Chemistry 336A: Honors Organic Chemistry
Winter 2004
MWThF 10:30am-11:20am, Bagley 261

Instructor: Prof. Kathryn M. Koeller
Email: koeller@chem.washington.edu
Office: CHB 204B
Office Hours: WThF 11:30-12:30

TA: Karyn Mlodnosky
Email: karynm@u.washington.edu
Office: BAG 205, 685-7507
Office Hours: MW 3:30-4:30

Prerequisite: 2.2 or greater in Chemistry 335A

Course Synopsis: Chemistry 336A is the second quarter segment (2nd of 3 quarters) of Honors Organic Chemistry (4 credits). In this course, we will be discussing the reactivity of various classes of organic compounds, generally organized in terms of functional group. Students will be required to gain a general understanding of reaction mechanism, as well as be able to apply reactions to organic synthesis. In addition, certain spectroscopic methods for analysis of organic compounds will be covered.

Website: http://faculty.washington.edu/kkoeller/Chem336A/index.html
Epost: A discussion group has been created for this class, and the link to it is posted on the above website. The online discussion will open January 5, and will remain open through March 19. In attempting to solve the problem sets in each chapter, you may find online discussions with your classmates helpful. In addition, the online discussion lacks the time constraints of attending office hours, as a further convenience.

Text: *Organic Chemistry*, 8th edition, Solomons & Fryhle (including the accompanying Study Guide and Solutions Manual). Molecular model kits are also recommended.

Grading: The course grade will be based on the best 4 of 5 quizzes (10% total), the best 2 of 3 hour exams given during the quarter (25% each), and a final exam (40%). (The lowest quiz and exam scores will be dropped.) No re-grades under 5 points will be considered. Make-up exams (or quizzes) will not be given. If legitimate circumstances (illness, family crisis, university sanctioned athletics) force more than a single hour exam to be missed, the final exam will be proportionally worth more. No grade adjustments will be made after finals have been completed.

Problem sets and quizzes: Students are encouraged to work all of the problems in the chapter, although these will not be collected or graded. Solutions can be checked against those in the study guide. Working through problems is the best way to gain an understanding of organic reactions, and completion of the problem sets in each chapter is highly recommended. Problems that appear in the text may appear on quizzes or exams. A short quiz will take place Wednesday during class (unless there is an exam scheduled during the same week), and will encompass material covered since the previous week's quiz or exam.

Course outline: The course outline is given below. The lecture schedule is tentative, and may change during the quarter to accommodate the needs of the class. Quiz and exam dates will not change from those listed below. Lectures designated as "Review" lectures may be used to finish up lecture material not covered due to time constraints, as well as provide a summary and overview of the material to be covered on the exam.

COURSE OUTLINE:

DATE		TOPIC	READINGS
1/5	M	**Course introduction** **Alcohols and Ethers Part I**: structure and nomenclature; properties; review of synthesis from alkenes	Ch. 11.1-11.4
1/7	W	**Alcohols and Ethers, Part II**: reactions of alcohols; alcohols as acids; conversion of alcohols into alkyl halides	Ch. 11.5-11.9
1/8	Th	**Alcohols and Ethers, Part III**: leaving group derivatives of alcohols; synthesis and reactions of ethers	Ch. 11.10-11.12

