CHEMISTRY 112 / S09

Section 007

Dr. Andrew Pounds,

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Office Hours:	MWR 11:00-12:00 (or by appointment)

CHM 112 is the second course in a two-part sequence to introduce students to the foundational principles of Chemistry. Students in CHM 112 will be exposed to the fundamental laws of mass and energy conservation and their application to chemical systems and reactions. Students will also study the role of energy and entropy in chemical systems and how they manifest themselves in chemical equilibrium. The approach to equilibrium will also be investigated through the study of chemical kinetics. Students in CHM 112 are expected to read at the college level and also set up and solve algebraic and trigonometric equations. For that reason, MAT 133 (Precalculus) is a corequisite for the course. Upon completion of this course, a student will demonstrate competence in each of the following areas:

- solving chemical problems,
- understanding chemical concepts from the lecture by successfully applying these concepts on homework and tests,
- making accurate physical and chemical measurements in the laboratory, and
- writing clear and concise laboratory reports.

Class Meeting Times and Locations

Lecture:	MWF 2:00–2:50 a.m., WSC 310
Lab:	W 3:05 p.m – 5:45 p.m., WSC Room 302

Course Materials

General Chemistry: An Integrated Approach, Hill and Petrucci, 4$^{\text{th}}$ ed.,
Laboratory Notebook (numbered, carbonless pages, available at bookstore)
Scientific Calculator
Laboratory Instructions (From WWW)
Approved Safety Glasses/Goggles
Lock (for lab drawer)

Course Structure

Nine chapters of the text will be covered during the semester in the order listed on the class schedule. The lecture time will be used to expound on and augment the text and also discuss problem solving strategies. Students are responsible for all material covered in class as well as the material from the textual sections listed in the class schedule. While homework will not be collected, students are encouraged to complete as many problems as possible to gain competency with the material. Several unannounced in-class quizzes will be given during the semester. The best five grades from the quizzes will count toward the final grade. Five 50 minute exams will be given per the schedule and the best four exam grades will count toward the final grade. A three hour final exam will be administered at the end of the term.

Grading

Tests (best 4 @ 100 pts)	400 pts
Quizzes (best 5 @ 20 pts)	100 pts
Laboratory (11 @ 25 pts)	275 pts
Final Exam	225 pts
Total Possible	1000 pts

The following grading scale is assured but *may* be *slightly* lowered based on test results.

A ≥900 pts
B ≥800 pts
C ≥700 pts
D ≥600 pts
F <600 pts

General Information

Honor Code: All students in CHM 112 are expected to adhere to the Mercer University Honor Code. Any suspected violations will be reported to the Honor Council for further investigation.

Attendance: Except for the first day of the semester, attendance will not be taken. However, students are still accountable for all material covered in class as well as any announcements made during the lecture period.

Missed Quizzes: No makeup quizzes will be given.

Missed Exams: Anyone missing an exam for *any* reason (personal illness, death in the immediate family, or other emergency) must notify Dr. Pounds in advance. The absence will be considered unexcused otherwise. Make-up exams will be individually scheduled.

Partial Credit: Partial credit will not be awarded on any quiz, exam, prelab, or lab report unless individuals show their work and clearly delineate how they arrived at their answers.

Re-grading Policy: If a student suspects that an error was made in the grading of a submitted work, they may return the paper for re-grading with the understanding that the entire work will be re-graded and not only the portion in question.

Posting of Grades: Grades will periodically be posted throughout the semester. This will most likely be done via *BlackBoard*. If you have questions, see Dr. Pounds.

E-mail Listserve: I maintain an e-mail listserve which I use use copiously to send information to the class and which you can use to communicate with each other. To sign up for the listserve and to learn how to send information to it, please go to: `http://theochem.mercer.edu/mailman/listinfo/chm112`.

