

Chemistry 1A, General Chemistry

Fall 2015, Sections 03 & 04

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Lecture time: T, Th 11:30 am – 12:45 pm (G6)
Section 03 lab: T, Th 7:30 am – 10:20 am (SC2202)
Section 04 lab: T, Th 2:30 pm – 5:20 pm (SC2202)
Office hours: T, Th: 1:20 pm – 2:20 pm; 5:30 - 6:30 pm
or by appointment (SC1220)

Class website:

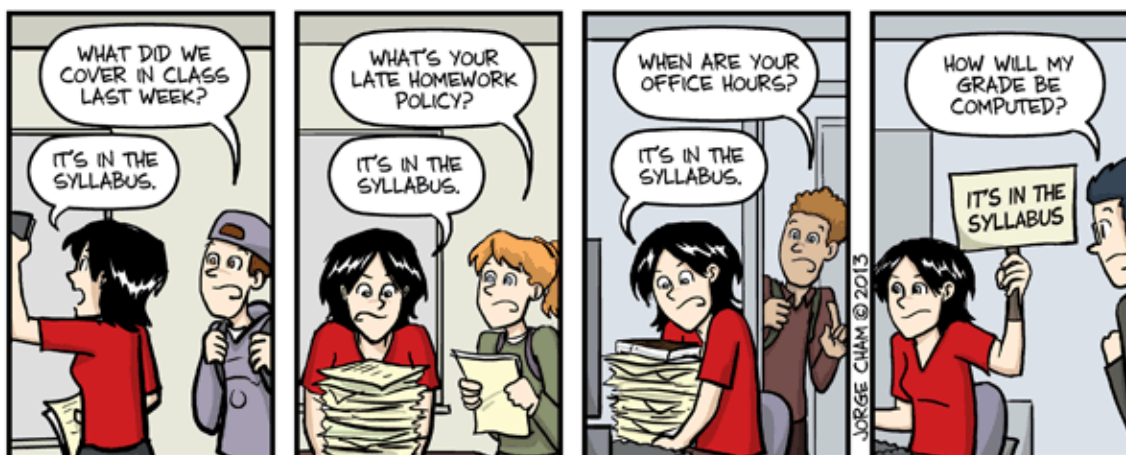
www.deanza.edu/faculty/wankanny/chem1af15/index.html

Chem 1A is the first of a three-quarter general chemistry course. This class introduces the structure and reactivity of matter at the molecular level. We will cover: measurement, atomic structure, the periodic table, solutions, thermochemistry, quantum theory, molecular structures, molecular bonding, and orbital theory.

Required course material

- 1) OSHA approved laboratory safety goggles from the bookstore. *Other types of goggles are NOT permitted.*
- 2) A scientific calculator with at least log and exponential functions. *Graphing calculators or cellphones will not be allowed for tests! (e.x. TI-30X).*
- 3) Permanently bound laboratory notebook with duplicate copies (carbon or carbonless, 8.5" by 11" or similar).
- 4) Chemistry: The Molecular Nature of Matter and Change, 7th edition by Silberberg and Amateis (McGraw-Hill: 2012; ISBN 978-1-25-943287-3)
Note: Given the high costs of textbooks, you are welcome to use a previous edition of this textbook but all of the homework/ practice problems, section numbers, diagrams, or tables referred to in class correspond only to the official text and it is your responsibility to match the problems/content to our official text. A copy of the official text will be available during office hour for comparison.
- 5) Lab manual (available free @ <http://deanza.edu/chemistry/Chem1A.html>)

Optional: Latex or Nitrile Gloves & lab coat (available from the bookstore).



IT'S IN THE SYLLABUS

Attendance & absences and make up policies

Attendance: Attendance is expected for all class periods. Please be on-time and stay for the duration of the whole class until dismissed. *Note:* the lecture and the course cannot be taken as separate courses and you have to attend the sections that you are enrolled in – no switching is allowed under any circumstances.

