

El Camino College
Chemistry 7A: Organic Chemistry I

Instructor: Dr. Robert McLeod
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Section 1210	Section 1212	Office Hours
Lec: MW 11:00–12:25 pm, Rm 133 Lab: TTh 9:30–12:40 pm, Rm 153	Lec: MW 2:00–3:25 pm, Rm 133 Lab: TTh 2:00–5:10 pm, Rm 153	MW 10:00-10:50 am, Rm 114 MTh 1:00-1:50 pm, Rm 114

Course Description

Chemistry 7A involves a comprehensive study of the major classes of aliphatic hydrocarbons and of organic halides, alcohols and ethers. This includes nomenclature, structure, properties, stereochemistry, reactions, synthetic methods, and spectroscopy. Emphasis is placed on a systematic approach to understanding the material through the use of bonding theories, energy concepts, kinetics, and reaction mechanisms. In the laboratory, emphasis is on techniques of separation and purification of organic compounds, common organic reactions, and spectroscopy. The course prerequisite is Chemistry 1B with a minimum grade of C.

Required Materials

- Vollhardt and Shore, *Organic Chemistry: Structure and Function*, 5th ed.
- Shore, *Study Guide and Solutions Manual for Organic Chemistry*, 5th ed.
- Pavia, Lampman, Kriz and Engel, *Introduction to Organic Laboratory Techniques: A Small Scale Approach*, 2nd ed.
- Molecular Model Set for Organic Chemistry, Allyn and Bacon
- Student Laboratory Notebook (Spiral Bound, 100 Carbonless Duplicate Sets), Hayden-McNeil
- Safety Goggles (Instructor Approved)
- Permanent Marker (for lab glassware)
- Optional: Laboratory Coat or Apron

Grading Procedures

Distribution of course points:

Exams (4 @ 150 points)	600
Quizzes (4 @ 50 points)	200
Laboratory (total lab points adjusted to be out of 300 pts)	300
Final Exam	250
Course Total	1350

The overall course grade will be based on the following percentage of total points possible.

<u>Grade</u>	<u>Percent</u>
A	88 – 100 %
B	78 – 88 %
C	65 – 78 %
D	55 – 65 %
F	under 55 %

Students who drop the course by the published “last-day-to-drop-with-a-W” date will receive a W. After this a letter grade must be assigned. It is your responsibility to officially drop the course. Failure to do so could result in a grade of F. As part of dropping a chemistry class, you should see a stockroom technician and check out of your lab drawer.

Policies, Procedures, Expectations and Guidelines for Success

1. Academic Integrity and Courtesy

- Be prompt and regular in attendance; this is mandatory. Excessive absences and/or tardies may result in a lower grade or being dropped from the class.
- Always come to class prepared. Bring needed course materials including a calculator (not a cell phone or other electronic device).
- Polite and Respectful behavior is expected at all times. Cell phones and other electronic devices must be turned off and put away. Disruptive behavior such as being tardy, inappropriate talking, texting, ringing of a cell phone, sleeping, etc. will not be tolerated.
- Questions related to the classroom topic are encouraged.
- There will be no makeup exams, quizzes or laboratories. If you have a valid excuse for missing an exam, quiz or lab, contact the instructor prior to class and give the reason for your absence and when you expect to return to class. Contact may be made in person, by telephone message or by e-mail. See the instructor immediately when you return to class. These situations will be dealt with on a case-by-case basis.
- Honors Code: Evidence of cheating or plagiarism will, at a minimum, result in an F for that piece of work. Submission of an Academic Dishonesty Report Form, suspension from class or expulsion from the college are additional possible consequences.

2. Exams and Quizzes

- Be present and on time for all exams and quizzes. Late arrivals will not be given extra time. It is your responsibility to come prepared with all necessary materials.
- Answer keys will be posted in the display case in the hallway outside the Chemistry faculty offices.

3. Assignments

- Regular assignments are given. They are an essential part of the course intended to give you representative practice, drill, and reinforcement of the course material.
- Complete all assignments in a timely manner. This your responsibility; they will not be collected.
- You are encouraged to attend the instructor's office hours to ask questions concerning any material or problems that you don't understand.
- It must be assumed that students are keeping up with the course since the content of most lectures requires an understanding of previously discussed material.

4. Laboratory

- Read laboratory experiments before coming to class. This will allow you to take full advantage of instructions provided by the instructor and to work more efficiently in the laboratory.
- If you make a mistake during an experiment, check with the instructor before doing anything else. Do not start over without instructor approval.
- Complete laboratory notebooks/reports independently. Students are required to do their own work outside of lab on all lab reports regardless of whether or not the lab work was done with partners. Copying is considered cheating. Do not work with partners in lab unless directed to do so.
- To receive credit for a lab, you must have the instructor initial your lab notebook/report form before you leave. Keep your lab notebook/report reasonably neat; it must be easily readable.
- Unless announced otherwise, laboratory notebooks/reports are due before the beginning of the class one week after their scheduled completion day. Late work will be penalized 5 points per class day late. Being tardy or absent is not an excuse for late lab reports.

- The instructor may spot check your lab notebook/report at any time during a lab period.
- Since chemistry is a laboratory science, passing work in the laboratory portion (55% or more of possible lab points) of the course is required to earn an overall course grade of C or better.
- Laboratory grades will depend on laboratory notebooks/reports, unknown results, quality and quantity of products, quality and interpretation of chromatographs, quality and interpretation of spectra, laboratory techniques, attendance, and following all directions and requirements .

