

Chemistry 20-1156: Fundamentals of Chemistry – Fall 2009

Instructor: Dr. Mel Kantz

Office: Chem 132; Office Hours: M/W 5:15 PM-5:55 PM and other times by appointment.

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Chemistry 20 is an introductory chemistry course that presents fundamental theories and principles of chemistry applied to inorganic, organic, and biological chemistry; atomic and molecular structure, kinetic-molecular theory, chemical and physical changes, solutions and colloids. The course emphasizes chemical nomenclature, chemical equations, and problem-solving calculations. Chemistry 20 is intended for students who require a basic knowledge of chemistry for use in their daily lives or as a prerequisite for other courses, and who have not previously taken a chemistry course.

Prerequisite: Mathematics 40 or 41B with a minimum grade of C (or by placement exam)

Recommended Preparation: Eligibility for English 2R

Required Materials:

- ✓ Karen Timberlake, Chemistry: an Introduction to *General, Organic and Biological Chemistry*,
- ✓ 10th Ed., Benjamin Cummings.
- ✓ Charles Hendrickson, et al., *Laboratory Guide for General, Organic, & Biochemistry*, 6th Ed., McGraw-Hill Higher Education
- ✓ A scientific calculator, capable of doing exponential calculations (exp or EE key).
- ✓ Safety goggles (Instructor approved)

Optional Materials:

- ✓ Karen Timberlake, Study Guide with Selected Solutions for the required text.

Grading: Final letter grades will be assigned according to the following percentage of total points earned:

<u>Grade</u>	<u>Percent</u>
A	88-100%
B	87-78%
C	65-79%
D	54-64%
F	< 54%

SPECIAL NOTE: Because chemistry is a laboratory science, passing work (50% or more of possible points) in the laboratory portion of the course is required in order to earn an overall grade of 50 or higher, regardless of test and quiz scores. Likewise, a minimum of 40% on the Final Exam (which is cumulative and comprehensive) is required in order to earn an overall passing grade in the course, even if the total points percentage is higher than 50% because of other lab and test scores.

Approximate distribution of points:

	<u>Points</u>	<u>Percent of Total</u>
Exams (Best 3 of 4 @ 125 points each)	375	39.5
Quizzes (10 @ 20 points each)	200	21.0
Laboratory (10 @ 15 points each)	150	15.8
Independent Study Assignments and Participation	25	2.6
Comprehensive Final Exam	<u>200</u>	<u>21.1</u>
Course Total	950	100.0

Student Learning Outcomes (SLO)

The letter grade that is earned by a student in Chem 20 reflects his or her mastery of knowledge topics and skills presented during the semester. One especially important assessment of student learning is as follows: On a written exercise, given the chemical formulas of reactants, students will be able to write the correct formulas of products, identify the reaction type, and balance the equation. The four mastery levels below are the rubric for making this assessment .

Level 1

- ✓ Students cannot correctly identify the reaction type.
- ✓ Students cannot correctly predict the products of the reaction.
- ✓ Incorrect formulas are used for products.
- ✓ Students cannot balance the equation.

Level 2

- ✓ Students correctly identify the reaction type.
- ✓ Students correctly predict the products of the reaction.
- ✓ Some formulas are correctly used for the products.
- ✓ Students cannot balance the equation.

Level 3

- ✓ Students correctly identify the reaction type.
- ✓ Students correctly predict products of the reaction.
- ✓ Correct formulas are used for the products.
- ✓ Students cannot balance the equation.

Level 4

- ✓ Students correctly identify the reaction type.
- ✓ Students correctly predict the products of the reaction.
- ✓ The correct formulas are used for the products.
- ✓ Students can correctly balance the equation.

COURSE OBJECTIVES for CHEM 20

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 solution 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 Brønsted-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 carbon atom.
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 burettes, pipets, and volumetric flasks
3. illustrate basic principles of gases, solutions, acids and bases, and ox and red agents through experimental set ups

POLICIES, PROCEDURES, AND GUIDELINES FOR SUCCESS IN CHEMISTRY

Attendance - Be prompt and regular in attendance. This is a matter of personal responsibility and courtesy to others. Excessive absences and/or tardiness may result in a lower grade, or being dropped from the class. Let me know by phone or email message **before** class if you must be absent or late for a legitimate reason. If you arrive to lab after my presentation of detailed instructions and safety procedures, you may be excluded from the lab that day and receive a grade of **zero**.

