THINGS YOU MUST DO THIS FIRST WEEK OF CLASS
1) Attend your lab section to claim your space. If you miss your first lab, you will be dropped from the course!
2) Read this greensheet thoroughly. You are responsible for all the information contained in this document.
3) Log on to the course Canvas website before the second day of class and get started on Quiz 0 (review from Chem 1A). The quiz must be completed by 10 am sharp on Friday, Feb. 5th. Do not wait until the last minute to make sure you can login to the Canvas website and begin the quiz, since no late quizzes will be accepted.
4) If you purchased the manual, read pages i – xii of the lab manual before attending the first seminar session.
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 her to add people efficiently.
6) 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/….
7) 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!
8) Do the review of significant figures, units, etc. in your lab manual.

BOOKS/SUPPLIES/WORKSHOPS
Required
1) Chemistry: The Central Science – Brown, LeMay and Bursten – 12th edition (11th or 10th also OK)
2) Lab Manual/Handouts for Chemistry 1B - Sold during the first 2 weeks of school by the Chemistry Student
3) **Preparing for Your ACS Examination in General Chemistry** – Technically not required, but highly recommended! 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 the MCAT or other standardized tests that cover Gen Chem. ($21- Also sold by Chem Club in DH 20.)

4) 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 nor lab exam, nor a quiz!**

**Not Required (But useful)**

1) **Academic Excellence Workshops** to help you study for Chem. 1B. These are 3-hour per week organized study sessions. I will provide more information on how to enroll and the times.

2) 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 the library.

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

4) Student Study Guide for the textbook. – More worked-out problems and many more practice problems.

5) **Suggested items to purchase for lab:** small notebook to keep in your drawer (or you can staple together 15 sheets of lined paper), safety glasses and a china marker (sold at bookstore).

**Course Web Page**

Students will take on-line quizzes on the course website hosted by Canvas. Course materials such as this green sheet, quizzes, extra materials, etc. will also be provided there. You are responsible for the material on the course website, so you should either check it daily or set up your profile to notify you when there are changes. Login with your student ID & SJSUOne password.

Instructions: [http://www.sjsu.edu/at/ec/docs/CanvasStudentTutorial_New.pdf](http://www.sjsu.edu/at/ec/docs/CanvasStudentTutorial_New.pdf)

Login: [http://www.sjsu.edu/at/ec/canvas/](http://www.sjsu.edu/at/ec/canvas/)

(If you are having trouble logging in, the most common problem is trying to bookmark the next page after the above website which will not work. Instead go back to the above login website which may be bookmarked. If this does not solve your problem, then go to [https://isupport.sjsu.edu/ecampus](https://isupport.sjsu.edu/ecampus) for technical support.)

Note: Course materials for the **laboratory** portion of the course will be posted to the 1B **seminar** Canvas page.

**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 to remain in the course or who wishes to add the course must be present in seminar for the safety discussion during the first seminar period and must take a safety quiz during 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 ionics, 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.**

**Catalog Course Description**

Topics including stoichiometry, colligative properties, kinetics, equilibria, thermodynamics and electrochemistry. Lab program complements lecture.
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) in lecture and quantitative chemistry in the laboratory. This semester will require greater use of your mathematical abilities in problem solving. A listing of course topics is provided at the end of this greensheet.

Attendance/Workload

Regular attendance to lecture and lab are required. Attendance will not be taken in lecture, but you are responsible for all announcements and material presented during class. 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, homework and laboratories to succeed in this course. The instructor is not responsible for covering material you missed due to absences. 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!!). In an effort to reward those that attend class on a regular basis, once or twice during the semester I will give a simple quiz. Those present in lecture will receive bonus points. Please remember that missing lecture or lab to study for another class is not an acceptable excuse.

HOMEWORK: In order to master CHEM 1B material and succeed in the course, students will need to spend a significant amount of time practicing problem solving. At a minimum, students should do the study assignments located in the lab manual at the end of each experiment or occasionally towards the back of the manual in the Practice Problems section (see course schedule). I may also mention problems from the text that seem suitable.

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 for a reasonable course load now; don't wait until you are behind. The university workload expectations are a minimum of three hours of study time per unit per week.

Grading

Lecture Exams and Final

Three fifty-minute exams (100 points each), will be given approximately every fourth week. Dates for the exams are on the course schedule. The exams might include a take-home problem. Please plan ahead. The final exam (200 points) is a comprehensive multiple choice test that covers Chem. 1A and 1B topics. Most of the final is a standardized American Chemical Society test used at many universities. More details on this will be provided in lecture. 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 e-mail or by leaving a message in my voice mail, including a phone number where you can be reached. You will need to provide me with written evidence (doctor’s 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.

