#### Chemistry 7A Fall 2009

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# **Required Materials:**

- Vollhardt and Schore, Organic Chemistry: Structure and Function, 5<sup>th</sup> ed.
- Schore, Study Guide and Solutions Manual for Organic Chemistry, 5<sup>th</sup> ed.
- Pavia, Kriz, Lampman, and Engel, *Introduction to Organic Chemistry Techniques; A Small Scale Approach*, 2<sup>nd</sup> ed.
- Laboratory Notebook (Spiral Bound, 100 Carbonless Duplicate Sets)
- Safety Goggles (Instructor Approved)
- Molecular Model Set for Organic Chemistry (optional)
- Permanent Marker (for lab glassware)
- Apron or lab coat (optional)

#### **Course Objectives:**

- To draw and name molecules using systematic rules.
- To understand the concepts of conjugation, hyperconjugation and aromaticity.
- To understand conformational analysis of molecules.
- To recognize the relationship between the three-dimensional structure of organic molecules and the consequences on their physical properties.
- To learn the three general classes of organic reactions (polar/ionic, pericyclic and free-radical reactions).
- To determine products or reactants for common reactions.
- To demonstrate knowledge of mechanisms for common reactions.
- To plan and outline a synthesis of a given organic compound.

# **Grading Procedures:**

Exams (4 @ 100 pts)	400
Quizzes (4 @ 25 pts)	100
Laboratory	100
Final Exam	_200
Total possible pts	800

Grading will be done on a straight scale (<u>no curve</u>). Final letter grades will be based on the following percentage of total points possible.

Grade	Percent
А	89-100
В	78-88
С	66-77
D	55-65
F	< 55

Requests for regrading must be submitted in written form no later than 2 days after the exams were handed back. Keep in mind that the entire exam will be regraded. Students who drop the course within 12 weeks will receive a grade of "W". After the 12<sup>th</sup> week a letter grade must be assigned. It is your responsibility to drop the course. Failure to do so could result in a grade of "F". In order to drop a chemistry class, you must check out of your laboratory drawer and have a clearance card signed by the chemistry stockroom technician.

# POLICIES, PROCEDURES, EXPECTATIONS

#### 1. Attendance and Academic Integrity

- Be prompt and regular in attendance. Excessive absences and /or tardies may result in a lower grade or in being dropped from the class.
- Always come to class prepared. Disruptive behavior such as being tardy, talking to other students, ringing of cell phones, etc. will be not tolerated.
- Evidence of cheating or plagiarism will be reported to Academic Affairs Office and could result in expulsion from the college.

# 2. Exams and Quizzes

- All exams are cumulative. There will be <u>no make-up</u> exams or quizzes.
- You need to take the exams and quizzes in your assigned section.
- Answer keys will be posted in the display case outside room 105.

# 3. Assignments

- Regular assignments are given from the textbook and other handouts. They are an absolutely essential part of the course and are intended to give representative practice, drill and reinforcement of the course material.
- Assignments will not be collected.
- Be prepared to ask questions at appropriated times during class or office hours concerning any material you don't understand.

# 4. Study Habits

- Consistent, disciplined study habits are a prerequisite for doing well in this course. You should study every day, at least 16 hours per week.
- Looking over the chapter prior to lecture will allow you to understand the material covered in lecture better.
- Memorization is an important part of organic chemistry, but it is not sufficient to do well in this class. In order to succeed, you need to understand how to apply and integrate concepts covered in the course.

- Do the assigned problems and read over your notes, textbook and handouts.
- Success is a matter of preparation and repetition. The material will often require a great deal of time to learn and will build on itself. Do not let any gaps develop in your knowledge. Keep in mind that catching up is nearly impossible once you fall behind.
- Once you are familiar with the material, study partners are recommended as an effective way to review for quizzes and exams.

#### 5. Laboratory

- Attendance in lab is mandatory; there will be no make-up labs.
- Being late for lab (10 min or more) will result in loss of 1 pt.
- Students who are unable to finish their lab assignments on time and stay in lab longer than the allocated time (10 min or more) will lose 1 pt.
- Students who do not clean and dry their glassware, hood space and lab-bench will be penalized 2 pts.
- Failure to follow proper laboratory instruction and safety rules will result in dismissal from class.
- Prelabs have to be completed before coming to class. Incomplete prelabs will result in loss of 2 pts. Students without a prelab will not be allowed to work in the lab.
- Laboratory reports should be completed individually and should be turned in <u>before</u> the beginning of the class meeting at which they are due. Late work will be penalized 2 pts per day late.
- I will check your lab notebook/report at the beginning of the lab period.
- To receive full credit for a lab, you must have the instructor initial your lab notebook before you leave.
- Safety goggles should be worn at all times; failure to do so will result in loss of 2 pts.
- If you make a mistake, check with me <u>before</u> starting over.
- At the end of each lab period two students will be assigned to cleaning up the balance area and the instrument room.

