

Chemistry 20 (#1152) Fundamentals of Chemistry: Dr. Amy Grant
(2-4 W, F Chem 103 2-5 Th Chem 166)

Fall 2009

Office Hours: Tu-Th 10-10:30, Th 12:35-1:05, F 1-2, and by appointment

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Web: www.elcamino.edu/faculty/agrant (Note: Students will be informed in advance if the syllabus is revised.)

Prerequisite: Mathematics 40 or 41B.

Required Materials: Timberlake, An Intro to General, Organic, and Biochem, 10th ed.; Henrickson, et. al., A Lab for General, Organic, and Biochem, 6th ed; Non-Programmable Scientific Calculator; Safety Goggles (Instructor Approved).

Grading:	Exams (4 x 100 pts)	400
	Quizzes (11 x 20) + 30 pt elements quiz	250
	Labs/Exercises (15 x 10 pts)	150
	<u>Comprehensive Final</u>	<u>200</u>
	Total	1000

Final letter grades will be assigned approximately to the following distribution:

100-88% = A; 87-78% = B; 77-65% = C; 64-54% = D; < 54% = F

Lab: Bring the entire lab, including blank report pages. If you forget pages, photocopy after lab lecture. You must attend the entire lab lecture to do the lab. Late students will get a penalty or be asked to leave depending on what was missed. Writing on another student's lab, bringing in graded expts, or copying a sentence or piece of data is cheating. Do independent work. View your lab notes on safety, disposal and important info during lab. Read the exp before the lab. Wear appropriate shoes to labs with burners or chemicals. Don't touch the chemicals! If you miss more than 2 labs, you will not pass the course. See Quizzes and Tests for missed lab policy.

Check the web page for assignments every week. Assignments aren't collected, but you must do problems to do well. It's helpful to rewrite class notes and redo class problems. Plan to study every day. This class will require far more time than you expect.

Quizzes and Tests: Missed quizzes/exams/labs result in zeros except in certain situations. To discuss a situation, you must leave me a message *at least one day before you return* so I can decide the nature of the situation. Generally, appointments are not considered emergencies as they can be rescheduled. If you forget your calculator, you may use another student's calculator when they finish the exam. You may not use cell-phone calculators, programmable calculators, or translators during a quiz or test.

Courtesy: Come to class on time and prepared. Questions, comments, and corrections from the class are appreciated. Questions may be answered after class. I do not want to see or hear your cell phone at any time.

Dropping: It is your responsibility to drop the course to avoid an "F". To drop, you must check out of your lab drawer.

Cheating: I hate to dwell on the negative, but every semester I catch at least one student cheating. Please give some thought as to whether you want to be a trustworthy person of integrity. I hope you'll realize that cheating isn't worth it. Students who are caught cheating will get a zero, will be reported (via written report) to the dean, and will be asked to sit apart from others during tests.

Doing Well: A few students need more math before they can pass chemistry, and a few will have a personal emergency. These situations probably require retaking the course. For others who fail Chem 20, I've noticed one or more of the following: They zone out during lecture, they don't study enough hours or days a week, they have too many time commitments outside of school, they don't try enough problems on their own, and they don't try aggressively to clear up confusion before moving to a new chapter. Don't wait until it's too late! See me or email me if you have any trouble. I want you to succeed!

Week	Date	
1	Wed 9/2	Introduction, Chapter 1 (Measurements). Bring your scientific calculator starting in the next class.
	Thu 9/3	Chapter 1, Safety Video: Students must be present at the safety video to work in lab.
	Fri 9/4	Chapter 1
2	Wed 9/9	Quiz 1 (Ch. 1) Lecture: Chapter 2 (Matter)
	Thu 9/10	Safety; Check-In; Handout: Burners (L1). Students must be present at the safety lecture to work in lab. Don't forget your goggles, closed shoes, and experiment.

	Fri 9/11	Elements Quiz Lecture: Chapter 3 (Elements and Atomic Structure)
3	Wed 9/16	Quiz 2 (Ch. 2) Lecture: Chapter 3, Chapter 4 (Nomenclature and Bonding)
	Thu 9/17	Experiment 1: Measurement and Density (L2)
	Fri 9/18	Chapter 4
4	Wed 9/23	Chapter 4
	Thu 9/24	Experiment 2: Graphing (L3)
	Fri 9/25	Test 1 (covering Chapters 1-3) <i>If you miss a test or quiz, see the syllabus for instructions.</i>
5	Wed 9/30	Chapter 4
	Thu 10/1	Nomenclature Exercise Handout (open book and open notes, L4)
	Fri 10/2	Quiz 3 (Ch. 4) Lecture: Chapter 4
6	Wed 10/7	Experiment 11: Structure of Covalent Molecules and Polyatomic Ions (L5)
	Thu 10/8	Experiment 6: Simple Chemical Reactions (L6) Don't forget your goggles, closed shoes, and experiment.
	Fri 10/9	Quiz 4 (Ch. 4) Lecture: Chapter 5 (Chemical Calculations)
7	Wed 10/14	Chapter 5
	Thu 10/15	Experiment 7: Hydrates (L7) Don't forget your goggles, closed shoes, and experiment.
	Fri 10/16	Lecture: Chapter 5
8	Wed 10/21	Quiz 5 (Ch. 5) Chapter 6 (Gases)
	Thu 10/22	Experiment 15: Combined Gas Laws (L8) Don't forget your goggles, closed shoes, and experiment.
	Fri 10/23	Test 2 (covering Chapters 4-6) <i>If you miss a test or quiz, see the syllabus for instructions.</i>
9	Wed 10/28	Chapter 7 (Solutions)
	Thu 10/29	Experiment 17 and Handout: Acid/Base Indicators (L9).
	Fri 10/30	Quiz 6 (Ch. 7) Lecture: Chapter 8 (Acids and Bases)
10	Wed 11/4	Chapter 8, Chapter 10 (Alkanes)