Absences: When you know that you will miss class (even if 10 minutes prior to class), please contact me immediately by e-mail or phone and give me a brief explanation for your absence. Absences will only be excused for medical emergencies or other emergencies (e.g. death in family) with written verification **and** if I was given proper advanced/reasonable notice for your absence. *Note that I have to drop you if you have 4 unexcused absences (or any in the first 2 week of class) & 2 or more unexcused absences from lab will result in an automatic 'F' for the entire course.*

Make-up policies: No missed work/quizzes/tests could be made-up with unexcused absences.

In the cases of excused absences:

- **Lectures & lab lectures:** If you've missed lectures or lab lectures and no quizzes were given, then you can just listen to the audio recording and review the class notes on the course website to learn what you've missed.
- **Pre-labs:** You must turn in the completed pre-lab as soon as you return to class.
- **Labs:** **Missed labs cannot be made up.** I may supply you with data necessary to complete the lab report, or your grade may be based on your average lab report scores.
- **Quizzes:** You can only make up your missed quizzes during office hours in the same week (or another pre-arranged time with me) or you'll receive a '0' for the quiz you missed.
- **Exams & Finals:** **exams and finals cannot be made up.**
Note: In the case of a true, verifiable emergency, I may make an exception and allow you to take the exam at another time in the same week if you contact me immediately with proof and make alternative arrangement. For a final, you may have to sign an official contract with me and receive an 'incomplete grade' until you take the test within one month of the original date – if you fail to resolve the contract, then your grade will be determined by the work already completed.
- **Late entrance:** **No extra time will be given if you arrived late** to a quiz, exam or final.

Registration and drop policies

Registration: Due to safety concerns, enrollment in each section is strictly limited to 30 students per section. Wait-listed students will be given add-codes in the order of the official wait list if/when spaces become available. Due to insurance reason, you will not receive a laboratory locker or be allowed to conduct lab experiences unless you are officially enrolled in the class (ie. no longer wait-listed). If there are any errors with registration or status, please contact Admission and Records. The registration deadlines (see table to the right) will be strictly enforced by the district with no exceptions.

Registration deadlines this quarter	
Last day to add class	10/3/15 (Sat)
Last day to drop class	10/4/15 (Sun)
Pass/fail deadline	10/16/15 (Fri)
Withdrawal deadline	11/13/15 (Fri)

Drop or withdrawal: If you choose to drop or withdraw from this course, **YOU** have to initiate the **drop or withdraw** process (either online or through Admissions & Records) by the above deadlines or you will receive a grade based on the work completed. The only time that I would initiate a drop is if you have unexcused absences before the add deadline (to get a clear census count). As such, it is very important to **let me know if you plan to miss class during the first two weeks of class.** If you've dropped or withdrawn you'll still need to checkout of your lab locker – see 'Lab checkout policy' on P.7 for details.

Tentative class schedule

Week	Date	Lecture topic	Chapter	Lab topic	Report due	
1	9/22	Intro + basic chemistry concepts review	1 - 2	Introduction + check in		
	9/24	Atom: history and details	1 - 2	Lab 1: Measurement		
2	9/29	The mole and stoichiometry (Quiz 1) (HW)	3	Lab 2: Nomenclature		
	10/1	Chemical equations	3	Lab 3: Hydrate (day 1)	Lab 1	
3	10/6	Reactions day 1 (Quiz 2) (HW)	4	Lab 3: Hydrate (day 2)		
	10/8	Reactions day 2	4	Lab 4: Precipitation (day 1)	Lab 2	
4	10/13	Exam 1 (HW)		Lab 4: Precipitation (day 2)		
	10/15	Forms of energy	6	Lab 5: Type of reactions (day 1)	Lab 3	
5	10/20	Calorimetry & state functions (Quiz 3) (HW)	6	Lab 5: Type of reactions (day 2)		
	10/22	Quantum mechanics	7	Lab 6: Conductivity (day 1) Lab exam 1		
6	10/27	Atomic orbitals (Quiz 4) (HW)	7	Lab 6: Conductivity (day 2)	Lab 4	
	10/29	Periodic table & electron configurations	8	Lab 7: Vinegar (day 1)	Lab 5	
7	11/3	Exam 2 (HW)		Lab 7: Vinegar (day 2)		
	11/5	Periodic trends & atomic properties	8	Lab 8: Calorimetry (day 1)	Lab 6	
8	11/10	Ionic & covalent bonds (Quiz 5) (HW)	9	Lab 8: Calorimetry (day 2)		
	11/12	All about bonds: energy & polarity	9	Lab 9: Redox Titration (day 1)	Lab 7	
9	11/17	Molecular structures (Quiz 6) (HW)	10	Lab 9: Redox Titration (day 2)		
	11/19	Molecular shapes & polarity	10	Lab 10: Line Spectra	Lab 8	
10	11/24	Exam 3 (HW)		Lab 11: Molecular model (day 1)	Lab 9	
	11/26	Thanksgiving Holiday				
11	12/1	Molecular orbital hybridization (Quiz 7)	11	Lab 11: Molecular model (day 2)	Lab 10	
	12/3	Resonance and delocalization	11	Lab Final & check out	Lab 11	
12	12/9	Final exam (Wed), at 11:30 - 1:30 pm (HW)				

