

Lewis & Clark College
General Chemistry II, Chemistry 120, Section 02
Spring, 2006

Basic Information

Professor: Barb Balko; Olin 225; x 7534; balko@lclark.edu

Lab Instructors: Robert Killin; Olin 222; x7540; rkillin@lclark.edu
William Randall Olin 216; x 7598; randall@lclark.edu

Department Secretary: Linda Noble; Olin 226A; x 7530; noble@lclark.edu

Tentative Office Hours: M 3 – 4, T 11 – 12 and 2 - 3, F 3 - 4; also, by appointment

Lectures: MWF, 12:40 – 1:40, Olin 301

Laboratory: T 8:30 am – 12:30 pm; T 1 – 5 pm; W 12:40 – 4:40 pm; Th 12:40 – 4 pm;
Olin 306/310

Class Website: www.lclark.edu/~balko/chem120_website.html

Class Listserv: 06SP-CHEM-120-01@lclark.edu

Help Center: Tuesday and Wednesday, 7 – 9 pm, Olin Lounge

Note: You must register for a laboratory section as well as the lecture. Labs start the second week of classes. For lab, please bring your safety goggles and lab notebook and wear closed-toe shoes, long pants or skirt, and a shirt that covers your midriff.

Required Materials

Text: Brown, LeMay, and Bursten, *Chemistry: The Central Science*, 10th edition (same text used in the Fall). This text is available in the college bookstore.

Lab Manual: *Chemistry 120 Lab Manual*, Spring, 2006 Edition. This can be purchased from Linda Noble (Chemistry Department secretary) or from your lab instructor during your first lab session.

Safety Goggles: These must be worn **at all times** in the laboratory. They can be purchased in the college bookstore.

Laboratory Notebook: This is a bound duplicate notebook with numbered pages; it can be purchased in the college bookstore.

Calculator: This must have log and exponential capabilities.

General Information

Class Goals:

This semester is when the real chemistry begins! During fall semester, you should have acquired the basic “language” of chemistry. This semester we will look at reactions in much more detail. In Chapter 14 (Kinetics) we will learn what determines how fast a spontaneous reaction will occur and what can be done to make a reaction faster or slower; in Chapters 15 – 17 (Equilibrium), we’ll learn that not all reactions go to completion, how we can estimate the concentrations of products and remaining reactants, and how we can “push” a reaction towards completion; in Chapter 19 (Chemical Thermodynamics) we will address what makes a reaction spontaneous. We

will also address applications of chemistry that will help you better understand the world around you: batteries and corrosion (Chapter 20, Electrochemistry), radioactivity and nuclear power (Chapter 21, Nuclear Chemistry), and colors (Chapter 24, Coordination Compounds).

Course Strategy:

Reading the text, doing all the assigned homework, and coming to class is essential for succeeding in this course. Doing extra problems is especially helpful. I encourage you to form study groups and I can help get these groups together and/or can suggest problems to work on. Also, don't be afraid to ask questions—there are no stupid questions and I guarantee that someone else has the same questions. In addition to helping you, your questions will help me by making me aware of difficulties that the class is having with the material. Don't hesitate to see me if you're having difficulties!

In order to encourage you to do problems, each week I will provide several "Discussion" questions. I would like students to work on these problems either during my office hours or with classmates. The students running the Tuesday/Wednesday evening help center will be provided with copies of these problems and their solutions so you may also find it useful to work on them during these help sessions.

Lectures:

It is important to read your textbook before coming to class. Use the syllabus to find out what will be covered in lecture and read ahead. When you go home after class, do some problems to see if you can apply what you learned that day. I will often assign problems that we will go over during the next lecture to force you to do this. If you don't understand something, ask questions during lecture or come see me after class or during my office hours.

Laboratory:

The lab is an integral part of the course. This is when you get to put into practice what you've been learning. If a picture is worth a thousand words, a laboratory is worth ten thousand. Plan on attending all your labs as there are no make-ups. Scheduling conflicts due to athletics or illness must be worked out with your lab instructor as soon as possible, preferably before the lab that will be missed.

Read the lab before you arrive! Doing so will likely give you greater experimental success and help you to finish faster.

Class Website:

The class website will feature pdf files of homework assignments and solutions to homework problems, and practice tests. There will also be links to other sites that you may find interesting. If the site starts to get full, older files will be moved to WebDisk.

