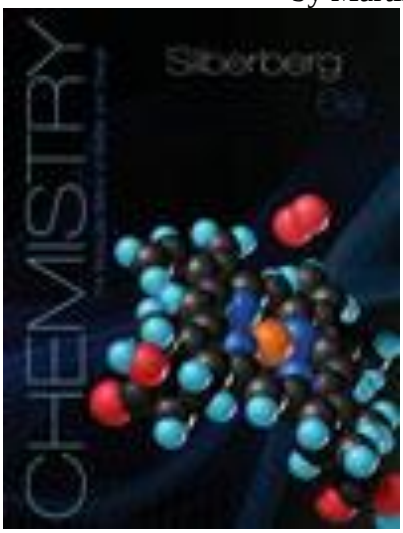
| CHM 2045 | General Chemistry | Spring 2013 |
|---|---|---|

| Sections | Class Period | Instructor | Office | Office Hours |
|---|---|---|---|---|
| | 10 and 11 | Mitchell | CLB 214 | Office phone 392-0517 |
| | | | | M W R 8th and 9th periods<br>3:00 to 3:50 and 4:05 to 4:55 pm |
| | | | | |

**TEXTBOOK: Chemistry: The Molecular Nature of Matter and Change (6th Edition)**
by Martin Silberberg (McGraw-Hill)




**INFORMATION**: CHM 2045 and CHM 2045L constitute the first semester of the two term sequence of General Chemistry, CHM 2045-2045L-2046-2046L. This sequence is suitable for all science and engineering majors. To continue into CHM 2046, you must earn a grade of C or higher in CHM 2045 *and have* MAC 1140, or MAC 1147 or calculus I or the equivalent of these or higher ***completed***. (Statistics does not count.)

**PREREQUISITES**: Passing score on the Chemistry Readiness Assessment (6 or higher on each portion, math and chemistry) OR Grade of C or higher in CHM 1025 OR Score of 3 or higher on the AP Chemistry Exam OR Score of 4 or higher on the IB Chemistry Exam plus MAC 1140 OR MAC 1147 OR MAC 2311. Students may take the MAC prereq concurrently with CHM 2045, but the MAC requirement must be met prior to taking CHM 2046.

Warning!! If you drop your math class and do not have MAC 1147 or the equivalent or higher you will not be able to go on to CHM 2046 even if you pass CHM 2045! Read the Guide to Majors catalog. This means that you must be taking the correct math this term or have it show on your transcript. You will be ejected from CHM 2046 at the start of the next term even if the system allows you to register if you do not have the proper math prerequisite.

**Lecture schedule: I will follow this schedule very closely.**
**Exam dates will not change!!**

**You cannot take the Final early don't ask!**

## **Class Lecture Schedule** (Spring 2013)

Section Number: _____ Discussion time and location:_____/_____

| Dates | Topics | Book Chapters |
|---|---|---|
| 07 Jan to 11 Jan | Introduction/ Components of Matter | Chaps.1, 2 |
| 14 Jan to 18 Jan | Components of Matter/ Stoichiometry | Chap.2 and 3 |
| **Wednesday, Jan 16** | **Online Assessment Quiz #1** | **Chaps. 1–2** |
| 23 Jan to 30 Jan | Stoichiometry/ Classes of Chemical Reactions | Chap.3, 4 |
| **Wednesday, Jan 23** | **Online Assessment Quiz #2** | **Chap. 3** |
| W 30 January | **Exam 1** | Chaps.1, 2, 3 and 4 |
| 31 Jan to 6 February | Thermochemistry (3) | Chap 6 |
| 7 to 11 February | Quantum Theory (2) | Chap. 7 |
| 13 to 18 February | Electron Configuration and Periodicity (3) | Chap. 8 |
| **Wednesday, Feb. 13** | **Online Assessment Quiz #3** | **Chap. 6–7** |
| 20 to 25 February | Models of Chemical Bonding (3) | Chap. 9 |
| W 27 February | **Exam 2** | Chaps. 6, 7, 8, and 9 |
| 28 Feb. to 13 March | Shapes of Molecules (3) | Chap. 10 |
| 14 to 20 March | Theories of Covalent Bonding (3) | Chap. 11 |
| **Wednesday, Mar. 20** | **Online Assessment Quiz #4** | **Chaps. 10–11** |
| 21 to 25 March | Gases (2) | Chap. 5 |
| 27 March to 1 Apr. | Intermolecular Forces and Liquids and Solids (3) | Chap. 12 |
| W 3 April | **Exam 3** | Chaps. 10, 11, 5, and 12 |
| 4 to 11Apr. | Physical Properties of Solutions (3) | Chap. 13 |
| **Wednesday, Apr. 17** | **Online Assessment Quiz #5** | **Chap. 13** |
| 15 to 24 Apr. | Kinetics (6) | Chap. 16 |
| | | |
| | | |
| M 29 April | **Final Exam:**<br>**Start Time: 3:00 pm end at 5:00 pm** | **Comprehensive**<br><br>Chap. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 17 |

