

San José State University
Science/Chemistry
Chem 1B – General Chemistry – All sections – Fall 2022

Course and Contact Information

Instructor: Dr. Karen A. Singmaster
Office Location: DH 16
Email: Karen.Singmaster@sjsu.edu
Telephone: Best by email
Office Hours: TBD I tend to get in to lecture early and leave late so a good time to ask questions.
Class Days/Time: MW 10:30 – 11:45
Classroom: YUH 124
Prerequisites: CHEM 001A (with a grade of "C" or better; "C-" not accepted).

Course Description

The student is expected to gain knowledge of elementary principles and facts of chemistry and their application to problem solving. While Chem. 1A emphasized inorganic, organic and qualitative chemistry, Chemistry 1B covers mainly physical chemistry (kinetics, thermodynamics, equilibria, electrochemistry, colligative properties) in lecture and quantitative chemistry in the laboratory. This semester will require greater use of your mathematical abilities in problem solving. It also builds from your Chem 1A knowledge.

Canvas

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas Learning Management System course login website. You are responsible for regularly checking with the messaging system through MySJSU on Spartan App Portal and through Canvas announcements to learn of any updates. For help with using Canvas see Canvas Student Resources page.

Books/Supplies/ Workshops

Required

- 1) Chemistry: The Central Science – Brown, LeMay and Bursten – 10th, 11th, 12th edition (Or a college level Chem. text if you feel comfortable with a different textbook.)
- 2) **Lab Manual/Handouts for Chemistry 1B** - Sold during the first 2 weeks of school by the Chemistry Student Club (DH20- basement) - They only take cash!
- 3) Hand-held scientific calculator - **Must be non-programmable** and should have log x, 10^x, ln x, e^x and x^y keys. - **You will not be allowed to use your programmable calculator during a lecture or lab exam, or a quiz!**

Not Required (But useful)

- 1) **Academic Excellence Workshops** to help you study for Chem. 1B. These are 3 hour a week organized study sessions. I will provide more information on how to enroll and the times.
- 2) **Preparing for Your ACS Examination in General Chemistry** – This book helps you review for the final exam which will be a standardized test taken at many universities. More details will be provided in lecture. This is also a good Gen. Chem. review for MCAT or other standardized test that contains Gen Chem. Book is sold by Chem Club in DH 20 when school starts and then they give it to me to sell.

3) Other Chemistry texts - Most freshman chemistry books are about the same in quality and content, however you might find another author's prose and text layout more to your liking. You can check out additional textbooks from MLK Library.

4) Solutions manuals to textbook problems - These options are available with your book.

5) Student Study Guide for the textbook – They have more worked out problems and many more practice problems.

6) **Suggested items to purchase for lab:** staple together 10 sheets of lined paper to keep in your drawer in lab, safety glasses and a china marker (sold at bookstore). **ASK ME WHY!**

Grading

Lecture Exams and Final

Three fifty-minute exams (100 points each), will be given approximately every fourth week. Scheduled dates for the exams are attached. The exams might include a take-home problem. Plan ahead. The final exam (200 points) will be 2 hours long. The final is a comprehensive multiple choice test that covers Chem. 1A and 1B topics. Most of the test is a standardized American Chemical Society test used at many universities. More details on this will be provided in lecture. The course lecturer reserves the right to give both in class quizzes and take home quizzes. There will be no make-ups for lecture exams. Should you miss an exam because of illness or equally compelling reasons, you should inform me of the fact as soon as possible, and hopefully before the exam is given. You can do so by emailing me. You will need to provide me with written evidence (doctors' note, police report, etc.) for your excuse. If I accept your excuse, I will use the score on the final as your missing exam score. An unexplained or unsatisfactory excuse for missing a lab or exam will result in a grade of zero. You may take the exam a day early if you have a planned, excused absence for the day of the exam, IF I can accommodate the request.

Quizzes

Several unannounced in class or take home quizzes will be given. No make-ups for missed or late quizzes.

Laboratory

The total lab grade constitutes 40% of the final grade. **Failing lab (55.0% or less) or lack of attendance to lab will result in an F grade for the FULL COURSE, irrelevant of how well you are doing in lecture.** Do not miss labs!! Details regarding the lab grade will be provided at the end of this syllabus.

