Chemistry 105
General Chemistry For Majors
Section 001

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Office Hours: 2:30-4 Tu/Th, or by appointment (Can be, by request**,** private).
Office hours provide a time and location for students to meet with the instructor to solve problems related to the course in an ongoing and timely fashion. It is best to be prepared. Bring in problems from the text chapters that you have difficulty with; bring in questions that you flagged when transcribing your notes. *I do not bite heads off nor is my office stuffed with UG bodies.*

Skype Hours: W 8-10 pm. As a *continuing experiment* I will offer access via Skype. My "handle" is Leadlady. Please note that it is easier to solve problems on Skype if you send them to me as a scanned document in advance.

Required Textbooks:

- Chemistry, The Central Science; 12th Ed., Brown, Lemay Bursten, Murphy, Woodward, Prentice Hall, 2012, ISBN-10:0321696727/SBN-13:97816967274.
- Chemical Principles & Basic Inorganic Chemistry Chem 105/106 Laboratory Manual; Drs. Fitch & Daubenmire, Fall 2013 & Spring 2014: purchase from instructors: **$$$$?**

Recommended Textbook: Student's Guide, Chemistry, the Central Science, J. C. Hill, Prentice Hall, Inc., 12th ed., 2012. ISBN-10: 0321704584 | ISBN-13: 9780321704580. This paperback contains numerous additional, detailed, worked-out examples as well as many practice exam questions. This paperback book could be shared to reduce cost.

Lecture: Lectures are scheduled for Tuesday and Thursday at 1:00 – 2:15 PM in Flanner Hall, Room 133. Power Point lectures will be posted either before or after the lecture, but no later than 1 week falling content. Occasional emails via the Loyola email system Microsoft Exchange may be sent.

Discussion: Discussion, section 002, is scheduled to meet twice a week, i.e., Tuesday and Thursday at 4:00 – 5:00 PM in Flanner Hall, Room 133.

Course Description: A study of chemical principles, reactions, and bonding with emphasis on the development of a scientific attitude and an understanding of fundamental concepts.

Course Objectives: Provide a foundation for advanced work in chemistry and an appreciation forthe scientific method with special emphasis on problem solving. Acquire knowledge about the properties and reactions of matter. Gain an understanding of the basic principles of chemistry and its many applications.

Calculators/Cell Phones/Calculators/Lap Tops/Recording Devices

- Cell phones should be turned off during lecture

- Students are encouraged to use calculators with statistical functions and built in quadratic calculators. This means that if you do not have those functions you will competing against those who do on an exam. Please be aware that in an exam all work must be shown so if you are using a calculator with quadratic functionality the steps taken to set up the quadratic must be shown.
- Many key concepts and problems may be assigned in an Excel or Spreadsheet format.
- A calculator will be necessary for exams but all numerical work should be demonstrated
- Lap Tops. Students are welcome to use lap tops to display and annotate lecture slides, take notes, and look up chemistry information on the web as we refer to it. Use of the lap top for other purposes is discouraged. If it appears that your lap top interferes with the learning environment you may be asked to put it away.
- Recording devices, **if permission is asked**, may be used.

Laboratory: Chemistry 105 has a laboratory component, sections 003 & 004, which meet in FH-305 and 308 on Wednesdays at 11:30 – 2:30 and 2:45 – 5:45 PM, respectively. **Laboratory** work **will begin on 9/5/12.????**

COURSE STRATEGY

Research shows that different students learn differently. Studies also show that some strategies tend to help learning. This course is designed to "hit" a variety of learning strategies so that most students should encounter one which fits their needs.

1. **Text Book (visualization, reinforcing concepts):**

Students are expected to read the material in advance of Lecture; you will be randomly called upon and/or quizzed on the reading material. Part of active learning is to read and take notes in a separate notebook. At the end of the day you should transcribe your notes from reading along with your notes from lecture to create your final set of notes, in which you highlight any questions that are unresolved.

2. **Text Book End of Chapter Problems (repetition and drills):**

Every year I ask the "A" students what their study strategy is. I always get the same answer. AN "A" student successfully works 7-12 unassigned end of chapter problems EVERY NIGHT! It is essential to work **every night** because of how your brain processes information. Working 1 hour every night for 5 nights is an efficient way of transcribing information into the brain that can then be later accessed for problem solving. It is vastly superior to working 5 hours on 1 night.

