CHEMISTRY 112 / S13

Section 009

Dr. Andrew Pounds,

Office: Rm. 105 Willet Science Center, (478) 301-5627
e-mail: pounds_aj@mercer.edu
Alt. Phone (SMS) : (478) 227-3444
Office Hours: MWF 11 *(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. As such students must have satisfied the math prerequisites for CHM 111 and made a grade of C or better in CHM 111. 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 9:00 – 9:50 a.m., WSC 310
Lab: T 3:05 – 5:45 p.m., WSC 308

Course Materials

Chemistry, Julia Burdge, 2nd ed.,
Laboratory Notebook (numbered, carbonless pages, available at bookstore)
Scientific Calculator (TI or HP with *Numerical Equation Solver* highly recommended)
Laboratory Instructions (From WWW)
Approved Laboratory Safety Glasses/Goggles and Clothing
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 eight grades from the quizzes will count toward the final grade. Four 50 minute exams will be given per the schedule and the best three 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 3 @ 100 pts)	300 pts
Quizzes (best 8 @ 25 pts)	200 pts
Laboratory (10 @ 25 pts)	250 pts
Final Exam	250 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. Attendance is required in lab. See policies in the lab section.

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 not be posted throughout the semester. 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 book contains numerous problems which you should attemp. In addition I will give you a selection of problems you should attempt. The book problems and the additional 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 in 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 the SI instructors or 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
January 6th	18.1 – 18.5	Energy and Entropy (Review)
	11.1 – 11.3	Properties of Gases, Gas Laws
January 13th	11.4 – 11.7	Gas Mixtures and Reactions of Gases
		Kinetic Theory of Gases
		Real Gases and Intermolecular Forces
	12.1 – 12.2	Properties of Liquids
		Vapor Pressure
January 20th		**MLK Holiday (Monday)**
	12.3 – 12.5	Crystal Structure and Lattices
		Properties of Solids
January 27th	12.6 – 12.7	Phase Changes, Phase Diagrams
		EXAM #1, 2/1/13
February 3rd	13.1 – 13.4	Physical Properties of Solutions
		Concentration and Solubility
February 10th	13.5 – 13.7	Colligative Properties
		Colloids
	14.1 – 14.2	Reaction Rates, Rate Laws and Reaction Orders
February 17th	14.3 – 14.6	Integrated Rate Laws
		Temperature Dependence
		Reaction Mechanisms, Catalysis
February 24th		**EXAM #2, 2/25/13**
	15.1 – 15.2	Principles of Equilibria
		Equilibrium Constants
	18.6	Themodynamics and Equilibrium
March 3rd	15.3 – 15.5	Equilibrium Expression and The Law of Mass Action
		Solving Difficult Equilibrium Problems
March 10th		**SPRING BREAK**
March 16th		Le Châtelier's Principle
		EXAM #3, 3/20/13
		LAST DAY FOR COURSE WITHDRAWAL 3/21/13
	16.1 – 16.3, 16.12	Acid/Base Theories
		Self-Ionization of Water and pH
March 24th	16.4 – 16.8,	Weak Acids, Ionization Constants
		Acid-Base Conjugate Pairs
		Polyprotic Acids
		Good Friday (3/29/13)
March 31st	16.9 – 16.11	Molecular Structure and Acid Strength
		Hydrolysis
	17.1	The Common Ion Effect
April 3rd	17.2 – 17.3	Acid/Base Equilibrium
		Buffers and Titrations
April 7th	17.4 – 17.6	Solubility Equilibria
		Common Ions and Solubility
		Complex Ions
		(BEAR DAY, 4/11/13)
		Precipitation Reactions
April 14th	19.2 – 19.4	**EXAM #4, 4/15/13**
		Galvanic Cells
		Cell Potentials
April 21st	19.5 – 19.6	Free Energy, Equilibrium, and Cell Potential
		The Nernst Equation
		Batteries and Corrosion
April 28th		**FINAL EXAM, 4/29/13, 9 a.m.**
		(Monday)

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

The Laboratory

Safety always comes first in lab. Developing good lab safety habits is important, even if the day's lab activities are not particularly dangerous. You will not be allowed in lab if you are not prepared. That means being appropriately dressed, having your safety glasses and knowing what you are supposed to do during the lab. The lab schedule and instructions are available at: http://chemistry.mercer.edu/genchem/chm112.htm

The lab manual pdfs SHOULD NOT be printed. No points will be awarded for printed laboratory procedures. Instead, read the manual and think about what you are going to do and why. Write down the procedure and any questions you have in your lab notebook before coming to lab. **If you do not have your notebook with the hand written procedure in it, you wont be allowed in lab.** The lab report forms available from the same web site should be printed and turned in along with the yellow copies from your notebook. Data and observations MUST to be written in your notebook, not on the lab report form. Due dates are listed on the class schedule. **No credit is available for the lab report if you miss lab for any unexcused reason, including showing up unprepared, or if you are more than 10 minutes late.** It is important to show up on time, since we will go over safety notes in the first few minutes. You will lose 1 pt for each safety violation in a lab period (ie. removal of safety glasses for any reason in the laboratory). Lab reports are due before, **NOT** during the next laboratory session.

If you must miss a laboratory meeting for a Mercer University event, you need to see Dr. Pounds at least one week in advance to attempt to schedule an alternate laboratory meeting. Students will not be penalized for laboratories missed due to excused absence (as defined below)up to a limit of three laboratory absencesand a complete laboratory report will still be required on the announced due date. **A passing grade for CHM 112 will NOT be available to any student who misses more than three laboratory meetings (excused or otherwise).**

Excused Absences (1) medical or mechanical emergencies with appropriate documentation presented to the professor as soon as possible (2) illnesses reported to the professor prior to the scheduled course meeting (documentation may be required); or (3) Mercer University events for which the appropriate office has provided an advance request to excuse participants.

Laboratory Grading:

There will be ten pre-lab exercises (5 pts each) and a ten lab reports (20 pts each) over the course of the semester for a total of 250 pts. The laboratory component is thus worth one quarter of your final grade for CHM 112. Labs are due prior to the beginning of the following lab session (see table below), and lab 10 will be due to Dr. Pounds at the beginning of lecture on the last day of class. Late labs will lose 5 points/day, with a grade of zero resulting if the write-up is more than 5 days late.

Prelabs:

Pre-lab exercises will be administered via *BlackBoard*. More information related to these exercises will be provided prior to the first lab.

Laboratory Policies:

Cell Phone: Out of courtesy for all those participating in the learning experience, all cell phones and pagers must be turned off before entering any classroom, lab, or formal academic or performance event.

Chemical Sensitivity Statement: This course includes the handling of chemicals, and the reasonable accommodation policy also applies to any chemical sensitivity, allergy, or other physical or medical condition that might limit a student's ability to participate in the required course activities. In these cases, the instructor may require a physician's documentation of the student's condition before arranging accommodation. If the instructor determines that the student's condition cannot be reasonably accommodated, then the student will be asked to select an alternative course.