

Chemistry 231
Introduction to Equilibrium and Reactivity
Spring 2010

- Instructor:** Professor Amber Hupp
Office: 235 Haberland
Telephone: 508-793-2502
Email: ahupp@holycross.edu
- Office Hours:** Monday 10 AM – 12 PM, Wednesday 11 AM – 12 PM,
Thursday 1 – 3 PM
- Lecture:** Monday, Wednesday, Friday 9 – 9:50 AM, 123 O'Neil
- Laboratory:** Thursday 8 AM – 12 PM, 256 Smith Labs
- Course Material:** General Chemistry, Principles of Modern Applications, 9th Ed.,
by Pertucci, Harwood, & Herring
Laboratory notebook
TI-30Xa calculator
Some course materials, including the Laboratory Manual, will be
posted on Moodle, which is accessible from:
<http://www.holycross.edu/login/>
- Course goals:** This course focuses on studying and understanding the role that
equilibrium, thermodynamics, and kinetics play in chemical
systems. Specific topics include chemical equilibria, colligative
properties, acid-base equilibria, chemical kinetics, electrochemistry,
thermodynamics, and gas laws.
- Prerequisites:** Atoms and Molecules, Organic Chemistry, and one semester of
college Calculus. Due to the pace of the course, there will not be
time for review of this material. It is your responsibility to review
any necessary concepts from these prerequisites.
- Course Format
& Evaluation:** The laboratory will be the guiding influence for this course.
Lectures will be used to introduce new material as well as support
material introduced in the laboratory under the discovery format.
Evaluation in the course will be comprised of both laboratory effort
and understanding of lecture and laboratory material. Grades will
be compiled from the following categories:
- | | |
|----------------------------|------|
| Laboratory | 30 % |
| Hourly Exams (4 at 12.5 %) | 50 % |
| Final Exam | 20 % |

Examinations: There will be four hourly examinations and one final cumulative examination. Each hourly exam is worth 12.5 %. The hourly exams will tentatively be given on the following dates:

February 5 February 26 March 31 April 30

The *final exam* is worth 20 % of your overall grade and will be held May 11 at 8:30 AM

Laboratory: The laboratory will be the guiding influence for this course, and lectures will focus on expanding on material introduced in the lab, as well as new material. To that end, your preparation for and active participation in the lab sessions are vital to your success in this course. Your laboratory grade (30% overall) will be comprised of two grades: with half of the points coming from data sheets, lab notebook, and lab practical (graded by the lab supervisor), and the other half of the points from weekly lab problem sets and lab quizzes (graded by the professor).

Tips for Success: Each week, a chapter from the text pertaining to the lab will be discussed in lecture. You should use the text as a resource almost daily. The in-chapter and end-of-chapter problems are an excellent tool to gauge your understanding of the material. I will suggest problems for you to tackle from each chapter. You should do as many as needed until you feel comfortable. Feel free to do more than those that are suggested! You may work on these problems in study groups, but you should be certain that you understand the material on your own. Working the problems as you study helps you understand the material; if you have trouble with them, that helps you identify the areas that need more work before you go on to the next topic.

Missed Assignments: Make-ups for labs and hourly exams will not be given except in serious and documented extenuating circumstances. A dean's excuse is required for any missed exam. If sickness (i.e. the flu) arises, please contact me as soon as possible to arrange for a make-up.

Re-grading: Re-grades or grade corrections must be requested within *one week* from the date your assignment is returned.

Academic Honesty: All work submitted for this class must be your own. Any student caught cheating or plagiarizing work in any way will receive a zero for the assignment or for the course, depending on the severity of academic dishonesty. In addition, all instances of academic dishonesty will be reported to your Class Dean and put in your file.

Course Schedule:

Date	Experiment	Lecture Chapter(s)
1/28	Lab 1: Equilibrium Vapor Pressures of Pure and Mixed Systems Using GC	6
2/4	Lab 2: The Effect of Solute upon the Freezing Point of a Solvent in Solution	12, 13
2/5	Exam 1: Gases and Colligative Properties (Chs 6 & 13)	
2/11	Lab 3: Heats of Reaction	7
2/18	Lab 4: Thermodynamics and Equilibrium	15
2/25	Lab 5: Analysis of Titration Curves	16
2/26	Exam 2: Thermodynamics and Equilibrium (Chs 7 & 15)	
3/4	<i>NO LAB – Spring Break</i>	
3/11	Lab 6: Investigation of Buffers	17
3/18	Lab 7: Qualitative Analysis	17
3/25	Lab 8: Electrochemistry I – Spontaneous Reactions and Equilibrium Constants	18
3/31	Exam 3: Acids and Bases and Equilibrium (Chs 16, 17, & 18)	
4/1	<i>NO LAB – Easter Break</i>	
4/8	Lab 9: Electrochemistry II – Calculating and Predicting Equilibrium Constants	19
4/15	Lab 10: Introduction to Kinetics and Mechanisms	20
4/22	Lab 11: Kinetics and Mechanisms	14
4/29	Lab 12: Determination of the Concentration of an Unknown Solution	
4/30	Exam 4: Electrochemistry and Kinetics (Chs 19, 20, & 14)	