American Disability Act: "Students with a documented disability must inform the instructor at the close of the first class meeting. The instructor will refer you to the Student Support Services office for consultation regarding evaluation, documentation of your disability, and a recommendation as to the accommodation, if any, to be provided. Students must provide instructors with an accommodation form from Student Support Services listing reasonable accommodation to sign and return to Student Support Services. The Student Support Services office is located on the 3rd floor of the Conned Student Center. If you do NOT consult with the instructor and follow up at the Student Support Services office during the first two weeks of classes, as provided above, you will thereby waive any claim to a disability and the right to any accommodation pertaining thereto."

Electronic Submission of Materials: "Students bear sole responsibility for ensuring that papers or assignments submitted electronically to a professor are received in a timely manner and in the electronic format(s) specified by the professor. Students are therefore obliged to have their e-mail client issue a receipt verifying that the document has been received. Students are also strongly advised to retain a copy of the dated submission on a separate disk. Faculty members are encouraged, but not required, to acknowledge receipt of the assignment."

Tips for Succeeding in Chemistry 112

There is unquestionably a lot of material to be covered in Chemistry 112. It is also more mathematically rigorous than CHM 111. For that reason it is imperative to keep up with the class. The last thing you want to worry about is covering two chapters of new material the night before the test. You are expected to keep up with the class reading and problems. The unannounced quizzes are an added incentive for you to do this.

The class schedule lists problems you should attempt. These problems are representative of some of the problems you will see on the exams. To become proficient you will need practice. In short, work as many problems as you can before the test. The student solutions manual provides solutions to the odd numbered problems. In addition, solutions to other problems described class will sometimes be posted on the WWW (`http://theochem.mercer.edu/chm112`), or worked in class. Students who need solutions to additional even-numbered problems should contact Dr. Pounds.

For more help in the course you should utilize the SI sessions for your class as well as the University's free tutoring service. Both of these resources are here for you to use and, although they can not guarantee a higher grade in the course, they will most likely increase your understanding of chemistry and thereby positively affect your performance in the class.

Tentative Class Schedule[1]

Week Starting	Chapter Sections	Lecture and Problem Solving Topics	Problems[2]
January 11th	17.1 – 17.3	Spontaneity and Entropy	(Chap 17) 19-41 (odd),
January 18th		**MLK Holiday (Monday)**	
	17.4 – 17.5	Free Energy	
	11.1 – 11.4	Phase Changes	(Chap 11) 17-69 (odd)
January 26th	11.5 – 11.10	Intermolecular Forces	
	12.1 – 12.2	Solution Concentrataion	(Chap 12) 21-79 (odd)
February 1st	12.3 – 12.10	Colligative Properties	
		EXAM #1, 2/2/09	
February 8th	13.1 – 13.6	Reaction Rates	(Chap 13) 23-89 (odd)
		Reaction Orders	
February 15th	13.7 – 13.10	Chemical Kinetics Theory	
		Reaction Mechanisms	
		EXAM #2, 2/16/09	
February 22nd	14.1 – 14.3	Dynamic Equilibrium	(Chap 14) 19-73 (odd)
	17.6 – 17.7	Thermodynamic Equilibrium	(Chap 17) 45-69 (odd)
March 1st	14.4 – 14.5	Le Châtelier's Principle	
		Solving Difficult Equilibrium Problems	
		EXAM #3, 3/6/09	
March 8th		**SPRING BREAK**	
March 15th	15.1 – 15.4, 15.11	Acid/Base Theory	(Chap 15) 21-99 (odd)
		Self-Ionization of Water and pH	
March 22nd	15.5 – 15.10	Polyprotic Acids	
		Common Ion Effect	
		Buffers	
March 29th	16.1 – 16.5	Solubility and Equilibrium	(Chap 16) 19-83 (odd)
		Precipitation	
April 5th	16.6, 18.1 – 18.2	Complex Ion Equilibria	
		EXAM #4, 4/6/09	
		Redox Reactions	(Chap 18) 25-81 (odd)
		GOOD FRIDAY	
April 12th	18.3 – 18.6	Voltaic Cells	
		Standard Electrode Potentials	
		Concentration Effects in Electrochemistry	
April 19th	18.7 – 18.11, 19.1 – 19.3	Batteries and Corrosion	
		Radioactivity	(Chap 19) 21–65 (odd)
		Decay Rates	
April 26st	19.4 – 19.10	Stability	
		Energetics of Nuclear Reactions	
		EXAM #5, 4/29/09	
		Review for Final	
May 3th		**FINAL EXAM, 5/9/09, 2 p.m. (Saturday)**	

[1] I reserve the right to modify this schedule as situations warrant.