Grading Scale

At the end of the semester you will receive a single grade for the course. The following grade scale is for the full course, including lab.

above 97.0 %	A+
96.9 - 91.0 %	A
90.9 - 88.0 %	A-
87.9 - 84.0 %	B+
83.9 - 79.0 %	B
78.9 - 76.0 %	B-
75.9 - 71.0 %	C+
70.9 - 64.0 %	C
63.9 - 60.0 %	C-
59.9 - 56.0 %	D+
55.9 - 53.0 %	D
52.9 - 50.0 %	D-

Below 50.0% F

Incompletes will not be given unless a strong compelling reason with proof is furnished to support the need for an incomplete. Incompletes will not be granted just because the university won't late drop you or because the low grade will disqualify you, put you on probation or increase your car insurance payment! Incompletes do not remove past scores in exams! Incompletes are only given to persons who have completed at least 80% of the course. Incompletes are removed by completing pending tasks. I do not provide special projects to make up incompletes.

PLEASE note we do NOT provide extra credit work at the end of the semester for students who are doing poorly nor do we negotiate grades.

Roughly the % weight of each lecture graded item is: 11% for each lecture exam, 22% for the final and 5% for the lecture/Canvas quizzes; with lab covering the remaining 40%.

Absence from a test

We provide three lecture exams. If you are absent from ONE test for due to a **strong, compelling, documented** reason, we will use your % in the final to replace the exam score. We will not do this for more than ONE test.

Attendance /Workload

Regular attendance to lecture, seminar and lab are required. Lecture material will not necessarily reiterate text material. It is a serious mistake either to depend on a classmate's notes or exclusively on the textbook. It is essential to keep up with class work, homeworks and laboratories to succeed in this course. The instructor is not responsible for covering material you missed due to unexcused absences. We do not give xeroxed copies of the instructor's notes if you are absent. **Absences to lab can and will result in an F grade for the FULL course** (two unexcused absences from lab are sufficient for me to drop or fail you!!). We do have in class quizzes! Please remember that missing lecture or lab to study for another class is not an acceptable excuse. You signed up for your course load, you are now responsible for fulfilling the obligations that come with that course load.

Please remember this is a 5 unit course, it will require a great deal of your time. Seldom does a student who works and carries a full course load succeed in this class. Make arrangements now, don't wait until you are behind. **The university guidelines are three hours of study time per unit per week.**

Please email me if you are going to be absent from class for a legitimate reason. You can also email me if you are unable to reach your lab instructor to let him or her know that you will be absent from lab. To attend another lab section so as to complete work, you will need the consent of the section's lab instructor. They are not required to accept you in their lab, particularly if their lab is full! I strongly encourage you to not be absent from lab.

University Policies

Per University Policy S16-9, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (<https://www.sjsu.edu/curriculum/courses/syllabus-info.php>). Make sure to visit this page to review and be aware of these university policies and resources.

Misconduct

While taking exams or quizzes, the student should keep his/her eyes down on his/her own paper. No whispering or talking is allowed. You are not allowed to share a calculator or periodic table during exams or quizzes. If your calculator fails inform the instructor. They can then decide a course of action. You may not

use your cell phone or PDA as a calculator; these should be stored in your backpack or on the floor beneath your seat. You may not answer the phone during a test. You cannot have headphones/earphones in your ears irrelevant of what you are listening to. All printed or written material (notebooks, textbooks, etc.) should be placed under the seat, left outside the room or placed near the lecturer's table, at the front of the room. Failure to comply will cause the instructor to pick up the exam and give a grade of F for the exam and/or course. Willful solicitation, procurement or conveyance of exams/quizzes/unknowns will also result in failure of the course. The instructor can and will bring the person caught cheating to the attention of the university committee in charge of student misconduct.

Emergencies /Evacuations

If you hear a continuously sounding alarm, or are told to evacuate by Emergency Coordinators (colored badge identities), walk quickly to the nearest stairway (end of each hall). Take your personal belongings with you as you may not be immediately allowed to return. Follow instructions of Coordinators. Be quiet so you can hear. Once outside, move away from the building. Do not return to the building unless the Police or Coordinators announce that it is permissible. If an alarm should occur during an exam or quiz, please attempt to give your instructor the paper.

Miscellaneous

1) You must bring the lab manual to each lab class and lecture (just in case you need to look at one of the handouts); however you do not need to bring the textbook to lecture.

2) Safety glasses must be worn at all times during the lab experiments; if they fog up, take them off outside the room!! SJSU provides you with goggles in your lab drawer but you might consider buying your own at the bookstore.

3) Keep track of your scores. Also keep your exams, quizzes, etc. At the end of the semester compare your grade sheet with the lecturer and lab instructor's grade sheets to make sure we have transcribed and adjusted you grades correctly. **You have only 9 days from the day a quiz or exam is returned to ask for a regrade of your exam or quiz. I will not do regrades after nine days have passed.** I do not return the Scantrons for exams/quizzes, so I strongly suggest you circle your choices on the exam.

