# CHEM 1A GENERAL CHEMISTRY – Hybrid S-18

Total Number of Units: 5. Hours of Lecture/Week: online. Hours of Laboratory/Week: 3. Hours of Discussion/Week: online

Prerequisite: Chem 16, or 2A or a score of 20 or higher on the California Chemistry Diagnostic test and a grade of C or higher in MATH 102 or Math Placement Level 4 or higher. (If you have completed one year of high school chemistry with a grade of C or higher, you will be eligible to enroll in this course once you have seen a counselor.)

Course Instructor: Cliff Gottlieb, Phone: 242-2323. e-mail cgottlieb@shastacollege.edu web page: http://www.cliffschemistry.com
Lab Instructor: Berkeley Shorthill e-mail bshorthill@shastacollege.edu

Office Hours: M 10:30 - 11:00AM; T 11:00AM – 2:00 PM; W 9:30 – 11:00 AM and by appointment in 1412. Please come visit!

**The hybrid nature of this course offers students the flexibility in study times to meet individual needs. However, a successful student in an online situation must be motivated, organized, and a self starter. The lecture and discussion are online and the lab is in room 1414 at Shasta College. Plan to spend at least 12 hours per week on the lecture/discussion part of this course.**

Catalog Course Description: A course for science and engineering majors which covers the nature of atoms, molecules, and ions; chemical reactions; precipitation, oxidation-reduction, and acid/base chemistry. stoichiometry; electronic structure; periodicity; chemical bonding; properties of solids, liquids, gases, and solutions; and an introduction to thermodynamics and equilibrium. NOTE: Students must provide those materials which are of continuing value outside of the classroom setting (goggles and calculator).

Student Learning Outcome: Students will be able to find, interpret, analyze and apply information and data to solve problems and answer questions in chemistry.

Materials for the Class: (The text, the solutions manual, and other materials are available in the Science Learning Center.)

Chemistry, 6th ed. McMurry and Fay. Publisher: Prentice-Hall ISBN 0321704959
or 5th edition , ISBN 0131993235. Cheap online using ISBN number to search for it.
Laboratory Manual: Available online or by handouts.
Lab Safety Goggles – Must meet ANSI Standard 287.1 1989(buy from Science Club at the Science Learning Center; ≈ $6)
Lab Notebook: Cloth bound not spiral bound
Scientific Calculator
Suggested but not required: Solutions manual for the text

INTERNET DELIVERY ISSUES: The lecture and discussion sections of this course will be delivered over the internet using the Shasta College online program called **Canvas**. Most documents are in Adobe Acrobat PDF format. You should download the free Acrobat Reader immediately and install it on your computer. Here is the hyperlink, Get Acrobat Reader. **You must be comfortable using computers and the internet.**

You also must expect to spend the same amount of time on this course to what you would have spent on the face to face version of this course which is a **minimum of 12 hours at home per week. You should log onto this course in Canvas every day, check your mail, calendar, any announcements, and discussion boards and make sure all of your work is up to date**. Furthermore you must have sufficient self-discipline to set and adhere to your own and to the course timelines. The internet version of this course is equal to the content and may be more time consuming than the face to face version. Expect to spend at **least 12 hours per week** on this class in addition to the lab. DO NOT FALL BEHIND!! I AM ALWAYS READY TO HELP YOU.

## For your success it is absolutely imperative that you have thoroughly studied the chapters related to each lab BEFORE you come to lab!!!

## I will do everything I can to help you succeed in this course!! You just have to ask!!

**The weekly and daily course schedule is at the end of this syllabus. Dates will also be on the course calendar in Canvas. Be sure to note the due dates! And NO FREAKING OUT!!**

TECHNICAL PROBLEMS: If you have technical problems, **NO FREAKING OUT**. **Freaking out is not allowed. ☺☺.** You just need to communicate with me immediately or as soon as possible. To communicate with me use Canvas e-mail. If that is not working, send me an e-mail at cgottlieb@shastacollege.edu and put Chem 1A as the subject.

