

Chem 1B, General Chemistry II Lecture, Section 1

Spring 2022

San José State University

Department of Chemistry

Course and Contact Information

Instructor:	Annalise Van Wyngarden, Ph.D., Associate Professor of Chemistry
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Office Hours: (via Zoom through Feb. 11)	Mondays, 10:30 – 11:30am (This time will change when in-person class resumes.) Wednesdays, 3:30 – 4:30pm or by appointment
Class Days/Time & Classroom:	Mondays & Wednesdays 10:30-11:45am Morris Daily Auditorium (Tower Hall) <u>During Remote Learning (through Feb. 11)</u> Monday class periods – “Free” (I highly recommend using this time to watch lecture videos and/or do homework problems.) Wednesday class periods – Discussion Sessions (via Zoom)
Prerequisites:	CHEM 1A (with a grade of "C" or better; "C-" not accepted)
Credit:	5 units – including lab and seminar (activity)

THINGS YOU MUST DO THIS FIRST WEEK OF CLASS

- 1) Attend your seminar on Friday and your first lab meeting.
- 2) Read this syllabus thoroughly. You are responsible for all the information contained in this document.
- 3) Log on to the course Canvas website before Monday, Jan. 31 and get started on Quiz 0 (review from Chem 1A). **The quiz must be completed by 10 am sharp on Wednesday, Feb. 2nd.** 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) Complete Canvas Module 0 – Review of CHEM 1A.
- 5) If you decide to drop the course, you need to do it on MySJSU.
- 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 Expt. 13 problems on concentration and stoichiometry found at the end of the experiment in your lab manual.**

BOOKS/SUPPLIES/WORKSHOPS

Required

- 1) Chemistry: The Central Science – Brown, LeMay and Bursten – 13th edition (10th, 11th, 12th or 14th also OK)
- 2) **Lab Manual/Handouts for Chemistry 1B** - Sold by [Maple Press](#). **Your homework for lecture is in this manual!**
- 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. (\$25)
- 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!**
- 5) Students are required to have an electronic device (laptop, desktop or tablet) with a camera and built-in microphone. (IF we are required to return to remote exams due to pandemic or other unforeseen conditions: Students will be required to have a phone (or other **second** electronic device) with a camera and built-in microphone for remote proctoring via Zoom during lecture exams. SJSU has a free [equipment loan](#) program available for students. Students are responsible for ensuring that they have access to reliable Wi-Fi during exams. If students are unable to have reliable Wi-Fi, they must inform the instructor as soon as possible or at the latest one week before the test date to determine an alternative. See [Learn Anywhere](#) website for current Wi-Fi options on campus.)

Not Required (But useful)

- 1) **Academic Excellence Workshops (SCI 1)** to help you study for Chem. 1B. These are 3-hour per week organized study sessions. Information on how to enroll and the times are posted to Canvas.
- 2) **Supplemental Instruction (SI) sessions** - Your Supplemental Instruction (SI) Leaders will facilitate group study sessions outside of class to review course concepts and learn the best strategies for studying. While all SI sessions are voluntary and I will not know who attends and who does not, your SI Leaders will work with me to tailor your study sessions so that they cover the most important course concepts. Students who attend SI Sessions tend to excel in the course.
SI Leaders: Jared Nguyen jared.nguyen@sjsu.edu
Zachariah Holder zachariah.holder@sjsu.edu
SI Sessions: days/times TBA (see Canvas)
- 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 the library.
- 4) Solutions manuals to textbook problems - These options are available with your textbook.
- 5) Student Study Guide for the textbook. – More worked-out problems and many more practice problems.

CANVAS (COURSE WEBSITE)

Students will take on-line quizzes on the course website hosted by Canvas. Course materials such as this syllabus, quizzes, extra materials, etc. will also be provided there. You are responsible for the material on the course website, so you must 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/ecampus/docs/Canvas%20Student%20Log%20In%20Document.pdf>

Login: <https://www.sjsu.edu/ecampus/>

(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://www.sjsu.edu/ecampus/how-we-can-help/contact-us.php> for technical support.)

Note: Course materials for the *laboratory* portion of the course will be posted to the 1B *seminar* Canvas page.
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COURSE FORMAT/CANVAS MODULES DURING REMOTE LEARNING (through Feb. 11)

During the first 2.5 weeks of the semester (through Feb. 11), the lecture portion of this course is completely online and will be hosted on Canvas. Course materials such as this syllabus, lecture videos, quizzes, extra materials, etc. will be provided there. On Canvas, the course is divided into weekly Modules. Weekly Modules will contain textbook reading assignments, lecture videos, homework assignments, homework solutions, and graded (untimed) quizzes.

