

Chemistry 231 – Organic Chemistry I

Course Description:

Organic chemistry is the study of the structure, properties, and reactions of molecules containing carbon. The prominence of carbon containing molecules, organic molecules, in our everyday life may explain why organic chemistry is such a rich discipline. Much of what we wear, smell, eat, build, burn, and touch during our lives is composed of organic molecules. We ourselves and all other life we know are based on compounds of carbon.

Why has carbon adopted such a central role in our lives and life itself? One reason is that carbon is a versatile and promiscuous element. It is capable of bonding to itself and other elements in a multitude of ways. One indication of carbon's versatility is the fact that more than 14 million organic compounds have been described and hundreds of novel compounds are being prepared or discovered every month.

This course is the first of a two-course sequence designed to introduce students to the theoretical underpinnings of organic chemistry. We will begin by exploring how organic molecules are held together, learn to identify the key functional groups, and develop an understanding of how spectroscopy is used in determining the structure organic molecules. For the remainder of the year, we will take an in-depth look at the chemistry and properties of a number of functional groups. During our study you will acquire the tools to design a synthesis for simple organic molecules. You will also learn how to employ familiar concepts from thermodynamics and kinetics to predict both the products that are likely to form in an organic reaction and the detailed course of events that leads to their formation.

Instructor and Resources:

Instructor:	Dr. John Hofferberth
Email:	hofferberthj@kenyon.edu
Office:	312 Tomsich Hall
Office Hours:	Tuesday 2-3 PM (one on one) Tuesday 3-4 PM (small group) Thursday 3-4 PM (one on one) Thursday 5-7 PM (group review/study session)
Lecture Hall:	Hayes 109
Class Time:	Section 1: 8:10 – 9:00 AM, MWF Section 2: 9:10 – 10:00 AM, MWF
Text:	Organic Chemistry, 6 th Ed, Vollhardt and Shore (optional study guide)
Materials:	HGS Molecular Structure Model (Kit C)
Website:	moodle.kenyon.edu (search for Chemistry 231 once you have logged in)

Course Policies and Expectations:

Course Grade: Your grade in the course will be determined by your performance on homework, quizzes, midterms and the final. The point breakdown that will be used is provided below:

Quizzes and Homework (3 pts each)	114 pts
Midterm Exams (3 × 100 pts)	300 pts
Final Exam	150 pts
Participation and Preparation	20 pts
Total Points	584 pts

The following absolute grading scheme will be followed to determine your final grade:

Grade	Percent of Total Points Earned
A (+/-)	100% - 90%
B (+/-)	89% - 80%
C (+/-)	79% - 70%
D (+/-)	69% - 60%
F	< 60%

Attendance: Your attendance at every lecture is expected.

You will be permitted three unexcused absences. Every absence thereafter will result in a grade reduction of 1/2 of a letter grade (29 pts) for the course. You will be expelled from the course after six unexcused absences.

Preparation: The material in this course builds on itself. For that reason it is imperative that you keep up with the lecture.

Taking an active approach to learning the material is the best way to succeed. A few recommended strategies include:

- 1) Complete assigned reading before class and focus on active learning after class.
- 2) Neatly recopy and annotate course notes with material from the text, course web page, and other resources *after every lecture*.
- 3) Complete homework assignments on time and seek help *immediately* if you cannot.
- 4) Keep up with all aspects of the course and seek help *quickly* if questions arise.

You can get help on any aspect of the course from the following sources

- 1) The instructor (office hours or by appointment)
- 2) The Math and Science Skills Center (101 Tomsich; Sunday, Tuesday, and Thursday 7:00 - 10:00 PM). There should always be a tutor able to help with organic questions available at the MSSC. We will also have a lead tutor for this class, Q Tashiro, who will hold two office hours each week at the MSSC (Sunday, 8-10 PM).

*Thursday
Evening Review
Sessions:*

Dr. Hofferberth will lead a weekly review/study session on Thursday evenings between 5:00 and 7:00 PM in RBH 109. These sessions are entirely optional and the content will be directed by student questions. The review sessions will end promptly at 7:00 PM and students with additional questions can make use of the Thursday hours for the Math and Science Skills Center (7:00 – 10:00 PM). If these sessions are poorly attended the instructor reserves the right to discontinue them.

*Homework and
Suggested
Problems*

The best way to master organic chemistry is to practice. Suggested problems will be indicated on the syllabus for each unit covered in class. Mastering the suggested problems is key to success on quizzes and examinations. Revisiting suggested problems will increase comprehension, build confidence, and increase your speed in responding to exam questions. Working additional problems in the text (or in other organic chemistry texts) is a valuable use of your preparation time for this class. *Suggested problems will appear on quizzes and exams.*

A specific homework assignment will be posted after each lecture on the Moodle Forum and texted to students via Remind. Homework assignments may include a set of suggested problems from the text, practice problems prepared by the instructor and linked to course Moodle page, webcasts, and/or a reading assignment. On occasion, homework assignments will be collected in lieu of the daily quiz so bring your homework to class everyday. Keeping your homework organized in a 3-ring binder is an excellent way to organize your work.

Quizzes:

Quizzes are a tool to help students know if they are preparing adequately for class. A quiz will be given during the first 5 minutes (section 1 - 8:10-8:15 AM, section 2 – 9:10-9:15 AM) of class every day except for the day of exams. The quiz on a given day will cover concepts from homework assigned for that day. On occasion, students will submit the homework assigned for that day in lieu of a quiz and one or two problems will be spot-checked for completion and correctness. *Keep your homework assignments and other suggested problems organized in a binder so it is easy for you to find.* There will be no make-up quizzes but quizzes missed during excused absences will not impact your final grade (total points possible will be reduced).

