BOOKS/SUPPLIES/COURSES

Required
1) Chemistry: The Central Science – Brown, LeMay and Bursten – 12th edition (or 10th or 11th edition -Or a college level Chem. text if you feel comfortable with a different textbook.)
2) Lab Manual for Chemistry 1A - Sold during the first 2 weeks of school by the Chemistry Student Club (DH504) - They only take cash!
3) Hand-held scientific calculator - Must be non-programmable and should have log x, 10^x, e^x, ln x, and x^y keys. - You will not be allowed to use your programmable calculator during a lecture or lab exam, or a quiz!
4) Scantron forms 882-E (or ES) - Purchase four scantron forms to cover the three lecture exams and the final and give them to Dr. S. He will provide Scantrons on test days. Don’t write your name on them!

Not Required (But useful)
1) Academic Excellence Workshops to help you study for Chem. 1A. These are 3 hour a week organized study sessions. We will have three or four different session facilitated by former 1A students. I strongly encourage you to enroll in one of these workshops. The average GPA of students who enroll in these workshops and attend more than 70% of the time is almost one letter grade higher than for students who do not enroll!!!!! I will provide more information on how to enroll.
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 Clark Library.
3) Solutions manuals to textbook problems - These options are available with your book.
4) Dr. Silber has written a problems book for CHEM 1A called “A Chemistry Sampler: Selected Topics in General Chemistry”. This book will be sold during the first 2 weeks of school by the Chemistry Student Club (DH504) - They only take cash! The book contains worked out examples, an outline of most topics (except organic chemistry) and old test questions. This Professor receives absolutely no money from the sale of the book and it is optional. Past students have said that it was very useful. I will assign homework from the book.

NOTE: THERE ARE NO PRINTED GREENSHEETS IN CHEMISTRY COURSES. YOU WILL BE ABLE TO FIND THE GREENSHEET ON LINE. INSTRUCTIONS WILL BE GIVEN IN CLASS AND/OR BUY EMAIL. YOU ARE RESPONSIBLE FOR READING THE ENTIRE GREENSHEET. THERE WILL BE A SEPARATE GREENSHEET FOR THE LAB. I WILL BURY A BONUS QUESTION FOR TEST 1 IN THE GREENSHEET FOR THOSE WHO FOLLOW INSTRUCTIONS.

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 your seminar section this week. This seminar is a required safety discussion.
3) Read this greensheet thoroughly. It is the rules of the game. Best to know the rules before you start.
4) If you purchased the manual, read pages i – viii of the lab manual before attending your lab session.
5) Review significant figures and units. The handout will help. Do the practice problems. We won’t be going over this in class. This is review from high school or Chem. 10!
6) If you decide to drop the course, please give Dr. Silber a note with your name indicating that you will be dropping the course. It will allow us to add people efficiently.
7) Start memorizing your ions! List is in the Chemistry Sampler.
8) 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 firefighter/police officer/FBI agent, CIA, etc…..
9) If you are trying to add you must attend one lab section and one seminar section a week until we add you. Please note the only person that can add you to the course is Dr. Singmaster. The lab and seminar instructors do not have codes, nor can they save you a space. Adds will be done in order of priority. If she adds you to the course, you will be input directly into the system prior to the last day to add! You will not be receiving add codes. The adds will be announced in lecture and the list posted in the glass cabinets across from DH17 and between DH507 and 508. You must claim your space in writing within 24 hours by placing a note with your name, last four social security numbers and a statement indicating that you accept in Dr. Singmaster’s BOX on the door to DH16.
PREREQUISITES/COREQUISITES
The prerequisites for Chem. 1A are completion of a one year high school chemistry course. You are expected to have completed high school algebra including logarithms and exponents. You must have completed any remedial English or Math courses required by the university prior to taking this class. You must be Math 19 and Engl. 1A eligible. You should not enroll in Chem. 1A if you have not had high school chemistry or if you can’t remember your high school chemistry! You should take the Chem. 10 or 30A!!

Every student who wishes to remain in the course or who wishes to add the course must be present in lab and seminar for the safety discussion and must take and pass a safety quiz. If you are waiting to get into the class please make certain you attend the safety discussion and take the safety quiz. You must pass the safety quiz with a score of 8 or better!

OBJECT AND SCOPE OF THE COURSE
To gain knowledge and understanding of the basic principles of chemistry, and of their applications. Topics covered emphasize atomic structure, electron configuration, and chemical bonding, thermodynamics and organic chemistry.

