

Southwestern College Chem 240: Organic Chemistry I Fall 2008 Section 01 Syllabus

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Office Hours: W 11:00-11:50 a.m., TTh 4:30-5:20 p.m. and by appointment

Lectures: TTh 12:00 – 1:15 p.m. 332
Laboratory: TTh 1:30 – 4:20 p.m. 333

Pre-requisites:

Chem 210 or equivalent Math 121 or 240 or equivalent

Course Description and Objectives:

This 5 unit course is the first in a two semester sequence in organic chemistry for science, engineering, and pre-professional majors, such as medicine and dentistry. This course consists of 3 hours of lecture and 6 hours of laboratory work per week and cannot be taken on a credit/no credit basis. The lecture will stress learning foundational concepts in order to achieve the course objectives listed below. Laboratory exercises will focus on application of those concepts as well as familiarization with techniques of quantitative and qualitative organic analysis. For a copy of the complete official course description and objectives, inquire at the office for the School of Mathematics, Science and Engineering or go to:

<http://www.swccd.edu/%7Emse/Ex1/Pdfs/Chem%20240%20F03.pdf>

1. Draw Lewis structures for simple organic molecules, identify orbitals involved in bond formation, rationalize molecular structure using atomic, valence bond, and molecular orbital theories.
2. Draw line structures of organic molecules from the corresponding International Union of Pure and Applied Chemists (IUPAC) name, write the IUPAC names of molecules from their corresponding line structures, and identify functional groups.
3. Draw diagrams showing the geometry of stereoisomers, give IUPAC names to stereoisomers from their 3D representations, describe the relation between chirality and optical activity, identify and differentiate between enantiomers, diastereomers, and *meso* compounds, assign R, S configurations, and predict the location of stereogenic centers and optical activity of products of additions to alkenes.
4. Compare and contrast in words the mechanism of S_N2 , S_N1 , E1, and E2 reactions of alkyl halides.
5. Student will for hydrocarbons; relate the properties of alkanes and cycloalkanes to conformations, relate properties of alkenes to bonding and to structure, explain the methods of synthesis of alkenes, relate properties of alkynes to bonding and to structure, explain the methods of synthesis of alkynes, determine the products of alkene/alkyne addition and oxidative cleavage reactions.
6. Student will describe the kinetics of a reaction and draw potential energy diagrams to describe a chemical reaction, describe reactions in general, and categorize the reactions as an addition, substitution, condensation, elimination, or oxidation-reduction
7. Student will interpret infrared spectra, using correlation charts as an aid.
8. Student will predict the appearance of the proton NMR spectrum of simple organic molecules, and interpret the proton NMR spectra of simple organic molecules.
9. Student will explain, in answer to essay questions, the mechanism for electrophilic aromatic substitution.
10. Student will determine possible methods of synthesis of substituted aromatic compounds.
11. Student will carry out synthesis and purification of organic compounds using standard taper glassware in a proper manner, maintain a proper laboratory notebook, collect and analyze scientific data using microscale techniques, (recrystallization, melting points, extractions, distillations, thin layer chromatography (TLC) and column chromatography.), operate and analyze organic compounds with a Fourier Transform Infrared (FTIR) spectrometer, gas chromatography (GC-Mass) spectrometer and a high performance liquid chromatography (HPLC) system, write a scientific laboratory report, demonstrate a knowledge and understanding of all of the safety rules in an organic chemistry laboratory by following all safety procedures whenever working in the laboratory.

Required Materials:

Solomon, Fryhle, *Organic Chemistry*, 9th ed.
 Organic Chemistry Laboratory packet
 Fessenden, *Organic Laboratory Techniques*, 3rd ed.
 Laboratory notebook (numbered, duplicate)
 scientific calculator
 approved eye protection
 access to online materials
 Lab coat
 Soap
 matches

Recommended Materials:

Wiley Plus Online Suite
 Solutions Manual
 Study Guide
 molecular model kit
 Towel

Grades:

The semester grade will be determined by combining all portions of the course, dropping the lowest quiz, and lab report. Failure to pass ($\geq 55\%$) either the lab or lecture portion of the course will result in a failing grade for the entire course. Progress reports will be given before each drop date and before the final exam. Additional progress reports can be obtained upon request. All graded assignments MUST show complete work. No credit will be awarded for assignments containing answers only.

Letter grades will be assigned as follows: A ($\geq 90\%$), B ($\geq 80\%$), C ($\geq 70\%$), D ($\geq 60\%$), F ($< 60\%$)

Exams:

| | |
|----------------------------------|---------------------|
| 3 of 4 for 100 pts each (2-3 hr) | Total 300 pts (30%) |
| 1 cumulative final exam (2 hr) | Total 250 pts (25%) |

Quizzes:

| | |
|--|-------------|
| 10-20 quizzes with lowest quiz dropped | Total (20%) |
|--|-------------|

Lab grades:

| | |
|---|-------------|
| Approximately 10 lab reports with lowest report dropped | Total (20%) |
| Lab evaluation | Total (5%) |

Homework:

Problems may be included in exam

Re-grades:

Any paper (exam, quiz, homework or laboratory, etc.) submitted for re-grading may be subject to a complete re-grade.