This schedule may be changed at any time with proper advanced notice. Note: (HW) = homework due

Grades

The point distributions and the grading scale for the course are as follows:

Lecture		Lab		Grading Scale					
Task	Points	Task	Points	Grade	Points	%	Grade	Points	%
Exam 1	150	Lab reports (15 pts each)	150	A+	960 - 1000	96 - 100	C+	760 - 779	76 - 78
Exam 2	150			A	900 - 959	90 - 96	C	700 - 759	70 - 76
Exam 3	150	Lab Exam 1	50	A-	880 - 899	88 - 90	D+	680 - 699	68 - 70
Final	250	Lab Exam 2	50	B+	860 - 879	86 - 88	D	620 - 679	62 - 68
Quizzes	50			B	800 - 859	80 - 86	D-	600 - 619	60 - 62
Total	750	Total	250	B-	780 - 799	78 - 80	F	0 - 599	0 - 60
Total points for class: 1000									

Note: If you do not complete all the lab experiments, or you score less than 60% on either the lecture or lab portion of the class, you will receive an 'F' for the entire class.

Grades (cont.)

Curves: Your grade in this course is based on your earned point total only, and the grading scale above guarantees the minimum grade that you will receive in this class. No curves will be applied. However, your **2 lowest quiz scores and your lowest lab report score** will be **dropped**. Additionally, if you show improvement (ie. if your **percentage on the final exam is higher than that on your lowest exam**), **the score for that lowest exam will be replaced by the final exam score (in terms of %)**. No scores will be changed if you've scored lower on the final than your exams.

Extra Credit: 20 points of extra credit (2 points each x 10 collection total), which boosts 1/2 a grade if you are on the border, will be awarded for timely completion of homework assignments. To receive credit, all questions must be answered (with all work shown and the numerical answers boxed); however, you do not need to copy the question or answer in complete sentences. **Homework will be given after every lecture and collected every 2 lectures (usually on Tuesday).**

All homework (due in lecture) and lab reports (due in lab) are due **at the beginning of class** on the dates stated in the schedule (P.3). 20% of the total grade will be deducted for each 24 hours that the lab report is late, and no extra credit will be given to late homework.

Lab safety

Safety: Lab safety is **EXTREMELY** important! We have set up rules for helping keep everyone safe, and you **must** follow these with no exception (see P.6-7). Violation will result in a dismissal from lab (which will be a 0 for that lab report) or expulsion from the course (and receive a grade of "F") depending on circumstance.

Pre-labs & format

Pre-lab: Before each new experiment, you are required to prepare a pre-lab. You will tear out and turn in your copy (not the original) of the pre-lab to me before class at the first day of every experiment, and I will verify whether you have completed the pre-lab satisfactorily. **If your pre-lab is not complete, you will not be allowed to perform the experiment and will thus receive a '0'.**

General notes: Always write in pen and record any data directly into the notebook. Never write in pencil, erase, use a white-out or completely scratch something out in your notebook – use a single line through the text if correction is needed. Write in third person and passive voice (ie. don't use I, me, my, you, your, we, us, our, one, the student, etc.; e.g. 1 mL of H₂O was added to via pipette.)