Exams and Quizzes - Quiz and exam questions will involve material covered in both lecture and lab. It is your responsibility to be present and on time for all exams and quizzes. No extra time will be allotted due to late arrival. There will be no make-up exams or quizzes, except for certain rare unplanned occurrences and emergencies. You must contact me as soon as possible **before** the next class meeting so that I can evaluate the nature of the absence.

Independent Study - Problems from the text, laboratory manual and other sources will be assigned. Solving topical problems is an essential part of your learning process. Independent study assignments give you practice, drill, and reinforcement of the course material. Be prepared to ask questions at appropriate times during class or during office hours concerning any material or problems which you don't understand.

Laboratory - Read laboratory experiments **before** coming to the laboratory. Directions and detailed instructions, as presented in the paragraph style of the laboratory manual, may not be fully understandable to you. You may find it very helpful to rewrite the instructions in a step-by-step or outline form. Careful reading and selective highlighting will allow you to ask appropriate questions and to take full advantage of further instructions so that you will be able to complete the laboratory work in the allotted time. **The Pre-Lab exercise for each experiment must be completed before entering the lab. Moreover, Pre- and Post-Lab exercises must be the work of only the person's whose name is on it.**

Lab quizzes may be given at any time, and will be part of the overall lab points total. There will be no time for make-up quizzes and labs. Chemistry is a science that is grounded in observation and measurement; therefore, you must maintain passing lab grades to pass the course.

The lab safety rules will be strictly enforced. A list of rules will be provided. You must wear approved eye protection and closed footwear to perform experiments that involve the use of chemicals and sources of flame (burners). Students who are unprepared to perform the assigned experiment and students who are dressed inappropriately may be dismissed from the lab. Dismissal will result in a zero for that lab.

Grades are earned, not negotiated, appointed or gifted. It is up to you to learn the material fluently enough to do well on quizzes, exams, labs, and on the final exam. Plan to spend **no fewer than 10 hours per week on this course-- in addition to time spent in class**. Study effectively: read the texts before lecture; take good lecture notes; rewrite your lecture notes to look for holes or areas that are not yet clear; study the texts and your notes; do all of the independent study assignments, and then some more. You cannot do well in Chemistry if you do not **independently** answer the assigned questions and solve the assigned problems. This is a guarantee! Use flashcards to help memorize terms and formulas. Working with study partners or study groups is especially recommended!

Success is a matter of preparation and repetition. Make use of all possible learning resources - your texts, the Instructor (in class and during office hours), internet chemistry tutorials, human tutors if necessary, and especially your fellow students in study groups. Remember that everything in Chemistry builds on itself, and the final exam is cumulative and comprehensive, so don't let any gaps develop!

Extra Credit – There will be no extra credit assignments. You are expected to practice, learn, and master all of the materials presented and assigned to you.

STANDARDS OF STUDENT CONDUCT

General Policy

Conduct at El Camino College must conform to the laws of the State of California, District policies, and campus rules and regulations. The El Camino College faculty, staff and administration are dedicated to maintaining an optimal learning environment; the standards of behavior as outlined in this policy are essential to the maintenance of a quality college environment. These standards will apply to all students on campus, other college property or while attending any college-sponsored event. Violation of such laws, policies, rules and regulations or behavior adversely affecting suitability as a student, will lead to disciplinary action. Disciplinary actions as noted in Section II may be taken against any person who engages in behavior defined as misconduct as listed.

Misconduct

Dishonesty, including but not limited to cheating, plagiarism or knowingly furnishing false information to the College.

Forgery, alteration, or misuse of college documents, records, or identification.

Continued disruptive behavior, continued willful disobedience, profanity or vulgarity, or continued defiance of the authority of, or abuse of, college personnel or to anyone on campus.

Participation in hazing or commitment of any act that tends to injure, degrade or disgrace a student or college personnel.

Obstruction or disruption of teaching, research, administration, disciplinary proceedings, or other authorized college activities including but not limited to its community service functions or to authorized activities held off campus. Obstruction or disruption includes but is not limited to the use of skateboards, bicycles, radios, and roller skates.

Persistent, serious misconduct not listed above.

