

HONORS GENERAL CHEMISTRY

CHEM 181A

Professor: Joe Jarrett
Bilger 245
jtj@hawaii.edu
956-6721

Lectures
Tues 1:30 – 2:45 pm
Wed 1:30 – 2:20 pm
Thur 1:30 – 2:45 pm
Bilger 335

Office Hours
Mon 1:30 – 2:30 pm
Wed 3:00 – 4:00 pm
Bilger 245

Goals:

Chemistry is the core science that forms a critical base for further understanding in many disciplines, from engineering to molecular biology to medicine. This course will cover in one semester the material typically covered in a two semester general chemistry course, and will integrate basic chemical principles with selected aspects of materials chemistry, organic chemistry, and biochemistry. By the end of the semester, you should: understand the molecular nature of all phases of matter, understand the various ways of depicting chemical compounds and chemical reactions, have developed an ability to solve basic quantitative problems regarding the properties of molecules, chemical equilibria, and chemical kinetics, and have developed the ability to appropriately apply this knowledge to general scientific problems in various fields of science and engineering.

More specifically, students should understand:

1. The basic structures of atoms, ions, and molecules, and ways to quantitatively describe the properties of atoms and molecules in the various phases of pure matter and in mixtures.
2. The reactivity of atoms, ions, and molecules, and the various qualitative and quantitative methods for describing or depicting chemical reactions.
3. The concept of chemical equilibrium, and the energies that drive chemical reactions: an introduction to the field of thermodynamics.
4. The concept of chemical kinetics and the energy required to initiate a chemical reaction.
5. The relationship between the electronic configurations of atoms and molecules and their chemical properties: an introduction to the field of quantum mechanics.

•In addition, you should become “functionally literate” in the language of chemistry.

•You should be able to incorporate the basics concepts of chemistry into your other science studies such as engineering, cell biology, zoology, botany, marine biology, and health sciences.

•You should be able to recognize “chemistry” in the popular press and ads, and to begin to recognize and be skeptical of “bad” science.

•Finally, you should be thoroughly prepared for further study in chemistry: Organic Chemistry (Chem 272/273), Physical Chemistry (Chem 351/352), Inorganic Chemistry (Chem 422), and Biochemistry (Biol 402/Bioc 442).

- Text: **Chemistry: The Molecular Science**, 3rd Edition
Authors: Moore, Stanitski, and Jurs
Publisher: Brooks/Cole – Thomson Learning
- Hardcover version available used only. Includes interactive CD-ROM. Does not have valid General ChemistryNow Subscription (can be purchased online).
 - Softcover version available new only. Includes 4 mo. General ChemistryNow subscription. Also includes “Survival Guide for General Chemistry with Math Review.” Should include OWL access card. Does not include interactive CD-ROM.
- Online Resources: Online Web-based Learning (OWL) (available in bookstore or \$35 online)
<http://owl1.thomsonlearning.com/>
This site has tutorials and web-based problem sets for each chapter of the textbook. Since Chem 181A will not have written problem sets, you should use OWL to practice solving problems, especially those involving calculations.
- General ChemistryNow (comes with new textbook or \$15 online)
<http://chemistry.brookscole.com/moore2e/>
This site also has tutorials and web-based problems sets. The graphics are largely taken from the textbook, so it should look familiar. Some animations to help explain tough concepts.
- If you prefer web based information over textbooks, I would recommend subscribing to both and working your way through the related sections in parallel. I would like to get your evaluation of these two options towards the end of the semester.
- Optional Books: **Study Guide for Chemistry: The Molecular Science**, Larsen and Goldfeld.
Summarizes the information in an abbreviated format. More problems to work through.
- Student Solutions Manual for Chemistry: The Molecular Science**, Ozment.
Most of the problems from the textbook have been worked through and the solutions explained in detail. This may be useful for students who learn best by working through problems on paper.
- These are available online from Amazon.com or by special order from the UH Bookstore.
- Lectures:
 - The lectures will highlight the important points from the text, but are not a replacement for actually reading.
 - Cell phones should be off or in buzzer mode. Do not answer calls in class!
 - Come to lectures to listen and learn. Do not come if you plan to sleep, read newspapers, surf the web, or listen to your iPod.
- Exams:
 - Exams will be a mix of multiple choice and short answer/calculations. In general, they will be about 10-15 questions and will be held during normal class sessions.

- They will be closed book, closed note, and I will provide a sheet of equations that I feel are important.
- You should bring a calculator, but not a computer or PDA.
- I will personally grade all of the exams. If you feel there has been an error in the grading, you may raise this issue during office hours only, and if I feel it is warranted, I will re-grade your entire exam.
- There will be no makeup exams. If you miss an exam for any reason, it will automatically become your dropped score (see below). If you miss a second exam, I will require documented proof of a medical emergency (or similar problem) before discussing your options.

Grades:

The overall grade in the course will be based on 3 out of 4 exams. I will drop the lowest score and sum the remaining 3 exam grades. The approximate mean for the course will be set to a "B+".

Syllabus:

The course will follow the textbook and cover Chapters 1-19, and Chapters 21-22 if time allows. Class sessions will highlight important points from the text, and may include some problem solving examples when appropriate. This is a very tight schedule and there will be very little extra time for question & answer sessions or live demonstrations, but you will learn a great deal about chemistry in a relatively short amount of time.

Week	Topic	Book Chapter
8/22 – 8/24	Atoms and Elements	Chapter 1 – 2
8/29 – 8/31	Chemical Compounds	Chapter 3
9/5 – 9/7	Reactants, Products, and Reactions	Chapter 4 – 5
9/12 – 9/13	Energy and Reactions	Chapter 6
9/14/06	Exam 1	Chapters 1-5
9/19 – 9/21	Electron Configurations	Chapter 7
9/26 – 9/28	Covalent Bonding	Chapter 8
10/3 – 10/5	Molecular Structures	Chapter 9
10/10 – 10/11	Gases	Chapter 10
10/12/06	Exam 2	Chapters 6-9
10/17 – 10/18	Liquids and Solids	Chapter 11
10/24 – 10/26	Organic Chem, Chemical Kinetics	Chapter 12 - 13
10/31 – 11/2	Chemical Equilibrium	Chapter 14
11/8 – 11/9	Solutes and Solutions	Chapter 15
11/14 – 11/15	Acids and Bases	Chapter 16
11/16/06	Exam 3	Chapters 10-15
11/21 – 11/22	Aqueous Equilibria	Chapter 17
11/28 – 11/29	Thermodynamics	Chapter 18
12/5 – 12/7	Electrochemistry	Chapter 19
Final Exams	Exam 4	Chapters 16-19

I would recommend the following as a good weekly schedule:

1. Read the textbook chapter ahead of time (Monday?)
2. Attend the lectures.
3. Every weeknight - reread the section of each chapter that corresponds to what was discussed in class.
4. Near the end of the week, do 10-20 practice problems from the textbook. Use the web-based learning aids - either OWL or General ChemistryNOW.
5. If you still don't understand something, write it down and come see me in office hours.

FYI – I will try to respond to emails during the week, but my response may be that you should come see me personally. I will not respond to emails over the weekend.