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. To protect your privacy, I recommend you meet with me outside of class to discuss your accommodations. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/drc/ to establish a record of their disability. All rules from AEC with regard to tests, must be followed. It is the student’s responsibility to provide all forms to the instructor by the required date. Note: if you think there is a need for AEC accommodations, you can go to the AEC at any time during the semester to apply for accommodations.

ATTENDANCE/WORKLOAD
Regular attendance to lecture, seminar and lab is 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, homework and laboratories to succeed in this course. The instructor is not responsible for covering material you missed due to unexcused absences. Please do not ask for individual tutoring or my notes for classes 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!!).

In an effort to reward those that attend class on a regular basis, I give short unannounced quizzes. Last semester I gave 12 of these and students had the possibility of adding up to 13 points to their lecture test grades. These quizzes not only count in the test average, they also provide information about who comes to class. I will send an e-mail after the first test showing the numbers of quizzes taken and the lecture grade. Since most of my test questions come from lecture and homework, it is not surprising that students who missed many classes did not pass the course. 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. Students who do not do the homework the first time will often get a better grade when they repeat the course for the second time. I will neither collect nor grade the homework. You can expect homework problems to appear on the tests, although the numbers might be changed. If you have questions or problems, be sure to visit me in my office hours. Make arrangements now, don't wait until you are behind.

Please call me if you are going to be absent from class for a legitimate reason (408-924-4954). You can also call me if you are unable to reach your lab instructor to let him or her know that you will be absent from lab. All lab absences must be made up by attending another section and completing the 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. One excused lab absence can be made up by attending another section and completing the work within the same week of the absence.

CHEM 1A - Classroom Protocol
- Be on time to class, class starts at 9:30 am SHARP.
- Turn off cell phones for class period.
• You are responsible for all the lecture material and handouts given in class or sent as an e-mail. If you are absent, please make provisions to obtain this material from a classmate. Do not ask me for my lecture notes, especially since I don’t have notes for many of the lectures.

• I encourage you also to study in small group of 2 or 3 persons for homework and problem sets.

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 calendar web page located at:

http://www.sjsu.edu/academic_programs/calendars/academic_calendar/

The Late Drop Policy is available at:
http://www.sjsu.edu/aars/policies/latedrops/policy/.

Students should be aware of the current deadlines and penalties for dropping classes. Important dates:

Monday 8/25  First day of instruction
Monday 9/1    Labor Day, University closed
Friday 9/5    Last day to drop without an entry in your permanent record
Friday 9/12   Last day to add
Friday 10/3  TEST 1
Friday 11/14  TEST 2
Tuesday 11/11 Veterans’ Day, University closed
Thurs./Fri 11/27-28 Thanksgiving, University closed
Monday 12/8   TEST 3
Wednesday 12/10 Last day of classes

Thursday 12/18, 7:15 AM to 9:30 AM FINAL EXAM

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Remember, the course instructors do not approve or disapprove any drops, we only certify we have seen the forms.

GRADING
Lecture Exams and Final

Three fifty-minute exams, which are predominantly multiple choice, will be given. Scheduled dates for the exams are in the greensheets (shown above) and changes in the schedule (if any) are announced at least 10 days in advance. Plan ahead. The final exam will be 2 hours and 15 minutes long; it is a comprehensive multiple-choice exam. This course builds on itself so material covered on a previous lecture exam could be needed in a following exam. 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 leaving a message on my answering machine, including a phone number where you can be reached (408-924-4954 or Department secretary - 924-5000). 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 (questions pertaining to the particular exam) as your exam score. An unexplained or unsatisfactory excuse for missing a lab or exam will result in a grade of zero. The quiz points will be added to your three exam percents. The final counts 40% of your lecture grade, except if you improve compared to the three test scores (plus quiz points) and then it counts 60%.

Quizzes
Multiple unannounced in-class quizzes will be given at 9:30 AM. If given, quizzes are at the start of the period. If you arrive before the quiz is collected, you may start, but your quiz is handed in with everyone else’s quiz. If you are late, you will miss the quiz. This instructor does give quizzes if the class attendance is low and these are usually trivial quizzes, which will count. University rules prohibit giving points for attendance, so the quizzes can have a real chemistry question.

Laboratory

The total lab grade constitutes 35% 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 attached 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 full course, including lab. The course grade cutoffs are not the same for my class, Dr. Esfandiari’s class or Dr. Singmaster’s class. Remember, our tests are very different.

