San José State University  
College of Science/Department of Chemistry  
Chem 1B  Sec. 1  Spring 2020

Course and Contact Information

Instructor:  Dr. Karen A. Singmaster  
Office Location: DH 16  
Email:  Karen.Singmaster@sjsu.edu  
Telephone:  Best by email  
Office Hours:  Monday 11:30 -12:20 PM, Wed 2 – 3 PM and by appt  
Class Days/Time:  MWF 10:30 – 11:20  
Classroom:  MD 101  
Prerequisites:  CHEM 001A (with a grade of "C" or better; "C-" not accepted).

OBJECT AND SCOPE OF THE COURSE

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.

THINGS YOU MUST DO THIS FIRST WEEK OF CLASS

1) Attend your lab section to claim your space.  Miss your first lab, we drop you from the course!  
Also attend the first seminar on 1/24!  
2) Read this greensheet thoroughly. It is the rules of the game. Best to know the rules before you start.  
3) If you purchased the manual, read pages i – xii of the lab manual before attending the first seminar session. You can also find most of this in the Chemical Safety rules in the Chem Dept. website. There is a Greensheet Quiz through Canvas for your seminar!  
4) If you decide to drop the course, please give Dr. Singmaster a note with your name indicating that you will be dropping the course. It will allow us to add people efficiently.  
5) Turn off your cell phone and/or pager, unless you have a family member with a serious medical condition (critical care, spouse in 9th month of pregnancy, etc.) or you are a fireman/policeman/FBI agent/….  
6) 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!  
7) Do the review of significant figures, units, etc. in your lab manual.  
8) Do Quiz 0 which is review from Chem 1A. The quiz is near the end of this greensheet and will be posted through Canvas for submission.  
9) Start working on the concentration and stoichiometry problems in Exp. 13!

BOOKS/SUPPLIES/COURSES

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 ($20)!  
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!**

**PREREQUISITES/COREQUISITES**

The prerequisite for Chem. 1B is a grade of C or better in Chem. 1A. If you took Chem. 1A two or more semesters ago, and/or just barely got a C in Chem 1A, you will need to work hard to pass this class. Be aware of this, keep up to date with the work and find study groups or tutors early. Do not postpone or the material will then be truly overwhelming.

Every student who wishes remain in the course or who wishes to add the course must be present in seminar for the safety discussion and must take a safety quiz the second seminar period. You must get 80% or better on this quiz. If not, you will get a chance to take a make-up safety quiz. If you do not pass this second time, you will be dropped from the course. If you are waiting to get into the class please make certain you attend the safety discussion in one of the labs and take the quiz during the next lab meeting.

Lecturer and lab instructors will assume you are adept at writing and naming chemical compounds, balancing chemical reactions (redox, double displacement – net ionicics, combustions), using the solubility rules and performing calculations with mass, moles, atoms, molarity, % composition, stoichiometry, heats of reaction and molecular weights following correct units and significant figures. They will also assume you understand electronic configuration, bonding, intermolecular forces, gas laws, etc. These are Chem 1A topics and are required knowledge for Chem 1B!

**BS/BA Chem Program Learning Outcomes Covered by Chem 1B**

Chem 1A provides basic, introductory support for the following degree outcomes.

PLO #1 - Demonstrate understanding of core concepts and to effectively solve problems in inorganic chemistry.

PLO #2 - Demonstrate understanding of core concepts and to effectively solve problems in organic chemistry.

PLO #3 - Demonstrate understanding of core concepts and to effectively solve problems in analytical chemistry.

PLO #4 - Demonstrate understanding of core concepts and to effectively solve problems in physical chemistry.

PLO #5 - Demonstrate understanding of core concepts and to effectively solve problems in biochemistry.

PLO #6 - Answer questions regarding safe practices in the laboratory and chemical safety.
PLO #7 - Demonstrate safe laboratory skills (including proper handling of materials and chemical waste) for particular laboratory experiments.

CHEM 1B COURSE LEARNING OUTCOMES

The detailed learning outcomes are at the end of this greensheet.

UNIVERSITY POLICIES – Greensheet Quiz might require that you go read these…

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/”

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.

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 in the lab greensheet.

Grading Scale

At the end of the semester you will receive a single grade for the course. The following grade scale is for the
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%.