4) Do not believe any sign written on the board saying the Chem. 1B class is canceled. You are expected to wait for me until 10:45. If I am late, but get to class by or before that time, I will lecture.

5) Each exam in lecture will require that you sign a statement indicating that you have behaved in an honorable manner while taking the exam. This means that you have not used crib sheets, programmed equations, etc. in your calculator, requested information from a classmate, etc. The statement will also indicate that you are not aware of any other classmate cheating, etc. during the course of the exam. Although you might not be required to sign such a pledge in your lab quizzes, honorable behavior is still expected. Please be aware that you have classmates that do not tolerate cheating and will most likely inform the instructor if they observe such behavior. If you feel that you are unable to sign such a pledge, talk to me.

6) **If a fire alarm were to interrupt an exam please do the following: Leave the room via the door closest to the instructor and give the instructor your quiz or exam. Provide assistance to any disabled students. Take your books with you since there is some chance you might need to go to your next class before you are allowed in the room.** Please note that if the cause of evacuation is a bomb threat, the Dean will request that I give him and UPD a list of students absent from the exam.

7) Please remember that you must check out of the lab even if you drop the course. A \$25 charge will be billed to you if you do not check out.

8) **Any student with a disability requiring special testing conditions must show the necessary documentation from the university to the instructor within the first two weeks of class.**

9) It might be useful to keep a **second** copy of your raw data for each experiment in those papers I suggested you staple and keep in your lab drawer. That way, if you lose your lab manual or misplace the data,

you have a safe copy in your drawer and you do not need to start the experiment over. All you need to copy is the raw data, you can always redo the calculations. Some labs take three periods and would require you redoing everything to get a final result.

10) You get your own two lockers in Chem. 1B. You do not share these. Once you check in you are financially responsible for any breakage or loss. More details in lab. We have been having issues with students checking out certain equipment and not returning it in a timely manner for other students to use. **There will be a late charge of \$5.00 to all Chemistry 1B students who do not return limited resource items at the end of the lab period. Subsequently students will be charged \$5.00 for each additional day (not including weekends and Holidays) they fail to return these items to the Service Center.** Past the initial late fee charge of \$5.00, students will not be required to pay a late fee greater than the replacement cost of that item. Late Charges for Chemistry 1B students are for the following limited resource items: Liquid and Gas Burets, Volumetric Pipets and Bulbs, Volumetric Flasks, Conical Flasks (except 500 ml), Graduated Cylinders, Centrifuge Tubes, Funnels, Aluminum Spiral, Stopwatches, Digital Thermometers, and Volt Meters.

Office hours

TBD - Subject to change if my teaching responsibilities change after the printing of this syllabus. My office is located in the basement level of Duncan Hall (Room 16, only two of the elevators make it down to the basement!). Please be efficient and organized when you come to ask questions during office hours. I might have to limit the amount of time I spend with you if there are several students waiting. If the selected office hours do not match your schedule, set up an appointment. Please note the bonus question on the first exam will be what is the color of the piece of paper titled **“Dr. Singmaster’s Schedule Fall 2022”** that will be placed on the glass portion of the door to DH16. This paper will be placed on the door by Aug 29th so wait until then to go look. If you can’t find my office, ask me for help.

On occasions I will have to cancel office hours due to medical appointments or important committee meetings. I'm sorry for the inconvenience. Please see if you can get assistance from one of the lab instructors or tutors.

Resources for help

- 1) Dr. Singmaster (Lab and Lecture)
- 2) Lab instructors (Lab predominantly, although some can also provide excellent help for lecture)
- 3) Academic Excellence Workshops (Lecture) – You must be enrolled! **Please note these are not tutoring sessions.** They are organized, collaborative study times.
- 4) CoSAC - (DH 213) Tutoring and advising center for the College of Science.
- 5) Peer Connections
- 6) ASPIRE – Student Resource Center – 10th Street Garage – Services are limited to low income, first generation college students or students with disabilities. Not sure if they have funding for tutors this year.
- 7) Counseling Services - They might have brochures or workshops on how to deal with test anxiety, if that is an issue you are having. More information at the end of the greensheet
- 8) Private tutors – Cost \$\$\$. You might find ads in SAACS and in the hallways where Chemistry courses are taught (5th floor of DH, 1st floor of Sci).
- 9) If you feel that you are unable to keep up with the class even though you have all the prerequisites; if you are spending ample time studying yet you never have time to finish exams and quizzes and/or if this class, for some reason, is testing your abilities to learn, you might consider paying a visit to the Accessible Education Center.

