

ORGANIC CHEMISTRY I (CHEM 231) – FALL 2012

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 Hall 308
Office hours: Mon & Wed, 10 am – 12 pm; Mon, 1 pm – 2 pm, or by appointment
PBX: 5304
email: getzlery
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Text: Vollhardt, K. Peter C.; Schore, Neil E. Organic Chemistry: Structure and Function, 6e

Optional: Schore, Neil E. Study Guide and Solutions Manual for Organic Chemistry, 6e

Material: HGS Molecular Structure Model Kit (same as used in CHEM 12X sequence)

Point Distribution:

3 Midterm Exams @ 120 points each	360
Final Exam	360
Problem presentation & homework	200
<u>Class participation</u>	<u>80</u>
Total	1000

Exam Schedule:

<u>Exam</u>	<u>New Chapters</u>	<u>Date & Time</u>
Exam I	1 – 4	Mon, Sept. 24 th
Exam II	5 – 7	Fri, Oct. 26 th
Exam III	8, 9 & part of 11	Fri, Nov. 16 th
Final	11 – 13	Sun, Dec 20 th , 8:30 – 11:30 am

Goals: This course can change the way you think of the physical world. Chemistry 231 provides a foundation for other courses at Kenyon, including Organic Chemistry II (Chem 232), Advanced Organic Chemistry (Chem 401), Biochemistry (Chem 256), Advanced Biochemistry (Chem 401), and Genomics (Bio 263). By the end of academic year, you should be able to understanding much of organic chemistry research.

Attendance: The material you will be expected to know for this course continuously builds on itself. It is quite easy to get behind if you miss a topic. Thus, class attendance is mandatory. As stated in the college policy:

“Absences for reasons of illness are not ordinarily excused: only when a student is declared by the College physician to be infirm (in a hospital or at home) will a health report be sent from the Health and Counseling Center to the Dean of Students, giving the days when each patient is judged infirm and recommending that the student’s class absences be excused.”

ONLY the Dean of Students or Dean of Academic Advising (NOT the instructor) may offer Excused Absences. If you miss in-class assignments or exams due to severe illness or emergency, your name must appear on the *Excused Absence List* to make up the work; if not, a failing grade will be given. In the event of an absence, you student are responsible for securing any notes, handouts or announcements from the class.

Student-Athletes: Note the college policy on attendance in the *Scheduling Guidelines for Athletic Contests* (<http://www.kenyon.edu/PreBuilt/provCASatleticsgl.doc>). By the end of the first week of classes, please notify me of all potential athletic conflicts, which should not exceed 10% of our meeting times (4 classes).

Studying: To thrive in this class, most Kenyon students will need to devote *9 hours minimum per week outside the classroom* to studying. There are many potentially effective strategies for success. Read the text to be covered in class before coming to class. Take advantage of the Math and Science Skills Center (biology.kenyon.edu/HHMI/math-science/). Work through 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 questions in class and during office hours. I also believe your model kits are essential. Familiarity with three-dimensional structure is a crucial skill for organic chemistry and one often neglected by students.

In-class problem presentations: At the beginning of each class, when there is no exam or quiz, one or two students will be called to the board to present a homework problem. 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 one follow-up question. If you are not present, you will receive no credit. 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 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.

Homework: Every class, a few randomly selected students may be asked to hand in the homework problems. If you are absent, you will receive no credit for this assignment. As above, you have one free pass.

Class participation: I will call on you to answer relevant questions; evaluation is on a 0, \checkmark -, \checkmark , \checkmark + basis. Asking a question relevant to the intellectual content of the course counts towards your participation grade.

Exams: The first three exams will be 1.83 hours long, running either from 8:10 to 10:00 or 9:10 to 11:00. The choice is yours, but you must inform me one week in advance if you plan to use the latter slot. While the focus of each exam will be the material covered since the last exam, you must be familiar with basic concepts (stoichiometry, conformational analysis, etc) from earlier in the semester and prior courses. The final will be cumulative with one third of the material coming *directly* from prior exams.

Academic Honesty: You will follow the college policy for academic honesty (*KC Course of Study 2012-2013*; <http://www.kenyon.edu/x11747.xml>). All materials submitted for credit must be your own work. I hold you responsible for ensuring each others' honesty; if you know of a violation, please promptly relay your concerns to myself or the Dean of Students.