**METHODS OF EVALUATION/GRADING SCALE: Each of you has the innate ability to earn an "A". I hope that each of you**

**will** work **to** achieve **an** "A"!**!**

| |
|---|
| 1. Four chapter based exams are 100 points each. Exams will be given either at the beginning of the lab or in the Science Learning Center. |
| 2. One cumulative final worth 75 points |
| 3. Quizzes/assignments. No make-ups allowed. There will be quizzes/assignments worth 100 grade points. It is possible to earn up to 130 points out of 100 points possible This is like having the opportunity to earn 30 "extra credit" points. Quizzes will be given either at the beginning of the lab or will be an online assignment. |
| 4. Graded homework will be done online using the Shasta College Online Canvas program and are worth 96 points. |
| 5. Lab is worth 150 points. This will be an **average** of your lab grades (based on a 10 point scale) times 15. |
| 6. Discussions are worth 33 points. These discussions consist of two types: For one you will have to ask a question about something you don't understand about a topic in each chapter. I will answer it. You must reply to my answer. This is worth 2 points each. The other is that you will write a short paragraph about something you do understand about a topic in each chapter. This is worth 1 point. |
| 7. There may be other required or optional assignments or in class questions worth up to 100 points each. This may change the totals below. |

Your **course grade is not determined by percent but by total points** at the end of the course. IGNORE THE PERCENT COLUMN IN THE CANVAS GRADEBOOK!!!! Therefore out of 854 class points not counting extra credit, you course grade is determined as follows: A = 769 points, B = 683, C = 598, D = 512

**There is NO OTHER CREDIT other than outlined above so don't ask. No make-up or LATE exams, quizzes, or homework are allowed unless you have immediate family or personal health or legal emergencies. If you have an emergency contact me by using Canvas mail or office phone at 530-242-2323 as soon as possible, typically the same day, to notify me of your emergency. Be prepared to provide documentation to verify your emergency. If you have health, legal, or sports non-emergencies, we typically will be able to make arrangements to take an exam, quiz or submit homework early. You must contact me at least one week before the quiz/exam to make arrangements. I do not drop exams. Bottom line: Communicate with me and I will work with you!**

If you work within my parameters, I will do everything I can to accommodate your needs. I do not drop exams, nor offer other extra credit. **Keep all graded work!** Keep track of your own total points. I will post current point totals after the 2nd and 3rd exams. During the week before the last day to drop, I will review your class performance and grades. Otherwise do not ask me to figure out your grade. I will discuss with you at any time, your progress in the class. If you have any corrections or grade questions about any exam, quiz, or other graded assignment, you must notify me within one calendar week after the assignment is returned to the class. No adjustments in grades will be made after this time. I reserve the right to create grading policies to cope with atypical situations.

ACADEMIC HONESTY: DON'T CHEAT! CHEATING is the unauthorized giving or getting of answers to quizzes or exams or having someone else take exams, take quizzes or write discussions for you. All work is to be completed by you individually. No copying or group work unless explicitly stated. It is not fair to you, your classmates, or to me. In life all you really own is your personal integrity. Please for your own peace of mind; do not throw away your integrity for a grade in a course. That would be pathetic. DON"T DO IT!! . If you cheat, you will receive a 0 for the work involved and a penalty of a 50 point deduction from your final course grade. BY ENROLLING IN THIS CLASS, YOU AGREE NOT TO CHEAT BY OATH ON YOUR RELIGIOUS, SPRITIUAL, OR PHILOSOPHICAL BELIEFS!! If you have concerns regarding academic honesty, or any aspect of cheating, please contact me.

Finally, you probably are aware that only you can get your education--no professor can give you an education. **You are responsible for yourself.** I am responsible to help you help yourself. Your success in this class is a reflection of your effort.

ERRORS, OMISSIONS, or CORRECTIONS on all graded exams, quizzes, and discussions must be submitted to me NO LATER THAN ONE WEEK AFTER THE DUE DATE. Check your grades regularly

**I will do everything I can to help you succeed in this course!! You just have to ask!! No Freaking Out!!**

THE DETAILS REGARDING EVALUATION

EXAMS will be given during the first hour of lab period. They will be fill in the blank, problems, and short answers questions. I will provide a copy of last semester's exams with answers, which you can use to familiarize yourself with my exams. Also I provide a detailed study guide for each exam that tells you exactly what you need to know. Use it!

QUIZZES will be open ended question, problems, multiple choice, fill in the blank, or submitting a list of at home observations. Each quiz is worth 10 points. Quizzes will be offered in person at the beginning of the lab period. No late or make-up quizzes permitted other than health or legal situations or emergencies.

