

Principles of Chemistry I

Section 002, CRN#40455

Chem 1210

MWF 10:30 – 11:20 am

Fall 2006

ESLC 130

Professor John L. Hubbard **Office: Maeser Lab 361**
Office Hours : MTWTh 12-1pm, or by appointment

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Text: "Chemistry: The Central Science" 10th Edition, Brown, Lemay, Bursten (9th Edition 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 909-920*). A recitation section consists of about 30 students and meets weekly, *starting the second week of the term*. Material covered in recitation is a review of material first presented in the MWF class meetings. A Teaching Assistant (under my direction) is 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.

Resource Room: Times and locations of the "Resource Room" will be announced during the first week of the term. These sessions are available on a walk-in basis to all general chemistry students.

Supplemental Instruction Leader : Tyler Elison (eli@cc.usu.edu)

Times: Mon 3:30 Tues 6:30 pm Thurs 4:30 pm **Location:** Engineering Room 103

Tyler attends the class and will be an important source for skill-building and problem solving.

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

1 st Hour Exam (M, 9/25, 10:30 am, ESLC 130)	100 pts
2 nd Hour Exam (M, 10/23, 10:30 am, ESLC 130)	100 pts
3 rd Hour Exam (M, 11/20, 10:30 am, ESLC 130)	100 pts
Final Exam (W, 12/13, 9:30 am, ESLC 130)	200 pts
Recitation quizzes.(best 10 of 12).....	100 pts
Total	600 pts

Tentative Letter grade brackets (brackets could be lowered- *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, December 1, by appointment with Dr. Hubbard. 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.

WebCT

I will be utilizing a WebCT management system for this section of Chem 1210. All registered students will have access to WebCT using the following process: Using a web browser from any location go to: **webct.usu.edu**. Log on using your WebCT identity, which is simply your Banner ID. Your Password is the first 6 characters of your Banner PIN. Your courses that utilize WebCT should be listed. Click on Chem 1210 and begin to browse.

If you did not buy a new 10th Edition of the text from the USU Bookstore (that includes the WebCT Media Pack), you may purchase the WebCT Media Pack from the USU Bookstore. *This is optional*. I will be providing essential material through my WebCT site and this is *Free*. The WebCT 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 my Chem 1210 site WebCT (Free of charge)

Your Exam results will be e-mailed confidentially to your cc.usu.edu e-mail account.

SAVE this syllabus and schedule for future reference !

Design of the Chem 1210 Course Schedule :

Three chapters per Midterm Exam- (10 Lecture days + 1 day of review in class on the Friday prior to the Monday exam)

(Midterm exams are 25 Multiple choice questions)

Final Exam covers 3 new chapters (30%) and Comprehensive (70%) -

(Final Exam is 50 Multiple Choice questions total)

Recitation “Cycles” prepare students for the Midterm Exams- Quizzes offered each week, best 10 of 12 counted

Day	Date	Lecture	Topic	Chapter	Recitation Dates, Coverage (Recitations on Thurs and Fri)
M	8/28	1	Intro to WebCT, Course Overview, Matter	1	
W	8/30	2	Elements, Compounds	1	NO Recitations Thurs/ Fri 9/1-9/2
F	9/1	3	Measurements, calculations	1	
M	9/4	Holiday	Labor Day	-	
W	9/6	4	Atomic Structure	2	Week 1- Thurs/Fri 9/7-9/8 Chap 1
F	9/8	5	Periodic Table	2	
M	9/11	6	Nomenclature	2	
W	9/13	7	Balancing Equations	3	Week 2- Thurs/Fri 9/14-9/15 Chap 2
F	9/15	8	Atomic/Molecular Wts	3	
M	9/18	9	Empirical Formulas	3	<i>{Last day to Add/Drop w/o “W” on transcript }</i>
W	9/20	10	Chem Equation Calcs	3	Week 3- Thurs/Fri 9/21-9/22 Chap 3
F	9/22	11	Review	-	
M	9/25	EXAM 1	Chapters 1, 2, 3	-	
W	9/27	12	Molarity, Electrolytes	4	Week 4- Thurs/Fri 9/28-9/29 Chap 4
F	9/29	13	Acid, Bases, Salts	4	
M	10/2	14	Metals, Titrations	4	
W	10/4	15	Energy, First Law	5	Week 5- Thurs/Fri 10/5-10/6 Chap 6
F	10/6	16	Energy, Hess's Law	5	
M	10/9	17	Enthalpy of Formation	5	
W	10/11	18	Radiant Energy	6	Week 6- Thurs/Fri 10/12-10/13 Chap 6
F	10/13	19	Quantum Effects	6	
M	10/16	20	Bohr Atom, Orbitals	6	
W	10/18	21	Many-electron system	6	No recitations this week 10/19 - 10/20
F	10/20	-	Holiday	-	
M	10/23	EXAM 2	Chapters 4, 5, 6	-	
W	10/25	22	Atomic sizes, energies	7	Week 7- Thurs/Fri 10/26-10/27 Chap 7
F	10/27	23	Ionization energies	7	
M	10/30	24	Periodic Properties	7	<i>{After 11/1, Drops req. signature, shows WF }</i>
W	11/1	25	Lewis Structures	8	Week 8- Thurs/Fri 11/2- 11/3 Chap 7
F	11/3	26	Covalent Bonds	8	
M	11/6	27	Resonance, Octet	8	
W	11/8	28	Bond Energies	8	Week 9- Thurs/Fri 11/9-11/10 Chap 8
F	11/10	29	VSEPR theory	9	
M	11/13	30	Bond polarity	9	<i>{No Dropping after 11/15 }</i>
W	11/15	31	Hybrid Orbitals	9	Week 10 Thurs/Fri 11/16-11/17 Chap 9
F	11/17	32	Review	-	
M	11/20	Exam 3	Chapters 7,8,9	-	
W	11/22	Holiday		-	
F	11/24	Holiday		-	
M	11/27	33	Gases, Gas Laws	10	
W	11/29	34	Partial Pressures	10	Week 11- Thurs/Fri 11/30- 12/1 Chap 10
F	12/1	35	Liquids and Solids	11	Make up exam Fri 12/1 (by Invitation only!)
M	12/4	36	Phase Changes, phase diagrams	11	
W	12/6	37	Solutions, Concentration definitions	13	Week 12- Thurs/Fri 12/7-12/8 Chap 11-13
F	12/8	38	Colligative Properties	13	Last Day of Class
W	12/13	FINAL EXAM 9:30 am	30% Chap 10, 11, 13 70% Comprehensive		NOTE: The Final is at 9:30 am !! Wed, Dec 13, ESLC 130

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” will be employed. A “gain score” is a measurement of how much a student’s capability has (hopefully) increased between the beginning of a class and the completion of the course.

One measurement is the comparison of the performance on weekly quizzes and to the performance on the midterm exams. Another measurement is how the midterm exam scores compare to the comprehensive final exam grade. 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. These kind of questions emphasize the above-mentioned “Learning Objectives” and help us assess the overall quality of the Chem 1210 course.