The format of the pre-lab is as follows:

1. **Title of the experiment and date it is performed**
2. **Abstract:** one or two sentences summarizing the main purpose of the experiments. If chemical equations are involved please include this in the abstract as well.
3. **List of chemical hazards:** list any important safety information about the chemicals you are using in your experiment. This is usually given in your experimental procedure, but if it is not, write down the compound's name and leave a space for the info and fill it in when I talk about it in lab lecture.
4. **Chemical disposal:** for each chemical you are using, list the appropriate waste container for its disposal (ie. acidic aqueous, basic aqueous, or organic). If you are unsure how a chemical should be disposed of, write down the compound's name and leave a space for the info and fill it in when I talk about it in lab lecture
5. **Procedure:** rewrite the full experimental procedure in your own words – you must write **with enough detail so that you can run the whole experiment with only what you wrote in your lab notebook**. Leave a margin space next to your procedure to record any deviations from the planned procedure and observations. Also, note that you only have to write down the procedure, meaning you don't have to write down any theory or any of the pre-lab questions for your pre-lab.

Lab notebook format

Your lab notebook should include a table of content at the beginning, one that you update after every experiment. It should be followed by experiments, and each experiment should contain:

1. **Items listed in pre-lab:** see above (P.4). Update the procedure as needed during the experiment.
2. **Observations:** You should note any color changes, bubbles, instrumentation problems, etc. in the right hand column next to the procedural steps.
3. **Data and Calculation:** I am not going to read this section but this data and calculations will be included in your report. I recommend that you write down the data and complete all the calculations necessary in this section of the notebook for your own reference. If graphs are needed, you don't need to put them into the lab notebook. However, you might want to write down how you obtained the graphs in your notebook for your own reference later.

Lab report format

All lab report must be type written. No hand-written report will be accepted. The report should be written in 3rd person and passive voice with correct sub/superscript notations (ie. H₂O, not H2O).

Unless otherwise specified, your lab reports are to be in the following format:

1. **Title:** Include the title of the experiment at the beginning of the report.
2. **Objective:** State what are the key quantitative results that you are seeking in the experiment as well as the method utilized to obtain determine these results.
3. **Procedure:** State the page numbers of the procedure in your lab notebook. You don't have to retype the procedure. Credit any collaboration and explain who did what here if applicable.
4. **Data and calculations:**
 - **Data:** should be listed in a table or tables, be clearly labeled and include the proper units of measurement. Make a note of any data that you didn't personally collect here.
 - **Calculations:** must include the appropriate unit(s) of measure and should be logically labelled. Be sure to define any variable names used in your calculations. The general mathematical formula (ie. definition without numbers) must be typed out for each unique kind of calculation you perform. After showing the general formula for a calculation, you should then type one example of the equation substituted with actual data. For each unique type of calculation, you only need to write the general formula and the sample data formula once. If the calculation is repeated multiple times, the rest of the results may simply be tabulated after the formulas.
 - **Graphs:** If graphs are necessary, then the graphs should be done using Microsoft Excel with all axes labeled with the proper units and pasted into this section of the report.
5. **Conclusion:** Your conclusion should exactly parallel your objective – meaning you should state exactly those quantitative or qualitative results that were the focus of the experiment. This could be one sentence in some cases.
6. **Discussion:** To help justify your conclusion, you should include a brief discussion of how your data and calculations led you to your stated results (and the theory/technique used if it helps to explain your results). You should include an explanation of any sources of errors that might explain why your results are different from the known or expected values.

Instead of printing, you may email a pdf (not a .doc file, a pdf file only) of your lab report to me with the subject "Chem 1A lab report" before the due date.

While some experiments require you to collaborate with a lab partner, you may only share data. You must complete the lab report, along with all the calculations and analyses, **on your own**. Sharing analyses or conclusions will constitute plagiarism (see P.7). *Note:* If you collaborated with someone to collect data, they have to be credited in your notebook and the report.

