Chemistry 1C: General Chemistry Section 01 and Section 02
Spring 2019

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Course Webpage: Canvas. *Turn on e-mail notifications to receive class announcements.*

Office Hours: MW 2:20 pm – 4:20 pm

Class Meetings
Lecture: MW 4:30 pm – 5:45 pm, S32
Lab Section 01: MW 11:30 am – 2:20 pm, SC2208
Lab Section 02: TTh 1:30 am – 2:20 pm, SC2208

Syllabus Statement
This course syllabus is a contract. Please read it carefully and completely in its entirety before asking me any questions regarding the course schedule, content, requirements, grading, etc. Changes and corrections to the Syllabus will be communicated through Canvas.

You are expected to adhere to the De Anza College Student Code of Conduct Administrative Policy 5510 at all times.

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.

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 with an introduction to electrochemistry, the chemistry of transition metals, and nuclear chemistry. The full course outline is available online at https://www.deanza.edu/catalog/courses/outline.html?cid=CHEM1C

Prerequisites
Completion of Chemistry 1B at De Anza College with a grade of C or better. You are expected to be proficient in intermediate algebra skills including linear analysis, logarithms, and anti-logarithms.

Hours
Three hours lecture and six hours laboratory will be spent in class. You should expect to spend an additional 8-12 hours a week studying and working on class assignments.

Attendance Policy
Your *punctual* attendance is expected at all lecture and laboratory sections of the course. If you will have to miss class for any reason, let me know by e-mail as soon as possible. The De Anza College Chemistry Department does not offer make-up labs under any circumstances. I will make some course announcements in lecture and lab, and it will essential that you are present to receive this information.

Textbook and Materials
Required
1. *Chemistry: The Molecular Nature of Matter and Change*, 8th edition by Silberberg and Amateis. You are strongly encouraged to purchase this textbook from the De Anza College bookstore; however, we will not use McGraw-Hill Connect in this course. You may use an older version of the textbook.
2. A scientific calculator with natural log functionality. Phones and graphing calculators may not be used on exams or quizzes. I recommend the **TI-30XS calculator** which is available from multiple retailers.
3. The Chemistry 1C laboratory manual, available online on the course Canvas webpage.
4. Laboratory notebook with carbon copies such as https://www.amazon.com/Student-Lab-Notebook-duplicate-Package/dp/1930882742. These notebooks may also be purchased at the De Anza College Bookstore.

5. Approved laboratory safety goggles (not safety glasses), available from the De Anza College Bookstore. Safety goggles *must* be ANSI-rated and approved by your instructor. ***You will not be permitted to attend lab without appropriate eye protection***.
6. A box of nitrile laboratory gloves. ***You will not be permitted to work with chemicals without gloves***.
7. Stapler and staples.

Resources

1. 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. Their website is: https://www.deanza.edu/studentsuccess/mstrc/
2. 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. Their website is: https://www.deanza.edu/dsps/

Study Tips

1. ***Complete the assigned reading*** before coming to class. Review 1A, 1B, and algebra topics that are unfamiliar.
2. Take notes during class and review your notes regularly. Write down any questions you have and bring them to class or office hours.
3. Do a little bit every day. After every lecture, review the reading assignment and complete in-chapter and end-of-chapter exercises.
4. Join a study group. Work on practice problems together. The best way to learn the material is to teach it to somebody else.
5. If you feel that you are a poor test-taken, *complete and turn in all other assignments on time* in order to pass the class.
6. ***Do the practice problems and make sure you understand them.*** My students from previous quarters have told me that this is the best way to prepare for my exams. Attending lecture alone is not enough!
7. Take care of yourself! Stay well-rested and drink water.

Important Dates

Add Day:	April 20, 2019	Last day to *add* courses.
Drop Day:	April 21, 2019	Last day to *drop* courses without a withdraw being recorded.
Withdraw:	May 31, 2019	Last day to *withdraw* from the course.
Check-out:	Lab check out will take place on the last lab day of the quarter	
Final Exam:	June 26, 2019	

If you drop or withdraw from the course, you must check out of your lab locker on the designated lab check-out day.