**HOLIDAYS (no classes):** January 21 (MLK Jr. Day); March 4–8 (Spring Break)

**TIPS:** Chemistry is very much a "learn by understanding" subject. Because of this you must work in this course to do well. That means you should read the textbook, work on the website, and do the electronic

homework until you understand! Then you should work extra problems (from the book) to test your understanding.

**QUIZZES:** The Quizzes will be taken on-line, these will open early in the morning and close late at night. Do not forget to take the quiz you do not get a makeup. A schedule of dates is on the lecture schedule. Five (5) Quizzes will be given we will drop the lowest one. **No makeup quizzes will be given for any reason.** As with the progress exams, to accommodate unavoidable conflicts, we offer a dropped-quiz policy (the best 4 of 5 quizzes counting toward your grade – see under "GRADES" below). The lowest grade will be dropped, for a maximum total of 100 course points. **We will not have any make up quizzes!!**

**DISCUSSION: First discussion will be Friday, 18 January 2013.**
**Know your section number so you can find the discussion location! This info is on your ISIS schedule.**

**The first thing you MUST do is find out the CLC schedule of your TA so you know when and where to find them outside of discussion.**

**EXAMS: Three** progress exams and a **cumulative** final exam will be given in the course. All exams will be given in the evening (8:20 pm start time) and rooms will be assigned by section number and posted on the Home Page so **learn your section number!** Be on time and bring a calculator (non-graphing) and pencil to the exam room nothing else. NO NOTES OR INFORMATION SHEETS, NO COMPUTERS, CELL PHONES or any information storage device electronic or paper is allowed.

**ABSENCES:** The General Chemistry program at UF administers all conflicts with scheduled assessments and examinations in accord with University policy. As such, *certain* unavoidable *absences* by students from examinations *are allowed*, if properly documented and disclosed to the instructor in charge **one week BEFORE the anticipated conflict**. Such allowed absences include, but are not limited to:

- religious observances,
- sanctioned sporting events,
- other UF exams if the other course has a higher course number than the General Chemistry course.

In all such cases, students will be given the opportunity to take a *conflict exam*, which takes place shortly *before* the scheduled assessment for the class.

*No* exams will be administered to absent or otherwise compromised students for a grade ***AFTER*** the established and scheduled assessment time. Exams given to excused students after the rest of the class is given their exam are herein defined as *makeup exams*; **no makeup exams** are given in General Chemistry at UF. If you have any questions about requesting a conflict exam, please contact your instructor or the Director of General Chemistry «genchem@chem.ufl.edu».