[2] At a minimum these are the problems, in addition to the end of chapter review exercises, that you should try. Other problems will be provided to the class via e-mail as warranted.

The Laboratory

Students are **expected** to prepare for lab by downloading laboratory instructions and report forms from the online repository (`http://chemistry.mercer.edu/genchem/chm111.htm`). Students will be expected to follow *all* of the safety procedures outlined in the laboratory instructions and during the pre-lab meeting. STUDENTS WHO ARE IMPROPERLY CLOTHED OR WHO DO NOT HAVE THEIR SAFETY GLASSES WILL NOT BE PERMITTED TO ENTER THE LAB. Failure to follow any of the lab safety procedures will result in a 10% point reduction for the laboratory experiment being performed.

Lab grades will consist of 11 prelabs @ 5pts and 11 lab reports at 20 pts for a total of 275 pts.

All data from the lab should be recorded in the lab notebook, not the report sheets, using a black or blue ball-point pen. Each page needs to show your name, date, and experiment title. Do not remove the original pages from the notebook. The yellow copies from the notebook will occasionally be collected at the end of lab. If the pages are not collected at the end of lab then they should be turned in with the lab report.

Pre-lab exercises will be administered via *BlackBoard* and should be completed before *the beginning* of lecture on the day specified in the laboratory schedule. Once a prelab expires on *BlackBoard*, it will no longer be available for students. It is impossible to turn pre-labs in late. Lab reports should be turned in *at the beginning* of the subsequent laboratory period. Late lab reports will penalized 20%/day. The final lab report should be turned in on the last day of class. It is critical that submitted lab reports be neat and organized. Students may collaborate on the lab reports, but each student is expected to individually fill out and turn in their data sheets and questions.

Once you check into lab you are personally responsible for all contents of your lab drawer. You will not be permitted to take the final exam for the course until you check out of lab and pay any lab fees.

It is imperative that you attend lab on the date scheduled. Unless you have a excused absence for a University sanctioned event, you will not be permitted to make up the missed lab. Absences due to medical illness or mechanical failures are considered excused. If you are going to miss lab for any reason except a mechanical failure, you must notify Dr. Pounds prior to the absence or the absence will be considered unexcused. Unexcused lab absences will result in a zero grade for the lab and more than one unexcused absence will result in a failing grade for the course. In the event that a student is granted an excused absence, the average of their other lab grades will be used to compute the missing grade.

Students who have a excused absence for a University sanctioned event still must notify Dr. Pounds if they are going to miss lab. Dr. Pounds and the student will arrange, with another General Chemistry Professor and the Chemistry Stockroom Coordinator, a time for the student to make up the laboratory. This must be done during the week the laboratory is initially scheduled. Once a new week of experiments has started it will be impossible to make up the laboratory. If it is impossible to make up the lab in another section, then the average of the student's other lab grades will be used to compute the missed lab. Missing more than three labs, excused of unexcused, will result in a failing grade in the course.

Laboratory Schedule

Lab Day	Experiment
January 28th	Check-in NMR
February 4th	NO LAB
February 11th	Freezing Point Depression
February 18th	Kinetics – Concentration Effects
February 25th	Kinetics – Temperature Effect
March 5th	Gaseous Equilibrium
March 11th	SPRING BREAK
March 18th	Analysis of an Antacid Tablet
March 25th	Acids, Bases, and Buffers
April 1st	Aqueous Equilibrium
April 8nd	Thermodynamics and Borax Solubility
April 15th	Redox Titration
April 22nd	Electrochemistry Check Out