98 - 100% A+
90-97.9% A
88-89.9% A-
86-87.9% B+
80-85.9% B
77-79.9% B-
75-76.9% C+
60-74.9% C
58-59.9% C-
56-57.9% D+
48-55.9% D
45-47.9% D-
below 45% F

Note: if either your lab or lecture grade is failing, you will fail the entire course. Remember 55% is the minimum passing grade in lab. Most of the F’s I give to students earn it by flunking the lab, or stopping from coming to lecture or possibly by academic dishonestly.

Let me summarize again how to calculate the lecture test score. Add the 3 test percents plus the total quiz points and divide by 3. This gives you your test average before the final. I will e-mail this to you after the third test. This can change if additional quizzes are given after TEST 3. Your final counts 40% of the lecture grade and the test + quiz average is 60% of the lecture grade. If your final exam score is higher than your test plus quiz score, then the final counts 60% of your lecture grade and the test/quiz average counts 40% of the lecture grade. Because of the University rules about grade releases for student not doing course evaluations online, I can neither send you my calculated lecture average, nor your lab grade. If you cannot figure out how to do the calculations based upon the information above, you may want to review algebra examples before the first test.

Incompletes are normally not given unless proof is furnished to support the need for an incomplete; you will sign a "contract" agreeing to fulfill the necessary requirement during a given timeline. This protects both the instructor and the student, limiting the possibility of a misunderstanding. 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. If you miss the final, you will receive a “WT,” which converts to an “F” within a year. 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 and I certainly do not give any extra points after your final grade is submitted, so please do not ask me to raise your final grade. In the fall semester of 2013 and the spring of 2014, I received multiple requests to raise student grades after the course ended, including students who asked me to raise an F grade to a C-. I do not raise grades after they are submitted, unless I made a calculation error, so please do not e-mail me to do so. Dr. Silber received his BS degree from Lehigh University.

LABORATORY 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.

**Academic integrity**

Students should know that the University’s Academic Integrity Policy is available at

[http://sa.sjsu.edu/judicial_affairs/faculty_and_staff/academic_integrity/index.html](http://sa.sjsu.edu/judicial_affairs/faculty_and_staff/academic_integrity/index.html)

Your own commitment to learning, as evidenced by your enrollment at San Jose State University and the University’s integrity policy, require 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 Chemistry Department has a long and strong history of reporting violations for further actions. A reminder this includes copying quizzes, tests or laboratory reports inside or outside of class. 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. 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. Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) may result in a failing grade for the course and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If a homework assignment is to be collected, and if you are allowed to work in groups, all members of the group must be listed on the front page. If someone has not participated in the exercise and you put their name on the list, this too is cheating. If you would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Policy F06-1 requires approval of instructors.

The Student Conduct and Ethical Development website is available at


**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; you must bring the booklet of handouts to lecture; 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. Sometimes the student chemistry club sells them.
3) Keep track of your scores. Also keep your exams. 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 5 days from the day an exam is returned to ask for a regrade of your exam. I will not do regrades after five days have passed.** I do not return the Scantrons for exams, so I strongly suggest...
you circle your choices on the exam.

4) Do not believe any sign written on the board saying the Chem. 1A class is canceled. I have never been more than a couple of minutes late and I am usually in the classroom before the lecture begins to answer questions.

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 and must meet the AEC deadlines.

9) A student has two weeks to determine whether they wish to remain in the course. Students dropping after 12 days 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 Drs. Silber and Singmaster know in writing of their intent to drop.

10) You will be a locker with another student in a different section. Please do not leave any valuables in the locker. Leave the locker clean and without stored chemicals for the next student. We will financially penalize students who consistently leave the lockers dirty for the next student. Consider getting your own personal safety goggles or glasses, and do not leave them in the locker.

OFFICE HOURS – MW 10:30-11:15
And by appointment

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 or seminar instructors.

LECTURE/LAB BUDDIES
In a difficult and time consuming class such as this one, it is often very useful to establish a buddy relationship with one or two students. You can lend each other notes, study together, collect handouts for each other and commiserate with each other. Seriously consider establishing such a relationship with someone in lecture and in your lab (doesn’t have to be the same person).