Quizzes

Seven on-line quizzes will be given via the Canvas website. There will be no make-ups for missed quizzes, since solutions will be posted immediately after the due date in the glass cabinets between the two doors to DH 9. Students should print the quiz questions and record their work since Canvas will not show the quiz questions after submission.

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, regardless of how well you are doing in lecture. Do not miss labs!! Details regarding the lab grade will be provided in the lab/seminar 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 full course, including lab.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
<th>Grade</th>
<th>Percentage Range</th>
<th>Grade</th>
<th>Percentage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>above 97.0%</td>
<td>A</td>
<td>90.9% - 88.0%</td>
<td>A-</td>
<td>87.9% - 84.0%</td>
</tr>
<tr>
<td>B+</td>
<td>87.9% - 84.0%</td>
<td>B</td>
<td>83.9% - 79.0%</td>
<td>B-</td>
<td>75.9% - 71.0%</td>
</tr>
<tr>
<td>C+</td>
<td>75.9% - 71.0%</td>
<td>C</td>
<td>70.9% - 64.0%</td>
<td>C-</td>
<td>59.9% - 56.0%</td>
</tr>
<tr>
<td>D+</td>
<td>59.9% - 56.0%</td>
<td>D</td>
<td>55.9% - 53.0%</td>
<td>D-</td>
<td>Below 50.0%</td>
</tr>
</tbody>
</table>

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 on exams! Incompletes are only given to students 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 that we do NOT provide extra credit work at the end of the semester for students who are doing poorly.

Roughly the % weight of each lecture graded item is: 11% for each lecture exam, 21% for the final and 1% for each quiz. (Lab covers the remaining 40%).

Academic Integrity
Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Specific rules for an exam/quiz in lecture:
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 on 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 or on the stairs!

2) Keep your eyes down on your own paper.
3) No whispering or talking during an exam, even if you have handed in your exam. Wait until you leave the room.
4) No programmable calculators, cell phones nor smart watches. No sharing of calculators nor periodic tables. If your calculator fails, inform the instructor.
5) You may not use your cell phone nor smart watch as a calculator; these should be stored in your backpack or on the floor beneath your seat. You may not answer the phone during an exam.
6) No caps, hats, etc. unless required by a physician. Then they need to be turned around.
7) No head phones or other devices in ears unless they are prescribed hearing aids!
8) 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.
9) Ask for scratch paper. Do not pull it from your backpack.
10) 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!
11) Leave by the door at the front 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.

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 the building by an Emergency Coordinator, walk quickly to the nearest exit. Take your personal belongings as you may not be allowed to return. Follow the instructions of the Emergency Coordinators. Be quiet so you can hear instructions. Once outside, move away from the building. Do not return to the building unless the Police or the Emergency Coordinator announces that this 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) Keep track of your scores. Also keep your exams, quizzes, etc. Grades for lecture will be posted to Canvas. 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 your 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 9 days have passed.**

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

4) 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. 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.

5) 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 belongings 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.

6) 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.

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 $40 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.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

Note from Dr. Van Wyngarden: This ensures protection of privacy and allows for appropriate accommodations to be provided in cases where they are necessary. Assignments missed due to disabilities or other special concerns will not be accepted except as requested by the AEC.

Office Hours

My office is located in the basement level of Duncan Hall (Room 2). 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 my office hours do not match your schedule, then contact me to set up an appointment. Office hours are subject to change with adequate notice.

Other good sources for assistance are the lab instructors or tutors.
Resources for Help
1) Dr. Van Wyngarden (Lecture predominantly)
2) Ms. Serrano, Ms. Padmanabhan and Dr. Singmaster (Lab predominantly)
3) Lab instructors (Lab predominantly, although some can also provide excellent help for lecture)
4) Academic Excellence Workshops (Lecture) – You must be enrolled! Please note these are not tutoring sessions. They are organized, collaborative study times.
5) CoSAC - (DH 213) Tutoring and advising center for the College of Science.
6) Peer Connections – See Other Services Provided by SJSU
7) 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.
8) Counseling Services - They might have brochures or workshops on how to deal with test anxiety, if that is an issue you are having. See Other Services Provided by SJSU
9) Private tutors – Cost $$. You might find ads in the ChemClub and in the hallways where Chemistry courses are taught (5th floor of DH, 1st floor of Sci).
10) 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.