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.

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 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 you 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.

OFFICE HOURS
Subject to change if my teaching responsibilities change after the printing of this greensheet. From Jan 23 – Feb 5, I will be in and out of my office due to management of enrollment for 1A/B. My office is located in the basement level of Duncan Hall (Room 16, only two of the elevators make it down to the basement!). Grades are posted in the Canvas. 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 Spring 2020” that will be placed on the glass portion of the door to DH16. This paper will be placed on the door by Feb. 9th 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) Ms. Slobodov (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 – More information at the end of the greensheet
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 were 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. They might be able to test you to determine whether you have a learning disability.

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 a week before, both in lecture and in the glass cabinet near the lab. 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 or on the stairs!

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.

8) Leave by the door at the base of the room that we will open, not the back door, so that I can keep track of who is leaving and whether they have handed in the exam.

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.
## Lecture Schedule

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topic</th>
<th>Textbook Chapter</th>
<th>Experiment</th>
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</thead>
<tbody>
<tr>
<td>1/24</td>
<td>Greensheet, Concentration, Stoichiometry</td>
<td>3.6, 3.7, 4.5, 4.6, 5.6, 5.7, 13.4</td>
<td>13, 14, 16, 19, 23, 24</td>
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<tr>
<td>1/27 -1/31</td>
<td>Heat of reaction, Entropy, Gibbs</td>
<td>19</td>
<td>15</td>
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<tr>
<td>2/3 - 2/7</td>
<td>Gibbs, Rate of reaction</td>
<td>19, 14</td>
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<tr>
<td>2/10 -2/14</td>
<td>Rate laws, half-life</td>
<td>14</td>
<td>17</td>
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<tr>
<td>2/24 - 2/28</td>
<td>Equilibrium constant, Q,</td>
<td>15</td>
<td>18</td>
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<tr>
<td>3/2 - 3/6</td>
<td>Le Chatelier, Acids and bases, pH</td>
<td>15, 16</td>
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<td>3/-9 - 3/13</td>
<td>Weak acid.base, hydrolysis</td>
<td>16, 17</td>
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<td>3/16 - 3/20</td>
<td>Exam II, Buffers</td>
<td>17</td>
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<td>3/23 - 3/27</td>
<td>Solubility</td>
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<td>4/6 - 4/10</td>
<td>Solubility, Electrochemistry</td>
<td>4.4, 20</td>
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<td>4/13 - 4/17</td>
<td>Electrochem</td>
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<td>4/20 - 4/24</td>
<td>Electrochem</td>
<td>20</td>
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<td>4/27 - 5/1</td>
<td>Exam III, Nuclear Chem</td>
<td>21</td>
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<td>5/4 - 5/8</td>
<td>Nuclear Chem, Colligative</td>
<td>21, 13.5</td>
<td>23</td>
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<td>5/11</td>
<td>Closing</td>
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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 have also provided a detailed list of readings and problems from the textbook.

### Exam Dates

- **Exam I** – Wed, February 19th – Concentration, stoichiometry, thermodynamics, kinetics
- **Exam II** – Wed. March 25th – Kinetics, General Equilibrium, pH, strong acid base
- **Exam III** – Wed. April 22nd - Acid-base and solubility equilibria
- **Final** – Fri. May 15th, 9:45 AM – Electrochemistry and nuclear, with ACS exam
  (Make-up day for emergencies is Wed. May 20th)

Exams I, II and III have a take home problem.

(Note the Lab Exams are on March 20 and May 8)
Chem. 1B Final Exam – ACS Standardized Test

It is important that to note that the final will be a comprehensive standardized test covering the FULL year of General Chemistry. It will be multiple choice. The test is written by the American Chemical Society (ACS) and is given at many universities. The test provides some of the equations, and often the calculations required for it are easier than what I require in 1A/B exams. I have done this the last two times I taught Chem 1B and the average on the ACS test has been higher then the average on my old 1B final exam! The test has:

- 25 Chem. 1B questions - 4 points each
- 19 Chem. 1A questions - 2 points each
- 6 questions not covered in 1A/B - 1 bonus point each if you get it correct.

In addition, I will be adding in an additional 20 multiple choice questions at 4 points each to cover topics not cover by one of the lecture exams (electrochem and nuclear typically).