Rules for an exam or quiz in lecture/seminar

- 1) You must sit in the seat you are assigned! Check the seating chart well before the exam date! It will be posted in Canvas. Find the seat in the lecture hall a few days before the exam so that you do not waste

time looking for it! If you reach your seat and it is broken, please come tell me and I will find another one. No sitting on the floor in the back of the lecture hall!

2) No programmable calculators, PDAs or cell phones. No sharing of calculators. (This applies to lab also!)

3) No caps, hats, etc. unless required by a physician. Then they need to be turned around.

4) No head phones or other devices in ears unless they are prescribed hearing aids!

5) Ask for scratch paper. Do not pull it from your backpack.

6) Place backpacks under your seat so as to make sure that others don't trip trying to get out. No open books, notes, etc. on the floor at your feet!

7) No talking during an exam, even if you have handed in your exam. Wait until you leave the room.

Safe and Respectful Community

We hope that the classroom and laboratory will serve as an environment that will promote learning and the development of new ideas, as well as be a safe and respectful community. Behavior that interferes with the normal academic function in a classroom or lab is unacceptable. Students exhibiting this behavior will be asked to leave the class. Examples of such behavior include

a) Persistent interruptions or using disrespectful adjectives in response to the comments of others.

b) The use of obscene or profane language.

c) Yelling at classmates and/or faculty.

d) Persistent and disruptive late arrival to or early departure from class without permission.

e) Physical threats, harassing/bullying behavior, or personal insults (even when stated in a joking manner).

f) Use of personal electronic devices such as pagers, cell phones, PDAs in class, unless it is part of the instructional activity.

Course Learning Outcomes

If a specific objective is also partially addressed with an experiment, then the experiment number has been in parenthesis. Please note that for many of the topics in this course real world examples are used and are analyzed by students. Also, on occasion, the topics result in brief discussions of economic or societal issues.

The student will be able to:

1) calculate concentration using different units and convert between different concentration units (molarity, %, ppm, g/L, etc.) (Exp. 13, 16, 19, 23)

2) calculate concentration changes associated with dilution (Exp. 13, 20, 22, 24)

3) solve stoichiometry problems using concentration or mass including balancing redox, combustion and double displacement reactions, and calculations with known or unknown limiting reagents (Exp. 16, 19, 21)

4) predict heats of reaction using bond energies and compare these values to heat of reaction obtained from Hess' Law or heats of formation calculations

5) define entropy and evaluate the sign of entropy for compounds, physical processes and chemical reactions (Exp 15)

6) calculate the entropy for a reaction given molar entropies for the compounds

7) evaluate whether a chemical reaction will occur using predictions for the sign of heat of reaction and entropy and whether altering the temperature of the reaction will affect product formation (Exp. 15)

- 8) calculate Gibbs free energy using data for heat of reaction and entropy or Gibbs free energy of formation for compounds
- 9) explain the effect concentration, temperature, presence of a catalyst and physical state have on the rate of a reaction and predict what effect changing these variables will have on the rate of reaction (Exp. 17)
- 10) derive the rate law for chemical and non chemical systems using data and then use the rate law to obtain half life and determine the amount of product formed at a given time or vice versa
- 11) apply Arrhenius' equation to chemical systems to obtain activation energy and explain the effect of temperature on chemical reaction rate at molecular level (Exp. 17)
- 12) construct a rate law using a reaction mechanism and evaluate reaction mechanisms to predict whether they are plausible based on rate law information.
- 13) define the terms catalysis and inhibitor; and compare data for reaction rates to determine whether a reaction is catalyzed or inhibited by selected compounds (Exp. 17)
- 14) construct the mathematical expression for an equilibrium constant given a chemical equilibrium and use thermodynamic or experimental data to find the value of the equilibrium constant (Exp. 18, 20, 21)
- 15) use reaction quotient to determine the direction a chemical system must shift to reach equilibrium
- 16) calculate equilibrium concentrations given initial concentrations and an equilibrium constant
- 17) use Le Chatelier's principle to explain the effect changes in temperature, pressure, volume and addition/removal of a reagent will have on a system at equilibrium; use this principle to plan how to get an equilibrium to produce more products
- 18) define and identify acids and bases based on their types (conjugate, weak, strong, Arrhenius, etc.)
- 19) calculate an equilibrium constant for a weak acid or base given pH data (Exp. 20)
- 20) analyze acid base equilibria so as to determine the type of equilibrium and utilize this information to calculate the pH of the solution
- 21) define a buffer clearly describing how it works and why buffers are important; given a buffer system calculate the pH (Exp. 20, 25)
- 22) design a buffer system given the pH region where it must serve as a buffer and the total concentration of ions needed (Exp. 25)
- 23) calculate the equilibrium constant for an insoluble salt given solubility data and vice versa, calculate the solubility of a insoluble substance when given K_{sp} (Exp. 21)
- 24) use the solubility product to determine whether a precipitate will form when solutions are mixed, including the effect pH might have on the given system