#### TENTATIVE LECTURE/LAB SCHEDULE

<sup>I</sup>denotes investigative type experiment HOS = handout sheet <sup>P</sup>denotes preparative type experiment

Week 1 W	/: Ch.	1: Structure a	and Reactivity
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**8/29/09 lab:** Ch. 1: cont'd

Week 2 W: Ch. 1: cont'd ,Ch. 2.

- 9/7/09 lab: Ch. 2: cont'd Check-In, Safety
- Week 3 M: Ch 2. cont. Ch. 3: Reactions of Alkanes
- **9/14/09 lab:** Exp. 2: (part C) Melting Point <sup>I</sup>, Tech. 9 (omit 9.6, 9.9), p. 669: prob. 4
  - W: Quiz 1 (Ch. 1-2). Ch. 3: cont'd

- **lab:** Exp. 3: (part C & D) Extraction<sup>I</sup>; Tech. 12.1-12.4, 12.8-12.11, p. 722 prob. 2, 9
- Week 4 M: Ch. 4: Cyclic Alkanes
- 9/21/09 lab: Extraction cont'd.
  - **W:** Ch. 4: cont'd
  - **lab:** Exam 1 (Ch. 1-3) Exp. 16AB: Isolation of Chlorophyll and Carotenoid Pigment from Spinach; Tech. 19.1-19.14
- Week 5 M: Ch. 5: Stereoisomers
- 9/28/09 lab: Stereochemistry Exercise I: Molecular Models (HOS)
  W: Ch. 5: cont'd
  lab: Stereochemistry II: Molecular Models (HOS)
- Week 6 M: Ch. 6: Properties and Reactions of Haloalkanes
- 10/5/09 lab: Exp. 47: (parts A & C) Paper and Thin Layer Chromatography of Food Colors<sup>1</sup>; Tech. 20 (omit 20.3); p. 831; prob. 1, 4
   W: Ch. 6: cont'd
  - lab: Quiz 2 (Ch. 4, 5) Ch. 6: cont'd, Chromatography cont'd
- Week 7 M: Ch. 7: Further Reactions of Haloalkanes
- **10/12/09 lab:** Exp. 5: Simple and Fractional Distillation<sup>I</sup>; Tech. 3, 7.1A, 13.1, 13.2, 14.1-14.3, 15.1-15.6; p. 741: prob. 1,4 p.763: prob. 2,
  - **W:** Ch. 7: cont'd
  - lab: Exam 2 (Ch 4-6)Distillation cont'd (Analysis by GC), Tech. 22.1-22.11 p. 856: prob.1, 2, 4
- Week 8 M: Ch. 8: Hydroxy Functional Group
- 10/19/09 lab: Exp. 30, 30A: Chromic Acid Oxidation of Alcohols<sup>1</sup> p. 253: prob.1 W: Ch. 8 cont'd
  - **lab:** Exp. 36, 36A: Grignard Synthesis of Triphenolmethanol<sup>P</sup>, Tech. 7.2, 7.5, 7.6, p. 314: 1, 2, 5d
- Week 9 M: Ch. 9: Further Reactions of Alcohols and the Chemistry of Ethers
- **10/26/09 lab:** Grignard Synthesis cont'd
  - W: Ch. 9: cont'd
  - lab: Quiz 3 (Ch. 7, 8). Exp. 23, 23A: Synthesis of n-Butyl Bromide from n-Butyl Alcohol<sup>P</sup>. Tech. 7.8, p. 193: prob. 3, 4
- Week 10 M: Ch. 11: Alkenes (omit sec. 4,5)
- **11/2/09 lab:** Synthesis of n-Butyl Bromide cont'd
  - **W:** Ch. 11: cont'd
  - **lab:** Exp. 24: Dehydration of an Alcohol: Preparation of
    - 4-Methylcyclohexene<sup>P</sup>(omit unsaturation tests) p. 197: prob. 1, 2a-d

