

Principles of Chemistry I

Section 001 CRN#11414

Chem 1210

MWF 10:30 – 11:20 am

Spring 2009

BNR 102

Professor John L. Hubbard **Office: Maeser Lab 361**

Office Hours : MW 11:30 -1:30, or by appointment

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Text: “*Chemistry: The Central Science*” 11th Edition, Brown, Lemay, Bursten (9th, or 10th Editions may be used)

Prerequisites: Math 1050 or equivalent; prior introductory chemistry can be an advantage

Recitation: All Chem 1210 students must register for a recitation section (*must be specific sections 901-908*). A recitation section consists of about 30-40 students and meets once weekly. **The Recitation “cycles” start the second week of the term- Monday, January 12.** The material covered in recitation is a review of material first presented in the MWF class meetings. Teaching Assistants (under my direction) are in charge of helping students work problems and review conceptual material from the class. At the end of each recitation session, a short quiz is administered over the material covered that week. Topics covered on exams are covered in recitation before exams. **One sixth (1/6) of the Chem 1210 grade is based on the weekly quiz performance.**

Supplemental Instruction Leader : Brittany Woytko (brittwoytko@gmail.com);

Google Group Site: groups.google.com/group/chem-1210-si)

SI Times/Locations: M - 5:30-6:20 in ENGR 101, Thursdays – 6:30-7:20 in ENGR 101

Grading: A total of 600 points is possible in Chem 1210. Points are distributed as follows:

1 st Hour Exam (W 2/4, 10:30 am, BNR 102)	100 pts
2 nd Hour Exam (W, 3/4, 10:30 am, BNR 102)	100 pts
3 rd Hour Exam (W, 4/8, 10:30 am, BNR 102)	100 pts
Final Exam (Friday, 5/1, 9:30 am, BNR 102)	200 pts
Recitation quizzes.(best 10 of 11)	100 pts
Total	600 pts

Tentative Letter grade brackets (brackets *may* be lowered (“curved”)- but **will Not** be raised):

A-/A	88-100%
B-/B/B+	77-87%
C-/C/C+	60-76%
D/D+	50-59%

Anyone missing a scheduled exam for legitimate reasons (**required** written documentation from physician, parent, guardian, lawyer, judge, etc.) will be eligible to take the Comprehensive Make-up Exam, offered on Friday, April 17th, by appointment with Dr. Hubbard. Personal or family vacations are not excused absences for exams. Make-up recitation quizzes will not be offered.

Course Provisions:

The *Americans with Disabilities Act* mandates that reasonable accommodation will be made for students with disabilities in order to assure equal participation in Chem 1210. Students requesting such accommodation must meet with Dr. Hubbard during the first week of classes and must coordinate such accommodations with the Disabilities Resource Center.

The administration of Chem 1210 will adhere strictly to the academic regulations stipulated in the most recent Schedule of Classes and the USU General Catalog. Withdrawal from the course will follow official USU procedures.

Blackboard® Internet Class System

I will be utilizing a Blackboard® management system for this section of Chem 1210. All registered students will have access to Blackboard using the following process: Using a web browser from any location go to: **bb.usu.edu**. Log on using your Blackboard identity, which is simply your Banner ID. Your Password is your Banner PIN. Your courses that utilize Blackboard should be listed. Click on Chem 1210 and begin to browse.

The purchase the publisher’s Web Media Pack is **optional**. I will be providing essential material through my Blackboard site and this is **Free**. The publisher’s Media material may be helpful but it is not a primary source of class material.

All supplemental materials for the class, including notes, problem assignments/ solutions, sample exams, demonstrations, and related material will be available through the Chem 1210 Blackboard site.

Your Exam results will be sent to your “preferred” email account..