- 25) organize compounds in order of increasing strength as acids or solubility given equilibrium constants
- 26) calculate standard cell potentials for any redox reaction and combine this information with concentration data to determine the effect concentration will have on the cell potential (Exp. 22)
- 27) draw a redox cell diagram given cell notation, identify all the components, reactions occurring and, if applicable, the roles selected components play (Exp. 22)
- 28) determine cell potentials using thermodynamic data
- 29) cite the differences between chemical reactions and nuclear reactions; list the biological effects of radiation exposure
- 30) balance nuclear reactions identifying which nuclear particles are involved in the process and use the neutron to proton ratio to predict the possible types of nuclear decay an isotope could undergo
- 31) calculate mass differences and binding energies for nuclei and nuclear reactions; use this information to identify species that can undergo fusion or fission
- 32) calculate kinetic parameters for nuclear decay including applications to radioactive dating
- 33) list the colligative properties of solutions, explaining how and why each property is affected by an increase in the amount of solute (Exp. 23)
- 34) calculate the osmotic pressure of a solution.

Lecture Schedule- Brief Version

Dates	Topic	Textbook Chapter 10th, 11th and 12th edition
Tentative lecture topics - We might go a little faster or a little slower.		
8/22 - 8/26	Conc/Stoichio/Thermo	3.6, 3.7, 4.5, 4.6, 5.6, 5.7, 13.4
8/29 - 9/2	Thermo/Kinetics	19, 14
9/6 - 9-9	Kinetics	14
9/12 - 9/16	Kinetics EXAM I	14
9/19 - 9/23	Kinetics	14
9/26 - 9/30	General Equilibrium	15
10/3 - 10/7	Gen Equil., pH	15,16
10/10 - 10/14	Acid Base Equil	16, 17
10/17 - 10/21	Acid Base Equil EXAM II	17
10/24 - 10/28	Solubility	17
10/31 - 11/4	Solubility, Electrochemistry	4.4, 20
11/7 - 11/10	Electrochem	20
11/14 - 11-18	Electrochem EXAM III	20
11/21 - 11/22	Nuclear Chem	21
11/28 - 12/2	Nuclear Chem	21
12/5	Colligative	13.5

The first problems you should try are in the lab manual with the experiments or occasionally towards the back of the manual in the Practice Problem section. We will also mention problems from the text that are suitable.

Exam Dates

Exam I – Wed, Sept 14 – Concentration, stoichiometry, thermodynamics, intro to kinetics

Exam II – Wed. Oct. 19 – Kinetics, General Equilibrium, pH, strong acid base

Exam III – Wed. Nov. 16 - Acid-base and solubility equilibria

Lab Exam – Fri. Dec 2

Final – Tues. Dec. 12th, 9:45 AM – Electrochemistry and nuclear, with ACS exam

CHEMISTRY 1B Lab
Continuation of Chem 1B Syllabus

Fall 2022

Dr. Karen A. Singmaster, Lab Coordinator
Karen.Singmaster@sjsu.edu

Ms. Brenda Serrano, Lab Coordinator
Brenda.Serrano@sjsu.edu
Office hours – TBD

Books/Supplies

Required

- 1) **Lab Manual/Handouts for Chemistry 1B** - Chem Club
- 2) Hand-held scientific calculator - **Must be non-programmable** and should have log x, 10^x , $\ln x$, e^x and x^y keys. - **You will not be allowed to use your programmable calculator during a lab exam or quiz!**

Not Required (But useful)

1) **Suggested items to purchase for lab:** small notebook to keep in your drawer (you can staple together 15 sheets of lined paper?), safety glasses (side and top shields) and a china marker (sold at bookstore). The notebook is to keep a set of data in your locker in case you lose your lab manual. The safety glasses are in case you don't want to use the goggles provided in your locker and the china marker writes on glass to label things quickly. Note though the china marker will not label things that go in the oven!

Things you must do the first week of school (Aug 19-25)

- 1) Attend your seminar on Aug 19. Before coming to seminar view the videos below
Safety - <https://youtu.be/mMUgpExXUcU> <https://youtu.be/sInkkTNer1k>
- 2) Read this syllabus thoroughly. It is the rules of the game. Best to know the rules before you start. There is a syllabus and ethic quiz through Canvas for your seminar that you must complete. Don't forget to get it done by the due date.
- 3) Attend your first lab meeting.
- 4) If you decide to drop the course, you need to do it on MySJSU.
- 5) Do the calculator practice in your lab manual. It is your responsibility to know how to use your calculator. Instructors will not assist you during an exam or quiz!
- 6) Start working on Exp. 13 problems on concentration and stoichiometry found at the end of the experiment in your lab manual.

