Chem 335, Organic Chemistry II Syllabus, Fall 2011

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/chem335.htm
Office Hours	W, F 9:20-11:20 am; or by appointment
Lecture	M W F 11:30-12:30 (HS-175)
Laboratory	All lab sections meet in HS-455 Sec 1: Wednesday 1:50-5:10 pm Sec 2: Thursday 1:20-4:30 pm

Lecture Textbook, Solutions Manual, and Model Kit

- Janice Gorzynski Smith "Organic Chemistry" with Solutions Manual, 3rd Ed. McGraw Hill, and bundled HGS molecular model kit (Required). These are the same books and model kit as were used in Chem 235.

Laboratory Books

- Chem 335 Organic Chemistry II Laboratory Manual, Fall 2011, (Required). This is a new item and can be purchased from the book store.
- Pavia, Lampman, Kriz, and Engel "Techniques in the Organic Laboratory, Microscale and Macroscale", Harcourt College Publishing. (Required). Same as used in Chem 235.
- 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. **Laboratory Absences:** If you need to miss lab you should contact your lab instructor as soon as possible. The reason for the absence must be reported to your lab instructor within 24 hours, or as soon as possible under exceptional circumstances. Reasonable excuses could include illnesses or family emergencies as examples. These absences will be considered excused and won't affect your grade unless you fail to makeup the work. To make up a lab in another section you'll need to contact the instructor of that section ahead of time to request permission to attend. We will do our best to accomadate make up requests as lab space permits. As per department policy, two absences from lab without a valid excuse will result in a grade of F for the course.
2. **Exam Absences:** If you miss an exam and wish to make it up you need to contact me within 24 hours of the exam, or as soon as possible under exceptional circumstances. Reasonable excuses could include illnesses or family emergencies as examples. I will schedule a time for you to make up the exam. An absence from an exam without a make up will result in a zero for that exam and this will serve as your dropped exam.
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 7-10. 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. **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 II - All Sections" to access the list of quizzes for the course.
4. **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 experiment 4 will require a formal write up. Instructions for each report are included at the end of each experiment.

LECTURE AND EXAM SCHEDULE (TENTATIVE)

Date	Key Concepts	**Chapter:** sections
9/7	Discuss syllabus, Mass spectrometry	**13:** 1-2
9/9	Mass spectrometry and Infrared spectroscopy	**13:** 3-5
9/12	Infrared spectroscopy	**13:** 6-7
9/14	NMR: theory, number of NMR signals	**14:** 1-2
9/16	NMR: position of signals and strength of signals	**14:** 3-5
9/19	Spin-spin splitting, other ^{1}H NMR facts	**14:** 6, 9
9/21	NMR: solving unknowns, ^{13}C NMR	**14:** 10-11
9/23	Reduction of alkenes, alkynes, R-X, and epoxides	**12**: 1-7
9/26	Epoxidation, dihydroxylation, oxidative alkene cleavage	**12:** 8-10
9/28	Oxidation of alcohols	**12**: 12
9/30	***Exam 1: Fri, Sept. 30 (chapters 12, 13, 14)***	
10/3	Radical reactions, alkane halogenation, chlorination of ethane	**15**: 1-4
10/5	Chlorination of other alkanes, bromination, allylic bromination	**15:** 5-8, 10
10/7	Lipid oxidation, antioxidants, polymers;	**15:** 11-14
10/10	Resonance, conjugation, dienes	**16:** 1-4
10/12	Diene stability and the Diels-Alder reaction	**16:** 5-9, 12-13
10/14	Diels-Alder reaction continued	**16:** 13-14
10/17	Benzene nomenclature and structure	**17:** 1-5
10/19	Benzene's unusual stability, criteria for aromaticity	**17:** 6-7
10/21	Aromatic rings of other types	**17:** 8
10/24	***Exam 2: Mon., Oct. 24 (chapters 15, 16, 17)***	
10/26	Halogenation, nitration and sulfonation	**18**: 1-4
10/28	Friedel-Crafts reactions, effects of ring substitution, limitations	**18:** 5-10
10/31	Disubstituted benzenes, side chain reactions, synthesis	**18:** 11-12, 14-15
11/2	Carboxylic acids: naming, properties, and preparation	**19:** 1-7
11/4	Carboxylic acid, reactions, and acidity	**19:** 8-11
11/7	Carbonyl chemistry: reductions of aldehydes & ketones	**20:** 1-5
11/9	Reduction of carb. acid derivatives, organometallic reagents	**20:** 7, 9-10
11/11	Synthesis, organometallic reactions	**20:** 11, 13-14
11/14	***Exam 3: Monday, Nov. 14 (chapters 18, 19, 20)***	
11/16	Aldehydes and ketones: naming, properties, preparation	**21:** 1-6
11/18	Aldehyde/ketone reactions, nucleophilic addition, Wittig rxn	**21:** 7-8, 10
11/21	Wittig rxn continued, imines	**21:** 10-11
11/23	*Thanksgiving break*	
11/25	*Thanksgiving break*	
11/28	Acetal formation/hydrolysis/use in protecting C=O	**21:** 14-17
11/30	Carboxylic acids and their derivatives	**22:** 1-5
12/2	Reactions of acid chlorides, anhydrides	**22:** 6-9
12/5	Reactions of carboxylic acids, esters, and amides	**22:** 10-13
12/7	Summary of acyl substitutions, applications	**22:** 14-17
12/9	Keto-enol tautomerism; the aldol reaction	**23:** 1-2; **24:** 1
12/12	***Exam 4, Monday, Dec. 12 (chapters 21-24)***	
12/14	Review for final exam	
12/16	***Comprehensive Final Exam, Friday, Dec. 16***	

LABORATORY SCHEDULE

Dates	Exp #	Complimentary Lecture Topic	Experiment Title
9/7-9/8		Spectrospocy	No lab
9/14-9/15	1	FTIR, MS	Check in. Isolation and characterization of Eugenol (essence of cloves)
9/21-9/22	2	MS, IR, NMR	Spectral Identification of Organic Compounds
9/28-9/29	3	Oxidation	Oxidation of Cyclohexanol to Cyclohexanone
10/5-10/6	4-1	Spectroscopy	Identification of a General Unknown, part 1
10/12-10/13	4-2	Spectroscopy	Identification of a General Unknown, part 2
10/19-10/20	5	Diels-Alder Reaction	The Diels-Alder Reaction: Synthesis of 4-Cyclohexene-*cis*-1,2-dicarboxylic Anhydride
10/26-10/27	6	Aromatic Substitution	Electrophilic Aromatic Substitution: the Nitration of Toluene
11/2-11/3	7	Carbonyl chemistry	Reduction of Heptanal Using Sodium Borohydride
11/9-11/10	8	Organometallic Reagents	Preparation & Carbonation of a Grignard Reagent: Benzoic Acid
11/16-11/17	9	Carbonyl chemistry	The Synthesis of an Alkene Using a Wittig Reaction
11/23-11/24			*Thanksgiving Break*
11/20-12/1	10	Carboxylic Acid Derivatives	Flavors and Fragrances: Synthesis of Isopentyl Acetate (Banana Oil)
12/7-12/8	11	Enolate Chemistry	Synthesis of 2 Methyl-2-pentenal: An Aldol Condensation Check out
12/14-12/15		No Lab	No Lab