The standardized test is for 55 minutes. I won’t be enforcing that time but rather you have two hours to complete the test as well as the additional Chem. 1B multiple choice questions. Time should is not be a problem for the final.

The Chemistry Clubs sells the ACS booklet for General Chemistry to help you review for the test. They will be selling it at the start of the semester for a price that is lower than if you attempt to purchase it yourself because the ACS charges an $8 handling fee that they don’t charge the club.

In looking over the book I thought it was an excellent book to purchase at the start of Chem. 1B because it provides you with review as well as multiple choice questions. That way you can use it for the full semester. In addition, I suspect it is a really good book to use to review for MCAT, DAT or other standardized tests that require knowledge of General Chemistry. (By the way they also have one for the full year of Organic Chemistry which will help in Chem. 112B because they to will give you the full year standardized test at the end of Organic!)

Grade Record for Chem. 1B Students

<table>
<thead>
<tr>
<th>Lecture (60% of grade)</th>
<th>Lab (40% of grade) (You must pass the lab with 55% or better to pass the course!)</th>
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<tbody>
<tr>
<td>Exam I _______/100</td>
<td>Lab Exam I _______/100</td>
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<td>Exam III _______/100</td>
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<td>Quizzes _______/10</td>
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COURSE LEARNING OUTCOMES FOR CHEM 1B
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 Arrhenuis’ 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 an insoluble substance when given Ksp (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.
OTHER SERVICES PROVIDED BY SJSU (which you pay for with fees, so use them as needed?)

**Student Technology Resources**
Computer labs for student use are available in the Academic Success Center at [http://www.sjsu.edu/at/asc/](http://www.sjsu.edu/at/asc/) located on the 1st floor of Clark Hall and in the Associated Students Lab on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library. A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include DV and HD digital camcorders; digital still cameras; video, slide and overhead projectors; DVD, CD, and audiotape players; sound systems, wireless microphones, projection screens and monitors.

**SJSU Peer Connections**
Peer Connections, a campus-wide resource for mentoring and tutoring, strives to inspire students to develop their potential as independent learners while they learn to successfully navigate through their university experience. You are encouraged to take advantage of their services which include course-content based tutoring, enhanced study and time management skills, more effective critical thinking strategies, decision making and problem-solving abilities, and campus resource referrals.

In addition to offering small group, individual, and drop-in tutoring for a number of undergraduate courses, consultation with mentors is available on a drop-in or by appointment basis. Workshops are offered on a wide variety of topics including preparing for the Writing Skills Test (WST), improving your learning and memory, alleviating procrastination, surviving your first semester at SJSU, and other related topics. A computer lab and study space are also available for student use in Room 600 of Student Services Center (SSC).

Peer Connections is located in three locations: SSC, Room 600 (10th Street Garage on the corner of 10th and San Fernando Street), at the 1st floor entrance of Clark Hall, and in the Living Learning Center (LLC) in Campus Village Housing Building B. Visit Peer Connections website at [http://peerconnections.sjsu.edu](http://peerconnections.sjsu.edu) for more information.

**SJSU Counseling Services**
The SJSU Counseling Services is located on the corner of 7th Street and San Fernando Street, in Room 201, Administration Building. Professional psychologists, social workers, and counselors are available to provide consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit Counseling Services website at [http://www.sjsu.edu/counseling](http://www.sjsu.edu/counseling).

**Career Center**  ADM 154  [http://www.sjsu.edu/careercenter/students/](http://www.sjsu.edu/careercenter/students/)
CHEMISTRY 1B Lab & Seminar
Continuation of Chem 1B Greensheet

Spring 2020

Dr. Karen A. Singmaster, Lab Coordinator
DH 16
Karen.Singmaster@sjtu.edu
Office Hours – Monday 11:30 -12:20 PM, Wed 2 – 3 PM and by appt

