

CHEMISTRY 360 SYLLABUS Spring 2009

Organic Chemistry II

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Classroom: SL118

Required Text and Materials:

1) Text: "Organic Chemistry", 6th edition, by Wade

2) Solutions Manual: "Solutions Manual, Organic Chemistry, 6th Edition", by Simek, Wade

Test Schedule

Test #1 (100 pts) Ch. 15 Conjugated Systems and Orbital Symmetry

Wednesday, Feb. 11 Ch. 16 Aromatic Compounds

Ch. 17 Reactions of Aromatic Compounds

Test #2* (**50** pts) Ch. 13 Nuclear Magnetic Resonance Spectroscopy

Wednesday, Feb. 25 Ch. 12 Infrared Spectroscopy

Test #3 (100 pts) Ch. 18 Ketones and Aldehydes

Friday, April 3 Ch. 22 Alpha Substitutions and Condensations of Enols and Enolate Ions

Test #4 (100 pts) Ch. 19 Amines

Friday, May 1 Ch. 20 Carboxylic Acids

Ch. 21 Carboxylic Acid Derivatives

Final Exam (150 pts)

Wednesday, May 13, 12 noon

Comprehensive (Standardized American Chemical Society Exam, _

Covers Entire Year of Chemistry!!)

Grading Summary:

Tests 350 points

Final exam 150 points

Homework/Quizzes ???? (not many)

(+10 points extra credit possible for perfect attendance)

Tentative letter grades

A/A- ≥89%

B-/B/B+ ≥77%

C-/C/C+ ≥65%

D-/D/D+ ≥52%

The instructor may lower but will not raise the numbers required for a letter grade.

Attendance: Perfect attendance will be rewarded with 10 points of extra credit and a single absence with 5 points of extra credit. Be sure to sign the attendance sheet each day!

Final Exam: The final exam will be cumulative, covering the entire year of organic chemistry. The test is a standardized test produced by the American Chemical Society, taken by thousands of students at schools throughout the country. It is useful for comparison to other students at other schools.

Jasperse website: <http://www.mnstate.edu/jasperse/>

This will include copies of:

- handouts
- quizzes
- practice tests and practice text answers
- old notes.

Homework: All assigned book problems are representative of what I consider to be reasonable test-level problems, and have worked-out answers in the Solutions Manual. With solutions, I will not collect the book homework. After each class, review your notes and try to work all of the assigned book problems for the sections covered. Do all of the assigned end-of-chapter problems as soon as a chapter is completed in class. A copy of the solutions manual is on reserve in the library, CHE-195.

Final Exam and Grading

The final exam will involve 70 problems, but your score will not be determined in the normal percentage way. (In other words, you don't need to get 89% correct in order to get an A...). Your raw score will be compared to national averages, and converted into a percentile format. For example, 52/70 may be 74%, but may be 90th percentile, and would be viewed as a strong A. Essentially I will use your raw score, convert that into percentile score relative to national norms, then use a formula to convert that back to a letter grade equivalent, and scale it all up to be worth 150 points. Bottom line: it will be fair and the class grade distribution/curve will be comparable to on regular tests.

Class E-Mail List

An email list will be used to notify you of special scheduling information or other miscellany. (If I am sick and won't be able to hold class; when and where practice tests are to be held; if there are errors in one of the practice tests or book problems or in something I communicated in class, etc.) The list uses your official mnstate e-mail address. If that isn't what you actually use, contact Jerome Fuchs (fuchs@mnstate.edu) and request that he set up a forwarding protocol so that e-mails to your mnstate.edu account actually get forwarded to the actual account you use.

- Note: A test e-mail has already been sent. If you haven't received one, something needs correction.

Course Description

CHEM 360 Survey of Organic Chemistry: Part II (3 credits)

The structure, nomenclature, reactions, reaction mechanisms, and synthesis of carbon compounds that contain oxygen and nitrogen. **Prerequisite:** Chem 350

Note: Organic Chemistry Laboratory II, Chem 365, is a related but separate class. It is not required, but if you want to be in the lab you must be registered for it.