Exam Dates and Tentative Content

April 29, 2019	**Exam 1**
	Chapter 13, Chapter 18 (review), Chapter 19 sections 1 and 2
May 20, 2019	**Exam 2**
	Chapter 19 section 3, Chapter 21
June 12, 2019	**Exam 3**
	Chapter 19 section 4, Chapter 23
June 26, 2019	**Final Exam**
	Chapter 24 sections 1, 2, and 6
	All material from exams 1 – 3

You may verify the date and time of the final exam at http://www.deanza.edu/calendar/final-exams.html. Note that students are responsible for taking final examinations at the scheduled time

Grading Breakdown and Grade Scale

To succeed in this course, you will need to exhibit ***consistent and sustained effort*** throughout the quarter. This will be demonstrated through in-class practice problems, laboratory preparation and data analysis, and examinations. ***No assignments or exams will be "dropped" from the final grade***.

Lecture	66% of total grade

Final %	Grade[1,2]

Practice problems	10%
Midterm exams	42%
Final	14%
Lab	34% of total grade
Pre-labs	7%
Notebooks	20%
Lab Final	5%
Clean-up	2%

>100.0	A+
90.0 – 100.0	A
88.0 – 89.9	A–
85.0 – 88.9	B+
80.0 – 84.9	B
78.0 – 79.9	B–
75.0 – 77.9	C+
68.0 – 74.9	C
63.0 – 67.9	D+
55.0 – 62.9	D
<55%	F

[1]If your average in either the lab *or* lecture portion of the course is less than 55%, you will receive an F as a final grade.
[2]A+ grades will be given to students who demonstrate excellence in the following three areas: lecture, lab *and* class participation.

Lecture (66%)

Your attendance and active participation is expected at every lecture period. ***Due to the high number of students wishing to enroll in the course, any unjustified absences during the first two weeks of class will result in you being dropped from the course.*** Absences may be excused in case of a verified emergency (e.g. doctor's note or police report). 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). 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. I do not consider computers necessary for lecture; however, you may use an electronic device to take notes and reference relevant class material. 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.

Homework (0%)

Consistent practice is an essential component of learning, and homework questions will often be similar to exam questions. Recommended practice problems from the textbook will be posted for each chapter; however, homework will *not* be graded. It is your responsibility to keep up with suggested practice problems *every day****.***

In-class practice problems (10%)

Practice questions will be posted and completed in class. Collaboration with your classmates is encouraged, and you may use any resource at your disposal. I will collect these problems and grade them for completion. Bring loose leaf paper and a writing utensil to class with you. These practice problems serve two primary purposes. First of all, practice problems serve a pedagogical purpose. They will be used to review material from Chemistry 1A and 1B, present new material in an "active learning" setting, and review recent lecture material. Practice problems are graded based on completion, so they also serve to reward lecture attendance and participation. Days with practice problems will not be announced in advance– it is your responsibility to come to lecture and keep up with the material.

Exams (56%)

There will be three midterm exams and one final exam, each worth 14% of your final grade. Early and late exams will not be administered, and missing an exam ***will result in a zero without documented proof of a medical or legal emergency*** (e.g. hospitalization or car crash). If you require any accommodations for exams, you must be approved by DSPS.

Exams will consist of a mixture of short answer, calculation, and choice questions with the opportunity for partial credit. You must show your work for calculations in order to receive credit for any answer. You will be asked to demonstrate your conceptual understanding of the material *and* apply those concepts in an algebraic context to solve quantitative problems.

The final exam will be cumulative. The final exam will be administered on **Wednesday, June 26th from 4:00 pm – 6 pm**. This date and time are determined by De Anza College and cannot be moved under any circumstances. If you cannot take the final at this time, you should not enroll in the class. The final will not be administered at an alternative time under any circumstances.