Unpredicted **absences due to medical illness** are **not covered under the above conflict exam policy**. If the time and severity of the illness is severe enough to make continuation in scholastic activity impossible for the rest of the term, a medical withdrawal is strongly advised. Note that the availability of an incomplete grade is severely restricted by UF policy, and students seeking such a remedy should read that policy carefully before requesting and incomplete in a General Chemistry course. If the medical condition warranting the absence at a scheduled exam is unexpected, relatively minor, and can be recovered from in short order, we request that the student, as soon as he/she is healthy (our first concern) provide verifiable documentation of the medical condition to the course instructor within a timely fashion of the scheduled assessment date. Furthermore the student is expected to makeup all work associated with the examination. This typically means completing the exam honestly under the instructions given with the exam without unauthorized assistance, and then self assessing the performance using the published exam solution. If proper medical documentation and the worked and self-graded exam are presented and prove acceptable to the instructor at the time the student is ready to restart their academic pursuits, the instructor and student together decide on one of the following options:

1) The exam score is omitted from the student's course grade computation by renormalizing the remaining assessment scores using a formula agreed to by the student and instructor, or
2) begin the process for the request of a medical withdrawal from the course by the student.
No makeup exams (as defined above) are ever given.

**Dropped exam policies** exist in most, but not all, courses in the General Chemistry program for the convenience and benefit of the student. When this policy is in effect, one or more of a given assessment type within a course is automatically omitted without any documentation or justification needed by the student. These policies are usually referred to as a "best 2 out of 3 exams are counted" or equivalent, and are in effect in all CHM2045 classes, and many others. Such a policy allows a student to be absent for one scheduled assessment *without* having to provide the detailed documentation or prior notification required for the excused absences detailed above. The dropped exam policy is not meant to replace UF exam absence policy for conflicts with sanctioned events, merely extend these for the benefit of the student.

**Student Responsibilities:**

1. **You are required to attend all classes and discussions. (No you don't get points for doing what you are supposed to do like coming to class.) You don't show to class it is up to you to find out what you missed. You are responsible for everything I say in lecture even if you don't come. Read the syllabus and check the online notes do not expect me to repeat a lecture. I have my class video recorded, how to access the videos will be posted. DO NOT depend on reviewing these the day before exam or use this as an excuse for not attending class. Note: The quality of the recording is not very good. You cannot sit and watch 3 hours in a row of my lectures and be successful in the class.**
2. **You are required to read and follow the syllabus it is a grading contract. You fail to comply and you will lose the points!**
3. **You must make check Sakai on a regular basis to make sure all your grades are posted or if an announcement is made. If you find something is wrong you must see me I will be glad to fix the problem. Come see me for missing electronic homework and exam grades and do so promptly. Do not wait until after the course ends, I will not be understanding.**
4. **Exam grades are posted promptly, usually within 24 hours unless we have a problem. So, if yours does not show see your instructor. Scantron errors are not negotiable. This includes Form Code errors, registry errors, name and UFID numbers to name a few. If you wait until the last few days of the semester to discover an incorrect grade you may lose points. DO NOT WAIT TO POINT OUT A MISSED GRADE! If you come to me after the last day of class you will lose the points no discussion!**
5. **You must work "lots of problems", lots is different for everyone. These include end of chapter problems, problems on the notes / power point slides I have posted. Do not come to me with I did all the problems you said but still failed the exam. You take 20 minutes to do a problem at home but on the exam you have only 5 minutes to do the same problem. If you can't work a problem in 5 minutes you did not do enough problems!**
6. **You must keep up with the lecture material, the on line homework and quiz material. All due dates are on the syllabus or the course home page so you have no excuse what so ever for missing or not knowing a due date. At first you may know the material and think you can slack off, don't do this it will harm your grade. Keep working, things happen fast here and once you get behind you may not be able to catch up.**
7. **You are responsible for your personal problems. Your problem(s) no matter how valid they are do not constitute an excuse or exemption from meeting the course requirements. Have a problem that stops you from performing then YOU must go see the Dean of Students, they can help you.**
8. **Please do not e-mail me with mundane and trivial questions. Read the syllabus and review the lecture video. If you want me to do something for you then you come see me. At the start or end of class if it will only take a minute. I cannot answer chemistry problems during this time. Office**