Lecture Videos During Remote Learning: Since CHEM 1B is all about problem solving, lecture videos utilize an electronic whiteboard. Students should take notes while watching the videos; these notes should be used while doing homework and studying for exams. The total video length is less than the standard 2.5 hours per week of lecture time, but the videos are designed to be paused periodically for students to work on a problem before being shown the answer. Students can also do some self-pacing according to their needs and prior knowledge. You may find that you need to pause or rewind occasionally to take notes (or even that you can skip some review material).

Discussion Sessions During Remote Learning: During the **Wednesday** class periods (10:30-11:45am), I will hold “discussion” sessions focused on problem solving practice. Students will work together on problems in Zoom breakout rooms. Attendance at these sessions is strongly encouraged (although not technically required) in order to make sure you are mastering the material.

Zoom Classroom Etiquette (Discussion Sessions)

- Turn your Camera On: This is highly recommended to get the most out of discussion sessions, workshops, SI sessions and/or office hours. (Turning your camera on will be required for exams if it becomes necessary to hold them remotely.)
- Mute Your Microphone: To help keep background noise to a minimum, make sure you mute your microphone when you are not speaking.
- Be Mindful of Background Noise and Distractions: Find a quiet place to “attend” class, to the greatest extent possible.
 - Avoid video setups where people may be walking behind you, people talking/making noise, etc.
 - Avoid activities that could create additional noise, such as shuffling papers, listening to music in the background, etc.
- Position Your Camera Properly: Be sure your webcam is in a stable position and focused at eye level.
- Limit Your Distractions/Avoid Multitasking: You can make it easier to focus on the meeting by turning off notifications, closing or minimizing running apps, and putting your smartphone away (unless you are using it to access Zoom).
- Use Appropriate Virtual Backgrounds: If using a virtual background, it should be appropriate and professional and should NOT suggest or include content that is objectively offensive or demeaning.

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 become truly overwhelming.

Lecture 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 syllabus.

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!!). Missing lecture or lab to study for another class is not an acceptable excuse. In an effort to reward those that attend lecture consistently, once or twice during the semester I will give a simple quiz. Those present in lecture will receive bonus points.

(During remote learning, it is essential to keep up with reading, videos, homework and laboratories to succeed in this course.)

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 recommend problems from the text.

Please remember that 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.** See [Syllabus Information web page](#).

GRADING

Lecture Exams and Final

Three midterm exams (100 points each), will be given approximately every fourth week. **Dates for the exams are on the course schedule; mark them in your calendars now!** 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 this 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 nor alternate dates for lecture midterm and final 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 your score on the final as your missing exam score. An unexplained or unsatisfactory excuse for missing an exam will result in a grade of zero.

(If remote exams become necessary: Exams will be proctored electronically via Respondus Lockdown Browser on your computer AND via a Zoom session that you must log into concurrently on your phone (or other secondary device). Your camera for the exam Zoom sessions must be oriented to provide a view of your head and hands. (This worked well the last three semesters, but I reserve the right to use other proctoring software such as Respondus Monitor or Proctorio if any significant problems arise with the above method. Students would be given as much advance notice as possible.) Please note that it is the instructor's discretion to determine the method of proctoring. More details and a practice quiz will be provided on Canvas before the exams. If cheating is suspected, the proctored videos may be used for further inspection and may become part of the student's disciplinary record.

Note that the proctoring software does not determine whether academic misconduct occurred, but does determine whether something irregular occurred that may require further investigation. Students are encouraged to contact the instructor if unexpected interruptions (from a parent or roommate, for example) occur during an exam.)

Quizzes

Seven on-line quizzes will be given via the Canvas website. They are due at 10am on their due dates. There will be no make-ups for missed quizzes, since solutions will be posted to Canvas immediately after the due date/time. 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 syllabus.

Grading Scale

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

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

Incompletes will not be given unless a strong compelling reason with proof is furnished to support the need for an incomplete. Incompletes will not be granted just because the university won't late drop you or because the low grade will disqualify you, put you on probation or increase your car insurance payment! Incompletes do not remove past scores 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](http://www.sjsu.edu/senate/docs/S07-2.pdf) 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](http://www.sjsu.edu/studentconduct/) 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.

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 virtual 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.

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.

College of Science COVID-19 Safety Policy

All students registered for a College of Science (CoS) class with an in-person component must view the [CoS COVID-19 Training](#) slides and the [SJSU Phased Adapt Plan](#) website and acknowledge reading them according to their instructor's directions. By working together to follow these county and SJSU safety practices, we can keep our college safer. Students who do not follow COVID-19 Safety practice(s) outlined in the training, the SJSU Phased Adapt Plan, or instructions from their instructors, TAs or CoS Safety Staff may be dismissed from CoS buildings, facilities or field sites. Please review this training as needed throughout the semester, as updates will be implemented as changes occur (and posted to the same links). Documentation of this training will occur through the seminar portion of this class.