Disciplinary Action

Disciplinary action appropriate to the misconduct as defined above may be taken by an instructor (see below), the Dean of Student Services or his or her designee (see below), and the Board of Trustees (see below).

Discipline

The following types of disciplinary action may be taken or pursued by the college:

Warning - A verbal or written notice, given to the student by a faculty member, the Dean of Student Services or any college manager that continuation or repetition of the specified conduct may be cause for other disciplinary action.

Reprimand - A written reprimand for violation of specified regulations sent to the student by the Dean of Student Services, noting that continued violations may result in further disciplinary action. The Dean of Student Services shall place a copy of this reprimand in the student file.

Removal by Instructor - In addition to an instructor's right to drop a student permanently from a class when the student is no longer participating i.e. lack of attendance in the course, an instructor may remove (suspend) a student from his or her class for the day of the incident and the next class meeting. During this period of removal, a conference should be held with the instructor and the student to attempt to resolve the situation that led to the student's removal and the student shall not be returned to the class from which he or she was removed without the concurrence of the instructor of the class.

If a student is suspended for one class meeting, no additional formal disciplinary procedures are necessary.

If a student is suspended from class for the day of the incident and the next class meeting, the instructor shall send a written report of the action to his or her dean who shall forward this information to the Dean of Student Services, the Vice President of Student Services, and the President. If the student removed by an instructor is a minor, the President's designee (Dean of Student Services) shall ask a parent or guardian of the student to attend a parent conference regarding the removal as soon as possible. If the instructor or the parent or guardian so requests, a college administrator shall attend the conference.

The instructor may recommend to his or her dean that a student be suspended for longer than two class meetings. If the dean, instructor and student cannot resolve the problem, the suspension will be referred to the President or the President's designee (Dean of Student Services) for possible actions described in Section 6 of this item.

Suspension- The President or the President's designee (Dean of Student Services) may suspend a student as follows:

- a. From one or more classes for a period of up to ten days of instruction; or
- b. From one or more classes for the remainder of the term; or
- c. From one or more classes and activities of the community college for one or more terms. The Dean of Student Services shall send the notice of suspension to the student, the student file, the Vice President of Student Services, the President of the College and the Campus Police. Whenever a minor is suspended from the College, the parent or guardian shall be notified in writing by the President or the President's designee (Dean of Student Services).
- d. During the period following the initial suspension from class for the day of the incident and the following class meeting, the student shall be allowed to return to the class until due process and the disciplinary procedures are completed unless the student is further suspended as a result of actions taken as defined in Section 6 of this item.

Cheating or Plagiarism

Cheating violates Section I.B.1 of El Camino College's Board Policy 5138, Standards of Student Conduct.

The El Camino College faculty, staff and administrators are dedicated to maintaining an optimal learning environment and will not tolerate academic dishonesty. To uphold the academic integrity of the institution, all members of the academic community, faculty and students alike, must assume

responsibility for providing an educational environment of the highest standards characterized by a spirit of academic honesty.

The following statement is part of Board Policy 5138, Standards of Conduct: “Dishonesty, including but not limited to cheating, plagiarism or knowingly furnishing false information to the college.” When there is evidence of cheating or plagiarism in classroom work, students may receive an F for that piece of work or may be suspended from all classes for that term and the following term if deemed appropriate.

Examples of Cheating or Plagiarism are:

§ Representing the words, ideas or work of another as one’s own in any academic exercise (plagiarism), including the use of commercial term paper companies;

§ Copying or allowing another student to copy from one’s paper or answer sheet during an examination;

§ Allowing another individual to assume one’s identity for the purpose of enhancing one’s grade in any of the following: testing, field trips or attendance;

§ Falsifying or attempting to falsify attendance records and/or grade rosters;

§ Changing answers on a previously scored test, assignment or experiment with the intent to defraud;

§ Inventing data for the purpose of completing a laboratory experiment or case study analysis with the intent to defraud;

§ Giving and/or taking information during an examination by any means such as sign language, hand signals or secret codes;

§ Obtaining copies of notes, exams or exam questions by any means other than distribution from the instructor. (This includes copying and removing exam questions from the classroom for any purpose.);

§ Using study aids such as calculators, tape recorders or notes that have been specifically prohibited by the instructor.