**hours will be posted on the course home page and on my office door. If I am in I will answer the phone, 352-392-0517.**

9. **If you need help get it early, help is available. The Chemistry Learning Center in Flint 257-278 it will have graduate students to assist you. A schedule with TA names and their times in the CLC will be posted on the course home page. You also have Broward Hall services.**
10. **Learn how to fill out a scantron. Scantron errors are not negotiable. This includes but is not limited to Form Code errors, registry errors, and name and UFID numbers. Make it hard for me to post your grade and you will lose points. You WILL BE penalized for scantron errors that require me to do extra work to get your grade into the Sakai grade book. First offense 9 points (this means that your grade will end in a 1 not a 0), second offense 18 points, third offense 24 points and fourth offense 36 points. It pays to learn how to fill out a scantron properly. A copy of a scantron is below look at it. We will give you a scantron for each exam at the start of the exam.**
11. **If you want to see your scantron you MUST come see me within 5 school days of the exam. They will not be e-mailed or given to a second party.**
12. **Need an interview for First year Florida I will do them but only in a group and only a few days. I will announce this in class.**

**SCORING:** Your grade for the term will be determined as follows:

| | |
|---|---|
| Progress Exams (best 2 of 3@ 250 pts each) | 500 |
| WEB Assign homework ($26) | 80 |
| Quizzes (best 4 of 5 @ 30 points each) | 120 |
| Final Exam | 300 |
| TOTAL | 1000 pts |

***Grades will not be curved.*** *The following grade cutoffs will be used: This is fixed; points* ***will not*** go up. We are now using minus grades so your grade will be based on the scale below. Off by one point you get the grade you earned.

| | | |
|---|---|---|
| A = 900 | B - = 760 | D + = 630 |
| A - = 860 | C + = 730 | D = 600 |
| B+ = 830 | C = 700 | E < 600 |
| B = 800 | C - = 660<br>Failing grade | |

**Why do I call a grade less than a C failing? You may not go on to CHM 2046 with a grad less than a C, read your Guide to Majors!! (This is not something I just made up.)**

**On-line Homework:** Sections of WEB Assign will be assigned regularly. The points you see on Sakai will be your course Web Assign points, max 80. WEB Assign points will be up dated on Sakai several times during the semester, usually when exam grades are posted.

**Each posting is the new total of the points you have. Keep up with your WEB Assign grade and know your due dates. If you wait till after the classes end to discover a grade is incorrect you will lose points. We will not reopen up or extend the dates just because you missed the due date. You have several days to complete each WEB Assign assignment. Do not wait till the last minute to do your assignments! Computer and server problems are yours and will not be considered.**

**Sakai:** To access Sakai you should go to the website: http://lss.at.ufl.edu . Choose "Sakai", then "University of Florida". To log in, you must use your GatorLink username and password. If you do not yet have one, you must obtain one. If you have any problems with your GatorLink name or password you should contact the Help Desk

at 392-HELP, or go to 520 CSE. They will only help you with GatorLink items, not WebCT problems. For the latter, see your instructor.

**WEBASSIGN (ON-LINE) HOMEWORK: You must purchase Web Assign it is NOT included with the text.** WebAssign assignments for each textbook chapter will be due on the dates listed in WebAssign – times due for each due date are just before midnight. Do NOT wait until the last minute to access and attempt to complete WebAssign assignments, because computer issues can arise at any time, and you don't want to be left at the last minute not being able to complete your assignments on time due to some technical error.

Once you log in to the UFL Gatorlink at https://webassign.net/ufl/login.html

Then click the log in button to get into the WebAssign Class.

WebAssign Access; You will have to buy the access from the web site (something like $26 for the semester). You'll have about 10 days "free"(it is not free for the term, you will have to purchase Web Assign at some point) of WebAssign usage once you access the site using the class-provided login information, after which you'll have to purchased access either on-line or in the bookstore.

