ORGANIC CHEMISTRY II (CHEM 232) – SPRING 2009

This syllabus subject to change pending notification verbally in class or via the email list.

MWF 9:10-10:00 am, Hayes 109

Prof. Yutan Getzler

Office:	Tomsich 308
Office hours:	Tuesday, 1 pm to 4 pm, Wednesday 10 am – 2 pm, or by appointment
PBX:	5304
email:	getzlery
website:	http://chemistry.kenyon.edu/faculty/getzler.htm

Text: Vollhardt, K. Peter C.; Schore, Neil E. Organic Chemistry: Structure and Function, 5th edition

Optional: Schore, Neil E. Study Guide and Solutions Manual for Organic Chemistry, 5th edition

On reserve in library: Silverstein, R. M; Webster, F. X. Spectrometric Identification of Organic Compounds, 6th edition (for NMR & IR)

Material: Molecular Visions Molecular Model Kit

Point Distribution:

3 Midterm Exams @ 150 points each (100 pts in-class, 50 pts take-home)	450
Final Exam	300
Problem presentation & Homework	200
Class participation	50
Total	1000

Exam Schedule:

Exam	**Primary Content**	Date & Time
Midterm I	Chs. 17, 18	W, Feb 4th, 9:10 – 10:00 am
Midterm II	Chs. 19, 20	F, Fed 27th, 9:10 – 10:00 am
Midterm III	Catalysis Readings	F, Apr 3rd, 9:10 – 10:00 am
Final	ACS; Chs. 14 – 16, 22	Tu, May 5th, 6:30 pm

Goals: Chemistry 232 provides a foundation of knowledge for other science courses at Kenyon, such as Advanced Organic Chemistry (Chemistry 453), Biochemistry (Chemistry 356), Advanced Biochemistry (Chemistry 460), and Molecular Genetics (Biology 363). By the end of the semester you should be able to read and understand much of the current published original research in organic chemistry. By the end of the semester you should have a better understanding of how the world works.

Attendance: As you already know by now from your experience in Chemistry 231, it is quite easy to get behind if you miss a particular topic. Also see in-class problem presentation below.

Prerequisite: By far the most important prerequisite for this course is a mind that is both curious and skeptical. Organic chemistry is a science that continually builds upon itself, and this course is acutely dependent upon your working knowledge of Chemistry 231 (first semester) material. As such exams in this course will contain topics from Chemistry 231. For example, you should continue to know how to synthesize alcohol, alkyl halides, etc.

Studying: To be successful in this class, most Kenyon students will need to devote *9 hours minimum per week* to studying for this course outside of class hours. There are many potentially effective strategies for success in this course. Read the sections of the text to be covered in class before coming to class. Work though the exercises and end-of-chapter problems, and not just the assigned ones. Work through them three or four times. Recopy your notes after each lecture. Make a slide-show of reactions you are trying to learn and play it as your screen-saver. Most importantly, ask question in class and during office hours. I also very strongly suggest you use your model kits. Familiarity with three-dimensional structure is among the most crucial skills for organic chemistry.

Exams: All exams are in Hayes 109. To allow for exam question which explore the rich complexity of organic chemistry each exam will have a take-home portion and an in-class portion. The take-home portion will be handed out at the end of the class prior to the exam and will be due at the beginning of the next class at the scheduled exam time. While the primary content of any exam will be the material most recently covered, you must be familiar with basic concepts (stoichiometry, computation of molecular weight, reactions of previously studied functional groups, etc) from earlier in the semester and prior courses. The key for each exam will be posted outside my office for ~3 weeks following the exam. You are strongly encouraged to discuss your exam with me as soon as you can while the material is still fresh in your head. The final will be cumulative with approximately half the material coming *directly* from prior exams.

In-class problem presentations: At the beginning of each class one or two students will randomly be assigned to come to the board and solve one of the suggested problems from last lecture. The presentation cannot last beyond 9:13 am (9:16 am if there are two presentations). Once the problem has been presented, I will ask you one follow-up question. If you are not present, you will receive no credit for this assignment. These presentations will be graded in the following manner: preparation/accuracy – 70%, time – 20%, follow-up question – 10%. I will cut you off at the end of the time period, which may also cut into the accuracy of your presentation. You have one free pass to not be called to the board, which I will consider used if you are absent when your name is called. This does not apply to homework which is handed in (see below).

Homework: At the beginning of every class, a number of randomly selected students will be asked to hand in the assigned homework problems. If your homework is not handed in when requested, you will receive no credit for this assignment. Between the in-class presentation and the submitted homework, you will be evaluated at least twice during the semester.

Class participation: I will call on you by name in class to answer relevant questions; evaluation is on a 0, ✓–, ✓, ✓+ basis. Asking a question relevant to the intellectual content of the course both counts towards your class participation grade and lowers the chance I will call on you by name.

