Chem 235, Organic Chemistry 1 Syllabus, Fall 2009

Instructor	Dr. Brant Kedrowski
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Online Content	All content is on D2L at https://uwosh.courses.wisconsin.edu/ General info: http://www.uwosh.edu/faculty_staff/kedrowsk/chem235.htm
Office Hours	T, Th 12:40-1:40 pm; Th 9:30-11:20 am; or by appointment
Lecture	M W F 12:40-1:40 (HS-109)
Laboratory	All lab sections meet in HS-454 *Sec 1:* Tuesday 8:00-11:20 am (instructor: Brant Kedrowski) *Sec 2:* Tuesday 1:20-4:30 pm (instructor: Dr. Evon Ford) Sec 3: Wednesday 8:00-11:20 am (instructor: Brant Kedrowski) Sec 4: Wednesday 1:50-5:10 pm (instructor: Dr. James Paulson) Sec 5: Thursday 8:00-11:10 pm (instructor: Dr. Evon Ford) Sec 6: Thursday 1:20-4:30 pm (instructor: Dr. Evon Ford) Sec 7: Monday 1:50-5:10 pm (instructor: Brant Kedrowski)

Lecture Textbook, Solutions Manual, and Model Kit

- Janice Gorzynski Smith "Organic Chemistry" with Solutions Manual, 2nd Ed., 2008 McGraw Hill, and bundled HGS molecular model kit (Required).

Laboratory Books

- Chem 235 Organic Chemistry I Laboratory Manual, Fall 2009, (Required)
- Pavia, Lampman, Kriz, and Engel "Techniques in the Organic Laboratory, Microscale and Macroscale", Harcourt College Publishing. (Required)
- A Bound Notebook (Required, you can use one from a previous lab if it's in good condition)
- An acceptable pair of goggles for lab (Required)

Evaluation of Performance

There will be 1000 points possible in the course. Five exams will be given throughout the semester, consisting of four regular hour exams and a comprehensive final. Each of these exams will be worth 200 points, and your lowest score will be dropped. The four remaining highest scores will total 800 possible points. There will be 120 points possible from laboratory reports, 60 points possible from online D2L quizzes, and 20 points assigned to your laboratory notebook. Students will be kept updated on their performance throughout the semester.

In calculating grades, I look for logical breaks in score distributions to set letter grade cut-offs. Clumps of students that have similar scores are assigned similar grades. As an *approximate* guide, I use the following percentages:

A ≥ 93%, A– ≥ 90%, B+ ≥ 87%, B ≥ 83%, B– ≥ 80%, C+ ≥ 75%, C ≥ 65%, C– ≥ 60%,

D ≥ 50%, F<50%.

Course Policies and Study Hints:

1. **Unexcused Absences:** Attendance is required for all exams and laboratories. As per department policy, two unexcused absences from lab will result in a grade of F for the course. An unexcused absence from an exam will result in a zero for that exam and this will serve as your dropped exam.
2. **Excused Absences:** The reason for any excused absence must be reported to your instructor (before the absence if possible), and substantiated in writing by the appropriate person (doctor, parent, etc…). Excused absences won't affect your grade. However, you'll still be required to makeup the work.
3. **Tips for Success:** 1) Read the assigned material in the textbook, follow through solved problems, solve sample problems within the chapters; 2) Come to lecture and take notes; 3) Solve as many additional problems as possible.
4. **Practice Problems** are located in the lecture textbook at the end of every chapter. At the start of each chapter I'll post recommended problems on D2L. Try all of the assigned problems, working out an answer for each on your own before checking the "Solutions Manual". These problems won't be collected or graded, but you should take them seriously. Practice is the best way to become proficient at organic chemistry.
5. **Old Exams** from previous semesters are available for extra practice on the course D2L site.
6. **Study Groups** work out very well for some people. I strongly encourage students to learn from each other as well as from me. However, if you do work in a group, make sure that everyone is participating equally. For example, simply copying someone else's answers for graded work is not allowed.

Laboratory:

Organic laboratory and lecture complement each other. The lecture supplies fundamental theory about molecular and electronic structure, chemical reactions, and their mechanisms. In the laboratory you will put this knowledge into practice to help you more fully understand the chemical process in progress. Additional laboratory information is listed on pages 8-11. The following is a typical timeline to follow for each laboratory experiment:

1. **Prepare for Lab:** Look ahead in the syllabus and make sure you prepare for each upcoming experiment. Read each experiment thoroughly. Also, read the assigned materials for each experiment in the Pavia and Smith books.
2. **Notebook:** After the above reading, prepare your notebook as described in the Pavia text pages 26 and 27. During the lab, write all data, calculations and observations in your notebook while you are doing the experiment. Present your notebook to your instructor for initialing before you leave the lab each week.
3. **Lab Reports:** After completing each experiment there will be a lab report to prepare. These lab reports are due one week after the experiment is completed. Most reports will be short and informal while others will require a formal write up. Instructions for each report are included at the end of each experiment.
4. **Complete Online Lab Exercise:** On D2L at https://uwosh.courses.wisconsin.edu/
   Log into *Desire To Learn* at the above address and select the course labeled "Organic Chemistry I - All Sections" to access the list of quizzes for the course. These are listed as quizzes on D2L, but they are really more like graded homework. They have no time limits, you may do them in more than one online session, and you can even print them. Each assignment will open the week of the experiment and stay open until the last day of the semester.

