

Cedar Crest College

Chemistry 205-00 Organic Chemistry I

Fall 2008: 3 credits.

Prerequisite: Chem 111 and 112, or the equivalent.

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CLASS MEETS: 10-10:50 MWF, OBC 1. Recitations (Mr. Moll): Wed. 2:30-3:20, OBC 1

Wed. 4-5 ALH 212

OFFICE HOURS: (SC 127): TR 9:30-11; W,F 3-4, or by appointment.

COURSE MATERIALS: Text: McMurry, *Organic Chemistry*, 7th ed., Brooks-Cole 2008,
also STUDY GUIDE.

optional models set.

ATTENDANCE: We expect no more than three (3) unexcused class cuts.* Courses of this type require regular attendance. Attendance is mandatory at all scheduled exams and quizzes: makeups are for valid documented reasons only.

*4 cuts: 1 point off final grade; 5 cuts: 2 points off final grade; 2 points off for each cut thereafter.

CLASS PROTOCOL: Arrive *on time*; No conversations while instructor is lecturing. No food or drinks in class. Positively *NO* electronic communication devices in class. This includes cell phones, pagers, ipods, laptops, etc. Any student who is an annoyance will be penalized severely or dropped from the course. Any student who is consistently late to class will be denied entry.

GRADING: (Evaluation and Assessment)

Quizzes: (count best three of four): total 15% of course grade

4 hourly exams: 15% each, total 60% of course grade.

Final examination: 25% of course grade.

The final examination must be taken on the date announced by the Registrar.

If the final exam grade exceeds that of the *lowest hourly exam grade*, then it substitutes for that low grade in addition to counting its usual 25%.

QUIZ DATES: Sept 5 (Fri.); Sept 29 (Mon.); Oct 24 (Fri.); Nov 14 (Fri.)

HOUR EXAM DATES: Sept 19 (Fri.); Oct. 10 (Fri.); Nov. 3 (Mon.); Nov 24 (Mon.)

EXAM and QUIZ PROCEDURES: Enter the exam room ready to work: No books, papers, or calculators at your worksite. Each student has an assigned seat and exam number. Specific rules are posted on the bulletin board. Conversations are only with the instructor. The instructor circulates through the exam room(s) during the exam to answer questions, etc. HONOR CODE is in effect.

SPECIAL CASES: Students with documented learning or physical impairments should inform the instructor during the first week of class. This applies to special testing environments.

MAKE-UPS: Makeup exams are permitted only for valid reasons. These include illness, emergency, or official work or college-sponsored events. In all cases, documentation may be requested, and final decision rests with the instructor. There are no makeup quizzes.

RETURNED EXAMS: Exam answers are posted when exams are returned. If there are real concerns about the grading, a specific procedure is used: (1) write concern on back of the exam (2) give exam to instructor- within 4 days of return date. The *entire exam* is then re-graded. Never change answers and then ask for re-grading: this is cheating. We randomly photocopy tests before returning them. Violators are dropped from the course with a “WF” grade.

EXTRA CREDIT: Sorry, but there is no extra credit in this course.

Course description:

A study of the chemistry of carbon compounds: structure, naming, reactions and synthesis involving major functional groups; also the relation of organic reactions to biological processes.

Course objectives:

This course is designed to familiarize the student with the basic structure, classification, and reactions of carbon compounds, and to show the interrelation of basic organic concepts with the chemistry of living systems.

Students showing academic maturity and making the required effort should emerge from this course with a sound knowledge of organic concepts and an ability to apply them in career situations. You will be able to read, interpret, and apply organic chemistry.

Course outcomes:

As it relates to the College outcomes, the course will nurture the ability to engage in scientific reasoning, develop technological competencies through use of information sources, and further one's mastery of written communication.

More specifically, and from the viewpoint of science knowledge, students will be able to relate organic chemistry to their specific fields and be able to interpret and communicate information pertaining to chemical naming, structure, reactivities, and properties of carbon compounds.

Assessment of these outcomes, as stated earlier, will be through written examinations and quizzes, plus our observation of your attitude toward learning. Our overall assessment of your capability and potential is both an objective and subjective process.

Instructor's comment: Be prepared to dedicate at least 12-15 hours per week to studying, reviewing, working problems, and re-writing notes in this course. Organic Chemistry is no place for a lightweight effort: You must review constantly- no last-minute studying for exams! Serious students often work extra problems to achieve a better grasp of the material. Take advantage of the Review Sessions, and do not hesitate to seek help from the Professor or one of our teaching colleagues. We will do all we can to guide you in the learning process, but *learning* is done by the *learner*. This is *your* course, *your effort*, and ultimately *your career*. If you plunge in with a strong desire to achieve in this course, you can reap immense rewards and satisfaction.