HOMEWORK ASSIGNMENTS will be available online using the Shasta College Online program and must be completed in the specified time. You will get 3 tries. I would study and then take the chapter homework. Then look at what you missed, study that material and then take the homework again. By doing this you should usually be able to get 100%. Each is worth 6 points. These are typically due on Tuesdays by 1PM

CHAPTER DISCUSSIONS will occur on the Shasta College Online discussion board and include 2 kinds for each chapter.

The first type of discussion is a question for EACH CHAPTER about material covered in the text, or notes which are related to the chapter objectives that you do not understand I will answer your question. This is worth 2 points for each chapter. **To get credit for this, you must reply to my answer by the due date for the chapter involved. Furthermore, do not repeat someone else's question!** You may say that someone else's question was your question and now you understand. That will count for credit.

Do not ask not questions about material not in my notes here, but ask those types of question in the "Ask Cliff questions here" forum

The second type is to write a brief paragraph for EACH CHAPTER explaining a concept you understand in your own words from the text, notes or provided websites. **A brief paragraph includes a topic sentence, at least 3 supporting sentences and a concluding sentence.** This is worth 1 point for each chapter.

You may ask more than one question although that will not affect your grade. I will answer all you questions and check your explanations to ensure that they are correct. **All students in the class are expected to read each explanation, question, and my replies. Any material on these attendance discussion boards can be put on quizzes and exams even if they are not in the text or notes.** Once we complete a chapter, you can no longer get credit for discussions. Questions are typically due on Sundays. Your replies to my answers and your explanations are typically due on Tuesdays at 1PM

OTHER DISCUSSIONS: There will also be two other discussion boards available to you throughout the class. One is dedicated to any other questions that you might have that you would like me to address. I will check this board regularly.
The other is for discussions between you and your classmates. I will look at these discussions infrequently.

MY RESPONSIBILITES

I will provide you with interesting information to you and be available to answer your questions. I will help you hone your understanding of how the world works from a chemical perspective. I will be available for consultation on the phone or in person during office hours, by Canvas e-mail or discussions from Monday to Friday, and by appointment. **You just have to ask.**

You can typically expect communications with me to be answered within 24 hours except from Friday afternoon through Sunday, when I will typically reply to communications on Monday. I will help you to achieve the best grade that you chose to achieve. I hope that you choose to achieve an **"A"**. If you have any difficulties, please see me in person. I am here to help

YOUR REPONSIBILITIES

You must read the book, read the notes, complete assignments, and participate in the class discussions. MAKE SURE THAT YOU READ MY NOTES !!!!! DO THE EVEN PROBLEMS AT THE END OF EACH CHAPTER!!! DOING PRACTICE PROBLEMS IS THE KEY TO YOUR SUCCESS!!! I suggest the evens because the answers to them are in the appendix of your text. Log onto the class at Shasta College Online EVERYDAY to make sure you are not missing anything! Plan to devote at least 12 hours a week in addition to lab on this course. Do not fall behind. You need to be self-motivated and disciplined to work on your own to complete assignments. You need to work with your classmates on-line to facilitate your learning. Studies show that students who study in groups typically perform better than students who do not work in groups. I DO NOT FORMALLY DROP STUDENTS FROM THE CLASS. IN ALL CASES YOU MUST DROP THE CLASS YOURSELF THROUGH THE REGISTRAR'S OFFICE!! Although if you do not participate in the class for more than 1 week, I reserve the right to "lock" you out of the Shasta College Online portion of the course. And of course **NO FREAKING OUT!**

Lab Procedure: Determined by your lab instructor. Attendance is mandatory. If absent on the first day, you may be dropped.

CLASS COMMUNICATIONS

Use the Shasta College Online Canvas program personal class communication. One discussion board will be for general coarse questions use the "Ask Cliff questions here" discussion board so everyone can benefits. Most course communication are made using the Canvas mail, unless there is a problem or emergency. The discussion forums are public. If there is a personal issue or emergency, send me an e-mail using Canvas. **ONLY if Canvas is not functioning**, send me an e-mail to me at cgottlieb@shastacolllege.edu and put CHEM 2B as the subject. MAKE SURE YOUR CURRENT E-MAIL ADDRESS IS ON FILE AT MY SHASTA.