Section 504 of the Rehabilitation Act (1973) & ADA (1990): If your disability requires accommodation to fully participate in this class, identify yourself to Erin Salva, Coordinator of Disability Services (PBX 5453, 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.

Date	Topic: <i>Planned Schedule & Reading Assignments</i>	Book
REVIEW OF BONDING & STRUCTURE		
F 8/31	Basics of Bonding – Coulomb, Octet Rule, Lewis Representation	1-1 to -5
M 9/3	Quantum Description, Orbitals, Structures & Formulas	1-6 to -9
W 9/5	Arrows, Thermodynamics, Kinetics, Acids, Bases & Other Functional Groups	2-1 to -3
ALKANES – CONFORMATION, STRAIN & STEREOCHEMISTRY		
F 9/7	FGs, Alkanes – Names, Structures & Properties, Conformations	2-4 to -7
M 9/10	Alkanes – Conformations, Model Building and Structure Drawing Activity	2-8
W 9/12	Carbocycles – Nomenclature, Structure, Strain, & Cyclohexane Intro	4-1 to -3
F 9/14	Cyclohexane, Larger Ring, Polycyclic Alkanes	4-3 to -7
M 9/17	Isomerism, Chirality & Optical Rotation	5-1 to -2
W 9/19	Absolute Configuration & Fischer Projections	5-3 to -4
F 9/21	Diastereomers, Meso Compounds & Reaction Stereochemistry	5-5 to -7
M 9/24	Exam I – No class 9/26 (Yom Kippur)	
INTRODUCTION TO MECHANISM		
F 9/28	Radicals – Structure, Uses, Radical Chain Mechanism	3-1 to -4
M 10/1	Radical Halogenations – Reactivity and Selectivity	3-5 to -7
W 10/3	Synthetic Halogenation, CFCs & Alkane Stability	3-8 to -10
INTRODUCTION TO SUBSTITUTION & ELIMINATION REACTIONS		
F 10/5	Haloalkane Properties, Nucleophilic Substitution & Arrow Pushing	6-1 to -3
M 10/8	Kinetics and Stereochemistry of Nucleophilic Substitution	6-4 to -6
W 10/10	Influence of the Leaving Group and Solvent	6-7 to -8
M 10/15	Influence of Sterics – Nucleophile & Substrate	6-8 to -9
W 10/17	Solvolysis, Unimolecular Substitution & Stereochemical Consequences	7-1 to -3
F 10/19	Effects of Solvent, Nucleophile, Substrate & Leaving Group	7-4 to -5
M 10/22	Elimination Reactions	7-6 to -7
W 10/24	Substitution vs Elimination & Chapter Review	7-8 to -9
F 10/26	Exam II covering material until 10/24	
M 10/29	Alcohols – Nomenclature, Structure, Properties & Industrial Preparation	8-1 to -4
W 10/31	Alcohol Synthesis – Nucleophilic, Redox, Organometallic	8-5 to -7
F 11/2	Alcohol Synthesis – Organometallic Reagents & Synthetic Strategy	8-8 to -9
M 11/5	Alcohol Reactions - Acid/Base & Carbocation	9-1 to -3
W 11/7	Esters from Alcohols; Ether Nomenclature, Properties & Williamson Synthesis	9-4 to -6
F 11/9	Ethers – Synthesis and Reactions	9-6 to -8
M 11/12	Reactions of Epoxides, Sulfur Analogues & Physiological Relevance	9-9 to -11
W 11/14	Alkene Nomenclature, Structure & Properties	11-1 to -3 & -9
F 11/16	Exam III – covering material until 11/14 – fall break	
ALKENES & ALKYNES		
M 11/26	Thermodynamics & Synthesis	11-10 to -11
W 11/28	Reactions	12-1 to -3
F 11/30	Electrophilic Add'n of HX, H ₂ O & X ₂	12-3 to -5
M 12/3	General Electrophilic Add'ns, ±Hg, Hydroboration-Oxidation	12-6 to -8
W 12/5	Cyclopropanation, Epoxidation, Dihydroxylation	12-8 to -11
F 12/7	Ozonolysis, Radical Add'ns, Polymerizations	12-12 to -15
M 12/10	Alkyne Nomenclature, Structure, Properties, Spectroscopy & Preparation	13-1 to -4
W 12/12	Preparation and Reactions	13-5 to -7
F 12/14	Reactions, Derivative and More	13-8 to -11

