

CHEMISTRY 111: General Chemistry

Spring 2014

Syllabus

Instructors:	Phone:	Office:	e-mail:
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Course Schedule: 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 or Th 8:45 - 11:35 or Th 2:00 – 4:50 in Heim 241

HDB's Office Hours: By appointment or just drop by – if my door is open, I'm available! If you need to reach me outside of regular work hours, feel free to call my home phone number. Please note that I rarely check e-mail when I am away from the office.

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. If you earned less than a C in CHEM 110, I **strongly** advise you to retake CHEM 110 **before** taking CHEM 111.

Required Text and Materials:

- "Chemistry: A Molecular Approach" 2nd edition by Nivaldo Tro.
- Laboratory Notebook (the lab manual will be available on Moodle)
- Calculator: Casio fx-260
- Composition book, for homework.
- Safety glasses or goggles

Optional Materials:

- 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

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.

Departmental Objectives

This course helps to fulfill the following Department of Chemistry learning objectives:

- Exhibit proficiency in the major sub-disciplines of chemistry
- Perform wet laboratory techniques as appropriate
- Exhibit integrative, problem-solving skills, such as data manipulation and data interpretation
- Communicate the results of chemical investigations
- Demonstrate responsible conduct in the laboratory

College Mission

The course supports the mission of Lycoming College to provide a distinguished baccalaureate education in the liberal arts and sciences.

Grading Criteria:	First Assignment	5 points
	Homework Notebook	20 points
	Quizzes (7)	105 points
	Exams (3)	300 points
	Final	125 points
	<u>Laboratory</u>	<u>100 points</u>
	Total	655 points

Final letter grades will be assigned as follows: >90.0% A, 80.0-89.9% B, 70.0-79.9% C, 60.0-69.9% D, <60.0% F. The ranges given include "+" and "-" grades (top and bottom 2% of range, respectively). *Please be aware that you must pass both the lecture and laboratory to receive a passing grade for the course.*

Final Grade	Interpretation (from the Lycoming College Catalog)
A	<i>Excellent:</i> Signifies superior achievement through mastery of content or skills and demonstration of creative and independent thinking.
B	<i>Good:</i> Signifies better-than-average achievement wherein the student reveals insight and understanding.
C	<i>Satisfactory:</i> Signifies satisfactory achievement wherein the student's work has been of average quality and quantity. The student has demonstrated basic competence in the subject area and may enroll in additional coursework.
D	<i>Passing:</i> Signifies unsatisfactory achievement wherein the student met only the minimum requirements for passing the course and should not continue in the subject area without departmental advice.
F	<i>Failing:</i> Signifies that the student has not met the minimum requirements for passing the course. A failing grade in the course may also result from academic dishonesty or from excessive unexcused absences.

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 quiz dates are given below. The first quiz will cover topics from CHEM 110 that are of particular relevance for CHEM 111.

Quiz Dates

All are Mondays. Mark them on your calendar!

January 13, 20, 27

February 17, 24

March 24, 31

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

Friday, February 7

Friday, March 14

Friday, April 11

The final exam will be administered at **8:30 am on Thursday, April 24.**

Quizzes and exams will include open-ended and/or multiple choice questions on concepts and theories in addition to calculation-based problems. While it is important that you can do the math / chemical calculations; these things are meaningless if you don't understand the concepts behind them. Resist the temptation to memorize algorithms for solving each type of problem. Working to understand the theory will pay dividends in terms of your performance in this course and in future chemistry courses. The conceptual questions at the end of each chapter will help you in this respect.

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.

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, log in and select CHEM

111 from the Spring 2014 list of courses. The enrollment key is: general. There is a separate Moodle site for the lab. Dr. Ramsey will provide additional information regarding the lab Moodle site at the first lab meeting.

Assignments from the Text: The chapters we will cover are listed below. Detailed reading and homework assignments will be posted on Moodle along with chapter outlines. Homework will be periodically collected as described below. Many of the quiz and exam questions will be derived from the homework assignments.