Lab safety policies

General Dos and Don'ts:

- It is your responsibility to be aware of your safety and the safety of those around you the entire time you are in lab. Know where the eyewash, safety shower & fire extinguishers are located.
- You must wear OSHA approved safety goggles and gloves at all times while in the laboratory. Note: wearing contacts presents an additional risk when handling chemicals.
- Long hair (ie. reaching the top of the shoulders) must be tied back securely at all times.
- Appropriate attire must be worn in the laboratory. Shorts (ie. not ankle length), open toed-shoes, stiletto heels & sleeveless shirts are not allowed. Loose clothing must be constrained.
- Eating and drinking is **NOT** permitted in the lab at any time. Never bring any food or drinks to the lab (even if they are in closed/sealed containers).
- The usage of personal headphones is not allowed.
- Chemical refrigerators are meant for chemicals **ONLY**; don't use it to store food or anything else!
- Don't apply cosmetics in lab. Avoid wearing jewelry (rings, bracelets, watches) if possible – you might ruin it and chemicals might be trapped in between your jewelry and your skin. Try not to touch your phone (or any personal item) either since you might get chemicals on it.

Emergency procedures:

- **You must inform me immediately in the case of any accidents, spills or injury.**
- **Spilled something?** Report it to me immediately and I'll guide you through the cleanup.
- **A chemical splashes in your eye?** Report it to me immediately, and then flush your eyes at an eyewash station as directed (usually for 15 minutes straight).
- **Splashed a chemical on yourself?** Report it to me immediately and then, unless otherwise directed, rinse the affected skin with large quantities of water for 15 minutes straight.
- **Splashed a large quantities of a hazardous chemical on yourself?** Report it to me immediately and then, if advised, use the emergency chemical shower. You may be forced to remove chemically contaminated clothing (so keep an extra set of clothes in your car if possible).
- **Fire?** Report it to me immediately! Don't try to put it out yourself – water may worsen chemical (metal) fires or electrical fires. Fire alarms are located in all lab rooms.
- **Your clothes or hair caught on fire?** Use the safety shower immediately and alert me ASAP. If this is not possible "stop-drop- and -roll."
- **Earthquake?** Step away from all lab equipment, duck under a lab bench or door frame, and cover your head. Do not exit the building during an earthquake as exit doors may contain glass or be near windows, and tiles or debris may fall from the roof. Once the quake passes, gather only vital personal possessions and evacuate to the designated area.
- **Emergency phones:** If directed (or deemed necessary), pick up any campus phone and dial 911, or dial (408)924-8000 to reach police in case of emergencies. For non-emergencies, dial (650)949-7313.

Rules regarding experiments:

- Know where the eyewash, safety shower, and fire extinguishers are located.
- All waste (chemicals, glasses, needles, etc.) must go into appropriate waste containers. Never throw anything down the sink or in the regular trash receptacles.
- Remember to wash your hands immediately after completing the experiment and checking out. Also, change your clothes as soon as possible.
- 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. No chemicals should ever be placed in or near the sink!
- Never return unused chemicals to their original containers (make sure to only take the quantity you need to avoid waste).

Lab safety policies (cont.)

Rules regarding experiments (cont.):

- Never re-use the same pipette to transfer a chemical once it has made contact with another container.
- Never pick up broken glass with your hands. Always use a brush and dust pan to sweep up broken glassware.
- Never point a heated system towards any person, including yourself (or me). Also heating closed systems are generally a terrible idea (think: boom!).
- 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. Then check out with the instructor.
- All stored samples must be labeled with the names (not formulas) of the chemicals and the date the sample was created.

Other rules:

- You may not be in the laboratory unless an instructor is present to supervise.
- Unauthorized experiments are expressly forbidden and can result in your expulsion from the course.
- Do not begin the laboratory experiment (e.g. place any chemicals or glassware on the lab benches, turn on Bunsen burners, etc.) until the safety introduction is complete and everyone is wearing their goggles and gloves. I 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 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.

Lab check out policy

You are officially required to check out of your lab locker, whether you complete the course or not. If you drop within the official add period during a quarter, you must clean out your locker **immediately**. If you fail to do so, your locker may be cleared (by cutting your lock) and reassigned to another student. After the add deadline (the first two weeks), if you drop or withdraw, you must check out by the assigned checkout date for your laboratory section. **Failure to check out of lab by the scheduled check-out date will result in a late fee and may also result in your grades being held and/or a block being placed on your future registration.** Also, you will be held responsible for any missing or broken lab locker equipment until you check out.

