your feet.* Broken glass on the laboratory floor and spilled chemical reagents are all too common. Shoes that cover your feet completely will protect them from broken glass and chemical splashes. The best types of shoes are closed-toe made out of leather.
7. *Wear clothes that cover your torso and your legs to the knees.* Clothing will give your body needed protection. Good clothing can be protected with a lab apron or coat.
8. Do not eat or drink in the laboratory.
9. Do not taste any chemical reagent.
10. *Do not smell chemical reagents directly.* When you are instructed to smell a chemical, do so by gently wafting the vapors toward your face. Do not inhale deeply.
11. *Do not pipette solutions by mouth.* Use a rubber suction bulb to fill the pipette.
12. Do not work with flammable liquids near a flame.
13. *Do not engage in games or horseplay in the laboratory.* Never run in the laboratory.
14. Do not attempt unauthorized experiments in the laboratory.
15. Do not work in the laboratory in the absence of your instructor or his or her authorized representative.
16. Use a fume hood when required.
17. *Handle glass tubing and thermometers carefully.* When inserting glass tubing or thermometers through a rubber stopper, always hold the glass close to the stopper and use a lubricant such as glycerin to help the glass slide through the stopper. Do not continue to try to force glass through a stubborn stopper, get a new stopper and/or get help. When inserting a pipette into a pipette bulb, hold the pipette near the bulb and GENTLY insert the pipette.
18. *When diluting, never pour water into concentrated reagents.* Always pour the reagent into the water.
19. If you spill a chemical reagent on yourself, immediately flood the exposed area with water and then summon the laboratory instructor. Inform the instructor immediately about any other accidents or spills.
20. *Be aware of your neighbors. Are they obeying the safety rules?* A neighbor's accident may injure you.
21. *Avoid touching your face and rubbing your eyes while in the laboratory.* If you must do so, first wash your hands.
22. Wash your hands before leaving the laboratory.
23. *Never heat a closed container.* Pressure build up can cause the container to explode.
24. Assume any chemical is hazardous if you are unsure.
25. Do not violate any other safety rule issued by your laboratory instructor.

Housekeeping Rules:

1. *Clean up broken glass immediately with a broom and dustpan. Do not use your hands.* Dispose of broken glass in the special container that is provided, never in a regular trash can.

2. *Chemical spills must be cleaned up immediately.* Immediately notify your instructor who will advise you how to clean it up and/or assist you. Dispose of the collected contaminated chemical properly as instructed.
3. *Do not pour any chemical down into the sink or in the trash without authorization.* Clearly labeled disposal bottles will be provided when needed.
4. *Take containers to the stock of chemical reagents.* Do not bring stock chemicals to your laboratory bench.
5. *Read the label on a reagent bottle carefully.* Is it the correct chemical? Is it the correct concentration?
6. Do not insert your own pipette, medicine dropper or spatula into a stock bottle.
7. *Use special care with stoppers or tops of stock bottles.* Do not allow them to pick up contamination. Your instructor will provide additional instructions for handling the stoppers or tops found in your laboratory.
8. *Always replace the stopper or top of a stock bottle when you are finished taking some of the reagent.* Make sure that you put the stopper or top back onto the correct bottle.
9. *When pouring liquid from bottles, hold the bottle with the label against the palm of your hand so that the liquid is poured from the side opposite the label.* If any liquid runs down the outside of the label, immediately wipe off the liquid.
10. *Do not take any more of a reagent than is required.* Many of the chemicals used in the laboratory, including deionized water, are costly.
11. *Never return any unused reagent to a stock bottle.* If you take too much of a chemical, dispose of it as directed by your instructor or offer it to a classmate who needs it.
12. Set up your glassware and apparatus away from the edge of your laboratory bench.
13. Thoroughly clean the area around your laboratory bench and the top of your laboratory bench before leaving lab.
14. *Keep shared areas of the laboratory clean.* This includes areas such as the balance room and where the stock bottles are stored. It is especially important to keep the balances clean and free of chemical spills.
15. *Keep your laboratory equipment clean.* Good results depend on clean equipment.
16. If a piece of equipment containing mercury is broken, inform your laboratory instructor immediately.

Keep the area blocked off to avoid scattering the mercury.

17. Follow any other housekeeping rules given by your laboratory instructor.

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.