Midterm Exams: Three in-class midterm examinations will be given during the semester (dates indicated on the syllabus). Seating for the in-class portion of the exam will be assigned by the instructor as students enter the exam room. Model kits may be used on all exams in this course. If you have a conflict with any of the exam times you must notify Dr. Hofferberth in writing **at least one week prior to the exam to schedule an alternate exam time.**

Final Exam: The final exam will be cumulative and closed-note. The final exam will take place between 6:30 and 9:30 PM on December 15th (Section 1) or December 18th (Section 2).

Accommodations: In accord with **Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990**: If you anticipate you may need accommodation in order to fully participate in this class, please identify yourself to Erin Salva, Director of Student Accessibility and Support Services (PBX 5453, salvae@kenyon.edu). *The instructor must receive information regarding the nature of the accommodation directly from Erin Salva and you must speak to the instructor about the accommodation at least one week in advance of using the accommodation for the class.*

Academic Integrity: Academic integrity is expected in all aspects of this course. A detailed description of academic integrity and the College policy regarding academic dishonesty can be found in the Course Catalog at the following link: <http://www.kenyon.edu/directories/offices-services/registrar/course-catalog-2/administrative-matters/academic-honesty-and-questions-of-plagiarism/>

Electronic Device Policy: Full engagement with the lecture portion of this course will be a key component of success. All electronic devices should be turned off before the beginning of every lecture.

Title IX: Kenyon College and the instructor of this course seek to provide an environment that is free of bias, discrimination, and harassment. If you have been the victim of sexual harassment/misconduct/assault we encourage you to report this. If you report this to the instructor, he must notify our college's Title IX coordinator about the basic facts of the incident (you may choose whether you or anyone involved is identified by name). For more information about your options at Kenyon, please go to : <http://www.kenyon.edu/directories/offices-services/office-of-equal-opportunity/sexual-assault-and-harassment/>

Tentative Schedule:

Date	Topic	Reading (Suggested Problems)
Review	Review Topics	Chap 1, Chap 2
8/29, 9/1	Introduction VB Model Drawing Organic Molecules UN Number	1.8, 1.9, 11.11 (1.35-1.45, 11.24, 11.62)
9/3-5	Functional Groups Resonance, Kinetics, TD's	1.5, 2.3, 2.7, 2.8 (1.29, 1.31, 2.26, 2.32, 2.45)
9/8-10	Acids and Bases, pK _a Electrophiles and Nucleophiles, Conformational Analysis Alkane Nomenclature	2.1, 2.2, 2.4, 2.5 (2.27-2.31, 2.35, 2.36 2.42, 2.43)
9/10-17	NMR, IR	10.1-10.9, 11.4 (10.32-10.40, 10.44, 10.45, 10.47, 10.54, 10.55, 10.58) 11.8 (11.34, 11.51, 11.52, 11.55, 11.57, WebSpectra (http://www.chem.ucla.edu/~webspectra/) – B-5, B-19, B-23, I1-9, I1-16)
9/17	Properties and Reactions of Alkanes, Bond Strength, Radicals	2.4, 2.6, 3.1, 3.2 (3.15, 3.16, 3.19)
9/19-22	Radical Halogenation, Hammond's Postulate, Combustion	3.4 – 3.10 (3.20 – 3.28, 3.30, 3.31, 3.34, 3.35)
9/24	Cycloalkanes, Nomenclature, Ring Strain	4.1 – 4.3 (4.21, 4.23, 4.24, 4.25 – 4.27)
9/26	Exam I	
9/29-10/1	Cycloalkanes, Conformational Analysis	4.4 – 4.7 (4.29, 4.30, 4.32, 4.33, 4.36, 4.39, 4.42)
10/3-8	Isomer Hierarchy, Chiral Molecules, Absolute Configuration, Optical Activity, Diastereomers and Meso Compounds, Stereoselectivity	5.1 – 5.3, 5.5-5.8 (5.32 – 5.35, 5.36 – 5.39, 5.41, 5.43, 5.45, 5.48 – 5.50, 5.53, 5.56, 5.57, 5.59, 5.60, 5.61, 5.63)
10/10	October Break	
10/13	Enantioselectivity	
10/15-11/3	Haloalkanes, SN ₂ , SN ₁ , E1, E2, Competition	6.1 – 6.9 (6.31 – 6.33, 6.38, 6.39, 6.41 – 6.48) 7.1 – 7.9 (7.25 – 7.49) 11.6 – 11.7 (11.39 – 11.41, 11.49, 11.50)
10/31	Exam 2	
11/3	Competition	

11/5-10	Alcohols	8.1 – 8.3, 8.5 – 8.9 (8.24 – 8.28, 8.30, 8.33 – 8.40, 8.42 – 8.48, 8.53, 8.54)
11/12-19	Reactions of Alcohols (Ethers, Sulfides, and Thiols)	9.1 – 9.10 (9.28 – 9.46, 9.49, 9.50, 9.53, 9.54, 9.58, 9.59)
11/21	Alkenes	11.1 – 11.3 (11.29, 11.30, 11.32, 11.33)
12/1 - 3	Reactions of Alkenes	12.1 – 12.9 (12.35, 12.36, 12.38, 12.40, 2.42 – 12.44)
12/5	Exam 3	
12/8 -12	Reactions of Alkenes	12.10 – 12.14 (12.45, 12.46, 12.47, 12,48 – 12.51, 12.53 – 12.57)
12/15	Final Exam Section 1: 6:30 – 9:30 PM	
12/18	Final Exam Section 2: 6:30 – 9:30 PM	