Responsibility of El Camino College Students

It is the responsibility of each student to conduct him/herself in a manner which encourages learning and promotes honesty; and to act with fairness toward other students in the classroom. This incorporates the notion that students should not seek an unfair advantage over other students when completing an assignment, taking an examination or engaging in any other kind of academic activity.

Consequences for Cheating or Plagiarism

Given alleged violation of the Standards of Conduct, any or all of the following actions may be imposed:

1. The instructor may assign a failing grade to the examination or assignment in which the alleged cheating or plagiarism occurred. This action is based on information that the instructor had.

2. The instructor may dismiss the student from the class or activity for the present and/or following class session(s) as stipulated in BP5138, section IIB5: Removal by Instructor.

3. The instructor may recommend suspension or expulsion of the student from the college as stipulated in BP5138, Section IIB6 and 8. This recommendation must be in accordance with El Camino College's Due Process and Disciplinary Procedures.
 4. Complete the Academic Dishonesty Report Form and submit it to your Division Office for distribution.
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ADA STATEMENT

El Camino College is committed to providing educational accommodations for students with disabilities upon the timely request by the student to the instructor. A student with a disability, who would like to request an academic accommodation, is responsible for identifying herself/himself to the instructor and to the Special Resources Center.

TENTATIVE* LECTURE & LAB SCHEDULES

Chemistry 20 Section 1156

FALL 2009

Dr. Mel Kantz

Lecture: Monday 6:00PM - 7:00P and Wednesday 6:00PM - 9:10PM, Chemistry, Room 105

Laboratory: Monday 7:05PM - 10:15PM, Chemistry, Room 166

Week #	Dates	LABORATORY	LECTURE READING ASSIGNMENTS
1	8/31 9/02	Chapter 1 continued,	Introduction. Math Review, Chapter 1, Measurements.
2	9/09	Labor Day Holiday	Chapter 1, continued; Chapter 2, Matter & Energy;
3	9/14 9/16	Lab Check-in.; Safety lecture. Lab equipment and techniques; Burners* Experiment 1: Measurement & Density	Chapter 2, Matter & Energy; continued Chapter 3, Elements and Structure of the atom
4	9/21 9/23	Experiment 2: Graphs and graphing	Exam 1 (wks 1-3)
5	9/28 9/30	Nomenclature Exercises	Chapter 4, Chemical bonding, nomenclature and structure
6	10/05 10/07	Experiment 11: Structure of Covalent Molecules and Polyatomic Ions*//Experiment 6: Simple Chemical Reactions	Chapter 4, continued; Chapter 5, Chemical reactions and calculations
7	10/12 10/14	Experiment 7 Hydrates, determination of chemical formula	Chapter 5, continued
8	10/19 10/21	Experiment 15 Combined gas law	Exam 2 (wks 5-7) Chapter 6, Gases
9	10/26 10/28	Experiment 17:*	Chapter 7, Solutions Chapter 8, Acids & Bases
10	11/02 11/04	Experiment 16: Acid-Base Titrations	Chapter 8, continued; Chapter 10, Intro to Organic Chemistry, Alkanes
11	11/09 11/11	Experiment 18 The Structure of Hydrocarbons	Chapter 10, continued Chapter 11, Alkenes and Alkynes
12	11/16 11/18	Experiment 19 The Properties of Hydrocarbons	Exam 3 (wks 9-11) Chapter 12 Organic functional groups: oxygen and sulfur
13	11/23 11/25	Experiment 22 Functional Groups*	Chapter 12 , continued; Chapter 13, carboxylic acids, esters, amines & amides
14	11/30 12/02	Experiment 22 Functional Groups* continued	Chapter 14, Carbohydrates
15	12/07 12/09	Experiment 25 Detection of Fats, Proteins & Carbohydrates in Foods. Lab Check-out	Exam 4 (wks 12-14) Chapter 14, continued; Chapter 15 Lipids
16	12/14 12/16	Final Exam will be given as the last class meeting on 12/16	Chapter 16, Proteins

* This schedule may be revised

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Revised: 9/7/09

Acknowledgement of Syllabus:

By signing and returning this sheet I acknowledge that I have read COMPLETELY the El Camino College Chemistry 20 Spring 2009 Syllabus and course objectives, and that I have understood all of their content.

Signature

Printed full name

Date