

CHEM 25: Organic Chemistry I
<https://moodle.drew.edu> (2009FA-CHEM-25-001)

Instructor

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Class

9:30-10:35am M, W, F (S244)

Laboratory

1:15-4:15pm Tu, W, Th, F (S226)

Peer-Led Learning Section

TBA

Office Hours

M,W 11am-12pm; T,Th 5-6pm
or by appointment

Required Course Materials

1. *Organic Chemistry*, J. McMurry, 7th Ed.
2. Advanced Molecular Model Kit (Orbit Kit 68827W)
3. *Peer-Led Team Learning – Organic Chemistry*, J.A. Kampmeier et al., 2nd Ed.
4. *Macroscale and Microscale Organic Experiments*, K.L. Williamson et al., 5th Ed.

Recommended Course Materials

Highly recommended for anyone planning on taking Organic Chemistry II (these will be required for that course) and anyone wanting to have additional problems to work on.

1. *Organic Chemistry – A Guided Inquiry*, A. Straumanis, 2nd Ed.
2. *Student Study Guide and Solutions Manual for Organic Chemistry*, S. McMurry, 7th Ed.

Additional copies of all the books listed above are on reserve in the library.

*During the first week of class, you will also need to purchase the lab manual (\$25) and goggles (\$10, if you don't already have a pair) from Jackie Cress in room S218. These are absolutely required before stepping into each and every lab.

COURSE OBJECTIVES

This is the first semester of a two-semester sequence of introductory Organic Chemistry. The major objective of this course is to learn *what* organic chemistry is and *how* organic chemistry relates to the rest of science and life.

Learning outcomes: The successful completion of Chem 25 will contribute to your

- Ability to communicate
- Ability to work with others
- Ability to problem solve
- Ability to learn independently
- Ability to think critically
- Information literacy skills
- Ability to process information and interpret data

General knowledge objectives:

- To apply knowledge of the chemical and physical properties of atoms, bonds and molecules to *explain why* and *how* organic reactions take place
- To develop writing skills which allow the communication of complex material to a general audience
- To develop an understanding of organic chemistry laboratory techniques

Specific course objectives:

1. Determine how electrons are distributed in a covalent bond between any two atoms and explain the consequences when electrons in a bond are not shared equally between atoms
2. Draw and recognize resonance forms of a structure (resonance structures) and explain why molecules with more than one resonance structure are considered stabilized
3. Draw and recognize functional groups, and explain their characteristic chemical behavior
4. Perform conformational analysis to explain why one isomer may be favored over another
5. Define nucleophile and electrophile, and explain their relationship to acids and bases
6. Know the four general types of organic reactions
7. Use curved arrow formalism to explain a reaction mechanism
8. Apply knowledge of stereoisomerism and stability of reaction intermediates to predict the outcome of organic reactions
9. Use energy diagrams to describe a reaction mechanism
10. Define chirality
11. Draw the mechanism for different types of addition, substitution, and elimination reactions, and explain the conditions under which each reaction takes place
12. Apply MS, IR, and NMR spectroscopic data to determine the structure of an organic compounds

COURSE OVERVIEW

Classroom: The classroom part of this course will consist of lectures and activities involving team learning and problem solving. After completion of an activity in class, you are expected to do the related exercises from the worksheets as well as the assigned readings and suggested problems.

Peer-led Learning Section: This is a mandatory, 1-hour session that will be led by a student who has previously taken this course. These sessions will review material from lectures through additional problem-solving exercises.

Assessments

Final Grade Calculation

Quizzes:	15%
Exams:	25%
Final exam:	20%
Lab:	20%
Assignments:	15%
Team Performance:	5%

Grading Scale

A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	≤59

Quizzes: Weekly quizzes will be given at the beginning of each Monday's class, except those days when an exam is given. These quizzes will be 10-minutes long. These quizzes will be cumulative, although an emphasis will likely be placed on more recently covered material. Students must show up on time; no time extensions will be permitted. There will be no make-up quizzes. Each student's lowest quiz grade during the course of the semester will be dropped when calculating the final grade. Quizzes are taken individually; however, if all members of the team score at least 80%, an extra 10% will be given to all members of the team.

Exams: Three in-class exams will be given throughout the semester. These exams will be cumulative, although an emphasis will likely be placed on more recently covered material. You may substitute your final exam grade for one of these exams. No make-up exams will be given. If you miss an exam, that is the exam for which your final exam grade will be substituted. If you

know ahead of time that you will miss an exam, please contact me at least 48 hours in advance to discuss your options.

Final exam: The final exam will be cumulative.

Laboratory: The purpose of *doing* organic chemistry is to gain experience in how organic chemistry is accomplished. Attendance on your scheduled lab day is expected. Unexcused absences from lab may not be made up. Each lab will consist of pre-lab and in lab write-ups, and a post lab report.

Assignments:

You will be assigned a sequenced writing assignment (2 papers) during the semester. More details will follow.