	Thu 11/5	Experiment 16 and Handout: Acid-Base Titrations (L10) Don't forget your goggles, closed shoes, and experiment.
	Fri 11/6	Quiz 7 (Chs. 8 and 10) Lecture: Chapter 10
11	Wed 11/11	Chapter 10, Chapter 11 (Alkenes and Alkynes)
	Thu 11/12	Experiment 18: Structure of Hydrocarbons (L11) Take Home Quiz 8 (Chs. 10 and 11)
12	Wed 11/18	Chapter 11, Chapter 12 (Organic Compounds with Oxygen)
	Thu 11/19	Experiment 19: Properties of Hydrocarbons (L12)
	Fri 11/20	Test 3 (covering Chapters 7, 8, 10, 11) <i>If you miss a test or quiz, see the syllabus for instructions.</i> Note—11/20 is the last day to drop with a "W"
13	Wed 11/25	Chapter 12, Chapter 13 (Esters, Acids, and Amines)
14	Wed 12/2	Quiz 9 (Ch. 12) Chapter 13
	Thu 12/3	Organic Functional Groups Handout (L13) Don't forget your goggles, closed shoes, and experiment.
	Fri 12/4	Quiz 10 (Ch. 13) Lecture: Chapter 14 (Carbohydrates)
15	Wed 12/9	Lecture: Chapter 14, Chapter 15 (Lipids)
	Thu 12/10	Organic Functional Groups Handout (L14) Don't forget your goggles, closed shoes, and experiment.
	Fri 12/11	Test 4 (covering Chapters 12-14)
16	Wed 12/16	Chapter 16 (Proteins)
	Thu 12/17	Quiz 11 (Chs. 15 and 16) Experiment 25: Detection of Fats, Proteins, and Carbohydrates in Food (L15) Don't forget goggles, closed shoes, and experiment.
	Fri 12/18	Final

Keep Track of Your Grades

EQ	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	L1	L2	L3	L4

L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	T1	T2	T3	T4	Final

Please refer to the course website (www.elcamino.edu/faculty/agrant) for the following information:

Course Description, Course Prerequisites, Student Learning Outcomes, Assessment Activities, ECC Policy on Attendance, ECC Statement of Student Conduct, American Disability Act Statement

COURSE OBJECTIVES

General Skills - The student will become proficient in the ability to:

1. use scientific terminology
2. name and write chemical formulas for inorganic compounds: binary nonmetal compounds, salts and acids
3. write and classify chemical equations for elementary chemical reactions
4. perform stoichiometric calculations involving chemical reactions

Structure - The student will:

1. demonstrate a basic understanding of Bohr theory
2. predict and explain periodic trends of elements in terms of electronic configurations
3. describe and illustrate the structure and bonding for molecules by: constructing Lewis structures, labeling molecular geometries, determining polarity

States of Matter - The student will:

1. use the Kinetic Molecular Theory to explain the behavior of gases
2. perform calculations involving the gas laws
3. relate intermolecular forces to observed properties of solids, liquids and gases

Aqueous solutions - The student will:

1. explain solubility in terms of properties of both solute and solvent.
2. determine concentrations of solutions quantitatively and experimentally
3. give qualitative & quantitative descriptions of soln colligative properties as a function of solute type and solute conc
4. classify solutes as strong, weak or nonelectrolytes
5. write net ionic equations for chemical reactions

Acids and Bases - The student will:

1. compare and contrast Arrhenius and Bronsted-Lowry acid theories
2. write acid-base reactions
3. determine pH and understand how a buffer works

Oxidation-Reduction - The student will:

1. determine oxidation numbers
2. identify the element oxidized and the element reduced in redox reactions

Organic Chemistry - The student will:

1. use the common and IUPAC systems to name simple examples of various classes of organic compounds
2. draw structural formulas of simple examples of various classes of organic compounds
3. write equations, using structural formulas, for selected common reactions of organic compounds
4. draw structural formulas which illustrate a knowledge of structural isomerism and geometric isomerism

Biochemistry - The student will:

1. demonstrate an understanding of chirality by drawing Fischer projections of enantiomers containing one chiral C
2. draw open chain and ring structural formulas for the common monosaccharides
3. describe the linkage between monosaccharide units in terms of the bonding involved
4. state the functions of the common di- and polysaccharides
5. draw the general structural formula of a fatty acid and a triglyceride
6. draw the structural formulas of at least three saturated and one unsaturated fatty acid
7. explain the function of a fatty acid in a membrane in terms of the structure of the fatty acid
8. draw a general structure for a phospholipid
9. draw the ring system found in steroids
10. draw the general structural formula for a zwitterion and explain how this structure can function as a buffer
11. draw the structural formulas of at least three amino acids at physiological pH
12. explain the geometry of a peptide bond by using resonance structures
13. state the features which characterize the primary, secondary, and tertiary structure of a protein
14. define denaturation as it applies to a biological system

Laboratory - The student will:

1. learn fundamental chemistry techniques such as titration, use of pH meter
2. become proficient in the use of: balance, common laboratory glassware such as burets, pipets, and volumetric flasks
3. illustrate basic principles of gases, solutions, acids and bases, and ox and red agents through experimental set ups