Attendance/Workload

Regular attendance to lab is required. Absences to lab can and will result in an F grade for the FULL course (two unexcused absences from lab are sufficient for me to drop or fail you!!). Please remember this is a 5 unit course, it will require a great deal of your time. Seldom does a student who works and carries a full course load succeed in this class. Make arrangements now, don't wait until you are behind. SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum effort of forty-five hours for each unit of credit for the semester so minimum of three hours per unit per week, including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

To attend another lab section so as to complete work, you will need the consent of the section's lab instructor. They are not required to accept you in their lab, particularly if their lab is full or if we have COVID restrictions in place! I strongly encourage you to not be absent from lab.

Misconduct

Students are to do only those laboratory experiments assigned. Certain chemicals when improperly used are very dangerous. You are responsible for disposing chemical wastes safely; the lab instructor will inform you on particular waste disposal issues for each experiment. If they forget to inform you, ASK THEM!! Any student found preparing anything that may in any way endanger her/his safety or the safety of others will be immediately dropped from the course with an F grade. Any student found disposing of wastes incorrectly is also in danger of being dropped from the course or failed. Students are expected to behave maturely and honorably in the lab and lecture course.

Laboratory

It is your responsibility to complete the experiment on time, particularly if you don't come prepared! Chem. 1B experiments require that you come to class with a clear idea of what you have to do and in what order. Also they often require that you process more than one run at a time or you won't have enough lab time to complete the experiment. You must pay attention to the lab instructor when they say "Start cleaning up". This will usually be said 15 minutes before the end of lab. There will be times when the instructor might say that you cannot start X part of the experiment because there isn't enough time to complete it. Follow those instructions or you will damage experimental runs and you will get to start over!

Credit for doing a lab comes from attending the lab, physically doing the lab and then handing in the necessary reports/worksheets. These report sheets get graded for accuracy and precision. Thus doing the experiment will not get you through the course. You have to do it WELL. Without the reports, you will not get any credit for the lab. If you hand in a report without having attended the lab, you will be dropped reported to the University's Disciplinary Committee.

Extra time in lab will be used to either work out data and the report sheet, or to practice doing problems. You have an instructor in the room who can help you study! Don't waste the opportunity.

Friday Seminar

This is when we discuss the following week's lab, do the lab quizzes and lab exam. No make-ups for absences to seminar. If a strong, compelling and documented absence is informed to Dr. Singmaster 24 hours before the seminar she MIGHT be able to accommodate doing a quiz through Canvas at the same time as classmates are doing it in seminar but note it will NOT be the same quiz. It will require lockdown browser as well as you will be limited to seeing one question at a time and cannot go back to correct. Also partial credit is not possible for numerical answers through Canvas.

Lockers

You will not be sharing lockers with a student from another lab section. You will have a check book to check out items from the stockroom. Return those items at the end of the lab or you will be billed for them at the end of the semester.

Grading

The total lab grade constitutes 40% of the final grade. **Failing lab (55.0% or less) or lack of attendance to lab will result in an F grade for the FULL COURSE, irrelevant of how well you are doing in lecture.** Do not miss labs!! **PLEASE note we do NOT provide extra credit work at the end of the semester for students who are doing poorly.**

The grade for lab is forwarded to your lecture professor. He/She will combine that with your lecture grade to give a grade for the full course. The grading is based on quizzes, lab exams, lab reports and evaluations points. **These points do not have the same weight!** Quiz and lab exam point weigh more than lab report points!

Quizzes

We expect that you will have about 9 or 10 lab quizzes which includes a Canvas quiz on the greensheet. Most will be 10 points. You must get 80% or better in the safety quiz to remain enrolled in the course. You will have a maximum of two chances to pass the safety quiz. We will NOT be deleting quiz scores. Rather we will add all your quiz scores and divide by the sum of the quizzes MINUS 10 points. This would be equivalent to deleting one quiz score.

Lab Reports/Unknowns/Worksheets

Typically you must submit a lab report at the end of every experiment. Some of the experiments have unknowns. Point value for the reports varies greatly depending on the nature of the experiment. ***Report sheets have due dates that are listed at the end of this greensheet.*** You are strongly encouraged to hand in the report sheets well before the due date and prior to the quiz on the experiment. **Report sheets handed in after the due date will have points deducted from the score at a rate of 20% per week late!** This hopefully forces students to keep up with the workload and minimizes last minute grading by the lab instructors.