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. 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 Canvas grades 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 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. 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 \$50 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.**

Office Hours

My office is located in the basement level of Duncan Hall (Room 2). During remote learning (through Feb. 11) office hours will be held via Zoom. 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. If you have private matters to discuss during Zoom office hours, let me know verbally or via Zoom chat; I use the Zoom waiting room or a breakout room for those cases.

Other good sources for assistance are the lab instructors or tutors.

Resources for Help

- 1) Dr. Van Wyngarden (Lecture predominantly)
- 2) Ms. Serrano 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) SI sessions – Group study sessions with an experienced peer leader.
- 6) CHEM 1B tutor – Natalie Belen – tutoring times TBA
- 7) Chemistry Department Peer Mentorship Program – informal peer mentoring via Discord
- 8) CoSAC - [The College of Science Advising Center](#) is located in the second Floor of Duncan Hall, DH 213. They have peer advisors and tutors. Check their schedule.
- 9) SAACS (Chem Club) - Student club may have tutors at selected times. Some are very good for 1B, others not as good. Look for someone who took 1B with Dr. Van Wyngarden or Dr. Singmaster. Ask them what grade they got!
- 10) Peer Connections – Student Services Center and Clark Hall - Tutors for many of your classes, but you might have to hunt down one that works for you. See [Syllabus Information web page](#)
- 11) [ASPIRE](#) – Student Resource Center – Services for low income, first generation college students or students with disabilities.
- 12) Counseling Services - They might have brochures or workshops on how to deal with test anxiety, if that is an issue you are having. See [Syllabus Information web page](#)
- 13) 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).
- 14) 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).

I recommend the [Preparing for Your ACS Examination in General Chemistry](#) booklet to help you review for the test. 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!)

UNIVERSITY POLICIES

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/> Make sure to review these university policies and resources.

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](#) requires that students with disabilities requesting accommodations register with the [Accessible Education Center](#) (AEC) to establish a record of their disability. AEC will contact the instructor with further details, if needed.

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 and exam accommodations will not be provided except as requested by the AEC.

Workload

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Recording Classes and Public Sharing of Instructor Material

This course or portions of this course (i.e., lectures, discussions) may be recorded for instructional or educational purposes. The recordings will only be shared with students enrolled in the class through Canvas. The recordings will be deleted at the end of the semester. If, however, you would prefer to remain anonymous during these recordings, then please speak with the instructor about possible accommodations (e.g., temporarily turning off identifying information from the Zoom session, including student name and picture, prior to recording).

Students are not allowed to record without instructor permission. Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (videos, exam questions, homework solutions, syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. 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. This university policy ([S12-7](#)) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor via the AEC.

LEARNING OUTCOMES

Course Learning Outcomes

Students will be able to:

- Demonstrate knowledge of how chemical and physical systems are governed by the fundamental principles of thermodynamics, kinetics, equilibrium, electrochemistry and nuclear chemistry.
- Solve problems involving chemical systems using the fundamental principles (including mathematical relationships) of thermodynamics, kinetics, equilibrium, electrochemistry and nuclear chemistry.

Above are the broad learning outcomes for the course. More detailed learning outcomes are listed within each module. 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.

Program Learning Outcomes

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

I. Core Chemistry Ideas (Fundamentals)

PLO 1.1 - Students will be able to identify, formulate, and solve a range of chemistry problems (fundamental to complex) through application of mathematical, scientific, and chemical principles.

PLO 1.2 - Students will be able to recognize, relate, and/or apply chemistry terms and concepts to propose and solve interdisciplinary and multidisciplinary real world problems.

II. Experimentation/Lab Practice

PLO 2.1. Students will be able to develop an experiment to address a hypothesis using literature and execute the planned experiment using standard chemistry techniques.

PLO 2.2 Students will be able to acquire, record, and critically evaluate data through use of instrumentation and software, appropriate record keeping practices, figure preparation, and scrutiny of experimental results.

PLO 2.3 Students will be able to recognize and assess laboratory hazards, practice risk minimization, and conduct safe laboratory practices.

III. Community, Social, Societal Implications

PLO 3.1 Students will be able to explore, critique, and reflect on how chemistry relates to society, culture, and issues of equity and ethics that shape their scientific beliefs and identities.