<u>Week</u>	<u>Chapter</u>	<u>Topic</u>
1-2	11	Liquids, Solids and Intermolecular Forces
2-3	12	Solutions
3-5	13	Chemical Kinetics
6-7	14	Chemical Equilibrium
8-10	15	Acids and Bases
11-12	16	Aqueous Ionic Equilibrium
12-13	17	Thermodynamics
13-14	18	Electrochemistry
14	19	Radioactivity and Nuclear Chemistry (selected topics)

Homework Notebook:

While it is not practical to collect homework on a regular basis in a class of this size, I am trying a new system that enables students who complete the assigned homework to earn credit for it. Complete your homework assignments in a composition notebook; I will collect the notebook six times during the semester. Bring this notebook with you to class EVERY DAY, as I will not announce when I am collecting notebooks ahead of time. Notebooks will be due BEFORE the start of class and late notebooks will not be accepted. Homework will be spot-checked and graded on a five-point scale for effort and overall quality. The best four homework grades (out of 6) will count.

Attendance Policy:

Regular attendance at lecture and recitation is mandatory. Attendance at class means arriving on time, remaining in class for the entire 50 minutes, and participating in class. Missing part of a class (late arrival, early departure, etc.), sleeping, reading, texting, or engaging in disruptive activities during class is equivalent to an absence and is counted as such. Students who engage in behavior that distracts their colleagues or the instructor will be asked to leave the class. Five or more absences in a semester, regardless of the reason, will result in a 10% deduction in the final course grade.

Exams and Quizzes: **There are no make-up exams or quizzes.** In the event of a missed exam or quiz, a grade of zero will be recorded. Exceptions may be granted only if there are significant extenuating circumstances -- usually a medical or family emergency that can be documented (such as by notification from the Dean). In this case, the grade on the final will be substituted for a missed exam; the quiz average will be substituted for a missed quiz. Please keep in mind that absences due to doctor's appointments, work conflicts, or simply not feeling well (as opposed to being seriously ill) are not considered exceptional circumstances.

Recitation: You are required to attend one of the recitation sections each week. You may attend either section.

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. The Department of Chemistry has adopted the Casio fx-260 as the calculator that is required for all courses. **Only Casio fx-260 calculators may be used on quizzes and exams** and calculators cannot be shared during quizzes and exams. You must remove the cover from the calculator and stow it in your backpack BEFORE the start of a quiz or exam. Cell phones and other electronic devices are not permitted in class and may not be used in place of a calculator. These **MUST** be **turned-off** and put **INSIDE** your backpack or purse during class. Using a calculator or device other than the Casio fx-260 on a quiz or exam will result in a zero on the quiz or exam.

Extra Credit: Extra credit points can be earned by attending departmental colloquia (2 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 10 points depending on the quality of the paper, the length of paper, and the number and quality of sources). Extra credit papers will not be accepted after the last day of class. Extra credit is capped at 10 points and a maximum increase of ½ of a letter grade (for example, from a B+ to an A-). Please keep track of the number of colloquia that you attend as I will not total-up the number of colloquia attended by each student until the end of the semester.

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 will be penalized to the fullest extent possible and will be reported to the Provost. This includes looking at another student's work during a quiz or exam or copying homework or a lab report, in part or in full. The full College policy can be found in the Student Handbook.

Academic Support: If you have a learning disability and choose to request academic accommodations, please contact Mr. Dan Hartsock, Coordinator of Services for Students with Disabilities. His office is in the Academic Resource Center on the third floor of Snowden Library.

Study Suggestions: We will cover a lot of material 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 along with the outline for each chapter. Be sure to complete the homework problems and give them your best shot before checking the answer key or solutions manual.

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.

To have a reasonable expectation of earning an A or B in this course, you should, at a minimum:

- (1) show up to class;**
- (2) actively participate (take notes, work sample problems);**
- (3) study *without interruption* approximately 2 hours outside of class for every 1 hour in class (this includes reading, taking notes on the reading, reviewing your class notes, working problems);**
- (4) spread your study time out over the entire week;**
- (5) test yourself by working problems/answering questions without consulting the book, your notes or the answer key.**

When studying, do so in an environment that is free from disruptions and distractions. Find a quiet place; turn off your phone and any other devices.

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!