If you are not performing at this level it is highly unlikely that you will get above a "B" grade. I recommend getting a spiral bound notebook just for working problems. You should attempt problems for which answers appear in the back of the book appropriate to the material covered in class that day. Work for 10 minutes on a problem. If you cannot solve it set it aside and move onto another one. Quit when you reach either 8-12 successes or 1 hour. Keep a log of this in your notebook and see me WITH THE LOG/NOTEBOOK for help.

3. **Discussion Sections (repetition and drills AND communal knowledge):**

are an essential component of this class. The "point" of requiring discussion is that studies show that students learn better when they work in small groups - discussion is intended to foster the formation of external study groups; furthermore in order for me to gauge how well you (individually and as a class) are learning the discussion section gives me a change to move among all of you in friendly fashion to monitor what kinds of problems are stumbling blocks.

4. **Lectures**

The material in lecture may exceed that on exams as I

a) Attempt to provide context for a particular chemical concept. I will alert you that we are in "context" mode. Context is important for many students in creating a framework to learn upon.

b) Provide visualization of some chemical concepts for the visual learner

c) Derive math associated with chemical phenomena. It is always better to understand the chemical phenomena that give rise to the math rather than attempting to memorize a series of random equations.

5. **Posted Lecture notes:**

Lecture notes are posted in their entirety. Students attempting to learn from them

without attending lecture may find it difficult to interpret the notes. The notes are not a substitute for lecture or for reading and taking notes from your reading. Content is subject to change prior to class as lectures have to be adjusted to new text.

6. **Cheat Sheet:**

Students may **handwrite** a single one sided sheet of crib notes that must be turned in SIGNED with the exam. It will not be returned so if you want to expand on it or modify it you should make a copy. The point of allowing you to make a Crib Sheet is that it gives you a reason to try and assemble all of the information in a coherent fashion. Students usually find that it is the process of creating a handwritten cheat sheet that is important – not the sheet itself.

7. **Paper Assignment:**

The paper assignment allows the student to put the content of chemistry in relationship to some important society issue.

8. **Review Sessions:**

Review sessions are offered at my discretion. If and when I offer them I survey students for a likely "good" time that matches the bulk of students. I never offer review sessions the night before an exam because if you are stumped on that night you are already in big trouble. Generally the review session is 3 days before an exam.

GRADING

There will be a total of 525 points accrued throughout the semester with grades assigned in the following way:

	Percent	Points
A	88.000%	462-525
B	75.000 to 87.999%	394-461.5
C	60.000 to 74.999%	315-393.5
D	50.000 to 59.999%	262-314.5
F	0-49.999%	0-261.5

NO MAKE UP EXAMS
Use your ability to drop 1 exam

The number of decimal points show reflects the fact that 74.999%≠75%. Once the percentage is calculated there is **NO ROUNDING** because of the number of manipulations of the data, as described below.

A-/B+ etc will be assigned at the discretion of the instructor, but will always reflect a downward bell curve shift. For example, I may decide that a B student with 87.2% points is deserving of either a B+ or an A- based on their demonstrated successive improvement in the class. My judgment will be tempered by the necessity to avoid jumping said student over another student with an 87.5%. Any such "boosts" are entirely at my discretion.

Schemes for calculating total points:

Scheme 1	**Scheme 2**	**Scheme 3**
Best 3 of 4 exams	Best 2 of 4 exams (3 exams must be taken)	Best 1 of 4 exams (3 exams must be taken)
Final 100	2x(Final)	3x(Final)
Paper 25	Paper 25	Paper 25
%OWLS 25	%OWLS 25	%OWLS 25
%Discussion 75	%Discussion 75	%Discussion 75
525	525	525

Schemes 2 and 3 only apply if 3 out of four exams have been taken with average scores 30 points or better. This rule is intended to prevent students from skipping three exams, taking one exam and the final only. The final is cumulative.

The goal of multiple schemes is to allow students who take a while to "get up to speed" to be able to demonstrate their mastery of chemistry as their learning strategies improve.