**IMPORTANT!!!!** Using Canvas e-mail: **USE THE INBOX LINK TO SEND ME E-MAIL!!!** Here is how. After you click on the inbox, at the top middle of the page you will see a icon with a on a sheet of paper. Click on it and choose Chem 1A. At the far right of the "To:" Box you will see a person icon. Click it and choose your recipient. Type the subject, your message and hit send. The help link also has a way to send an e-mail to your instructor. **PLEASE DON"T USE THE HELP LINK TO SEND E-MAIL.**

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OTHER RESOURCES: **Science Learning Center**. It has tutors and other resources available if you are on campus

**Academic accommodations imposed by a disability:** Academic adjustments due to a disability or serious medical condition: Students should contact the office of Partners in Access to College Education (PACE) for authorization of academic adjustments (accommodations) for this course. The office is located in room 2006 (242-7790). Students will need to provide documentation that verifies the condition and the type of limitations that may result. The staff in PACE have been designated with the authority to 1) evaluate that documentation, 2) determine which academic adjustments are appropriate to this course, and 3) facilitate the provision of approved academic adjustments. Students will submit notices directly to the course instructor regarding specific academic adjustments that are authorized for this class.. www.shastacollege.edu/studentservices/dsps

NON-DISCRIMINATION STATEMENT: The Shasta-Tehama Trinity Joint Community College District ("Shasta College"), in accordance with applicable Federal and State Law, does not discriminate on the basis of race, color, national origin, sex, religious preference, age, disability (physical and mental), pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), gender identity, sexual orientation, genetics, military or veteran status or any other characteristic protected by applicable law in admission and access to, or treatment in employment, educational programs or activities at any of its campuses. Shasta College also prohibits harassment on any of these bases, including sexual harassment, as well as sexual assault, domestic violence, dating violence, and stalking. Inquiries regarding equal opportunity and non-discrimination may be directed to:

Greg Smith, Associate Vice President of Human Resources, (530) 242-7649, gsmith@shastacollege.edu
Sandra Hamilton Slane, Associate Dean of Students, (530) 242-7799, sslane@shastacollege.edu

Tentative Weekly Lecture and Lab Schedule. Detailed daily schedule below.

| **Week starting** | Chapter | Tentative Lab Activity |
|---|---|---|
| 1/16 | 1 ($5^{th}$ ed. include chapter 8 section 1) | 1. Check in & Bunsen Burner |
| 1/22 | 2 ($6^{th}$ ed. omit sections 2.6 – 2.9)($5^{th}$ ed include chapt 3 section 3 on Avogadro's number and the mole) | 2. Measurement |
| 1/29 | 3 | 3. Det. of Chem. Formula |
| 2/5 | 3 | 4. Limiting Reactants |
| 2/12 | 3 and study for exam 1 | 5. Acid-Base titrations |
| 2/20 | Exam 1 covers chapters 1-3. Start Ch 4 | 6. Analysis of $KClO_3$ |
| 2/26 | 4 ($5^{th}$ ed. omit section 9 & 10. $6^{th}$ ed omit section 9) | 7. Aqueous Rxns |
| 3/5 | 4 & 5 | 8. Analysis of $H_2O_2$ |
| 3/12 | 5 and study for exam 2 | 9&10.$H_2$ spectrum & Flame Tests |
| 3/19 | Exam 2 covers chapters 4-5. Ch 6 & 7 (chapter 6 for the 6th edition omit sections 7, 9 10, and 12. For the 5th ed. omit sections 6, 9, 10, 11, and 13) | Tie Dye Handout |
| 3/26 | 7 & 8 | 11 & 12. Ions and Molecules |
| 4/2 | Spring break but be sure to study ☺ | |
| 4/9 | 8 | 13.Thermochemistry: Hess's Law |
| 4/16 | Exam 3 covers chapters 6-8. Then start Ch 9 | 14. Chromatography |
| 4/23 | 10 | 15. P, V and T Relationships |
| 4/30 | 11 | 16. MW of Condensable Vapor |
| 5/7 | Study for exams | 17. Distillation and Check out |
| 5/14 | Exam 4 100 pt Ch 9-11 & a 75 pt Final exam over Ch 1-8 | |

With reasonable notice, this schedule may be changed at the instructor's discretion. All problems in the text may be included on exams. You should do all the problems in the chapter. I suggest that you complete at least the even numbered problems at the end of each chapter because the answers to them are in the appendix of your text. These will not be collected unless specifically announced. Answers to all problems can be found in the Instructors Manual in the Science Learning Center.

