

# CHEMISTRY 111: General Chemistry

## SPRING 2009 SYLLABUS

<b>Instructors:</b>	<b>Phone:</b>	<b>Office:</b>	<b>e-mail:</b>
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<b>Course Schedule:</b>	Lecture:	MWF 11:30 - 12:20 in Heim G-09
	Recitation:	Th 7:45 - 8:35 or 1:00 - 1:50 in Heim G-09
	Lab:	T 8:45 - 11:35, 2:00 - 4:50, or Th 8:45 - 11:35 in Heim 241

**HDB's Office Hours:** I am on campus all day, Monday through Friday. If I'm not in class or at a meeting, I'll probably be in my office - feel free to drop by or send me an e-mail to make an appointment.

**Course Description:** A continuation of CHEM 110, with emphasis placed on the foundations of analytical, inorganic, and physical chemistry. Topics include kinetics, general and ionic equilibria, acid-base theory, electrochemistry, thermodynamics and nuclear chemistry. The laboratory treats aspects of quantitative and qualitative inorganic analysis.

**Prerequisite:** Successful completion of CHEM 110.

### Text and Materials:

- "Chemistry: A Molecular Approach" by Nivaldo Tro.
- Laboratory Notebook
- Non-Programmable Calculator (cannot be shared during exams and quizzes)
- Safety glasses or goggles

### Optional Materials:

Copies of these are on reserve in the library.

- "Solutions Manual" for "Chemistry: A Molecular Approach."
- "ACS General Chemistry Study Guide"

To order, go to: [http://www4.uwm.edu/chemexams/guides/details\\_guides.cfm?ID=162](http://www4.uwm.edu/chemexams/guides/details_guides.cfm?ID=162)

### Course Objectives

Upon completion of this course, each student should be able to:

1. Identify types of intramolecular forces, their relative strengths and their effects on physical properties. Interpret phase diagrams and calculate energies associated with phase changes.
2. Express solution concentration in a variety of units. Determine the effect of solute concentration on the colligative properties of the solution.
3. Derive rate laws from experimental data and perform calculations using integrated rate laws. Identify factors that influence the rate of reaction. Understand the relationship between mechanism and the rate law.
4. Describe what is meant by "equilibrium." Write equilibrium expressions and perform equilibrium calculations. Identify how a system at equilibrium will respond when perturbed.
5. Describe acids and bases according to Bronsted-Lowry, Arrhenius and Lewis definitions and explain conjugate acid-base relationships. Conduct pH calculations. Describe how structure influences acid strength.
6. Describe how buffer solutions work and perform buffer calculations. Describe factors that influence the solubility of slightly soluble salts and perform calculations.
7. Describe enthalpy, entropy, and free energy. Determine whether a chemical process will be spontaneous.
8. Describe voltaic and electrolytic cells. Write oxidation-reduction reactions and calculate cell potentials.
9. Demonstrate proficiency with basic laboratory techniques and the ability to work safely in the laboratory environment.

<b>Grading Criteria:</b>	Quizzes (8)	120 points
	Exams (3)	300 points
	Final	130 points
	<u>Laboratory</u>	<u>100 points</u>
	Total	650 points

Final letter grades will be assigned as follows: >90% A, 80-90% B, 70-80% C, 60-70% D, <60% F. The ranges given include "+" and "-" grades. Be aware that you must pass both the lecture and laboratory to receive a passing grade for the course.

**Quizzes:** Quizzes are an incentive to stay current with the course. They provide you with a means of evaluating your progress and allow you to identify any potential "trouble spots" before the exam. Quiz questions will come from the homework, assigned reading and class notes. The lowest quiz grade will be dropped.

**Quiz dates: January 23 and 30 February 6, 20 and 27 March 13 and 27 April 3 and 23**

All are Fridays, except for April 23 (Thursday). Mark them on your calendar!

**Exams:** There will be three mid-semester exams and a final exam. The exam dates are given below.

**Friday, February 13**

**Friday, March 20**

**Friday, April 17**

The final exam will be administered at **1:00 pm on Wednesday, April 29.**

The mid-semester exams will consist of multiple choice, short answer and calculation-based questions. The final is the American Chemical Society exam for general chemistry. It is a multiple-choice exam and *covers material from Chemistry 110 and 111*. The grade on the final can be substituted (based on %) for a lower mid-semester exam grade.