Correct answers to WebAssign assignments require very precise attention to significant-figure rules – if you do not fully understand the usage of significant figures, you should read pages 25-28 in your textbook. Also, the correct answers to WebAssign assignments have very narrow acceptance windows – you must be very careful in the numbers you use for calculations and how you carry them through the problem-solving procedure. Here is a word type problem that students have great difficulty with and you **must** master it. The question is what is the name of HCl(g)? You answer hydrochloric acid, and that is wrong! HCl as a gas is hydrogen chloride, HCl(aq) is hydrochloric acid. Understand what is being asked, answer that question and not the question you want to answer!

Finally, you'll notice that many of the WebAssign problems have information next to the problem number (things like "EOCP" which refers to Silberberg EndOfChapterProblem such-and-such, so that you can consult the Silberberg textbook problem and the posted online solutions to find out how the problem is solved if you have any difficulties).
The WebAssign User Guide is at http://www.webassign.net/manual/student_guide/index.html and the WebAssign Student Technical Support is at http://www.webassign.net/user_support/student/

**WEB Assign assignments and due dates will be posted early in the first week of class.**

**HONOR SYSTEM:** All exams are given under the Honor System. Any student caught cheating will receive the maximum punishment I can bring to bear. (Cheating of any kind will result in a grade of E.) Check the website for the UF policy on honesty and cheating: http://www.dso.ufl.edu/stg/Code_of_Conduct.html

**CHEMISTRY LEARNING CENTER (CLC): CLC video link:**
**https://elearning2.courses.ufl.edu/access/content/group/UFL-CHM1025-12426-82012/pages/mod00/mod00_video03.html**

There is free help to be had from graduate student teaching assistants in the CLC Monday through Friday in Flint Hall 257 and 258. Your discussion TA will have office hours in the CLC, but you may go there anytime

and see any TA to get help on questions pertaining to chemistry. A schedule of the TA schedules will be posted in the corridor outside the CLC and on e-Learning. The CLC ends their office hours the last day of class I will ask them to stay for the reading days, the 25th and 26th of April. I end my office hours the last day of class, the 24th of April.

**Other Information:**
Honor Code: http://www.chem.ufl.edu/~itl/honor.html
Disabilities: http://www.chem.ufl.edu/~itl/disabilities.html
Counseling: http://www.chem.ufl.edu/~itl/counseling.html

**STUDENT ATHLETES and official SCHOOL EVENTS: You must see me in person each and every time about taking a progress exam outside posted times that means early but never late.**

**DISABILITY RESOURCES**: Disability resources students must see me the first week of class. If you are applying for disability resource status come see me the first week of class. Students requesting classroom and exam accommodations must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. Students will then go to the disability resource center.

The Dean of Students Office provides individualized assistance for students with documented disabilities. Services are based upon student need and impact of their specific disability. There is no requirement for any student to self-identify as having a disability. However, students requesting classroom accommodations must register with the Dean of Students Office and provide the appropriate documentation verifying their disability. The Dean of Students Office determines what is and is not appropriate documentation. Examples of accommodations that are available to students include, but are not limited to, registration assistance, approval of reduced course load, course substitutions, classroom and examination accommodations, auxiliary learning aids, additional course drops when disability related, and assistance in other university activities. The designated coordinator for compliance with Section 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) is the Assistant Dean of Students responsible for Students with Disabilities Programs, P202 Peabody Hall, 392-1261 (Voice), or 392-3008 (TDD).

The Disability Resource Center strives to provide quality services to students with physical, learning, sensory or psychological disabilities, to educate them about their legal rights and responsibilities so that they can make informed decisions, and to foster a sense of empowerment so that they can engage in critical thinking and self-determination.