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Detailed calendar:

Day/month/year

16/1/2018, Introduce yourself and take the no count practice quiz so you see how the online homework quizzes work.
16/1/2018, Start Chapter 1. Chapter 1 graded discussions and homework available on Canvas. 3 tries on homework.
16/1/2018, Lab 1: Bunsen Burner
21/1/2018, Ch 1 question due,
21/1/2018, Introductions due,
23/1/2018,Ch 1 your replies to my answers to your questions, your explanations & homework due 1 PM,
23/1/2018,Lab 2 Measurement. 10 points quizzes tonight on Chapt. 1 in lab,
24/1/2018,Chapter 2 discussions and homework available.
28/1/2018, Ch 2 question due,
30/1/2018,Ch 2 replies explanation & homework due by 1 PM,
30/1/2018,Lab 3 Determination of a Chemical Formula. 10 points quiz tonight on Ch 2 in lab,
31/1/2018,Begin Ch 3 discussions. Ch 3 homeworks available,
4/2/2018, Ch 3 question due,
6/2/2018,Ch 3 replies, explanation & homework part 1 due by 1 PM ,
6/2/2018,Lab 4 Limiting Reagents 10 point quiz on Ch 3,
13/2/2018,Ch 3 homework part 2 due by 1 PM,
13/2/2018,Lab 5 Acid-base titrations Another 10 point quiz on Ch 3,
14/2/2018,Study for exam 1 and ask questions,
20/2/2018,Exam 1 covers Ch 1-3. Lab 6 Analysis of $KClO_3$ in a Mixture ,
21/2/2018,Begin Ch 4 discussions. Ch 4 homeworks available,
25/2/2018,Ch 4 questions due
27/2/2018 Ch 4 homework part 1 due by 1PM,
27/2/2018,Lab 7 Aqueous reactions. 10 point quiz ch 4,
4/3/2018,Ch 4 replies, explanation & homework part 2 due by 1PM,
4/3/2018, Lab 8 Analysis of Hydrogen Peroxide Another 10 point quiz on Ch 4,
5/3/2018,Chapt 5 disc & homework avail,
11/3/2018,Ch 5 question due
13/3/2018,Ch 5 replies explanation & homework due by 1PM,
13/3/2018,Labs 9 and 10 Hydrogen spectrum and Flame tests/Fireworks Quiz Ch 5,
14/3/2018,Study for Exam 2 and ask questions,
20/3/2018,Exam 2 covers Ch 4 and 5. Lab Handout Tie Dye,
21/3/2018,Ch 6 & 7 disc & homework avail. Ch 6 omit following: 6th ed sections 7, 9 10, & 12. 5th ed. omit 6, 9, 10, 11, & 13,
25/3/2018, Ch 6 & 7 questions due
27/3/2018,Ch 6 & 7 replies explanation & homework due by 1PM
27/3/2018, Labs 11 and 12. Ions and Molecules. Two Quizzes: Ch 6 and 7
28/3/2018, Ch 8 disc & homework avail,
8/4/2018, Ch 8 questions due
9/4/2018, Ch 8 replies explanation & homework due by 1PM,
9/4/2018, Lab 13 Thermochemistry: Hess's Law. Quiz Ch 8,
10/4/2018,Study for exam 3
17/4/2018,Exam 3 Ch 6-8. Lab 14 Chromatography,
18/4/2018,Ch 9 disc & homework avail,
22/4/2018,Ch 9 questions due,
24/4/2018,Ch 9 replies explanation & homework due by 1PM,
24/4/2018,Lab 15 P, V and T Relationships. Quiz Ch 9,
25/4/2018,Ch 10 disc & homework avail,
29/4/2018,Ch 10 questions due,
1/5/2018,Ch 10 replies explanation & homework due by 1PM,
1/5/2018,Lab 16 MW of Condensable Vapor..Quiz Ch 10,
2/5/2018,Ch 11 disc & homework avail,
6/5/2018,Ch 11 questions due
8/5/2018,Ch 11 replies explanation & homework due by 1PM,
8/5/2018,Lab 17 Distillation. Check out Quiz Ch 11,
9/5/2018,Study for exam 4 (100 points covers chapters 9-11) and final (75 points over Ch 1-8) . Exam 4 may be taken early by arrangement. Please contact Cliff,
17/5/2018,Exam 4 and final. Have a happy life!!!!,