Lab (34%)

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 for*** to complete the required labs. Everyone is allowed 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 equipment demonstrations and essential safety information. ***If you miss lab lecture, you will not be permitted to complete that lab and it will count as a lab absence.***

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 lab notebook.

Pre-labs (7%)
Pre-lab assignments will be posted on Canvas at least two days before they are due. I will send announcements to alert you as to when they have been posted. Pre-labs should be handwritten on a piece of notebook paper.

Pre-lab assignments are due at the beginning of class. Each pre-lab will be graded out of 5 points. They may be submitted during the first 5 minutes of class for full credit. Late pre-lab assignments will receive an automatic 3 point deduction. *Chronic tardiness will have a negative impact on your grade*.

Lab Notebooks (20%)
A laboratory notebook is an essential scientific tool. If you choose to continue your scientific education, you will perform original scientific research in your chosen field! This means that you will be the first person *ever* to perform some experiments. The lab notebook provides a convenient place to record all of your physical and mental activities for a set of experiments. In some cases, a lab notebook may become a legal document to establish intellectual property. For Chemistry 1C, ***all laboratory work (including calculations and analysis) must be handwritten in your lab notebook in black or dark blue ink***.

For Chemistry 1C, you will a dedicated lab notebook with carbon copies. You may use a notebook from a previous class; however, you must remove all used pages. The laboratory notebook is a ***permanent and complete record*** of the work you perform in lab. This means that it should be detailed and reflect the physicals operations that you performed in lab in your own words. This means that I do ***not*** want you to copy the provided procedure word-for-word!

For each lab, you will turn in the *original pages from your lab notebook*. The carbon copies are yours to keep for the lab final. Each lab will typically be worth 20 points, with the exception of the cations lab which is worth 80 points.

Please note the following lab notebook requirements (read these requirements *carefully*—this is what I'm looking for when I grade!)

- Write your name, the class, quarter, and your contact information on the front cover. If you lose your lab notebook at any point in the quarter, this is the best way to allow it to be returned to you.
- All pages must be numbered in the upper outside corner.
- Only write on the right page. Do *not* write on the left (or back) pages.
- Leave the first three pages blank for a Table of Contents. As you complete each experiment, include the *Title of the Experiment*, the *Date(s) Performed*, and the *Page Numbers* where you can find the experiment.
- Always start a new experiment on a new page.
- The date of the experiment or work being performed must be written at the top of *every* page.
- All entries must be made in black or dark blue ink. If you make a mistake, simply strike the erroneous work with a *single line* and move on. Do not scribble over an error such that the original writing is obscured.
- Never use pencil in a lab notebook.
- Never use white-out in a lab notebook.
- Everything you do in the lab should be written in your lab notebook as you do it. Your lab notebook should be detailed enough that anyone can *exactly* reproduce your procedure and results. Imagine giving your lab notebook to a student in Chemistry 1A: that student should be able to walk around the Chem 1C and reproduce your exact experiment. This includes reagents, glassware, masses, measurements, new equipment protocols, etc.
- All data and observations must be directly recorded into your lab notebook. You may *not* write your data down on a separate piece of paper and rewrite it later. Keep your data and observations with the relevant step in your procedure. For example, write, "*I weighed out 4.9782 g of iron(III) chloride hexahydrate and 8.3674 g of potassium oxalate dihydrate in separate 50 mL beakers. Each was dissolved in 50.1 mL (iron) and 49.8 mL (oxalate) of water. I gently heated the iron solution on a hotplate until it was steaming. This helped the iron salt dissolve. The iron solution was dark yellow and the oxalate solution was clear. I combined the two solutions, and the mixture immediately turned emerald green.*"

- All data must be recorded with the correct number of significant figures.
- All calculations, using your data, must be performed in the lab notebook. You may do practice calculations on a separate sheet of paper; however, I will only grade what is in your lab notebook. I will grade calculations for accuracy; however, I am looking for the correct method. I will not base your lab grade on whether or not you got the "correct" answer.
- Graphs, when appropriate, should be prepared in a spreadsheet program such as Excel or Google Sheets. Carefully label each axis, including units when appropriate. Remove titles from the graph. Include a figure caption below the graph that indicates what is being plotted. Print the graph and tape it in to your lab notebook with a clear tape such as Scotch tape.
- Before you leave lab for the day, you must have your instructor (me) review and sign your lab notebook.