Chem. 1B Final Exam – ACS Standardized Test
It is important to note that the final will include 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. In addition, I will add approximately 20 multiple choice questions on topics covered near the end of the course and therefore not covered on midterm exams (usually electrochemistry and nuclear chemistry).

The Chemistry Club 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 a handling fee that they don’t charge the club.

It is 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, it may be 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, too, will give you the full year standardized test at the end of Organic!)

Chemical Safety Course
Chem 120S is a required course for all chemistry majors and minors and a prerequisite for all Chem 180/298 research.

IMPORTANT UNIVERSITY POLICIES

General Expectations, Rights and Responsibilities of the Student
As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU’s policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See University Policy S90–5 at http://www.sjsu.edu senate/docs/S90-5.pdf. More detailed information on a variety of related topics is available in the SJSU catalog, at http://info.sjsu.edu/web-dbgen/splash/catalog.html. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

Workload
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.

Class Attendance
NOTE that University policy F69-24 at http://www.sjsu.edu/senate/docs/F69-24.pdf states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

Dropping and Adding
Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latelapses/policy/. Students should be aware of the current deadlines and penalties for dropping classes. Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material
University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor’s permission to record the course and the following items to be included in the syllabus:

- “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor’s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”
  - It is suggested that the greensheet include the instructor’s process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
  - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.
- “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

LEARNING OUTCOMES

Course Learning Outcomes
Below are the main learning outcomes for the course. If a specific outcome is also partially addressed with an experiment, then the experiment number is included in parentheses. An even more detailed list of expectations, broken down for every exam, is in the lab manual, which all students must purchase.

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 heats 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 that 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 to 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 the 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 catalyst 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 a 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 that 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 a
    system at 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 $K_{sp}$ (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.
Program Learning Outcomes

CHEM 1B covers the basics needed to achieve BS/BA Chemistry Program Learning Objectives #1-7. Higher level chemistry courses address one or more of the objectives in more detail.

1) Demonstrate understanding of core concepts and to effectively solve problems in inorganic chemistry.
2) Demonstrate understanding of core concepts and to effectively solve problems in organic chemistry.
3) Demonstrate understanding of core concepts and to effectively solve problems in analytical chemistry.
4) Demonstrate understanding of core concepts and to effectively solve problems in physical chemistry.
5) Demonstrate understanding of core concepts and to effectively solve problems in biochemistry.
6) Answer questions regarding safe practices in the laboratory and chemical safety.
7) Demonstrate safe laboratory skills (including proper handling of materials and chemical waste) for particular laboratory experiments.

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/ 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 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.