RESOURCES FOR HELP
1) Dr. Silber (Lab and Lecture)
2) Seminar instructors (Lab and, to some degree, lecture also)
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) Tutors – I do not recommend private tutors. You should not need these.
6) SAACS – (Basement of Duncan HJall) Student club has tutors at selected times. Some are very good for 1A, others not as good. Look for someone who took 1A/B with Silber or Singmaster. Ask them what grade they got! You need to hunt down the good ones. I can make suggestions once I know who is tutoring.
7) LARC – Learning Assistance Resource Center – Student Resource Center – 10 St. Garage - Tutors for many of your classes, but again you might have to hunt down one that works for you. Look for someone who took either Chem. 1A/B or Chem. 11A with Singmaster. Ask them what grade they got!
8) ASPIRE – Student Resource Center – 10 Street Garage - Services are limited to low income, first generation college students or students with disabilities.
9) Counseling Services - They might have brochures or workshops on how to deal with test anxiety, if that is an issue you are having.
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 Disability
Resource Center. They might be able to test you to determine whether you have a learning disability.

**Rules for an exam in lecture**

1) The exam starts on time and ends on time. No one starts until everyone who is on time has received a test and a scantron.

2) No programmable calculators. No sharing of calculators. (This applies to lab also!)

3) No caps, hats, etc. unless required by a physician.

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. If your backpack is unusually large (such as you might use for a weekend camping trip, I will ask you to leave it in the front for safety reasons). 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. Do not stand by the door and talk about the exam, sound travels.

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.

9) You want to circle your choice on the exam as well as marking it on the Scantron. I return the exams, but I do not return the Scantrons!

10) Anyone using a camera or cellphone to take pictures during exams will be assumed to be cheating (unless a bona fide emergency can be proven).

11) **You must hand in your Scantron, your exam and all scratch paper. All the “Student Information” portion on the first page of the exam must be filled out!** The instructions will look like:

**INSTRUCTIONS:**

a) Please write fill out the Student Information above.

b) Please write your name and the course ID number on your Scantron.

c) Please write the exam number on your Scantron.

d) You can write on the exam, but please remember to record your choice on the Scantron. You must hand in the Scantron, the exam and all scratch paper if you want your exam graded. Please circle your choice on the exam also.

e) There are multiple versions of each test. Please put the letter corresponding to your test to the left of your name on the scantron. For almost all of the students, putting the wrong test letter will lower the grade because the key is different for each exam.

e) Sign the honor pledge below.

______________________________
Signature ascertaining that you have behaved honorably while taking this exam.

Bonus Test Question: Dr. Silber’s Ph.D. University is: (UC Davis)

Learning Goals

General chemistry is not a memory course once you learn how to name atoms, molecules and ions. We expect you to be able to apply the knowledge learned to new problems. Tests may contain some simple problems, but also some problems that may look different than homework problems, but are in actuality similar in concept. We expect students to be able to think through problems of more than one step. In this course, you will gain knowledge and reasoning ability.

Syllabus for Chem. 1A – Silber

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Chem 1A Course Learning Outcomes

This is a list of very specific learning outcomes for Chem 1A lecture. The lab will also provide hands-on opportunities to develop and apply this knowledge. If a specific outcome is also partially addressed with an experiment, then the experiment number has been included in parenthesis. Please note that for many of the topics in this course real world examples are used. Also, on occasion, the topics result in brief discussions of economic and societal issues. Also on occasion some historical development is done so as to see the role science played in certain world events.

The student will be able to:

1) apply significant figures rules in all calculations providing the correct number of significant figures and units (Exp 1, 2, 6, 7, 10, 11 and 12)

2) convert between different units using conversion factors and dimensional analysis (Exp. 1)

3) name elements, provide their symbols and determine the number of protons, neutrons,
electrons and nuclei in elements and compounds

3) calculate percent composition given a molecular formula and molecular formula given the percent composition (Exp. 2)

4) name salts, acids, bases and covalent compounds and provide formulas for these given a molecular formula (Exp. 3)

5) explain the difference between solubility and dissociation in water and apply this knowledge to acids, bases and salts (Exp. 3)

6) identify weak and strong acids and bases and insoluble compounds using dissociation and solubility rules (Exp. 3 and 4)

7) construct molecular, total and net ionic equations for double displacement reactions (Exp. 3 and 4)

8) identify redox reactions including identifying the oxidation, reduction, oxidation agent and reducing agent (Exp. 5)

9) calculate oxidation numbers and balance redox reactions (Exp. 5)

10) perform stoichiometry calculations for chemical and non-chemical systems whether the limiting reactant is known or unknown (Exp. 6 and 10)

11) calculate molarity of a solution starting with pure solute or with a concentrated solution as well as explain how to prepare a solution of a given molarity (Exp. 6)

12) provide brief descriptions of the accomplishments of Planck, Einstein, Thompson, Rutherford, Millikan, Rydberg, Bohr, de Broglie and Schrödinger; and how these contributed to understanding the atom

13) explain how a cathode ray tube works and how it assisted in understanding the electronic configuration of atoms.