Chem 1210 - Detailed Schedule, Spring 2009

Day	Date	Lecture	Topic	Chapter	Comments
M	1/5	1	Intro to WebCT, Course Overview, Matter	1	First day of Lecture
W	1/7	2	Elements, Compounds	1	<No Recitations Jan 5-9>
F	1/9	3	Measurements, calculations	1	
M	1/12	4	Atomic Structure	2	Recitation Cycle 1: Begins Mon, Jan 12 (Ch 1)
W	1/14	5	Periodic Table	2	
F	1/16	6	Nomenclature	2	
M	1/19	-	Martin Luther King Holiday		Recitation Cycle 2 Begins Tue, Jan 20 (Ch 2)
W	1/21	7	Balancing Equations	3	
F	1/23	8	Atomic/Molecular Wts	3	<Monday, Jan 26- Last day to add>
M	1/26	9	Empirical Formulas	3	Recitation Cycle 3 Begins Tue, Jan 27 (Ch 3)
W	1/28	10	Stoichiometry	3	
F	1/30	11	Chem Equation Calcs	3	
M	2/2	12	Review	1,2,3	
W	2/4	EXAM 1	Chapters 1, 2, 3	EXAM 1	**No recitations Thurs Feb 5 or Fri Feb 6
F	2/6	13	Molarity, Electrolytes	4	
M	2/9	14	Acid, Bases, Salts	4	Recitation Cycle 4 Begins Tue, Feb 10 (Ch 4)
W	2/11	15	Metals, Titrations	4	
F	2/13	16	Energy, First Law	5	
M	2/16	-	PRESIDENTS DAY HOLIDAY		
Tuesday	2/17	17	Energy, Hess's Law	5	**Note: we meet on Tuesday !!**
W	2/18	18	Enthalpy of Formation	5	Recitation Cycle 5 Begins Thurs, Feb 19 (Ch 5)
F	2/20	19	Radiant Energy	6	
M	2/23	20	Quantum Effects	6	Recitation Cycle 6 Begins Thurs, Feb 26 (Ch 6)
W	2/25	21	Bohr Atom, Orbitals	6	
F	2/27	22	Many-electron system	6	
M	3/2	23	Review	4, 5, 6	**No recitations Thurs Mar 5 or Fri Mar 6**
W	3/4	EXAM 2	Chapters 4, 5, 6	EXAM 2	<Mar 6 Last day to Drop with a "W"/ or P/F change>
F	3/6	24	Atomic sizes, energies	7	
M	3/9	-	SPRING BREAK		SPRING BREAK
W	3/11	-	SPRING BREAK		SPRING BREAK
F	3/13	-	SPRING BREAK		SPRING BREAK
M	3/16	25	Ionization energies	7	Recitation Cycle 7 Begins Mon, Mar 16 (Ch 6, 7)
W	3/18	26	Periodic Properties	7	
F	3/20	27	Lewis Structures	8	
M	3/23	28	Ionic Bonds, Covalent Bond	8	Recitation Cycle 8 Begins Mon, Mar 23 (Ch 8)
W	3/25	29	Octets, Resonance	8	
F	3/27	30	Bond Energies	8	<Mar 30 Last day to drop with "W/F" >
M	3/30	31	Valence Shell Electron Pair Repulsion theory	9	Recitation Cycle 9 Begins Mon, Mar 30 (Ch 8, 9)
W	4/1	32	Bond polarity	9	
F	4/3	33	Hybrid Orbitals	9	
M	4/6	34	Review	7, 8, 9	**No recitations For the week of Apr 6-10**
W	4/8	EXAM 3	Chapters 7, 8, 9	EXAM 3	
F	4/10	35	Gases, Gas Laws	10	
M	4/13	36	Partial Pressures	10	Recitation Cycle 10 Begins Mon, Apr 13 (Chap 10)
W	4/15	37	Liquids and Solids	10-11	
F	4/17	38	Phase Changes, phase diagrams	11	Make-up Exam (by permission/appointment only)
M	4/20	39	Solutions, Concentration definitions	11-13	Recitation Cycle 11 Begins Mon, Apr 20 (Chap 11)
W	4/22	40	Colligative Properties	13	
F	4/24	41	Surface tension, Review	13	Last Day of Lecture
Friday	5/1	FINAL 9:30 am	Final Exam- 70% Chap 1-10 // 30% Chapters 10, 11, 13	FINAL 9:30 am	NOTICE - Early Time !!!

Recitation "cycles"

Week 1 (Mon 1/12- Fri 1/16)

Week 2 (Tues 1/20- Mon 1/26)

Week 3 (Tues 1/27 - Mon 2/2)

No recitations Tues 2/3, Thurs 2/5, Fri 2/6, or Mon 2/9

Week 4 (Tues 2/10- Tues 2/17)

Week 5 (Thur 2/19- Tue 2/24)

Week 6 (Thur 2/26- Tue 3/3)

No recitations Thurs 3/6 or Fri 3/7

<<<Spring Break 3/9 - 3/13>>>

Week 7 (Mon 3/16- Fri 3/20)

Week 8 (Mon 3/23- Fri 3/27)

Week 9 (Mon 3/30- Fri 4/3)

No recitations Mon 4/6, Tues 4/7, Thurs 4/9, Fri 4/10

Week 10 (Mon 4/13- Fri 4/17)

Week 11 (Mon 4/20- Fri 4/24)

Coverage

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

Chapter 7

Chapter 8

Chapter 9

Chapter 10

Chapter 11

Comments

Mon-Fri Cycle

Cycle Begins on Tuesday, ends on the following Monday

Tues-Mon Cycle

(Exam 1 on Wed 2/4) Chapters 1, 2, 3

Note: Tues 2/17 is a Monday Schedule

Cycle Now Begins on Thurs, ends the following Tues

Thurs-Tues Cycle

(Exam 2 on Wed 3/4) Chapters 4, 5, 6

Cycle Now Begins on Monday, ends on Friday

Mon-Fri Cycle

Mon-Fri Cycle

(Exam 3 on Wed 4/8) Chapters 7, 8, 9

Mon-Fri Cycle

Mon-Fri Cycle

(Final Exam on Friday May 1)