Career Center ADM 154 http://www.sjsu.edu/careercenter/students/
Course Schedule
The following schedule of lecture topics is tentative and subject to change at the instructor's discretion. (Exam dates are not tentative and should be noted your calendar immediately.) The beginning of each new major topic is indicated by **bold font** and a reading assignment that should be completed **before** the lecture. Sub-topics within each major topic are listed, but may be covered in a somewhat different order.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Textbook Reading (Chapter and/or Sections)</th>
<th>Lab Manual Study Assignment (Homework)</th>
<th>Experiment</th>
<th>Quiz Due Dates (10am on Canvas)</th>
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<tbody>
<tr>
<td>Fri. 1/29</td>
<td>Introduction, syllabus, and class requirements</td>
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<tr>
<td>Mon. 2/1</td>
<td>Quick review of concentration, stoichiometry, limiting reagent and heat of reaction</td>
<td>3.6, 3.7, 4.5, 4.6, 5.6, 5.7, 13.4</td>
<td>13, 14, 16, 19</td>
<td>13, 14, 16, 19, 23</td>
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<tr>
<td>Wed. 2/3</td>
<td><strong>Thermodynamics</strong> – heat (and work), system and surroundings, enthalpy</td>
<td>5, 8.8, 19</td>
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<td>Fri. 2/5</td>
<td>Heat (enthalpy) of formation, Hess' law, Spontaneity, Entropy</td>
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<td>Mon. 2/8</td>
<td>Entropies of substances, Gibbs free energy</td>
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<td>Wed. 2/10</td>
<td>Gibbs free energy</td>
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<td>Fri. 2/12</td>
<td>Effects of conc. and pressure on spontaneity</td>
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<tr>
<td>Mon. 2/15</td>
<td>Phase changes and ΔG, phase diagrams</td>
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<td>Wed. 2/17</td>
<td><strong>Kinetics</strong> intro.</td>
<td>14</td>
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<td>Fri. 2/19</td>
<td>Rate laws, 1st and 2nd order rxns</td>
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<td>Mon. 2/22</td>
<td><strong>Exam #1</strong></td>
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<td>Wed. 2/24</td>
<td>Rate coefficients (k), relationship b/t rate orders and mechanisms</td>
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<td>Fri. 2/26</td>
<td>Integrated rate laws, determining rate laws from expt., half life</td>
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<td>Mon. 2/29</td>
<td>Collision theory, Boltzmann distribution, activation energy</td>
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<td>Wed. 3/2</td>
<td>Temperature dependence of k</td>
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<td>Fri. 3/4</td>
<td><strong>General Equilibrium</strong> –intro.</td>
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<td>Mon. 3/7</td>
<td>Acid/base equilibria intro., equilibrium constant (K), solubility intro.</td>
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<tr>
<td>Date</td>
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<td>Wed. 3/9</td>
<td>Equilibria approximations, acid/base, ΔG, leChatelier</td>
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<td>Fri. 3/11</td>
<td>$K_c$ vs $K_p$, LeChatelier - conc. and temp.</td>
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<td>Mon. 3/14</td>
<td>LeChatelier - temp., more equilibria examples,</td>
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<td>Wed. 3/16</td>
<td><strong>Acid/Base Equilibria - Aqueous solutions (ionic vs. covalent solute)</strong></td>
<td>16 17.1–17.3 (also p. 111)</td>
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<td>Fri. 3/18</td>
<td>pH, Bronsted Lowry acids/bases</td>
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<td>Mon. 3/21</td>
<td><strong>Exam #2</strong></td>
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<td>Wed. 3/23</td>
<td>Acid/base equilibria problems</td>
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<td>Fri. 3/25</td>
<td>Buffer pH</td>
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<td>Mon. 3/28</td>
<td><strong>Spring Break – No Class!</strong></td>
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<td>Wed. 3/30</td>
<td><strong>Spring Break – No Class!</strong></td>
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<td>Fri. 4/1</td>
<td><strong>Spring Break – No Class!</strong></td>
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<td>Mon. 4/4</td>
<td>Acid/base equilibria problem practice including titrations</td>
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<td>Wed. 4/6</td>
<td>Titrations continued</td>
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<td>Fri. 4/8</td>
<td><strong>Solubility Equilibria</strong></td>
<td>17.4–17.7</td>
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<td>Mon. 4/11</td>
<td>Common ion, precipitation reactions</td>
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<td>Wed. 4/13</td>
<td>Fractional precipitation, simultaneous equil.</td>
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<td>Fri. 4/15</td>
<td>Simultaneous equil.</td>
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<td>Mon. 4/18</td>
<td>Dissolving &quot;insoluble&quot; solids</td>
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<td>Wed. 4/20</td>
<td><strong>Electrochemistry</strong> – redox review, metal plating</td>
<td>4.4, 20</td>
<td>22 and Problems posted on Canvas</td>
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<td>Fri. 4/22</td>
<td>Voltaic Cells</td>
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<td>Mon. 4/25</td>
<td>Car battery, Standard Hydrogen Electrode (SHE)</td>
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<td>Wed. 4/27</td>
<td>Nernst Equation and Equilibrium</td>
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<td>Fri. 4/29</td>
<td>ΔG and K from $E_{\text{cell}}$, Non-standard conditions examples, incl. concentration cells</td>
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<td>Mon. 5/2</td>
<td>Exam #3</td>
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<td>Wed. 5/4</td>
<td>corrosion, sacrificial metals &amp; electrolysis</td>
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<td>Fri. 5/6</td>
<td><strong>Nuclear Chemistry</strong> – intro.</td>
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<td>Problems posted on Canvas</td>
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<td>Mon. 5/9</td>
<td>fission/fusion</td>
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<td>Wed. 5/11</td>
<td>nuclear rxns., radioactive decay kinetics</td>
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<td>Fri. 5/13</td>
<td>colligative properties</td>
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<td>Mon. 5/16</td>
<td>colligative properties</td>
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<td>Tue. 5/24</td>
<td>Final Exam: 9:45am – noon</td>
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### 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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<tr>
<td>Exam I</td>
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<td>Exam II</td>
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<td>Exam III</td>
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<td>Final Exam</td>
<td>Quizzes 10</td>
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<td>Quiz 6</td>
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