Make-ups:

There will be no make-ups of experiments, quizzes or exams.

Laboratory:

All safety regulations are strictly enforced in the laboratory. Violation of these regulations will constitute grounds for removal from the class. SAFETY GLASSES AND CLOSED-TOED SHOES MUST BE WORN AT ALL TIMES IN THE LAB. EATING OR DRINKING DURING LAB IS PROHIBITED. Students must come to class on time, equipped, and prepared. Prelabs will be inspected during class. Failure to complete the appropriate prelab will result in removal from the class. Laboratory reports must be received by the beginning of laboratory class. Experimental data must be written **directly on laboratory notebooks**. Failure to do so will result in a score of zero for the assignment. Late work will be accepted up to 1 week after the due date for half credit. Failure to maintain laboratory cleanliness will result in a 5 pt deduction from the laboratory grade.

Attendance:

Students must be in attendance within the first 15 minutes of class during the first week to ensure enrollment unless prior arrangements are made with the instructor. Students may be dropped from the course if absences exceed twice the number of hours of lecture in a week or two lab meetings. Tardiness may result in exclusion from the class.

Disabilities:

Any relevant disability or health-related concern must be brought immediately to the instructor's attention so that the appropriate accommodations can be put in place.

Adds/Drops:

Last day to add is 9/5. Last day to drop is 9/12. Last day to withdraw is 11/7. Although a student may be dropped by the instructor due to class absence, it is the student's responsibility to properly withdraw from the course. Failure to do so may result in a failing grade.

Academic Integrity:

Academic dishonesty in any form will result in an assignment grade of zero. At the instructor's discretion, offenders may receive a failing course grade and be reported to the dean of students. This includes plagiarism in any form, and contact with any unauthorized materials/individuals during the administration of examinations and quizzes.

Discipline:

Anyone engaged in behavior deemed by the instructor to hinder either the teaching or learning processes will receive a warning. Failure to heed such a warning may result in that person's removal from the classroom. This includes but is not limited to the ringing of cell phones, text messaging, and interrupting either the instructor or other students.

NOTE:

The instructor reserves the right to make modifications to this syllabus and the tentative class schedule as deemed beneficial to student learning.

Academic Success Center Referral:

To further your success, reinforce concepts, and achieve the stated learning objectives for this course, you are referred to the Academic Success Center learning assistance services. Upon request for tutorial services, you will be automatically enrolled in NC 3: Supervised Tutoring, a free noncredit course that does not appear on your transcripts. Services are located in the ASC (420), the Writing Center (420D), the Reading Center (420), Math Center (426), the Library/LRC Interdisciplinary Tutoring Lab, MESA, specialized on-campus School tutoring labs, the Higher Education Center, and the San Ysidro Education Center. Online learning materials and Online Writing Lab (OWL) are available at www.swccd.edu/~asc.

Tentative Class Schedule

Chem 240 (Khuong)

Fall 2008

Sect. 01

| Week Number | Date | Lectures (Chapters) | Lab (Assignments) |
|-------------|-----------------|---------------------|---|
| 1 | Aug 19/21(393) | 1 | Check-in & Safety TECH700/Lab notebook Molecular Models/ChemSketch/WebMO I |
| 2 | Aug 26/28 | 1 | Melting Points TECH 701/Problems Melting Points TECH 701/Problems |
| 3 | Sept 2/4 | 2 | Recrystallization TECH 703 Recrystallization TECH 703 |
| 4 | Sept 9/11 | 3 | Review/IR Exam 1 Ch 1-3 |
| 5 | Sept 16/18(393) | 4 | Thin Layer Chromatography TECH 707 WebMO II |
| 6 | Sept 23/25 | 5 | Thin Layer Chromatography TECH 707 Column Chromatography TECH 708 |
| 7 | Sept 30/Oct 2 | 6 | Column Chromatography TECH 708 Extraction TECH 705 |
| 8 | Oct 7/9 | 6 | Extraction TECH 705 Exam 2 Ch 4-6 |
| 9 | Oct 14/16 | 7/9 | Distillation TECH 704 Distillation TECH 704 |
| 10 | Oct 21/23 | 8/9 | Spectroscopy Problem Solving Dehydrating Cyclohexanol REAC 712 |
| 11 | Oct 28/30 | 9 | Spectroscopy Problem Solving GC/MS TECH 709 |
| 12 | Nov 4/6 | 10 | Competing S _N 1 and S _N 2 Reactions S _N 1 and S _N 2 Reactions: Summary Exam 2 Ch 7-9 |
| 13 | Nov --/13 | 10 | -- Cannizarro Reaction |
| 14 | Nov 18/20 | 11 | Cannizarro Reaction Cannizarro Reaction |
| 15 | Nov 25/-- | 12 | Grignard Reaction -- |
| 16 | Dec 2/4 | 13 | Grignard Reaction Exam 3 Ch 10-12 |
| 17 | Dec 9/11 | -- | TBD Review/Check-out |

Quiz will be administered roughly once each week or as needed. Exam dates are shown in **bold**. Prelabs are required in order to begin the corresponding lab. For full credit, lab reports must be submitted no later than one week after the experiment is complete. Final Exam: Tuesday, December 16th 10:30 a.m.-12:30 p.m.