Chapters 1-10, 11, 13

9:30 am BNR 102- Note the Early Time-

Learning Objectives for Chemistry 1210

Describe units of measurement for mass, length, velocity, time
Use the metric system of units and perform conversions mathematically
Perform calculations utilizing correct significant figures
Identify and describe the different particles inside an atom and describe the structure of an atom
Describe the Periodic Table as it relates to atomic number, atomic mass, valence electron count
Be able to name simple atoms and general ionic and molecular compounds
Balance chemical equations
Differentiate between a chemical formula and an empirical formula
Define units of solution concentration
Define an acid, a base, a salt, and electrolyte
Calculate formula weights and perform stoichiometric calculations
Determine theoretical yields and experimental yields
Utilize the First Law of thermodynamics and the Law of Hess; predict enthalpies for chemical processes
Describe the nature of electromagnetic radiation
Describe the origin of line spectra and how it relates to the development of quantum numbers
Describe the forces that favor the formation of the H₂ molecule over two isolated H atoms
Describe Bohr orbitals and the structure of a many-electron atom
Describe and draw the shapes of the Hydrogenic Orbitals (s, p, d, f)
Utilize the Periodic Table to predict atomic trends in size, ionization energies, electron attachment
Draw Lewis diagrams for atoms and polyatomic species
Describe the Octet Rule and draw resonance structures
Predict molecular shapes using the Valence Shell Electron Repulsion Model
Predict molecular polarity
Differentiate single, double, and triple bonds and estimate bond relative bond energies
Describe the notion of hybrid orbitals and when this approximation works
Describe the properties of gases and utilize the gas laws of Boyle, Charles, and Avogadro
Perform calculations using the Ideal Gas Law and understand the associated pitfalls
Describe and differentiate between the solid, liquid, and gas phases
Draw and use a phase diagram to describe temperature and pressure relationships
Define the term colligative property
Show how vapor pressure of a solvent is affected by solute concentration

“Gain Score” Assessment Strategies

In order to gauge the effectiveness of the Chemistry 1210 course, several different methods of “Gain Score Analysis” may be employed. A “gain score” is a measurement of how much a student’s capability has increased between the beginning of a class and the completion of the course. An initial quiz may be administered on the first day of class and the class performance (not individuals!) will be compared to similar questions offered on the final exam.

Another measurement is the comparison of the performance on weekly quizzes and to the performance on the midterm exams. Comparisons between midterm exam performance to the comprehensive final exam grade can also shed light on student progress. Finally, it is possible that the final exam could be a nationally “standardized” exam designed to cover the material in Chem 1210. Throughout the semester, “embedded questions” will be presented and revisited. These kinds of questions emphasize the above-mentioned “Learning Objectives” and help us assess the overall quality of the Chem 1210 course.

Suggested Strategy for a Successful Chem 1210 Semester

Everyone has different needs for achieving their academic goals. With very large classes like Chemistry 1210 and 1220, it is very important for you to understand how the class is presented- especially with regard to how information is presented and to how support services are made available.

My first suggestion is to obtain a copy of the text – 9th, 10th, or 11th editions will do fine. We have used this text for many years, and despite a few problems, it is still one of the best first-year chemistry texts available. It is a good value and useful for a complete year of chemistry. If you are a pre-med or science major with intentions of a science, medical, or technical career, I strongly suggest keeping the book for future study (like for MCAT, DAT, PCAT, GRE, etc).

I have worked extensively with the book and the changes between editions are minor. I organize the course around the book, but I will not read the book to you in class or just use PowerPoint slides to reproduce it in my lectures. Before class I suggest that you look at my detailed syllabus and see what sections will be covered each day. Before class, you need to browse those sections of the chapter and make some preliminary notes of your own – highlighting key words and concepts that will be covered, noting questions you may have. I plan to have my lecture notes available before class as Acrobat files (posted on the BlackBoard Web site).

When you come to class, have your pre-class notes organized in a notebook. My lectures and examples are organized around the material in the chapters- but you need to learn to jot down notes in your notebook as the lecture proceeds. Try to pay attention and LISTEN-

After class you complete the circle by taking your pre-class notes, and your in-class notes and see if things make sense. After you have done this, you need to look at the “Recommended Problems” for the chapter and begin to work problems. You may want to use a separate spiral notebook to do this so you can keep track of the problems you have worked out and be able to refer to them again for review.

Recitations each week are designed to help you review material. It is best to go to Recitation with a prepared mind- and be prepared to ask questions about specific things you do not understand. It is not useful to go to Recitation without preparation. One-sixth of your grade comes from the quiz at the end of recitation- so it is important to go and get as many of these points as possible.

Finally, the majority of the credit for the course rests on the 3 midterm exams (50%) and the Final exam (33%). The best way to prepare for exams is to ***practice taking exams under realistic conditions.*** “Going over” old exam keys is not very productive. Be careful about taking practice exams literally. The practice exams I offer are actually real exams from previous years. However, the exams you will see will not necessarily reflect the same exact questions. The questions will require the same preparation but you will need to read and consider the questions carefully since slight changes in conditions, numbers, etc can radically change the outcome.

Remember, I will be available through the Discussion Board on the Website (“Questions Asked/ Questions Answered”). I usually start my day by looking at the web and I check it regularly during the day and in the evening after I go home. So please don’t hesitate to ask questions. By addressing questions in this way, everyone can benefit from our discussions. You may also write to me privately by email. This way I can take your questions and present my answers on the Discussion link, removing any reference to your name.