Course Objectives: Upon successful completion of the course the student will be able to:

1. Apply scientific methodology to address a problem.
2. Use correct chemical terminology and nomenclature
3. Solve problems using dimensional analysis and conversions between units.
4. Use correct significant figures in measurement and calculations.
5. Recognize sources of error in measurements and error propagation
6. Explain the difference between accuracy and precision
7. Identify physical and chemical properties and changes in matter.
8. Describe the composition of atoms, and the experimental evidence for their structure
9. Use atomic spectra to identify elements
10. Distinguish between atoms, molecules, ions, and isotopes.
11. Distinguish between elements, compounds, heterogeneous and homogeneous mixtures.
12. Use the Periodic Table to predict formation of ions, properties and similarities of elements, and formulas of compounds.
13. Determine chemical formulas and names for molecular and ionic compounds (including use of polyatomic ions).
14. Write and balance chemical equations.
15. Define the chemical mole, and convert between moles, mass, and number of particles
16. Solve chemical problems using moles (i.e. determination of empirical and molecular formulas, percent composition, stoichiometry problems, limiting reactant problems, and theoretical and percent yield).
17. Identify reactions as precipitation, acid-base, or oxidation-reduction, and predict reaction products.
18. Identify substances that are oxidized or reduced, determine oxidation numbers, and identify oxidizing and reducing agents.
19. Use experimental results to determine an activity series, and use an activity series to predict whether a potential oxidation-reduction reaction will occur.
20. Write overall and net ionic equations, and identify spectator ions.
21. Identify substances as strong, weak or non-electrolytes.
22. Identify substances as acids or bases, and as strong or weak.
23. Predict whether a compound is soluble or insoluble in water.
24. Define and use concentration terms, especially molarity, in problem solving, including dilution problems.
25. Describe how to perform a titration, and do titration calculations.
26. Describe electromagnetic radiation, and perform calculations involving frequency, wavelength and energy.
27. Describe quantization and the Bohr model of the hydrogen atom, and relate to energy level transitions and photons
28. State the four quantum numbers, state their meaning, and use them to describe electrons and orbitals
29. Write electron configurations for elements and ions, and predict if a substance is paramagnetic or diamagnetic.
30. Explain the organization of the Periodic Table in terms of atomic structure, and the periodic nature of properties of the elements.
31. Draw Lewis structures for atoms, ions, molecules and formula units.
32. Use formal charge to select the best Lewis structure.
33. Predict if a bond is ionic, covalent or polar covalent, and describe the characteristics of each type of bond.
34. Complete Molecular orbital diagrams and use them to predict bond order and paramagnetism.
35. Use VSEPR and valence bond theory to predict molecular shapes and bond angles
36. Describe hybridization and the shapes of hybrid orbitals, identify the hybrid orbitals in a molecule.
37. Predict molecular polarity using electronegativity and molecular shape.
38. Relate the concept of intermolecular forces to the various states of matter.
39. Use phase diagrams to relate the states of matter to temperature and pressure.
40. Define temperature, thermal energy, heat and work, and identify the direction of heat transfer
41. Describe the meaning of the First and Second Laws of Thermodynamics.
42. Differentiate between the system and the surroundings, and identify processes as endothermic or exothermic
43. Define and use heat capacity and heat of phase changes, and perform calculations involving heat transfer
44. Use Hess's law and/or standard enthalpy values to solve thermochemistry problems.
45. Use calorimetry to determine the enthalpy of reaction.
46. Define enthalpy (changes) and perform enthalpy calculations using the stoichiometry of a reaction.
47. Using tabulated data, calculate changes in enthalpy, entropy and free energy
48. Use enthalpies of formation and Hess’s Law to determine the enthalpy change for a reaction.
49. Describe the variables that describe gases, and the relationships between them.
50. Solve problems using the ideal gas law, Dalton’s law, and chemical reactions.
51. Describe and apply the postulates of the kinetic molecular theory.
52. Describe how real gases differ from ideal gases.
53. State the types of intermolecular forces, determine when they occur, predict their relative strengths and effects on physical and chemical properties, and distinguish between intermolecular forces and chemical bonds.
54. Explain how solids, liquids and gases differ at a molecular level.
55. Distinguish between metals, ionic, network and molecular solids by their structures and properties
56. Describe the concept of chemical equilibrium, and apply it to chemical situations.
57. Interpret the salient features of phase diagrams.
58. Describe solutions, explain on a molecular level why they occur, and identify solute and solvent.
59. Describe the factors that affect solubility, predict relative solubilities, interpret solubility-temperature graphs, and apply Henry’s law to gas solubility situations.
60. Use and convert between concentration units, including molality, mole fraction, mass % and volume %.
61. Explain why addition of solute changes the properties of a pure solvent, describe the important colligative properties, and perform colligative property calculations such as freezing point lowering and boiling point elevation.
62. Explain how osmosis occurs on a molecular level, and perform calculations involving osmotic pressure.