Your lab notebook must be legible and organized. Take your time and come to lab prepared.

Lab Final (5%)
There will be one lab exam in this course. The lab final will be an open lab-notebook exam, and you may refer to any information that is handwritten in your lab notebook. In addition to the required pre-lab assignments, procedures, and data, I encourage you to include lab lectures notes, vocabulary, and example calculations. Extra pages (either printed or handwritten) may not be inserted. The final will cover material, calculations, and analysis related to your laboratory experiments.

Clean-up (2%)
Each student is required to sign up for one lab period in which they will be responsible for after-lab clean-up. This involves staying to end of lab, making sure the common lab areas and balance area is clean, the waste bottles are closed, etc. In addition, each student is responsible for cleaning their own materials and work area. Clean-up and check-out will start 30 minutes prior to the end of the class.

Laboratory Safety (0%, but grade penalties may be applied)
There are many hazards associated with working in a chemistry laboratory. Many chemicals are exciting because they are dangerous. Establishing a strong safety culture is an essential shared goal in any teaching laboratory. This means that students must follow the safety rules established by their instructor *at all times*. Constant vigilance is essential, and reckless or negligent behavior in lab *will result in point deductions from the lab notebook grade*.

Appropriate personal protective equipment (PPE) must be worn at all times in the lab. This includes closed-toed shoes, ankle-length clothing, shoulder-covering tops, and safety goggles. ***If you do not have appropriate PPE, you will not be permitted in the lab and this will count as one of your three absences.***

Waste management guidelines must be strictly adhered to in the laboratory. Mixing non-compatible chemicals may result in injury to yourself or others. As such, it is essential that you ***only dispose of chemical waste in the designated waste container***. Before you dispose of any chemical waste, check the yellow label! The label for the correct bottle will include the following information: ***the name of your instructor (Megan Brophy) and the chemicals that you are using that day will be listed on the correct waste bottle***. If you can't find the correct waste bottle or it is full, let me know right away. ***Do not pour your waste into another instructor's waste bottle under any circumstances. Pouring waste in the incorrect waste bottle will result in an automatic 10 point deduction.***

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

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

8) Use of electronic devices requiring headphones in the laboratory is prohibited at ALL times, including during lab lecture.
9) Students are advised to inform their instructor about any pre-existing medical conditions, such as pregnancy, epilepsy, or diabetes, that they have that might affect their performance.
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) **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.

Lab safety is all of our responsibilities! Manage risks with the following simple procedure:
Recognize hazards
Assess the risks of hazards
Minimize the risks of hazards
Prepare for emergencies

Lecture Schedule

Chemistry 1C will cover material presented in chapters 13, 19, 21, 23, and 24 of the Silberberg. The general chemistry sequence builds on prior material, so we will also review material from Chemistry 1A and Chemistry 1B. Every effort will be made to keep to the lecture schedule below. If we fall significantly behind this schedule, the content of the exams will be adjusted to reflect the material that we covered in class. Exam dates will not be modified except in cases of *force majeure*.

