CHE 171: Mechanistic Organic Chemistry I
Syllabus, Autumn Quarter 2005

Instructor:
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Course Description:
CHE 171 is the first in a sequence of lecture/laboratory courses designed to investigate what organic chemistry is and how it works, by emphasizing the relationship between structure and function of organic molecules. Our primary objective for CHE 171 is to become proficient with the language and fundamental concepts of organic chemistry. Specific objectives and expectations will be posted on the web site by Friday before each weekly quiz. Everything about this subject is comprehensive, and so it is very important that you do not fall behind with the material. Unlike for other courses, it is impossible to "cram" for organic chemistry at the end of the quarter. The best strategy for success in this course is to stay on top of the material. The schedule is outlined below and we will stick to this as closely as possible. Please read the assigned sections of the texts before you come to class or lab.

Texts and other Required Materials:

1. *Organic Chemistry (1st ed.)* by Smith
2. Molecular Model Kit
3. *Study Guide/Solutions Manual*
4. *Multiscale Operational Organic Chemistry* by Lehman (for lab)
5. Also required for lab: a bound laboratory notebook and enclosed safety goggles

Homework:
Daily reading assignments and Problems from Smith are listed in the schedule below. Working on suggested problems will help you become proficient with the material and prepare for weekly quizzes and exams. You are not required to hand in the homework problems, but if you do complete the assigned problems for the week and hand in the ones that are listed in **bold** on the schedule below (in one stapled packet) on Monday *before* the quiz or exam is administered, you will receive 1-3 bonus points on the quiz or exam: 3 points = most/all of the problems are correct and the work shows excellent effort; 2 points = good effort but some of the answers are off base; 1 point = some effort was made but answers suggest many points of confusion or misunderstanding.

Quizzes and Exams:
There will be some form of a quiz or exam during class on Monday of every week. (The scheduled "Quiz Section," Thursdays from 11:50 to 12:50, will be used for lecture.) Specific objectives will be posted on the web site by the Friday before each quiz or exam and answer keys will be posted afterward. Quizzes are worth 50 points each and will test your understanding of

roughly one chapter at a time. Exams are worth 100 points and will be comprehensive in nature (i.e. retest your understanding of the material that was on the previous two quizzes). Here's the deal: for every quiz-quiz-exam series, only your best scores count—EITHER the two quizzes OR the exam. So, by the end of the quarter the highest possible total points for quizzes and exams would be 300, or 50% of your overall grade for the course. The final exam is worth 150 points (25% of your overall grade) and the remaining 25% of your overall grade is based on your performance in lab.

Grades:
Final grades will be based on a point system, with 600 points as the maximum possible. Letter grades will be based on total points according to ranges shown below:

Course Component	*Points*
Quizzes and/or Exams	300
Final Exam	150
Lab	150
Total	600

Total Points	*Grade Range*
600-540	A
539-480	B
479-420	C
419-360	D
<360	F

General Course Policies, Guidelines, and Best Practices:

1. Attendance at lectures is highly recommended but not required. It's generally in your best interest to attend class and experience lectures first-hand.
2. Since there is so much flexibility in terms of your quiz and exam scores, there will be NO make-ups for quizzes or exams. If you have to miss a quiz or exam for any reason (except under extreme circumstances) your grade for the missed quiz/exam is "0".
3. Although quizzes and/or exams are given on Mondays, it's not a good idea to wait until Sunday night or Monday morning to prepare for them. It IS a good idea to devote a good chunk of time *everyday* to the material. A general rule of thumb is: study a minimum of two hours per hour of lecture. So, since there are three hours of lecture per week, you should be putting in at least 6 hours of study time per week, or roughly an hour per night.
4. The best way to learn organic chemistry and to be successful in this course is to really work hard on the assigned problems from the text. In many ways, learning organic chemistry is like learning to play a musical instrument or sport—you have to practice! Reading the chapter (even if you read it many times) is not enough to learn the material. Think about it: would you advise someone who wants to learn how to play football to read a book about football? Probably not. You'd tell them to get together with some other people, go out to the field and start tossing the ball around.
5. Studying and working on problems in groups is a good way to approach learning organic chemistry, but beware—it's tempting to think you understand a certain concept when someone who really does explains it to you… make sure you "get it" by explaining it to someone else.
6. Supplementary Instruction sessions are now offered for this course and I strongly encourage you to attend them. The SI leader has been through the course, understands the material, and has a good idea of how to study and solve problems. This is an excellent resource and one you shouldn't take for granted.

7. Use the Study Guide/Solutions Manual judiciously. Only check on an answer when you're convinced you're done with the problem. Things have a way of making a lot of sense when they're spelled out neatly in front of you, but that doesn't necessarily mean that you *understand* the material. I often here students say, "I don't know why I do so badly on the quizzes, because I really understand the problems when I work on them at home." My guess is that they work on the problems with the answer key open and look at it whenever they get stuck. Don't do this—you'll only convince yourself that you understand the material when you really don't and end up bombing the quizzes or exams.
8. Unfortunately, organic chemistry has developed a reputation on college campuses across the country as a "weed-out" course for students intending to apply to medical or dental school. One of my main objectives in teaching this course is to dispel the myth that organic is "impossible" and to show students that it is actually a fascinating and relevant subject. Organic chemistry is conceptual, it can be somewhat abstract, and there are many potential areas of ambiguity. I will do my best to make it interesting and intelligible to you, but ultimately your understanding and performance will depend largely on your own commitment and willingness to put the time in.