Ms. Brenda Serrano, Lab Coordinator
DH 502
bmserrano@juno.com
Office hours – TBD

BOOKS/SUPPLIES/COURSES

Required
1) 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, $20!
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) 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) Suggested items to purchase for lab: small notebook to keep in your drawer (you can staple together 15 sheets of lined paper?), safety glasses and a china marker (sold at bookstore). The note book 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 THIS FIRST WEEK OF CLASS
1) Attend your lab section to claim your space. Miss your first lab, we drop you from the course!
2) Attend seminar on the first week of school.
3) Read this greensheet thoroughly. It is the rules of the game. Best to know the rules before you start. There is a greensheet quiz covering this greensheet and the one for lecture on Canvas for your seminar that you must complete. Don’t forget to get it done by the due date.
4) If you purchased the manual, read pages i – xii of the lab manual before attending your lab session. If not, go to the yahoo group or SJSU Chem Dep website and read the safety rules for teaching labs.
5) If you decide to drop the course, please give Dr. Singmaster a note with your name indicating that you will be dropping the course. It will allow us to add people efficiently.
6) 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!
7) Start working on Exp. 13 problems on concentration and stoichiometry.

ATTENDANCE/WORKLOAD

Regular attendance to lab are 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 of forty-five hours for each unit of credit (normally 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! 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.

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 seminar; however you do not need to bring the textbook to lab or seminar, unless you want to.
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 or from the Chemistry Club, although note that the club has limited quantities and only sells for the first two weeks of school.
3) Keep track of your scores. 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.**
4) **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. If a fire alarm interrupts lab, please turn off any gas line.

5) 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.

6) Any student with a disability requiring special testing conditions must let Dr. Singmaster know within the first two weeks of class so as to determine times for lab exams.

7) A student has two weeks to determine whether they wish to remain in the course. Students dropping after those two weeks will be charged a $25 fee to help defray the costs incurred in lab and for the fact that we can’t replace them with an add. All students dropping the course are strongly encouraged to let Dr. Singmaster know in writing of their intent to drop.

8) It might be useful to purchase a small, inexpensive bound notebook to keep in your lab locker. You can keep a second copy of your raw data for each experiment in that notebook. (First copy of data goes on the data section of an experiment in your lab manual.) 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 two periods and would require you redoing everything to get a final result.

9) 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.

10) 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.

Laboratory

It is your responsibility to complete the experiment on time, particularly if you don’t come prepared! Chem. 1B experiments often take more than one lab period and 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. This counts for as much as 60% of your grade on your report sheet. 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 from the course and reported to the University’s Disciplinary Committee. Some of the labs are done in groups. Members of the group are expected to be physically involved in doing the experiment and collecting the data. If one student does all the work, the partner will not get credit, even if the partner hands in a report sheet!

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.

Please do not be absent from lab! Two unexcused absences are sufficient for us to fail you in the full course. To make up an absence it is possible to attend another lab section. However, if the lab is full the instructor can deny you access (most will be full!!). Request a make-up slip. Follow the instructions on the
slip. **You only have the privilege of one make-up. After that you need to consult Dr. Singmaster.**

**Friday Seminar**
This is when we discuss the following week’s lab, do the lab quizzes and lab exams. Attendance is required, is not optional. We also discuss the calculations. This will not be done in lab! This is also when we give the lab quizzes. You can take a quiz early but we do not do make-up quizzes.

**Lockers**
You will not be sharing lockers with a student from another lab section. To check out equipment you will be using a checkbook. It is important that you follow the instructions on how to use the checkbook. They will be provided to you in the lab manual. Equipment checked out with a check that is not returned at the end of the semester will be billed to your SJSU account.

**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 TEN 10-point lab quizzes which includes a Canvas quiz on the greensheet. We drop your lowest score to calculate your total quiz score. 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. If you fail the safety quiz the first time, you will have to either visit your lab instructor or Dr. Singmaster to get a make-up chance.

**Lab Reports/Unknowns**
Typically you must submit a lab report at the end of every experiment. Many of these experiments have unknowns. Point value for the reports varies greatly depending on the nature of the experiment. Exp. 16, 19 and 23 are quantitative analysis of a sample. As such they are the reports that are worth the most points. Exp. 24 and 25 are “lab practicals” and also count for a lot of points. We will be provided with a goal to accomplish and you will have to write the procedure and test it out. More details to be provided below and in lecture. These experiments will count for a significant number of points. Quantitative analysis unknowns in Chem. 1B require that you report the amount of material present. You are graded for both precision and accuracy. To obtain a perfect score for an unknown your result must have the proper units, the correct number of significant figures and, typically, must be less than a 1% off from the correct value. In addition the range of your data runs must be small (less than 1% of your value). This might seem like a strict grading scheme but for 90% of the students the scores on the unknowns are higher than for their lab exams and quizzes, thus unknowns typically raise your grade. The scores also reflect your ability to perform scientific procedures in a meticulous manner. If an experimental run is damaged, it is your responsibility to repeat it. You will need to discuss with your lab instructor whether you have the time to complete it in class or whether you need to attend another lab. **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 so that you can ascertain whether you are doing the work correctly! **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 work load and minimizes last minute grading by the lab instructors.