Week	Date	Day	Lecture Topics and Assigned Reading
1	4/8	M	Syllabus and review
	4/10	W	Silberberg 13.5 Concentration units and conversions Silberberg 13.1-13.4 Intermolecular forces and solubility as an equilibrium process
2	4/15	M	Silberberg 13.6 Colligative properties
	4/17	W	Silberberg 18 Acid-base equilibria Silberberg 19.1 What is a buffer?
3	4/22	M	Silberberg 19.1 The common-ion effect Henderson-hasselbach
	4/24	W	Silberberg 19.2 Acid-base titration curves pH Indicators
4	4/29	M	***Exam 1: Solutions and advanced acid-base equilibria***
	5/1	W	Silberberg 19.3 Equilibria of slightly soluble ionic compounds
5	5/6	M	Silberberg 4.5 Oxidation-Reduction (Redox) reactions Silberberg 4.6 Elements in redox reactions Silberberg 21.1 Redox reactions and electrochemical cells
	5/8	W	Silberberg 20.3 Entropy, free energy, and work Silberberg 20.4 Free energy, equilibrium, and reaction direction Silberberg 21.2 Voltaic cells: Using spontaneous energy to generate electrical energy Silberberg 21.3 Cell potential: output of a voltaic cell
6	5/13	M	Silberberg 21.4 Free energy and electrical work
	5/15	W	Silberberg 21.5 Electrochemical processes in batteries Silberberg 21.6 Corrosion: an environmental voltaic cell Silberberg 21.7 Electrolytic cells: using electrical energy to drive nonspontaneous reactions
7	5/20	M	***Exam 2: Solubility equilibria and electrochemistry***
	5/22	W	Silberberg 18.9 Electron-pair donation and the Lewis acid-base definition Silberberg 19.4 Complex ion equilibria Silberberg 23.3 Complex ions
8	5/27	M	*Memorial Day: No classes*
	5/29	W	Silberberg 23.1

			Properties of the transition elements Silberberg 23.2 The inner transition elements
9	6/3	M	Silberberg 23.3 Complex ions and isomerism Silberberg 15.2 Isomerism
	6/5	W	Silberberg 24.4 Theoretical basis for the bonding and properties of complex ions
10	6/10	M	Silberberg 24.4 Theoretical basis for the bonding and properties of complex ions
	6/12	W	***Exam 3: Complex ion equilibria and coordination chemistry***
11	6/17	M	Silberberg 2.4 The observations that led to the nuclear atom model Silberberg 2.5 The atomic theory today Silberberg 24.1 Radioactive decay and nuclear stability Silberberg 24.2 The kinetics of radioactive decay
	6/19	W	Silberberg 24.6 The interconversion of mass and energy
12	6/26	W	***Final Exam*** **4:00 pm – 6:00 pm**

Lab Schedule

Week	Monday	Tuesday	Wednesday	Thursday
1	***Check In*** ***Attendance is mandatory***	***Check In*** ***Attendance is mandatory***	Freezing point depression Day 1	Freezing point depression Day 1
2	Freezing point depression *Day 2*	Freezing point depression Day 2	Acid-base titration (Buffers lab) Day 1	Acid-base titration (Buffers lab) Day 1
3	Buffer preparation Day 2	Buffer preparation Day 2	K_{sp} and Common Ion Effect Day 1	K_{sp} and Common Ion Effect Day 1
4	K_{sp} and Common Ion Effect Day 2	K_{sp} and Common Ion Effect Day 2	Anions Day 1	Anions Day 1
5	Anions Day 2	Anions Day 2	Electrochemistry Day 1	Electrochemistry Day 1
6	Electrochemistry Day 2	Electrochemistry Day 2	Cations Day 1	Cations Day 1
7	Cations Day 2	Cations Day 2	Cations Day 3	Cations Day 3
8	***No class: Memorial Day***	Cations Day 4	Cations Day 4	Cations Day 5
9	Cations Day 5	Cations Day 6	Cations Day 6	Cations Day 7
10	Cations Day 7	Cations Day 8	Cations Day 8	Cations Day 9
11	***Lab Final*** ***Attendance is mandatory***	***Lab Final*** ***Attendance is mandatory***	***Check-Out*** ***Attendance is mandatory***	***Check Out*** ***Attendance is mandatory***

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.