**Moodle:** Announcements, assignments, answer keys for quizzes and exams, and the colloquium schedule will be posted on the course Moodle site. To access the site: go to [moodle.lycoming.edu](http://moodle.lycoming.edu), log in and select CHEM 111 from the Spring 2009 list of courses. If you are prompted for a password (enrollment key), enter "chem111" (all lower case, no spaces).

**Assignments from the Text:** The chapters we will cover are listed below. More detailed assignments will be distributed along with the chapter outlines. Homework will not be collected, but the weekly quizzes will be based on the homework assignments.

<u>Chapter</u>	<u>Topic</u>
11	Liquids, Solids and Intermolecular Forces
12	Physical Properties of Solutions
13	Chemical Kinetics
14	Chemical Equilibrium
15	Acids and Bases
16	Aqueous Ionic Equilibrium
17	Thermodynamics
18	Electrochemistry
19	Radioactivity and Nuclear Chemistry (time permitting)

## **Attendance Policy:**

**Lecture:** Regular attendance at lecture is mandatory. Attendance at class means arriving on time, remaining for the entire 50 minutes, and participating in class. Missing part of a class (late arrival, early departure, etc.), sleeping or reading during class, or engaging in disruptive activities is equivalent to an absence and will be counted as such. Three absences are permitted and each absence beyond that, regardless of the reason, results in a 2-point deduction from the final course grade.

**Quizzes:** Missed quizzes cannot be made-up (remember, the lowest quiz grade is dropped).

**Exams:** Missed exams cannot be made-up and a grade of zero will be recorded. Exceptions may be granted for only if there are significant extenuating circumstances -- usually a medical or family emergency that **must be documented** (such as notification from the Dean). In this case, the grade on the final will be substituted for the missed exam. Keep in mind that routine doctor's appointments are not considered exceptional circumstances.

**Recitation:** Although attendance at recitation is not mandatory, it is strongly recommended. Attendance will be taken at each meeting.

**Lab:** Regular attendance at the scheduled lab period is mandatory. Any questions regarding lab attendance or scheduling should be directed to Dr. Ramsey.

**Policy on Calculators and other Electronic Devices:** You will need a calculator for most class meetings, including recitations. Graphing (programmable) calculators may not be used on quizzes or exams and calculators can not be shared during quizzes or exams. Cell phones, PDA's, and all web-enabled devices are banned from class.

**Extra Credit:** Extra credit points can be earned by attending departmental colloquia (3 points per colloquium). If you are unable to attend colloquium, you may also earn extra credit by writing a brief research paper on a mutually agreed upon topic (up to 15 points depending on length of paper, number of sources, quality of paper). Extra credit papers must be submitted via turnitin.com and will not be accepted after the last day of class. Extra credit is capped at 15 points and a maximum increase of ½ of a letter grade (for example, from a B+ to an A-).

**Academic Honesty:** Be aware that in accordance with the College's policy on academic honesty, any work you submit must be your own. Any instances of plagiarism (including copying answers from a classmate) will be penalized to the fullest extent possible and reported to the Dean of the College. Please be aware that signing someone else's name on an attendance sheet also constitutes academic dishonesty and will be penalized.

**Study Suggestions:** We will cover a lot of material this semester and much of it is fairly challenging. Lectures and in-class exercises are prepared with the assumption that you have studied the assigned material and have completed the homework. I suggest you skim the reading assignment before class. After class, be sure to read and take notes on the assignment; *your notes on the reading will be a useful resource when it comes time to study for an exam or quiz.* As you read the text, take time to stop and work the "Example" and "For Practice" problems that appear throughout each chapter. If you get stuck, you can review the text and the detailed solutions for the "Example" problems. Finally, a list of end-of-chapter questions and problems will be provided in class along with the outline for each chapter. Be sure to complete the homework problems – very similar problems will appear on tests and quizzes.

Perhaps the best advice I can give you on how to succeed in this course is: Don't procrastinate! We cover a lot of material and cramming for a night or two before an exam simply will not work. Just like learning a foreign language or becoming proficient at a sport, you need to practice a little each day. Review your notes, read the text, quiz yourself, and most importantly: work lots of problems.

And remember, my job is to help you learn chemistry--if you have questions, if you are not sure how to approach a certain type of problem, or if a concept is still a little fuzzy, please ask me about it right away!