Week 11 11/9/09	<ul> <li>M: Ch. 12: Reactions of Alkenes;</li> <li>lab: notebook due. Dehydration of an Alcohol (Analysis by GC) cont'd</li> <li>W: Spectroscopy: NMR: Ch. 10, Ch 11 (sec 4), Pavia, Tech 26 IR: Ch 11 (sec 5), Pavia, Tech 25, UV: Ch 14 (sec 11) MS: Ch 19 (sec 3); Ch 11 (sec 6)</li> <li>lab: Exam 3 (Ch. 7-9,11)</li> </ul>
Week 12 11/16/09	<ul> <li>M: NMR cont'd. IR</li> <li>lab: Spectroscopy Exercise: HOS; p.942: prob. 5-10</li> <li>W: Ch11 (sec 5)</li> <li>lab: NMR Exercise: HOS. IR Spectrum of 4-methylcyclohexene. Tech. 25.1, 25.4, 25.7, 25.8. p.908: prob. 2 acehjkl</li> </ul>
Week 13 11/23/09	<ul> <li>M: UV: Ch. 14 (sec 11). MS: Ch. 20 (sections 9-11) Additional spectroscopy sections: 13.3, 15.4, 17.3, 19.3, 21.3</li> <li>lab: Exp. 58, 58A: Isolation of Essential Oils from Spices<sup>I</sup>, Tech. 18.1-18.3 p. 108: prob. 7,8</li> <li>W: Quiz 4 (Spectroscopy), MS cont'd lab: Steam Distillation cont'd</li> </ul>
Week 14 11/30/09	<ul> <li>M: Ch. 13: Alkynes</li> <li>lab: Exp. 26: Catalytic Hydrogenation: Methyl Stearate from Methyl Oleate<sup>P</sup> (omit unsaturation tests). Tech 8.8, p. 216: prob 3, 4</li> <li>W: Exam 4 (all spectroscopy, Ch 12)</li> <li>lab: Thanksgiving break – no class</li> </ul>
Week 15 12/7/09	<ul> <li>M: Ch. 13: cont'd</li> <li>lab: Exp. 11, 11A: Isolation of Caffeine from Tea Leaves<sup>I</sup>; (omit sublimation and derivation); notebook due</li> <li>W: Ch. 14 Delocalized Pi Systems</li> <li>lab: Exp. 49: The Diels-Alder Reaction of Cyclopentadiene with Maleic Anhydride<sup>P</sup>.</li> </ul>
Week 16 12/14/09	M: Ch 14 cont'd lab: Lab Check-Out;

W: Final Exam (comprehensive)

**Homework Assignments:** Homework assignments are from the end of each chapter. Problems are not collected, but are for you to practice to master the subject matter. Answers for in-chapter exercises are given in an "Answers to Exercises" section at the end of the textbook. Answers to end-of-chapter problems are given in the Study Guide and Solutions Manual to Organic Chemistry that goes with the textbook.

Chapter 1: Structure and Bonding in Organic Molecules 4,6.8,13-15, 17, 21, 23-25, 27, 28, 31-38, 46-50 Chapter 2: Structure and Reactivity 6-9,11-14, 16-18, 23, 24, 26, 27, 29-32, 34-36, 39, 46-49 Chapter 3: Reactions of Alkanes 13, 14, 18, 19ab, 20, 22, 24-26, 41-44 Chapter 4: Cycloalkanes 2, 3, 5, 9, 12, 13, 17-19, 23, 25, 27, 28, 35, 38, 42, 47-50 Chapter 5: Stereoisomers 1-3, 5, 7, 9-21, 26, 28-32, 34, 36-39, 43, 46, 47, 49-51, 53-54, 59-63 Chapter 6: Properties and Reactions of Haloalkanes 1-24, 27-32, 34-44, 46, 47, 49, 52, 56-59 Chapter 7: Further Reactions of Haloalkanes 1-19, 22-38, 40, 43, 47, 52, 54, 57-60 Chapter 8: Hydroxy Functional Groups: Alcohols 1-18, 21-24, 26-28, 32, 34-39, 41, 42, 44, 47-49, 51, 57-60 Chapter 9: Further Reactions of Alcohols and the Chemistry of Ethers 2-21, 26-30, 32, 34aceghjklm, 35aceghjklm, 36, 37, 39, 40, 44, 45, 48, 50, 52, 53, 58, 60ab, 69-72 Chapter 11 (skip 11.4-11.8): Alkenes 1-6, 20-21, 22, 26, 27, 45-47, 49, 51, 54, 56, 57, 58, 64-68 Chapter 12: Reactions of Alkenes 3, 7, 10-12, 15, 17-19, 21-22, 28, 29, 31-34, 36-39, 48, 55-58, 67-71 Spectroscopy UV – Ch 14.11: 63, 64 MS - Ch 19.3: 35, Ch 11.6: 10-17, 38, 39, 40 IR – Ch 11.5: 35-37 NMR – Ch 10: 25, 27-41, 43, 46, 47(decoupled only), 50, 56-59; Ch 11: 28, 43 Chapter 13 Alkynes 1, 3, 5-18, 21-23, 25, 28, 29ab, 30-36, 39, 40, 43, 44, 46, 50-54 Chapter 14 Delocalized Pi Systems 1-4, 6-12, 14-19, 28, 29, 32-35, 37, 38, 40-43, 44, 46, 48, 50, 52, 56-58, 66, 71-74 **DISCLAMER STEMENT:** Students will be notified ahead of time when and if any

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**DISABILITY STATEMENT:** If you have a documented disability and wish to discuss academic accommodations, please contact me as soon as possible.

**STUDENT LEARNING OUTCOMES:** On a written exercise, given the structures of reactants for a reaction, students will be able to write the correct structures of products and identify the reaction type.

ADDITIONAL INFO: Please refer to the course website

(www.elcamino.edu/faculty/agrant) for the following information: Assessment Activities, ECC Policy on Attendance, ECC Statement of Student Conduct.