Chem 336A

1/9	F	**Alcohols and Ethers, Part IV**: epoxide synthesis and reactions; crown ethers	Ch. 11.13-11.16
1/12	M	**Alcohols from Carbonyl Compounds, Part I**: oxidation-reduction reactions; reduction of carbonyl compounds	Ch. 12.1-12.3
1/14	W	**QUIZ** **Alcohols from Carbonyl Compounds, Part II**: oxidation of alcohols; Preparation of organometallic compounds	Ch. 12.4-12.6
1/15	Th	**Alcohols from Carbonyl Compounds, Part III**: reactions of organometallic compounds; alcohols from Grignard reagents	Ch. 12.7-12.8
1/16	F	**Alcohols from Carbonyl Compounds, Part IV**: planning syntheses with organometallic reagents; lithium dialkylcuprates	Ch. 12.8-12.10
1/19	M	**Holiday**	
1/21	W	**EXAM 1 (Ch. 11-12)**	
1/22	Th	**Conjugated Unsaturated Systems, Part I**: allylic substitution; allyl radicals; allyl cations	Ch. 13.1-13.4
1/23	F	**Conjugated Unsaturated Systems, Part II**: rules of resonance; alkadienes and polyunsaturated hydrocarbons; 1,3-butadiene	Ch. 13.5-13.7
1/26	M	**Conjugated Unsaturated Systems, Part III**: conjugated dienes; UV-Vis spectroscopy; 1,4-addition to conjugated dienes	Ch. 13.8-13.10
1/28	W	**QUIZ** **Conjugated Unsaturated Systems, Part IV**: Diels-Alder reaction	Ch. 13.11
1/29	Th	**Aromatic Compounds, Part I**: nomenclature, reactions, structure, and stability of benzene	Ch. 14.1-14.5
1/30	F	**Aromatic Compounds, Part II**: structure of benzene; Huckel's rule	Ch. 14.6-14.7
2/2	M	**Aromatic Compounds, Part III:** Huckel's rule; other aromatic compounds	Ch. 14.7-14.8
2/4	W	**QUIZ** **Aromatic Compounds, Part IV**: heterocyclic aromatic compounds; biochemistry; spectroscopy	Ch. 14.9-14.11
2/5	Th	**Reactions of Aromatic Compounds, Part I**: electrophilic aromatic substitution; halogenation, nitration, and sulfonation of benzene; Friedel-Crafts alkylation	Ch. 15.1-15.6
2/6	F	**Reactions of Aromatic Compounds, Part II**: Friedel-Crafts acylation; Clemmensen reduction; substituent effects	Ch. 15.7-15.10
2/9	M	**Reactions of Aromatic Compounds, Part III**: theory of substituent on electrophilic aromatic substitution	Ch. 15.11
2/11	W	**Reactions of Aromatic Compounds, Part IV**: side-chain reactions of alkylbenzenes; alkenylbenzenes; synthetic applications; nucleophilic substitution; reduction	Ch. 15.12-15.16
2/12	Th	**Review**	

2/13	F	**EXAM 2 (Ch. 13-15)**	
2/16	M	**Holiday**	
2/18	W	**Aldehydes and Ketones, Part I**: nomenclature; properties; synthesis of aldehydes; synthesis of ketones	Ch. 16.1-16.5
2/19	Th	**Aldehydes and Ketones, Part II**: synthesis of ketones; nucleophilic addition to the carbonyl; addition of alcohols	Ch. 16.5-16.7
2/20	F	**Aldehydes and Ketones, Part III**: addition of amines, hydrogen cyanide, ylides (Wittig reaction)	Ch. 16.8-16.10
2/23	M	**Aldehydes and Ketones, Part IV**: addition of organometallic reagents; oxidation; chemical analyses; spectroscopic properties	Ch. 16.11-16.14
2/25	W	**QUIZ** **Aldol Reactions, Part I:** enolate anions; tautomerization; reactions via enols and enolate anions	Ch. 17.1-17.3
2/26	Th	**Aldol Reactions, Part II:** aldol reaction; crossed aldol reactions	Ch. 17.4-17.5
2/27	F	**Aldol Reactions, Part III:** crossed aldol reactions; cyclizations; lithium enolates	Ch. 17.5-17.7
3/1	M	**Aldol Reactions, Part IV:** □-selenation; additions to □,□-unsaturated carbonyl compounds	Ch. 17.8-17.9
3/3	W	**Review**	
3/4	Th	**EXAM 3 (Ch. 16-17)**	
3/5	F	**Carboxylic Acids and Derivatives, Part I:** nomenclature; properties	Ch. 18.1-18.2
3/8	M	**Carboxylic Acids and Derivatives, Part II:** preparation of carboxylic acids; nucleophilic addition-elimination; acyl chlorides	Ch. 18.3-18.5
3/10	W	**QUIZ** **Carboxylic Acids and Derivatives, Part III:** anhydrides; esters	Ch. 18.6-18.7
3/11	Th	**Carboxylic Acids and Derivatives, Part IV:** amides; derivatives of carbonic acid; decarboxylation	Ch. 18.9-18.11
3/12	F	**Final Review, last day of class**	
3/15	M	**FINAL EXAM (8:30-10:20am)** **(CHAPTERS 11-18, WITH EMPHASIS ON CHAPTER 18)**	