Letters of recommendation: I will normally write favorable evaluation letters for students who earn A or B grades in organic chemistry, and occasionally for "C" students who have shown positive progress in this course and their overall academic program. These letters are for purposes of employment, internships, medical schools, and graduate schools. Because of the known intensity of this subject, strong evaluations from organic chemistry faculty are often of extreme importance. I will *not* write a recommendation letter for any student who has shown dishonesty or inattentiveness, and it is difficult to write a recommendation for a person who is more concerned about her grade point average than *learning the subject*.

Sequence of Topics (see separate sheet for recommended homework)

Note that in the beginning of the course, we will skip over much of the first two chapters and cover only selected material: This course essentially is starting with text chapter 3. Pay particular attention to what we cover and what is considered most important. For each major unit, we provide a **summary sheet** of important concepts, which is a guide to those topics which will be stressed.

<u>Text chapter(s)</u>	<u>Topics</u>	<u>notes</u>
1, 2	Principles of bonding, Lewis structures, ionic vs. covalent bonds, bond polarity; acids and bases: Bronsted and Lewis acids	focus on: sect. 1.2, 1.3, 1.5 2.1, 2.7-2.11

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<u>Text chapter(s)</u>	<u>topics</u>	<u>notes</u>
3	<p>sp³-hybridization: structure of methane and ethane</p> <p>Hydrocarbon types: alkanes, alkenes, alkynes, aromatic.</p> <p>Alkanes: buildup, structure, branching, naming, projections</p> <p>Alkane properties: physical and chemical</p> <p>Cycloalkanes: structure, naming, stereoisomerism (cis/trans)</p>	(begin learning functional groups)
4	<p>Alkanes and cycloalkanes: stereochemical concepts.</p> <p>Conformations, rotations, Neuman projections, energies, Cycloalkane conformations, axial/equatorial bonds, flipping, cis/trans isomerism in cycloalkanes: predicting stabilities.</p>	
5	<p>Reaction types: bond cleavages, radical vs. ionic (polar) reactions, representative mechanisms; energetics of a chemical reaction.</p>	
6	<p>Alkenes: the carbon-carbon double bond.</p> <p>sp² hybridization; degree of unsaturation, naming alkenes, cis/trans isomers: EZ system, cycloalkenes</p> <p>synthesis of the double bond: two major methods; Zaitsev's Rule.</p>	(synthesis is first part of Chapter 7)
7	<p>Alkenes (cont.): reactions of the double bond.</p> <p>Addition reaction mechanisms, Markovnikov's Rule, HX addition, hydrogenation, hydration, halogenation, halohydrins, insertions, oxidation and bond cleavage: structure determination.</p>	
8	<p>Alkynes: the triple bond. sp hybridization, naming and structure of alkynes; synthesis of the triple bond, reactions of the triple bond.</p>	
9	<p>Stereochemistry: chiral carbons (stereocenters) enantiomers, diastereomers, meso compounds, multiple stereocenters, RS system for configuration assignments. Resolution of enantiomers, stereochemistry of reactions.</p>	

Continued...

Sequence of topics (continued)

<u>Text chapter(s)</u>	<u>topics</u>	<u>notes</u>
10	Alkyl halides. Preparation of organohalogen compounds, Allylic halogenation, Halides from alcohols; the Grignard Reaction and uses.	
11	Reactions of halides: nucleophilic substitution and elimination SN-1, SN-2, E-1, E-2 processes. Nucleophiles, substrates, leaving groups, stereochemistry of substitution at saturated carbon.	

Notice that **no dates** are connected with coverage of any given topic. This is intentional, since there is always some variance in class response to topics, resulting in a need for time flexibility to insure maximum class understanding of material. Material to be covered on each exam is announced in class, several days in advance of the exam. The exams usually do not cover items which were given in the class session immediately preceding the test, unless of course these items are review material from previous lectures. Beware that all of organic chemistry is interconnected and that concepts from a September lecture may easily appear on an April examination.

Extra problem sets (handouts) are used with most of the major units, in addition to the recommended homework problems from the text. Answers are posted and trouble spots are discussed in the help sessions. Please feel free to ask questions. The Chem 205 Bulletin Board is located at the northwest end of the Science Center.

Detailed answers to the recommended text homework problems are in the **STUDY GUIDE**. Homework is not normally collected, but is a much-needed learning tool. Selected homework problems may appear on the examinations.