Academic Honesty: You are expected to follow the college policy for academic honesty (*Kenyon College Course of Study 2008-2009*; http://www.kenyon.edu/x11747.xml). All materials submitted for credit must be your own work.

email Contact: I am happy to answer questions *via* email, and can often respond quickly. If you email me after 9 pm, I may very well not reply before morning. When classes are in session, I guarantee a response within 24 hours.

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990: If you have a disability and need accommodation in order to fully participate in this class, please identify yourself to Erin Salva, Coordinator of Disability Services (PBX 5145, salvae@kenyon.edu). All information and documentation of disability is confidential. No accommodations of any kind will be given in this course without notification from the Coordinator of Disability Services.

Tentative Schedule & Reading Assignments:

Date	Topic	Section in V & S
	ALDEHYDES & KETONES	
M 1/12	Structure, Preparation and Addition Rxns of Aldehydes & Ketones	17-1 to -5
W 1/14	Hydrates, Hemiacetals and Acetals	17-6, 17-7
F 1/16	Acetals & Thioacetals as Protecting Groups / Imines and Enamines	17-8, 17-9
M 1/19	Wolff-Kishner Reduction / Cyanohydrins	17-10, 17-11
W 1/21	The Wittig Rxn / The Baeyer-Villiger Oxidation	17-12, 17-13
F 1/23	Enolates, Keto-Enol Equilibria / Deuterium Exchange / Stereoisomerization	18-1, 18-2
M 1/26	Halogenation & Alkylation of Aldehydes & Ketones	18-3, 18-4
W 1/28	The Aldol Addition Rxn & Condensation / Crossed Aldol Condensation	18-5, 18-6
F 1/30	Intramolecular Aldol Condensation / Conjugate Addition	18-7 to -9
M 2/2	The Michael Addition / The Robinson Annulation	18-10, 18-11
W 2/4	***Exam I – covering material until 2/2***	
	CARBOXYLIC ACIDS & THEIR DERIVATIVES	
F 2/6	Structural, Physical & Acid-Base Properties of Carboxylic Acids	19-1 to 19-4
M 2/9	Ppn of Carboxylic Acids & The Addition-Elimination Mechanism	19-6, 19-7
W 2/11	Ppn of Acyl Halides, Anhydrides, & Esters / The Fischer Esterification	19-8, 19-9
F 2/13	Ppn of Amides, Alcohols, α-Bromocarboxylic Acids / HVZ Rxn	19-10 to -12
M 2/16	Rxns of Acyl Halides & Acid Anhydrides	20-1 to -3
W 2/18	Rxns of Acid Anhydrides & Esters	20-3, 20-4
F 2/20	Claisen & Dieckmann Condensations, The Acetoacetic Synthesis	23-1, 23-2
M 2/23	Malonic Ester Synthesis / Michael Addition / Acyl anion equivalents	23-2, to -4
W 2/25	Rxns of Amides & Nitriles / The Hofmann Rearrangement	20-6 to -8
F 2/27	***Exam II – covering material until 2/25 – spring break***	
	SPECIAL TOPIC: METALS AND CATALYSIS	
M 3/16	Jacobsen's Hydrolytic Kinetic Resolution	readings TBA
W 3/18		check website
F 3/20	Grubbs Olefin Metathesis	
M 3/23		
W 3/25	The Heck Coupling	
F 3/27		
M 3/30	Monsanto/Cativa Acetic Acid Process	
W 4/1		
F 4/3	***Exam III – covering material until 4/1***	
	ALKYNES, DIENES & AROMATICS	
M 4/6	Ppn & Reductions of Alkynes	13-1 to -6
W 4/8	Addition Rxns, Alkynyl Halides & Industrial Use of Alkynes	13-7 to -10
F 4/10	Stability of Dienes / The Diels-Alder Rxn	14-5, 14-8
M 4/13	Benzene Structure, Resonance Energy, Properties & MO Theory	15-1 to -5
W 4/15	Aromaticity	15-6, 15-7
F 4/17	Electrophilic Aromatic Substitution: Halogenation, Nitration, & Sulfonation	15-8 to -10
M 4/20	Electrophilic Aromatic Substitution: The Friedel-Crafts Rxns	15-11 to -13
W 4/22	Electrophilic Attack on Substituted Benzenes: Control of Regioselectivity	16-1 to -3
F 4/24	Electrophilic Attack on Disubstituted Benzenes / Dissolving-Metal Reductions	16-4, 16-5
M 4/27	Synthetic Strategies / Electrophilic Attack on Naphthalene & Derivatives	16-5, 16-6
W 4/29	Benzylic Reactivity / Claisen & Cope Rearrangements / Quinones	22-1, 22-2, 22-7 to -9