PLO 3.2 Students will be able to identify as scientists within the scientific community through constructing peer reviews, engaging in collaborations, and participating in mentorship.

Grade Record for Chem. 1B Students

Lecture (60% of grade)		Lab (40% of grade) (You must pass the lab with 55% or better to pass the course!)			
Exam I	_____ /100	Lab Exam	_____ /100	Reports	_____ /
Exam II	_____ /100		_____		_____ /
Exam III	_____ /100				_____ /
Final Exam	_____ /200	Quizzes	_____ /10		_____ /
			_____ /10		_____ /
Quiz 0	_____ /10		_____ /10		_____ /
Quiz 1	_____ /10		_____ /10		_____ /
Quiz 2	_____ /10		_____ /10		_____ /
Quiz 3	_____ /10		_____ /10		_____ /
Quiz 4	_____ /10		_____ /10		_____ /
Quiz 5	_____ /10		_____ /10		_____ /
Quiz 6	_____ /10		_____ /10		_____ /
			_____ /10		_____ /
			_____ /10		_____ /
			_____ /10		_____ /

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 in 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 (or before viewing the lecture videos). Sub-topics within each major topic are listed, but may occasionally be covered in a somewhat different order.

Week/ Module #	Date	Quiz Due Dates (10am on Canvas) & Exam Dates	Topics	Textbook Reading (Chapter and/or Sections)	Homework (Lab Manual Study Assignment)
0	Wed. 1/26		Introduction, syllabus, and class requirements. Quick CHEM 1A REVIEW of concentration, stoichiometry, limiting reagent	3.6, 3.7, 4.5, 4.6, 5.6, 5.7, 13.4	13, 14, 16, 19
1	Mon. 1/31		THERMODYNAMICS – heat (and work), system and surroundings, heat (enthalpy) of formation and of reaction, Hess' law, spontaneity, entropy	5, 8.8, 19	15
	Wed. 2/2	Quiz 0			
2	Mon. 2/7		Entropies of substances, Gibbs free energy, effects of conc. and pressure on spontaneity, phase changes and ΔG , phase diagrams		
	Wed. 2/9				
3	Mon. 2/14		KINETICS intro, rate laws, 1st and 2nd order rxns, rate coefficients (k), relationship b/t rate orders and mechanisms, integrated rate laws, determining rate laws from expt., half life	14	17
	Wed. 2/16	Quiz 1			
4	Mon. 2/21		Collision theory, Boltzmann distribution, activation energy, temperature dependence of k		
	Wed. 2/23	Exam #1			
5	Mon. 2/28		GENERAL EQUILIBRIUM – intro, acid/base equilibria intro., equilibrium constant (K), solubility intro, equilibria approximations	15	18
	Wed. 3/2				
6	Mon. 3/7	Quiz 2	Reaction quotient, ΔG , K_c vs K_p , LeChatelier - conc. and temp., more equilibria examples		
	Wed. 3/9				

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7	Mon. 3/14		ACID/BASE EQUILIBRIA - Aqueous solutions (ionic vs. covalent solute), pH, Bronsted Lowry acids/bases, acid/base equilibria problems	16 17.1 –17.3	20 (also p. 111)
	Wed. 3/16	Quiz 3			
8	Mon. 3/21		Buffer pH, acid/base equilibria problems continued - including titrations		
	Wed. 3/23	Exam #2			
Mon. 3/28, Wed. 3/30		Spring Break – No Class!			
9	Mon. 4/4		SOLUBILITY EQUILIBRIA – intro., common ion, precipitation reactions, fractional precipitation	17.4 –17.7	21
	Wed. 4/6				
10	Mon. 4/11	Quiz 4	Simultaneous equil., dissolving "insoluble" solids		
	Wed. 4/13				
11	Mon. 4/18		ELECTROCHEMISTRY – redox review, metal plating, voltaic cells, car battery, Standard Hydrogen Electrode (SHE)	4.4, 20	22 and Problems posted on Canvas
	Wed. 4/20	Quiz 5			
12	Mon. 4/25		CHEM 1B concepts used in research at SJSU		
	Wed. 4/27	Exam #3			
13	Mon. 5/2		Nernst equation & equilibrium, ΔG and K from E _{cell} , non-standard conditions examples incl. concentration cells, corrosion, sacrificial metals & electrolysis		
	Wed. 5/4				
14	Mon. 5/9		NUCLEAR CHEMISTRY – intro., fission/fusion, nuclear rxns., radioactive decay kinetics	21	Problems posted on Canvas
	Wed. 5/11				
15	Mon. 5/16	Quiz 6	Colligative properties	13.5	
Thu. 5/19			Final Exam: 9:45am – noon		