El Camino College  
Chemistry 7A: Organic Chemistry I  

Instructor:  Dr. Peter A. Doucette  
Office: Chem 126  
Summer 2016  
email: pdoucette@elcamino.edu  

<table>
<thead>
<tr>
<th>Section 1250</th>
<th>Office hours</th>
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<tbody>
<tr>
<td>Lectures: MTWTh 12:15-1:40 Chem 105</td>
<td>MTWTh 11:45-12:15</td>
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<td>Labs: MTWTh 1:50-5:05 Chem 153</td>
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Course description:
Chemistry 7A involves a comprehensive study of the major classes of aliphatic and aromatic hydrocarbons, organic halides, and 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.

Required Materials:
- **Lab Textbook**: Pavia et al., *A Small Scale Approach to Organic Laboratory Techniques, 3rd* edition.
- **Student Laboratory Notebook**: spiral bound, 100 carbonless duplicate sets, Hayden-McNeil (others are not accepted)
- **Molecular Model Set for Organic Chemistry**: Allyn and Bacon (recommended)
- **Scientific Calculator**: logarithms and exponents - no graphing calculators are permitted on exams or quizzes
- **Safety Goggles** (instructor approved)
- **Permanent Markers** (glassware labeling)
- **Laboratory Coat or Apron, Latex or Nitrile Gloves** (recommended)

Grading:
Total course point distribution

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td>3 Midterms</td>
<td>600</td>
</tr>
<tr>
<td>Laboratory work</td>
<td>(adjusted to 200 points total) 200</td>
</tr>
<tr>
<td>Quizzes</td>
<td>(adjusted to 200 points total) 200</td>
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<tr>
<td>Final Exam</td>
<td>(250 points) 250</td>
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Total Possible 1250

Letter grades are given based on the percentage of total points*.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>100 - 89%</td>
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<tr>
<td>B</td>
<td>88 - 78%</td>
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<tr>
<td>C</td>
<td>77 - 65%</td>
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<tr>
<td>D</td>
<td>64 – 55%</td>
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<tr>
<td>F</td>
<td>54 – 0%</td>
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*Passing work in the laboratory portion of the course (55% or more of possible lab points) is required to pass the course.
Quizzes and Exams:

**Quizzes:** Quizzes will be in the same format as the exams, only shorter. These are designed to prepare you for the exam.

**Exams:** The format for exams is a multiple choice section followed by a free-response section. The free-response questions will include mechanisms, single reactions, multistep synthesis, nomenclature, and other types of questions that will depend on the material being taught. One Scantron form 882-E is needed for each exam (but not for quizzes).

Course website:

Course material will be available at the following website: [www.elcamino.edu/faculty/pdoucette/chem7a.html](http://www.elcamino.edu/faculty/pdoucette/chem7a.html). You are encouraged to print out lecture notes and other material and bring them to class.

e-mail text policy:

I will be in contact with the class via SMS text and or email throughout the semester using the service Remind.com. I recommend signing up to receive both texts and email messages so you are less likely to miss an important announcement. Please see the instructions on the course website how to sign up for your particular section. If you still need help, please see me right away.

Dropping the course:

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.

Add/Drop dates:

- Monday, June 27: Last day to add (there are NO late adds)
- Monday, June 27: Last day to drop with a full refund
- Monday, June 27: Last day to drop without notation on permanent record
- Thursday, July 28: Last day to drop with a “W”

Rules, expectations and tips for success:

1. General:
   - Attend class regularly and be on time. Excessive absences and/or lateness may result in a lower grade or being dropped from the class. People who miss classes and are often late, generally do not do well in this course.
   - Always come to class and lab prepared. Please bring your calculator to every lab meeting. It is also useful to bring your texts with you to class for reference and so you have the assigned problems with you at all times.
   - I encourage you to participate in the classroom discussion. Don’t be afraid to speak up! If you have a question, please ask. If you don’t understand something, most likely there are others in the class who don’t get it either.
   - There will be no makeup exams, quizzes or laboratories. If you have a valid reason for missing an exam, quiz or lab, contact me in person or by email before to the class meeting. See me as soon as possible to discuss your situation.
   - Cheating of any form will not be tolerated.

2. Laboratory:
   - You are expected to be familiar with the laboratory safety rules and to follow them at all times while working in the laboratory. If you are unsure about any aspect of laboratory safety you should see me before beginning any work in the laboratory. Failure to follow safety rules in the laboratory will result in dismissal from the lab. Safety is everyone’s responsibility and is a top priority of the chemistry department.
   - You must always wear approved safety goggles in the laboratory while an experiment is going on even if you are finished with your lab. You will be asked to leave immediately for infractions of this rule. Shoes must be stable (no high-heels) and securely fastened to your feet.
You should read and fully understand all labs **BEFORE** coming into the lab. Laboratory notebook preparation should begin days before the lab is scheduled. This process is described in a handout I will provide as well as in the laboratory text (technique 2). If you come to lab unprepared you will be asked to leave and you will receive a zero for that particular lab. Organic labs are more difficult, take longer and are often more dangerous than labs you have done in other classes. You should not begin the lab if you show up late. Please see me before you begin your work.