Exams

One 100-point exam will be given during the last Friday of the semester.

Total Lab score is made up by 25% lab exam, 40% lab quizzes and 35% lab reports. You must complete the lab with a 55% or you will fail the FULL course irrelevant of how well you did in lecture!

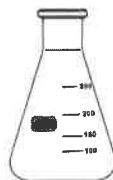
Students' biggest mistakes in Chem 1B lab - Very honest comments from Dr. Singmaster, in case you are interested

- 1) **Not taking the time to do and understand all the problems in Study Assignment 13.** Those problems will *haunt* you all semester because all semester you are doing concentration and stoichiometry.
- 2) **Being desperate to leave lab early.** You have 4.25 hours to get it done right, to get help with the report sheet, to work out problems with classmates. Don't waste points because you were cutting corners, not checking your calculations, etc. For experiment 16 we often have as many as 50% of the students handing in calculations that are wrong. Take advantage of the fact that the lab instructor is there to see if you are doing the calculations correctly, etc.
- 3) **Not being ready for lab.** Read the experiment, attend seminar and create a summary (recipe) so that you know what to do. Do not expect others to have this for you. They might be lost and you do the wrong thing, wasting time, etc. Sometime many mess up because they followed the mistakes one person made.
- 4) **Expecting others to do the work for you when working in groups.**
- 5) **Not taking advantage of the FREE Sci 1 workshops and of office hours with instructors.**

- 6) **Waiting for magic to fix it all...** If you are lost, don't wait for your score in Lecture Exam I to prove it to you. By that time you can't fix it and the material gets tougher.
- 7) **Forgetting material learned in Chem 1A.** For example, you learned how to draw a graph in Chem 1A. Use that knowledge in Chem 1B or we just take the points away and wonder why we passed you in Chem 1A. Even for Exp. 23 final report I get graphs that are so wrong in terms of axis choices, correct plotting that it is depressing for me to grade.
- 8) **Doing poorly on the Safety Quiz and Syllabus/Ethics Quiz on Canvas.** You should get at least 90% in both of these so that you start with two GOOD quiz scores.
- 9) **Not paying attention to Prelab Quizzes for Exp. 16 and 23.** Both are giving you significant hints!
- 10) **Not taking advantage of the resources YOU PAY FOR,** like: Counseling Services for test anxiety; Career Center to plan your future; Accessible Education Center if you have accessibility issues; Peer Connection for workshops and tutoring; and CoSAC for tutoring.
- 11) **Glassware Names** – Use them correctly. Figure out what they do. Measuring a volume is NOT the same as delivering a volume. A pipet delivers 10.00 mL to a flask, it does not contain 10.00 mL. The pipet sucked up a little more than 10.00 mL because it stays wet.



Volumetric flask
(narrow neck)



Conical or
Erlenmeyer flask

Lab Schedule will be a separate document.

This will allow us to update it based on possible campus closures due to COVID restrictions.

Beginner Course on Ethics in the Sciences and Engineering for Chem 1A/B Students

These are some of the codes of ethics scientists, engineers, health professionals, etc. are expected to follow. There are courses (Phil 133) and textbooks on the subject of ethics that can cover much more material and expand on these topics. Not following these codes can: get you fired from a job, generate criminal/civil charges leveled against you and will definitely cause your colleagues to not respect your work. At SJSU not following these codes gets you reported to the Office of Student Conduct and Ethical development. Both colleges, Engineering and Science, report many students every year. You, as budding scientists, engineers, health professionals, need to start applying these codes in your work. Be aware that “Does the applicant behave ethically?” is a question faculty and former employers have to answer when serving as a reference for you.

- 1) **Never, ever make up data.** You cannot fabricate data to fit the final answer, even if you know the final answer. I understand that you want to please the professor and give her the right answer but this is not the

way science is done. As an example as to why fabricating data is the wrong thing to do, think of medical researcher who made-up positive results on the testing of a new drug for diabetes just because he thinks it should work. Not a drug you would want to take! Or consider a civil engineer, whose calculation leads to answers he does not like so he changes the value to something he thinks it should be. You might not want to use that bridge or building he built. We are often biased towards wanting a certain result but we can't let that bias cloud our judgement. Ultimately it is data correctly obtained and analyzed that will determine whether you have succeeded in proving your hypothesis.