14) convert between wavelength, energy and frequency for light and understand the relationship between absorbed light and color (Exp. 7)

15) calculate the energy and wavelength of a given electronic transition in hydrogen (Exp. 7)

16) define what each quantum number represents and how to obtain quantum numbers for any electron in an atom

17) analyze an atom or ion of a given element providing the full electronic configuration, the abbreviated electronic configuration, the nl\cdot notation, a representative diagram of the orbitals and the unpaired number of electrons; then use this information to determine the possible oxidation states of the element and the magnetic properties of the element (Exp. 8)

18) define electronegativity, electron affinity and ionization potential

19) organize a set of element or monoatomic ions in order of increasing atomic radius, ionic
radius, first ionization energy and electronegativity

20) determine whether a bond is metallic, ionic, covalent or polar covalent

21) represent covalent and ionic bonding using Lewis dot structures

22) evaluate the molecular geometry, hybridization and polarity of a covalent molecule (Exp. 9)

23) evaluate the type of molecular bonding (s or p) in a covalent molecule and identify the orbitals used for bonding

24) explain the properties of temperature and pressure including how these are measured and convert between different units for these properties, including the use of different liquids in the measurement of pressure (Exp. 10)

25) derive the relationships between pressure, volume, temperature and moles for ideal gases; perform calculations using these relations, including when they are combined with stoichiometry or percent composition problems (Exp. 10)

26) define and apply Dalton’s Law of Partial Pressures and Graham’s Law of Diffusion and Effusion to mixtures of gases (Exp. 10)

27) use the results from the Kinetic Molecular Theory of Gases to explain the relationship between kinetic energy, average molecular velocity, temperature, pressure, density and number of collisions when an ideal gas undergoes a change of state

28) describe and provide examples of the five types of intermolecular forces and be able to analyze the forces present in a substance and organize a set of compounds in order of increasing intermolecular forces (Exp. 11)

29) define the terms and explain the temperature dependence of surface tension, viscosity, vapor pressure, normal boiling point, capillary action; and be able to organize a set of compounds in increasing order for most of these properties (Exp. 11)

30) explain the concept of specific heat and apply the equation to heating or cooling of materials

31) perform heat transfer calculations for systems with and without phase changes (Exp. 12)

32) calculate heats of reaction using Hess’ Law or heats of formation, including combining the process with stoichiometry, and identify whether the reaction is exothermic or endothermic (Exp. 12)

32a) be able to calculate reactions heats using first law of thermodynamics considerations

33) name unsubstituted and substituted alkanes, alkenes and alkynes given a drawing of a molecule and vice versa

34) identify all the isomers associated with simple aliphatic hydrocarbons and predict boiling point and vapor pressure change as a function of the number of carbons
35) identify and name the organic functional groups in a molecule

**Student Technology Resources**

Computer labs for student use are available in the Academic Success Center located on the 1st floor of Clark Hall and 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 digital and VHS camcorders, VHS and Beta video players, 16 mm, slide, overhead, DVD, CD, and audiotape players, sound systems, wireless microphones, projection screens and monitors.

**Learning Assistance Resource Center**

The Learning Assistance Resource Center (LARC) is located in Room 600 in the Student Services Center. It is designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. The center provides support services, such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. The [LARC website](http://www.sjsu.edu/larc/).

**SJSU Writing Center**

The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. Our writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. The [Writing Center website](http://www.sjsu.edu/writingcenter/about/staff/).

**Peer Mentor Center**

The Peer Mentor Center is located on the 1st floor of Clark Hall in the Academic Success Center. The Peer Mentor Center is staffed with Peer Mentors who excel in helping students manage university life, tackling problems that range from academic challenges to interpersonal struggles. On the road to graduation, Peer Mentors are navigators, offering “roadside assistance” to peers who feel a bit lost or simply need help mapping out the locations of campus resources. Peer Mentor services are free and available on a drop-in basis, no reservation required. The [Peer Mentor Center website](http://www.sjsu.edu/muse/peermentor).