**Exams**

Two 100-point exams will be given during the activity time on Friday. The exam dates are included on the schedule. The lab exams often have more of the calculations portion of the course, whereas the lecture exams often have a larger theory component. You can request to take an exam early but we do not do lab exam make-ups.

**Lab Practicals**

Experiment 24 is to prepare a solution with certain assorted concentrations and then test your solution to see if you prepared it correctly. This will require a solid understanding of significant figures, units, molarity, dilution, use of pipets, balance(s) and volumetric flasks. You get to write a procedure and then follow it. You test your solution and decide whether you are satisfied with your result or not. You then get a second chance to adapt your procedure and prepare a new solution. Exp. 25 will consist of preparing a buffer and testing to see whether you have done so correctly. An understanding of acid-base equilibria and stoichiometry will also be needed to complete this task. Again you will have the chance to test your procedure. Your written procedure as well as your result will be graded. Plagiarism will not be tolerated. If you do not know what plagiarism means come see me!

**Total Lab score is made up by 35% lab exams, 30% 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 can redo a lab on their own time as long as the needed equipment is in the room AND there is extra space in the lab section, if attending a lab other than their own. Highest possible value on a redo is 10% lower that the original value of the experiment. Report sheets have a penalty of 20% off for every week late!
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Lab Exam I – Experiment 13, 15, 16, 17 and 19
Lab Exam II – Experiment 18, 20, 21, 22 and 23
## Spring 2020 Chem 1B Lab Schedule in Accessible Format

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<td>11</td>
<td>4/13 - 4/17</td>
<td>23 and 24</td>
<td>Quiz 20, Discuss 25</td>
</tr>
<tr>
<td>12</td>
<td>4/20 - 4/24</td>
<td>23, 24 and 25</td>
<td>Quiz 21, Discuss 22</td>
</tr>
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<td>13</td>
<td>4/27 - 5/1</td>
<td>22, 24 and 25</td>
<td>Quiz 22, Q and A</td>
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<td>14</td>
<td>5/4 - 5/8</td>
<td>24 and 25, Check-out</td>
<td>Lab Exam II</td>
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<td>15</td>
<td>5/11</td>
<td>25, Check Out (M)</td>
<td>No seminar</td>
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**Lab Exam I** - Experiment 13, 15, 16, 16 and 19  
**Lab Exam II** - Experiment 18, 20, 21, 22 and 23

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**Due Dates of Report Sheets — You can hand in earlier!**

**Cautionary note — Dr. S strongly encourages you to not leave Experiment 23 for the last minute!**

- **2/3 - 2/6**: 13 Due at the start of lab to your lab instructor
- **2/10 – 2/13**: 15 Due at the start of lab to your lab instructor
- **3/2 – 3/5**: 17 Due at the start of lab to your lab instructor
- **3/6**: 16 **Due in Friday seminar** to Ms. Serrano and Ms. Padmadabhan
- **3/9 – 3/12**: 19 Due at the start of lab to your lab instructor
- **4/6 – 4/9**: 18 Due at the start of lab to your lab instructor
- **4/13 – 4/15**: 20 Due at the start of lab to your lab instructor
- **4/20 – 4/22**: 21 Due at the start of lab to your lab instructor
- **5/4 – 5/7**: 22 Due at the start of lab to your lab instructor
- **5/6**: 23(earlier OK!) **Due to Dr. Singmaster (DH 16, door pocket)**

Exp. 24 and 25 are due by the LAST lab meeting to your lab instructor. Early is better though, if you have it done!
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 in a hurry in lab.** You have 4.25 hours to get it done right and to get help with the report sheet. 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.** This is particularly a problem in Exp. 23.

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 Greensheet 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, particularly in Exp. 23, 24 and 25 write ups. And 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.