Conduct policies

Academic Dishonesty: As a student at De Anza College, you are bounded by the Academic Integrity policy as outlined in the De Anza College catalog at all times (see <http://www.deanza.edu/studenthandbook/academic-integrity.html>). Any violation will result in expulsion from the course, a grade of “F” for the course and a referral to the dean of PSME. Collusion, if proven, will result in each student receiving the same penalty. Please ask me if you are ever unsure about the policy.

Conduct in class: You are also bounded by the Student Code of Conduct. I will not tolerate any disruptive or abusive behavior towards myself or any student in the class, and if you do so, you may be dismissed from class/ reported to the dean of student development for disciplinary action.

You can use electronic devices to take notes in class, as long as you think that **it'll help you learn** and their usage are not disruptive/distracting to me or others (please turn on silent mode!). Please don't abuse this by watching videos or texting/IMing/skyping or having conversations out loud while in class. Except for select calculators & translators (pre-approved by me), no devices can be used during quizzes/exams/finals.

Tips for success

- Dedicate at least 8 hours every week to studying for the class (reading the text, doing homework/practice problems, reviewing notes).
- **Read the assigned chapters BEFORE you come to class (!!!).**
- Come to class and be ready to be engaged and learn. Yes, that means reading before class!
- **Do the homework assignments promptly after every class** – a lot of chemistry concepts build on each other, so if you haven't mastered the basics you will definitely have trouble mastering principles later on.
- Don't cram before an exam. Seriously, if you leave everything to the day (or even the week) before the exam it is not going to go well for you.
- **Come to office hour.** You don't need to have a specific question to come. In fact, I encourage you to come and sit and just work through problems on your own – that way you'll be dedicating at least 4 hours to chemistry each week and I'll be there for whatever question you have while working through problems. I promise I don't bite (and I'll probably have candy) =].
- Form study groups – if you don't want me as a study buddy then make friends with your classmates and study together. Being in a group can help to encourage studying, and it will give you the opportunity to teach each other, which is the best way to learn. But if working in a group is too distracting, then do whatever it is you need to do well. Do whatever works for you.
- Go for understanding rather than memorization. Rather than knowing facts, know why and how the facts came about. There will be problems on your test that you've never seen before that will test your ability to think and integrate concepts.

There are also a number of services available on campus to help you in your studies, including:

- **Mathematics, Science and Technology Tutoring Center (in S43):**
Drop-in tutoring, weekly individual tutoring, group tutoring
- **Counseling and Advising (in SCS - Student and Community Services):**
Provides counseling (academic or personal), transfer planning, and psychological services
- **Health Services (in Hinson Campus Center)**
Includes services such as minor first aid, medical exams, and immunizations

Special accommodation: If you have a physical or psychological disability, many accommodations and services are available through Disability Support Programs & Services (in SCS). Please contact DSP&S for a TAV form if you require academic accommodation on assessments (ie. additional time, a reduced-distraction environment, the use of alternative media/assistive technology, etc.). No accommodation will be given otherwise.

Learning objectives

Student learning outcome:

1. Identify and explain trends in the periodic table
2. Construct balanced reaction equations and illustrate principles of stoichiometry
3. Apply the first law of thermodynamics to chemical reactions

Course objective: 1) Examine contributions by investigators of diverse cultures and times to the body of chemical knowledge, with an emphasis on physical and chemical conceptual frameworks; 2) Investigate the critical aspects of measurement; 3) Explore the historical development of understanding the structure of the atom; 4) Assess the development of the Periodic Table of Elements in light of modern atomic theory; 5) Differentiate the causes and types of molecular bonding; 6) Appraise the effect of quantum mechanics on formulation of molecular structure; 7) Employ systematic nomenclature to the identification of molecules; 8) Utilize the principles of stoichiometry to analyze compounds, chemical mixtures, and reactions; 9) Examine the prominent characteristics of solutions; 10) Classify the major types of chemical reactions; 11) Apply the essential principles of thermodynamics to chemical systems.