# SCIENCE LEARNING CENTER

***Life Science Building – 1600 Room 1626 530-242-2325***

www.shastacollege.edu/ScienceLearningCenter

Margaret Savage, SLC Coordinator

The Science Learning Center offers a comfortable study environment and a variety of resources to assist students in any of the Science classes. There are computer programs that cover specific topics, old tests, Text books for most courses and the Solution Manuals that go with them. Microscopes and slides are available for reviewing some labs and FREE TUTORING.

**FREE TUTORING** is done by students who have successfully completed the course; often with the same instructor Tutors must have a "B" or better in the courses they tutor. They can help you initiate good study habits and organizational skills to maximize your study time. They can also help to clarify any confusing concepts. When there is interest, we run study groups that are led by tutors.

## OTHER RESOURCES AVAILABLE

- **Copy Machine** A copy machine is available in the computer area for .10 per copy.
- **Office Supplies** For your use, we have a paper cutter, stapler, scissors, tape and colored pencils .
- **Calculators** We have both basic scientific and graphing calculators. They can be checked out for use in the center and for test-taking. We hold your driver's license.
- **Computers** We have four internet connected computers with Microsoft Office suite installed. Printing is available off the computer for $0.10 a page. We also have 2 Laptops to use in the center.

**STUDYING IN THE SLC:** There is room available for students to study alone or in groups. We have one small room where students can isolate to minimize distractions. You are allowed to eat in the SLC.

The **SCIENCE LEARING CENTER** is a friendly, helpful, encouraging environment, which could become your home away from home. Come in and check it out.

**OPEN: MON. & WED. 7:30 AM – 6 PM; TUES. & THURS. 7:30 AM – 4 PM; FRI. 7:30 AM – 3 PM**

## ADDING A CLASS

Students may add a full-term class through the fourth week of the term.* After the first two class meetings, approval of the instructor is required to add the class, which includes both the signature of the instructor and the first date of attendance. **IT IS THE STUDENT'S RESPONSIBILITY** to pick up the form from the Admissions and Records Office and take it to the instructor for approval. The student must then return the form to the Admissions and Records Office or Extended Education Center for processing before the add is finalized.

## DROPPING A CLASS WITHOUT RECORD

Students may drop a class, and have no notation appear on their transcripts, through the fourth week* or 30% of the term for classes less than a semester in length. **IT IS THE STUDENT'S RESPONSIBILITY TO DROP CLASS (ES).** The necessary forms are available from Admissions and Records, Extended Education Centers, or by mail. If a student intends to drop a class and stops attending but fails to file the necessary forms, a failing letter grade may be assigned by the instructor.

## WITHDRAWING FROM A CLASS WITH A "W" GRADE

Students may withdraw from a class after the official "drop" date and up through the fourteenth week or 75% of the term for classes less than a semester in length. The notation "W's" will appear on the student's transcript and will not be used in calculations of grade point average. Excessive "W" shall, however, be used as factors in probation and dismissal procedures. **IT IS THE STUDENT'S RESPONSIBILITY TO OBTAIN FORMS AND SUBMIT THE NECESSARY PAPERWORK TO WITHDRAW FROM A CLASS.** Forms are available from Admissions and Records, Extended Education Centers, or by mail. Students who have not dropped or withdrawn from a class before the end of the fourteenth week or 75% of the term will be assigned a course grade.

## ATTENDANCE

Students are expected to attend all class meetings. A student who fails to attend the first meeting of a course without notifying the instructor may be dropped from the class. In addition, an instructor may drop a student during the first 30% of the term for excessive absences. Nevertheless, **IT IS ALWAYS THE STUDENT'S RESPONSIBILITY TO OFFICIALLY DROP OR WITHDRAW** from the class. Students who fail to file the necessary forms, even though they stop attending class