2) **Never alter or delete your data.** If you have a data point that you feel is not valid because you are aware that you spilled some of the solution, or you clearly went past the end point in a titration, etc., you lightly cross out the information in your notebook or report sheet, not erase it, and then write an explanation as to what happened. You can also not incorporate that data point into the calculation of the average value, since you have written evidence of a fault in your technique which invalidated the run. In more advanced courses, you can submit your data to statistical scrutiny (least squares fit, T test, Q test, etc.) which will give you guidance on whether that data point can be removed from consideration. Again, think of a medical researcher who decides to ignore the one patient out of 20 that developed cancer while under the drug he was testing. You would not be pleased if this side effect is not reported to you when you are deciding on whether to use that drug. This is why those drug commercials often end with someone rapidly reading every side effect observed so far (which freaks most of us out!). They can't ignore one data point. Or consider the civil engineer who is testing 15 supporting beams and decides to ignore the one that is not meeting specs by a little bit because it is just one beam so the beam gets used in the construction.

3) **Never take someone else's data and claim it as your own (i.e. plagiarism).** This is what a subset of Chem 1A students are currently doing, looking at old report sheets. You signed a document indicating you would not do that! Occasionally in Chem 1A you will do experiments with a partner. That is fine, you collecting data for both of you. Or maybe you were out sick and provide documentation of the issue, then the instructor might give you a fake data set to work out a report sheet or instruct you to obtain a data set from another student. That is OK. But "stealing" data from a classmate in lab because you don't want to do the work or want to get out of lab early, or using data from an old report sheet is plagiarism and will be reported to SJSU. Aside from the sporadic permission from an instructor to obtain data from another student, you are not allowed to use data collected by another student, even if the student gives you permission to use it!

4) **Give credit to others that were involved in collecting the data.** This is why your report sheets often ask you to include the names of your partners, if the data was collected together. You should never work with other collaborators and then submit the data as only your work. That is one way to really upset your colleagues, get alienated from the group and possibly even sued if you make money from it. In the same manner, contribute your fair share if you expect to get credit for the work. A researcher that watches his colleagues do the work and does not contribute assistance physically, intellectually and, occasionally, even financially should not be included as a co-author.

This one is often an issue throughout your college education and at work. Whether it is an experiment in lab, your senior project or a report in a class, working in groups can be tough. All members have to contribute in some way if they want their name included in the report. The problem often is that one student wants to have an A paper and the other one just wants to pass the class with a C so she does not want to put in as strong an effort. The student who wants an A, Sally, does a lot of extra work to produce that A paper but then has to write the other student's name, Jill, on the paper. Sally will be angry that Jill is getting credit for her hard work, but she still has to write Jill's name because she contributed some effort, even if it was

only 10%. Whenever possible try to form a group with people who have similar goals so that the work is better distributed and the commitment to the project is similar.

Since you are not generating new knowledge for the world when doing your Chem 1B experiment, we won't go into the rules for intellectual property. But that is also an issue that you need to learn about when you go work for a company in research and development. They own your ideas because they are paying for your time, training and access to things (equipment, chemicals, journals, experts, etc.) that allow you to come up with the new idea.

Self-test

1) Karen sees that Michael was assigned the same unknown as she was assigned. The lab is almost ending and Karen is one data run short. Without consulting with the instructor, Karen asks Michael whether she can copy one of his runs to her report sheet.

Karen behaved in an ethical manner. True False

2) Bill is doing the hydrate experiment, Exp. 2. He notices that his calculation leads to an average number of moles of water per molecule of hydrate of 192. This seems very illogical to him so he writes 2 as his final answer because he was able to look up the formula of the hydrate online.

Bill behaved in an ethical manner. True False

3) Jane and Lee have to do Exp. 12 as partners. They have to do three data runs to find the heat when Mg reacts with acid. The report sheet and the instructor indicate that the groups do two runs and then the third data set should be obtained from another group. Jane and Lee complete two runs and then copy their third run from Jack and Bill. On the sheet they write that they took their data for run 3 from Jack and Bill.

Jane and Lee behaved in an ethical manner. True False

4) Morgan finishes an experiment and goes home to do the report sheet. While at home he realizes that he did not collect all the needed data. Morgan texts a friend, Alexis, multiple times to share his data with him. He says please but Alexis says no. He continues to harass Alexis by text to provide the data.

Morgan is behaving in an ethical manner. True False

5) Sam does three runs for the titration in Exp. 6. While doing run 3 he notices that there are air bubbles in the tip of his pipet. He is also very certain that for run 3 he went over the end point by multiple drops because he had problems controlling the buret. He writes all three data runs on his report sheet but lightly crosses out run 3. He only averages the data for his first two runs. At the bottom of the report sheet he writes a note to his instructor indicating that he noticed air bubbles in the buret and had an issue with the buret releasing too much base at the end of the titration so this is why he did not include that run 3 in his calculations.

Sam behaved in an ethical manner. True False