Late policy: For the writing assignments, late papers will be accepted, but the grade of each assignment will be penalized 1-letter grade per 24 hours that the assignment is tardy.

Punctuality and attendance in lecture: Please be respectful of me and your fellow classmates and show up to class on time. In addition to mastering the material yourself, you are responsible for assisting the other members of your team in their understanding of the material. For this reason, attendance is required. You are allowed three unexcused absences without penalty. Any absence beyond this will result in a 0.5 point decrease (out of 5) in your Team Performance grade. For example, if you are absent five times, the highest your Team Performance grade can be is 4 out of 5. Throughout the semester, you will also be asked to assess yourself and your teammates. These *assessments will count towards your Team Performance grade*.

Homework: Like learning to play a musical instrument, or the lyrics to a song, practicing everyday is the key to success. Suggested problems from your textbook will be announced in every class. At minimum, you should do these problems *and be able to explain your solutions*. Do them more than once, and do not hesitate to work on problems that were not suggested. The suggested problems will not be collected, but we may go over them in class.

Special circumstances: If there are special circumstances, such as illness or other form of emergency, which should be taken into account with regard to any of the stated class policies, please inform me as soon as possible so that alternative arrangements can be made.

Academic accommodations: Should you require accommodations, you must file a request with the Office of Educational Affairs (BC 114, extension 3327). It is your responsibility to self-identify with the Office of Educational Affairs and to provide me with the appropriate documentation from that office at least one week prior to any request for specific course accommodations. There are no retroactive accommodations.

Academic ethics and integrity policy: You are expected to abide by the Drew University Standards of Academic Integrity. For the official policy go to: http://www.depts.drew.edu/composition/Academic_Honesty.htm. Plagiarism, whether deliberate or unintentional, and cheating on examinations, are not acceptable. Any such incidents will be referred to the Academic Integrity Committee.

COURSE SCHEDULE (SUBJECT TO CHANGE)

Week (class day)	Dates	Topic	Straumanis	McMurry	PLTL
1 (1-3)	Aug 31-Sept 4	Structure and Bonding	Intro, 1-3	1	
2 (4-5)	Sept 9-11*	Polar Covalent Bonds, Resonance	4A-C, 5	2	1-3
3 (6-8)	Sept 14-18	Acids and Bases Alkanes	4BC, NW1, 6B	2, 3	4
4 (9-11)	Sept 21-25	Alkanes, Cycloalkanes Overview of Organic Reactions	6A, 7AB, NW2	3, 4, 5	6
5 (12-13)	Sept 30-Oct 2*	Alkenes (structure and reactivity)	6C, 8A	6	5
6 (14-16)	Oct 5-9	Exam 1 (Oct 5, 2009) Alkenes (reactions and synthesis)	8-10	7	7
7 (17-18)	Oct 12-14*	Alkenes (reactions and synthesis) Writing I Due (Oct 13, 2009) Alkynes	10	7, 8	8
8 (19-21)	Oct 19-23	Alkynes and Synthesis Stereochemistry Primary Paper (Oct 23, 2009)	11,12	8, 9	10
9 (22-24)	Oct 26-30	Organohalides Ann. Biblio. Due (Oct 28, 2009) Reactions of Alkyl Halides	15AB, 16, 13AB	10, 11	11
10 (25-27)	Nov 2-6	Exam 2 (Nov 2, 2009) Reactions of Alkyl Halides	13CD	11	Review
11 (28-30)	Nov 9-13	Reactions of Alkyl Halides	14ABC	11	12
12 (31-33)	Nov 16-20	Spectroscopy Writing II Due (Nov 19, 2009)	L1	12	13
13 (34)	Nov 23*	Spectroscopy	L2	12	
14 (35-37)	Nov 30-Dec 4	Exam 3 (November 30, 2009) Spectroscopy	L3, L4	13	Review
15 (38-39)	Dec 7-9*	Special topics	(16A)	(8)	

* Short weeks (less than 3 classes)

LAB SCHEDULE (You will complete the labs in the following order:)

Remember that every activity in lab should be considered with the following questions in mind:

- What did I do? → How did I do it?
- What did I observe? → How did I observe it?
- What does it mean? → How do I communicate it?

Experiment #1:	Organic Solids - Melting Points and Thin Layer Chromatography
Experiment #2:	Organic Liquids - Boiling Points and Distillation
Experiment #3:	Extraction of Natural Products and Column Chromatography
Experiment #4:	Preparation of an Alkyl Halide
Experiment #5:	Some Reactions of Hydrocarbons
Experiment #6:	Isolation and Purification (Bromination & Debromination) of Cholesterol
Experiment #7:	Elimination
Experiment #8:	Synthesis and Characterization of an Alkyne
Experiment #9:	Chirality and Drugs
Experiment #10:	Radical Substitution
Experiment #11:	Competitive Nucleophilic Substitution
Experiment #12:	Nucleophilic Substitution
Experiment #13:	Spectroscopic Identification of Organic Compounds