**All data and observations obtained in the lab must be recorded in blue or black ink.** Always record data and observations directly in the lab manual - do not use scratch paper to record your data.

Everyone makes mistakes. If you make a mistake during an experiment, or even suspect you made a mistake, please see me immediately as to how to approach the situation. A small, easily fixable error at the beginning of an experiment can have drastic effects on your results. It's better to be safe and double check with me before proceeding.

Everyone has accidents. Please report any accidents or mishaps to me immediately. Especially if they are serious (e.g. you are bleeding); but even if you think they are very minor. I will not get angry, or embarrass you, so please don't be afraid to report accidents to me.

Complete and turn in laboratory reports independently, regardless of whether or not any lab work was done with another person. Never turn in a paper with more than one person's name on it.

Unless announced otherwise, laboratory notebooks/reports are due at the beginning of the lab one week after the experiment is completed. I will let you know if they are due earlier or later, either during lab, lecture, or by email. It is your responsibility to keep track of due dates. Late work will be penalized. Being late or absent is not an excuse for late work.

Laboratory grades will depend on report formatting, proper collection of data, your results, laboratory techniques, attendance and tardiness, and following all directions. I will also check that your prelab write-up is complete.

**3. Study tips:**

- Spend at least 14-16+ hours per week (2-3 hours every day) studying the material for this class in an environment where you can focus on chemistry. Don't wait until Sunday to study something from Thursday's lecture. By then, the material is long gone from your memory and you will have to relearn it from scratch. **It is much better to over study for this class - especially in the beginning - than find out you are a little behind. Falling behind (even a little) in organic chemistry is not recommended!**

- It is very helpful to read through the material in the lecture notes and textbook prior to lecture. This will allow you to better understand the lecture material and save you study time later.

- Write down questions you have about the material and find out the answers to all of them. Figuring out the answer for yourself is the most gratifying and valuable way to get the answers, but of course you can always come ask me!

- Do the assigned problems. To solve problems, review the textbook and lecture notes. Working problems is an essential part of the course and you should make this one of your primary goals. You should do all of the problems I assign and you should **avoid looking at the solutions manual** until you have figured out the problem on your own. You will be given a lot of problems and the more you work on them, the better you will get. As mentioned above, you should devote about 2-3 hours per day, six or seven days a week studying and a large part of this time should be doing assigned problems.

- At a later time, repeat problems you did incorrectly or really struggled with. Do this until you are comfortable with them and can do them quickly (as on a quiz or exam).

- Repeat all of the problems we do in class on your own (preferably right after class) and make sure you are comfortable with them. Don't just look over a problem and say "Yep, I got it" - Actually re-do the problem.

- Once you are comfortable with the material, it is often good to participate in small study groups with other motivated students. If possible, try and teach the material to each other. If you can explain it correctly to someone, then you know it!
• Success is a matter of preparation and repetition. The material in this class will 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 extremely difficult once you fall behind.

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 stereoisomers as enantiomers or disatereomers.
   5. Analyze IR and proton NMR spectra of the compound to determine its structural features and then predict its structure. MS, UV and carbon-13 NMR spectra are used to a lesser extent.

C) For the major classes of aliphatic hydrocarbons and of organic halides,

D) alcohols and ethers, the student will:
   1. Draw a structure given a specific name and vice-versa.
   2. List the most common and/or important compounds.
   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.

E) Predicting the structural and stereochemical outcome of reactions where isomeric products are possible.

F) 5. Arrange a series of related compounds in order of a given physical or chemical property.

G) 6. Plan and outline a synthesis of a given organic compound choosing from a limited variety of starting materials and utilizing the reactions studied.

H) 7. Describe how to distinguish between different compounds using simple tests.

I) 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 laboratory techniques.
   3. Record IR spectra using an infrared spectrometer.
Assessment:

Student success will be assessed via exams, lab reports, instructor observations, and student learning outcomes (SLO's). Two SLO's are listed below:

Chemistry Program Level Student Learning Outcome:

Students will practice safe laboratory procedures by putting their goggles on at the beginning of a chemistry lab experiment involving burners or chemicals, and by keeping their goggles in place during the entire course of the experiment. Students will not remove their goggles until the students are leaving or until the instructor has said that it is safe to do so (whichever comes first).

Chemistry 7A Course Level Student Learning Outcome:

On a written exercise, given the names of chemical compounds, students will be able to write the correct reactant formulas, states of matter (when required), identify reaction type, predict the formulas of products, and balance the chemical equation.

Students with Disabilities, including Learning Disabilities:

Students with disabilities, including learning disabilities, who believe they may need accommodations in this class are encouraged to contact the Special Resource Center on campus as soon as possible to better ensure such accommodations are implemented in a timely fashion. If you suspect, or are unsure if, you have a learning disability you are strongly encouraged to contact the Special Resource Center on campus as soon as possible for testing, to better ensure any needed accommodations are implemented in a timely fashion. If you have a documented or suspected disability and wish to discuss academic accommodations, please contact me privately to discuss your specific needs.

Please visit http://www.elcamino.edu/faculty/agrant/syllinfo.html for additional information regarding ECC policies, chemistry course descriptions, prerequisites, and student learning outcomes.