**Course Objectives: CHM 2045 (General Chemistry I)**
To build a basic fund of knowledge of the science of chemistry which is crucial to an understanding in many other disciplines: medicine, molecular biology, genetics, pharmacology, ecology, atmospheric science, engineering, material science, environmental science, etc. covering the topics below:
To learn about chemistry in your daily life

To analyze scientific concepts and think critically.
To review the importance of chemistry in our everyday lives.
To be able to utilize the methods of science as a logical means of problem solving.

**Course chapters:**

**The Foundation of Chemistry**
Matter and Energy-Basic Concepts of Chemistry
Measurements

Significant Figures
Metric System
Scientific Notation
Dimensional Analysis

**Chemical Formulas and Stoichiometry**
Atoms, Ions, Molecules and Compounds
Nomenclature of Inorganic Compounds
The Mole Concept
Percent Composition
Empirical Formula
Molecular Formula

**Chemical Equations and Reaction Stoichiometry**
Balancing of Chemical Equations
Calculations Based on Chemical Equations-moles/masses of reactants/products
Limiting Reagent Calculations
Percent Yield and Theoretical Yield Calculations
Sequential Reactions
Concentration of Solutions-Calculations Involving Mass % and Molarity
Dilution of Solutions: Calculations Involving $V_1M_1=V_2M_2$
Calculations Involving Solution Stoichiometry

**Chemical Reactions**
Organization of the Periodic Table
Aqueous Solutions-Strong and Weak Electrolytes
Reactions in Aqueous Solutions
Oxidation Numbers

**Thermodynamics**
- The First Law of Thermodynamics
- Enthalpy, $\Delta H$
- Calorimetry (constant-pressure and constant volume)
- Thermochemical equations
- Internal energy, $\Delta E$
- Relationship between $\Delta E$ and $\Delta H$
- Hess' Law
- Standard enthalpies of formation and reaction
- Bond energy and $\Delta H$
- The Second Law of Thermodynamics & Spontaneity

**The Structure of the Atom**
Experiments that led to the discovery of the fundamental particles of the atom
Subatomic Particles, Isotopes, Atomic Weight
Development of Quantum Mechanics
Quantum Mechanical Model of the Atom
Electronic Configuration and the Relationship to the Periodic Table
Orbital Diagrams
Quantum Numbers
Chemical Periodicity

**Theory of Ionic and Covalent Bonding**
Lewis Dot Formulas of Atoms
Formation of Binary Ionic Compounds-Coulomb's Law, Lattice Energy
Formation of Covalent Compounds
Lewis Structures for Molecules and Polyatomic Ions and the Octet Rule
Resonance and Formal Charges
Exceptions to the Octet Rule for Lewis Structures
Polar and Nonpolar Covalent Bonds

**Molecular Structure**
Valence Shell Electron Pair Repulsion Theory (VSEPR)
Electronic and Molecular Geometry and Molecular Dipole Moments
Valence Bond Theory and Hybridization of Orbitals
Molecular Orbital Theory

**Gases**
Gas Laws and Ideal Gas Law
Density and Molar Mass
Stoichiometry of Reactions Involving Gases
Kinetic Molecular Theory-Molecular Speeds
Real Gases

**Liquids and Solids**
Intermolecular Attractions and Phase Changes
Physical Processes and Properties of Liquids
Melting Point/Boiling Point
Phase Changes of Matter and Phase Diagrams
Molar Heat of Vaporization and Molar Heat of Fusion
**Solutions**
Dissolution Process for Solids, Liquids and Gases
Factors Affecting Solubility
Saturated, Unsaturated and Supersaturated Solutions
Other Units of Concentration
Colligative Properties

1. Vapor Pressure Lowering
2. Boiling Point Elevation
3. Freezing Point Depression
4. Osmotic Pressure

**Chemical Kinetics:**
Rate of a reaction
Factors that affect reaction rates
a. Nature of reactants
b. Concentration of reactants: Rate-law expressions & Reaction order
c. Concentration vs. time: Integrated rate equations and half-life
Collision theory, activation energy
Transition state theory
Mechanisms and Rate-law expressions
Arrhenius equation: temperature and rate Catalysts