Tentative Schedule: (Subject to change as necessary)

DATE	**READING**	**TOPICS**	**HOMEWORK** (Problems in **bold** may be handed in for bonus points)
W 9/7	1.1 - 1.4	Introduction. The periodic table. Bonding. Lewis structures.	1.1-8, **34-38**
Th 9/8	1.5 - 1.7	Resonance. Molecular shape. Drawing organic structures.	1.9-23, **39-58**
F 9/9	1.8 - 1.14	Hybridization. Bond length & strength. Electronegativity & bond polarity. Polarity of molecules.	1.24-33, **59-76**
M 9/12	**QUIZ 1** (Ch. 1, 50 pts)		
W 9/14	2.1 - 2.3	Bronsted-Lowry acids & bases and their reactions. Acid strength and equilibrium.	2.1-9, **27-34**
Th 9/15	2.4 - 2.6	Predicting outcome of acid-base reactions. Factors that determine acid strength. Common acids and bases.	2.10-20, **35 - 46**
F 9/16	2.7 - 2.10	Aspirin. Lewis acids and bases.	2.21-26, **47-51**
M 9/19	**QUIZ 2** (Ch. 2, 50 pts)		
W 9/21	3.1 - 3.3	Functional groups. Biomolecules.	3.1-2, **14-16**
Th 9/22	3.4 - 3.5	Intermolecular forces.	3.3-8, **17-32**
F 9/23	3.6 - 3.10	Applications: vitamins, soap, cell membrane. Functional groups & reactivity.	3.9-13, **33-40**
M 9/26	**EXAM 1** (Ch. 1-3, 100 pts)		
W 9/28	4.1 - 4.6	Alkanes and Cycloalkanes: nomenclature and common names.	4.1-16, **36-42**

Th 9/29	4.7 - 4.13	Physical properties. Conformations. Isomers.	4.17-31, **43-59**
F 9/30	4.14 - 4.16	Oxidation & Reduction. Oxidation of alkanes. Lipids.	4.32-35, **60-64**
M 10/3	**QUIZ 3** (Ch. 4, 50 pts)		
W 10/5	5.1 - 5.5	Stereochemistry, chiral and achiral molecules. Stereogenic centers.	5.1-11, **34-42**
Th 10/6	5.6 - 5.11	Absolute and relative configuration. R-S rules. Diastereomers.	5.12-27, **43-59**
F 10/7	5.12 - 5.14	Physical properties of stereoisomers. Chemical properties.	5.28-33, **60-62**
M 10/10	**QUIZ 4** (Ch. 5, 50 pts)		
W 10/12	6.1 - 6.4	Equations for organic reactions. Bond breaking and making.	6.1-6, **21-30**
Th 10/13	6.5 - 6.8	Thermodynamics. Energy diagrams.	6.7-16, **31-40**
F 10/14	6.9 - 6.12	Kinetics. Catalysts. Enzymes.	6.17-20, **41-45**
M 10/17	**EXAM 2** (Ch. 4-6, 100 pts)		
W 10/19	7.1 - 7.4	Alkyl halides. Nomenclature & properties.	7.1-4, **40-44**
Th 10/20	7.5 - 7.12	Nucleophilic substitution: S_N2 mechanism and stereochemistry.	7.5-22, **45-57**
F 10/21	7.13 - 7.20	S_N1 mechanism, carbocations, and stereochemistry.	7.23-39, **58-75**
M 10/24	**QUIZ 5** (Ch. 7, 50 pts)		
W 10/26	8.1 - 8.5	Alkyl halides & elimination reactions. Alkenes. The E2 mechanism.	8.1-11, **24-37**
Th 10/27	8.6 - 8.9	E1 mechanism. S_N1 and E1. E2 stereochemistry.	8.12-20, **38-43**
F 10/28	8.10 - 8.12	Alkynes. S_N1, S_N2, E1 and E2.	8.21-23, **44-51**
M 10/31	**QUIZ 6** (Ch. 8, 50 pts)		
W 11/2	9.1 - 9.5	Alcohols, ethers & epoxides. Nomenclature & properties	9.1-10, **38-42**
Th 11/3	9.6 - 9.10	Preparation & Reactions. Dehydration.	9.11-21, **43-57**
F 11/4	9.11 - 9.18	Alkyl halides from alcohols. Reactions of ethers and epoxides.	9.22-37, **58-70**
M 11/7	**EXAM 3** (Ch. 7-9, 100 pts)		
W 11/9	1 – 3	Review	
Th 11/10	4 – 6	Review	
F 11/11	7 – 9	Review	
M 11/14	**LAB FINAL EXAM**		
Tu 11/22	11:45-2:00	**FINAL EXAM** (Ch. 1-9, 150 pts)	

Academic Dishonesty:
Any violation of the academic honesty policy in the classroom, during quiz section, or in the laboratory is extremely serious and will be dealt with as required by the university. Please refer to the appropriate sections of the student handbook for the policy:
http://studentaffairs.depaul.edu/handbook/