All schemes are automatically applied and the best one selected for your final grade.

$$\%Discussion = \left(\frac{Total\ \ Pts\ Obtained\ \ In\ Discussion}{Total\ Possible\ Pts\ \ In\ Discussion} \right) 100$$

Each discussion period has assignments **turned in during discussion** worth 10 points. The total number of points is typically 120 (12 periods) but may vary if discussion period is used for review for the exam. Grading allows for 1 missed discussion so **there will be no "make up" of discussion.** Total discussion points possible 75.

$$\%OWLS = \left(\frac{total\ Pts\ Obtained\ In\ OWLS}{Total\ Poss\ Pts\ In\ OWLS} \right) 100$$

OWLS questions are made available during a discrete time phase. Once that time frame has passed that set of questions shuts down and no further grades are accepted from the OWLS system. The questions, however, are available for review and self testing.

The calendar time: Please be aware that the time posted is in OWLS time, I believe OWLS is on an Eastern Time frame, so if I say midnight shuts down grading, that means 11 p.m. central time grading is shut down. Grading allows for 1 missed session so **there will be no "make up" of OWLS.** Total OWLS points possible 25.

Paper: Total paper points possible 25.

The paper topic is energy. Student selects a carbon based fuel and finds a three dimensional model of the fuel. The atoms in the model should be labeled. The energy creating reaction is to be correctly balanced and the bonds broken to create that energy indicated on the molecule. The enthalpy associated with the reaction is to be obtained. The student should go to the Department of Energy resources and determine the sources of the fuel, the estimated reserves, and the location of that fuel.

Wk #	Wk of	Lecture Note #	Topics covered	Chap in Text
1	Aug 24	0a and 0b	structure of class, learning styles, how to study, grading	n.a.
		1	Measurements – Science is Referential – need to establish reference states and scaling systems. Significant Figures	1
2	Aug 31	2	Atoms, Molecules and Ions – Solar System abundance of elements – relationship of abundance to periodic table and stability – structure of atoms, stability of atoms (Z, A, etc.) Introduction of Electrostatic attraction based on charge and distance. Naming	2, 21
Sept 4-Sept 8 Labor DayWeekend (no class Friday or Monday)				
3	Sept 7	3	Mass and % Composition	2 (end)
4	Sept 14	4	Charge and Successful Reactions – ways to avoid memorizing solubility and strong acid rules by thinking about charge density. Starts the concept of changes with depth within a group. Introduces modeled images of various anions that do not conform to initial ideas about charge density.	2
Monday Sept 21: Exam 1 Covers Chapters 1-2				
5	Sept 21	5	Reactions in Aqueous Solutions (Very basic intro to precipitation, acid/base, and redox reactions).	3
6	Sept 28	6	Stoichiometry: Limiting Reactions; Includes neutralization reactions, preliminary introduction of amines and carboxylic functional	4
7	Oct 5			
Oct 5-6: Mid semester Break (No class Monday)				
8	Oct 12	6	Thermochemistry: heat, specific heat; enthalpy	5
9	Oct 19	7	More Thermochemistry: enthalpies of formation; energy; Hess's Law	
Monday Oct. 26: Exam 2 Covers Chapters 3, 4 & 5				
10	Oct 26	8	More measurements – introduces reference systems for energy measurements particularly energy and light	6&7
Last Day to Withdraw with a Grade of W Oct 30				
11	Nov. 2	9	Electronic structure – reemphasizes "classical" imagery of electrostatic attraction (Bohr model) then introduces quantum chemistry. Emphasizes relation of the quantum numbers to the arrangement of the periodic table.	7
12	Nov 9	10	Covalent Bonds: Lewis dot structures; VESPR; what do orbitals look like?	8,9
Monday Nov. 12: Exam 3 covers Chapters 6-9				
13	Nov 16	11	Gas Phase reactions –emphasizes that the Ideal Gas equation starts by assuming to electrostatic attractions. Ends by looking at exceptions to Ideal Gas law based on including electrostatic attractions	11
Friday Nov. 20 Paper is Due				
14	Nov 23	12	Intermolecular Forces: phase changes; evaporation; solubility; Henry's Law	12
Nov. 25-29 Thanksgiving (No class Wed or Friday)				
15	Nov 30	12	The chemistry of solids: structures, crystals	13
Monday Nov. 30 Exam 4 covers Chapters 11-13				
Dec 5 Last Day of Class				
Final Exam: (Cumulative) Friday Dec. 11: 9-11 a.m. Flanner Hall Auditorium				