Academic Honesty:

I expect academic honesty. This means homework, labs, and exams should be your own efforts. Discussion about homework assignments and labs is encouraged but the work you turn in should be your own (i.e., it should be in your own words and you should be able to explain it fully if asked). Cheating will result in failure on the assignment, possible failure of the course, and disciplinary action by the College Honor

Board. Please consult the *Pathfinder* for more information on the College's academic integrity policy. If you are having problems come see me!

Academic Accommodations:

If you have a disability that may impact your academic performance, you may request accommodations by submitting documentation to the Student Support Services Office in Albany Quadrangle (x7191), and that office will notify me of the accommodations for which you are eligible.

Grading

3 "Midterm" Exams	40%
Final	20%
Homework	15%
Laboratory	25%

Midterm Exams

Three one hour midterms will be given in class. The *approximate* dates are given in the syllabus.

Final Exam

Your final exam is scheduled for Wednesday, May 3, 8:30 – 11:30 AM. **DO NOT SCHEDULE ANY TRAVEL ARRANGEMENTS BEFORE THIS DATE**

Homework

Homework will be due every Wednesday. I will drop your lowest score when I calculate your homework grade. Homework will be accepted up to 1 week late (with a 10% penalty).

Laboratory

Your lab instructor will discuss how to prepare your lab reports and how these will be graded.

Tentative Class Schedule

Date	Material Covered	Reading
Wed., Jan. 18	Introduction, rate equations, concentration as a function of time	14.1 – 14.3
Fri., Jan. 20	Concentration as a function of time	14.4
Mon., Jan. 23	Reaction mechanisms	14.6
Wed., Jan. 25	Activation Energy and Catalysis	14.5, 14.7
Fri., Jan. 27	Equilibrium constants	15.1 – 15.4
Mon., Jan. 30	Using equilibrium constants	15.5 – 15.6
Wed., Feb. 1	Le Châtelier's Principle	15.7
Fri., Feb. 3	Acids, bases, pH	16.1 – 16.5
Mon., Feb. 6	Acid-dissociation constant	16.6
Wed., Feb. 8	Exam 1 (material covered through Wed., Feb. 1)	
Fri., Feb 10	Base-dissociation constant; relationship between K_a and K_b	16.7 – 16.8
Mon., Feb. 13	Salt solutions	16.9
Wed., Feb. 15	Relationship between acidity and chemical structure	16.10 – 16.11
Fri., Feb. 17	Common-Ion effect, buffers	17.1 – 17.2
Mon., Feb. 20	Titrations	17.3
Wed., Feb 22	Solubility Equilibria	17.4 – 17.5
Fri., Feb 24	Solubility (cont.), relationship to qualitative analysis	17.5 - 17.7
Mon., Feb 27	Catch-up Day/Review	
Wed., March 1	Entropy and the 2 nd Law of Thermodynamics	19.1 – 19.2
Fri., March 3	Entropy interpreted in terms of microstates, Entropy changes in chemical reactions	19.3 – 19.4
Mon., March 6	Exam 2 (material covered through Mon., Feb. 27)	
Wed., March 8	Gibbs Free Energy	19.5 – 19.6
Fri., March 10	Relationship between ΔG and K_{eq}	19.7
Mon., March 13	Balancing Redox equations	20.1 – 20.2

Wed., March 15	Electrochemical cells, standard reduction potentials	20.3 – 20.4
Fri., March 17	Nernst equation	20.5 – 20.6
Mon., March 20	Batteries, fuel cells, corrosion	20.7 – 20.8
Wed., March 22	Electrolysis	20.9
Fri., March 24	Radioactivity	21.1 – 21.4
	Spring Break!	
Mon., April 3	Rates of radioactive decay, energy changes	21.5 – 21.6
Wed., April 5	Fission, Fusion, and Nuclear Reactors	21.7 – 21.8
Fri., April 7	Biological effects	21.9
Mon., April 10	Catch-up Day/Review	
Wed., April 12	Metal Complexes	24.1 – 24.3
Fri., April 14	Isomerism	24.4
Mon., April 17	Exam 3 (material covered through Mon., Apr. 10)	
Wed., April 19	Color, Crystal Field Theory	24.5 – 24.6
Fri., April 21	Crystal Field Theory (cont.)	24.6
Mon., April 24	Teaching Evaluations, Review	
Wed., April 26	Review	