Lecture and Exam Schedule (Tentative)

Date	Key Concepts	Reading in Smith
9/9	Introduction, review of bonding and Lewis structures	1.1 – 1.4
9/11	Review resonance and molecular shape, drawing structures	1.5 – 1.7
9/14	Review hybridization, electronegativity, bond/molecule polarity	1.8 – 1.13
9/16	Brønsted acids/bases, pK_a, equilibrium in acid-base reactions	2.1 – 2.4
9/18	Structure & acidity, common acids/bases, Lewis acids/bases	2.5 – 2.8
9/21	Functional groups, intermolecular forces, physical properties	3.1 – 3.4
9/23	Applications, functional groups and reactivity, biomolecules	3.5 – 3.9
9/25	Introduction to alkanes and cycloalkanes, naming alkanes	4.1 – 4.4
9/28	Naming continued, fossil fuels, physical properties,	4.5 – 4.8
9/30	Oxidation of alkanes, lipids part 1, review	4.14 – 4.15
10/2	***Exam 1, Friday, Oct. 2 (covering lectures 9/9-9/30)***	
10/5	Conformations of acyclic alkanes, intro to cycloalkanes	4.9 – 4.11
10/7	Cyclohexane conformations	4.12 – 4.13
10/9	Chiral/achiral molecules, stereogenic centers, enantiomers	5.1 – 5.4
10/12	Assigning with *R* or *S*, diastereomers, meso compounds	5.5 – 5.8
10/14	Isomers, properties of stereoisomers, optical rotation	5.9 – 5.13
10/16	Writing reactions, bond breaking and making	6.1 – 6.3
10/19	Bond strengths, thermodynamics, energy level diagrams	6.4 – 6.8
10/21	Kinetics, activation energy, rates, catalysts and enzymes	6.9 – 6.11
10/23	Alkyl halides, properties, polarity, nucleophilic substitution	7.1 – 7.6
10/26	Review	
10/28	***Exam 2, Wednesday, Oct. 28 (covering lectures 10/5-10/26)***	
10/30	Leaving groups, nucleophiles, substitution mechanisms	7.7 – 7.10
11/2	S_N2 and S_N1 mechanisms, stereochemistry of S_N2 and S_N1	7.11 – 7.13
11/4	Carbocation stability, when is the mechanism S_N2 or S_N1?	7.14 – 7.17
11/6	Organic synthesis, elimination reactions, alkene stability	7.18 – 7.19, 8.1 – 8.2
11/9	Elimination mechanisms, E2, Zaitsev's rule, E1	8.3 – 8.6
11/11	E2 stereochemistry, when is a reaction S_N1, S_N2, E1 or E2?	8.7 – 8.11
11/13	Intro to alcohols/ethers/epoxides, naming, physical properties	9.1 – 9.5
11/16	Preparation and reactions of alcohols/ethers/epoxides	9.6 – 9.8
11/18	Finish preparation of alcohols/ethers/epoxides, review	
11/20	***Exam 3, Fri., November 20 (covering lectures 10/30-11/18)***	

11/23	Cation rearrangements, converting alcohols to alkyl halides	9.9 – 9.12
11/25	*Thanksgiving break*	
11/27	*Thanksgiving break*	
11/30	Reactions of ethers and epoxides	9.15 – 9.17
12/2	Intro to alkenes, naming, physical properties, lipids part 2	10.1 – 10.6
12/4	Prep. of alkenes, HX addition, Markovnikov's rule	10.7 – 10.10
12/7	Hydration, halogenation, stereochemistry	10.12 – 10.14
12/9	Hydroboration-oxidation, remembering reactions, synthesis	10.16 – 10.18
12/11	Intro to alkynes, naming, properties, preparation, reactions	11.1 – 11.4, 11.11
12/14	***Exam 4, Mon., December 14 (covering lectures 11/23-12/11)***	
12/16	Review for final	
12/18	***Comprehensive Final Exam, Fri. December 18***	

TENTATIVE LABORATORY SCHEDULE

Exp	Calendar Week	Title of the Experiments
	9/9 – 9/11	No lab
1	9/14 – 9/18	Check-in, Lab Orientation, Safety, Molecular Modeling
2-1	9/21 – 9/25	The Separation, Purification, and Identification of the Components of Excedrin - Part I
2-2	9/28 – 10/2	The Separation, Purification, and Identification of the Components of Excedrin - Part II
3	10/5 – 10/9	Identification of the Active Ingredients of an Unknown Analgesic by Thin-Layer Chromatography (formal report)
4	10/12 – 10/16	Computational Chemistry: Conformational Analysis of Alkanes
5	10/19 – 10/23	The Analysis and Separation of Selected Pigments Found in Spinach Leaves
6	10/26 – 10/30	Analysis of the Essential Oils in Citrus Fruit Peels by Gas Chromatography (GC)
7	11/2 – 11/6	Effects of Alkyl Halide Substitution and Leaving Group in the S_N2 Reaction
8	11/9 – 11/13	Synthesis of *t*-Butylchloride via an S_N1 Reaction
9	11/16 – 11/20	Dehydration of 2-Methylcyclohexanol
	11/23 – 11/27	No Lab – Thanksgiving Break
10-1	11/30 – 12/4	Hydroboration-Oxidation of 1-Octene - Part I
10-2	12/7 – 12/11	Hydroboration-Oxidation of 1-Octene - Part II
	12/14 – 12/18	Check out