5. Laboratory Safety

- A good oral and written command of the English language is required for laboratory safety. If necessary, improve your English skills before taking this course.
- Follow all instructions and safety rules. You are expected to be familiar with all given safety rules and to follow them at all times while working in the laboratory. Failure to do so may result in dismissal from the lab and a zero on that lab report. Safety is everyone's responsibility and must be given a top priority.
- Safety concerns require that you be present in class for the prelab discussion. If you come late to a laboratory class you must first report directly to the instructor; do not start lab work until given instructor approval. Tardiness may be noted on your lab report and result in a lower grade.
- You will always be required to wear approved safety goggles in the laboratory while an experiment is in progress; no exceptions. Shoes must be stable (no heels) and securely fastened to your feet.

6. Study Habits

- Spend at least 14 to 16 hours per week studying in a distraction free environment. Study on many different days each week rather than cramming to learn (when you should be reviewing) the material before a quiz or exam.
- Read a chapter once prior to the lecture on the material. This will allow you to better understand the lecture material and save you study time later. Soon after class, review your lecture notes and fix any areas that need clarification. To ensure that you have a detailed understanding of the material, you should rewrite your lecture notes in a neater, more organized way. Write questions about the material in the margin and find out the answers. A common practice is to add color to help organize the material or highlight key information.
- Do the assigned problems. Review the chapter material, lecture notes and handout materials as needed to solve problems. You must write out problem answers in a complete and accurate fashion so that you will be able to solve problems under exam conditions.
- Keep a separate notebook or section of a notebook just for problems. At a later time, repeat problems you did incorrectly. Do this until you are comfortable with them and can do them quickly (as on a quiz or exam).
- When reviewing for quizzes and exams, remember to review your lecture notes to see what material the instructor emphasized, and what hints and common problem areas the instructor pointed out. Be sure you understand important concepts so that you will be open to new applications of learned material. Although the "chapter integration" problems at the end of each textbook chapter are usually not assigned as homework, they are recommended for review.
- Once you are familiar with material (not before), study partners or groups are recommended as an effective way to increase your understanding and to review for quizzes and exams.
- Success is a matter of preparation and repetition. The material will often require a great deal of time to learn. Use all your learning resources including texts, instructor, other students and tutors, if necessary. The course material will build on itself, so do not let any gaps develop in your knowledge. Catching up is nearly impossible once you fall behind.

7. Additional Information (<http://www.elcamino.edu/faculty/agrant/syllinfo.html>)

The above website provides ECC chemistry course descriptions, prerequisites and information about student learning outcomes. It also gives ECC policies on attendance, student conduct and American Disability Act.

Course Objectives

- A. For all major classes of organic compounds, the student will
1. recognize the general formula and state the class name and vice-versa.
 2. identify the class to which a specific compound belongs and formulate specific examples for a given class.
- B. For any given organic compound, the student will
1. describe and illustrate the structure and bonding by
 - a. constructing the Lewis structure.
 - b. sketching and labeling the molecular geometries within the molecule.
 - c. sketching and labeling the types of bonds and the overlap of hybrid orbitals.
 - d. comparing and contrasting bond polarities.
 - e. comparing and contrasting the conformations associated with the molecule.
 2. predict and explain properties in terms of structure and bonding.
 3. evaluate the molecule for the existence of structural and stereoisomers and draw formulas for all structural and stereoisomers.
 4. demonstrate knowledge of stereochemical concepts by
 - a. locating all stereocenters in a stereoisomer.
 - b. deciding if a stereoisomer is chiral and if it is optically active.
 - c. classifying a stereoisomer as an enantiomer or a diastereomer.
 5. analyze IR and NMR spectra of the compound to determine its structural features and then predict its structure. MS and UV spectra are used to a lesser extent.
- C. For the major classes of aliphatic hydrocarbons and of organic halides, alcohols and ethers, the student will
1. draw a structure given a specific name and vice-versa.
 2. know what the most common and/or important compounds are.
 3. determine products given reactants and vice-versa for common and/or important reactions.
 4. demonstrate an extensive knowledge for many of the reactions studied by
 - a. writing mechanisms, particularly those involving radical or carbocation intermediates.
 - b. explaining how kinetic studies and energy measurements are used to support or disprove a proposed mechanism.
 - c. comparing and contrasting competing reactions using factors such as mechanistic differences, structural effects, steric effects, solvent effects, temperature, electronic effects, and conjugation and resonance.
 - d. predicting the structural and stereochemical outcome of reactions where isomeric products are possible.
 5. arrange a series of related compounds in order of a given physical or chemical property.
 6. plan and then outline a synthesis of a given organic compound choosing from a limited variety of starting materials and utilizing the reactions studied.
 7. describe how to distinguish between different compounds using simple tests.
- D. In the laboratory the student will
1. learn and practice fundamental organic laboratory techniques by separating mixtures and/or purifying compounds using recrystallization, extraction, chromatography (including column, gas, paper, and thin layer chromatography), and distillation (including simple, fractional, and steam distillation).
 2. set up and carry out several common reactions which illustrate a variety of methods for running organic reactions.
 3. record spectra using an IR spectrometer.