Student Learning Outcomes/Course Objectives

The general outcome goals are that students will understand the structure, characterization, nomenclature, reactions, reaction mechanisms, and synthesis of carbon compounds including those that contain oxygen and/or nitrogen. A general summary of major learning topics is summarized on page 1, with the listing of chapters that will be covered. A more detailed list of learning topics is summarized on page 4, with an approximately day-by-day listing of topic coverage. Most of the learning outcomes will be assessed by problems in which students must demonstrate their understanding. The list of problems on page 3 represents a detailed and representative sampling of the types of problems that should be solvable by a student who has achieved all the learning outcomes.

Academic Honesty

Cheating will not be tolerated and will be reported to the Dean of your College and the Vice President for Academic Affairs. It may also be reported to the Student Conduct Committee for further disciplinary action. For a full description of the MSUM Academic Honesty Policy, please see the Student Handbook. (<http://www.mnstate.edu/sthandbook/POLICY/index.htm>)

Special Accommodations

Students with disabilities who believe they may need an accommodation in this class are encouraged to contact Greg Toutges, Coordinator of Disability Services at 477-5859 (Voice) or 1-800-627-3529 (MRS/TTY), CMU 114 as soon as possible to ensure that accommodations are implemented in a timely fashion.

CHEMISTRY 360 PROBLEMS

SPRING 2009

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Ch	In Chapter Problems	End of Chapter Problems
15	1, 2, 4, 5, 6, 7(skip c), 9, 10-11(NBS=Br ₂ /hv), 12, 13, 14, 15 (skip d), 16 (ignore stereochem), 18	24, 25a-d,g-i, 26, 27, 30, 31, 33a-f
16	3(skip cyclooctatetraene), 5, 7b-d, 8, 9a, 10, 11, 12, 15, 16 (purine picture on top of page), 18, 22a, c,e,g, 24	27a-f, 28a-c,e,f, 29, 32, 34 (hint: N lone pairs are strongly basic when sp ³ or sp ² but weakly basic when p), 35, 36, 37 ("xylene" means dimethyl benzene), 43
17	2, 4(p-xylene is 1,4-dimethylbenzene), 6, 7, 8, 9, 12a, 14, 15, 16b(i-iv), 17a,c, 20a-c, 21, 22(skip c,d), 33, 34 (1), 36, 37	44a,b,d,f,h,j,l, 45, 46a,b,e,f,g, 47b-f,h,i,j,l, 48, 49, 51, 57, 60, 61
13	2, 3, 4, 5, 6, 7, 9, 11, 13a, 15, 16, 18, 22, 24a-e, 25, 27, 29, 30, 32	33, 34, 35 (skip d), 36, 38, 39, 40, 41, 43, 44, 49
12	4, 5	16
18	1a,b, 6, 7, 8, 9, 10, 11a,b, 12, 16, 17, 18a, 19, 21, 22, 24, 25, 26, 27a,b,d, 28, 29, 30, 31, 32, 33, 34a-d, 35a-c, 37a-c	39a-c, e-g, l, 40, 43, 44, 49, 50, 51a-f,h, 52, 56a-g, i-l, 57, 58,59, 61a-e, 64a-d, 65, 66
22	(Enols, Halogenation) 1, 2, 3, 4, 5, 6, 8a,c,d, 9b,d,e, (LDA alkylation) 13, (Aldol) 18, 19, 22, 23, 24, 25, 26, 27, 28, 29, 30,32, (Claisen) 34a, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, (alkylation-decarboxylation) 46, 47, 49, 50, (Michael) 55, 56, 57, 59	61, 62, 63, 64, 65, 66, 67, 68 (skip e), 69a, d, e, 70, 71, 73a-c
19	1,2(skip b,d), 3a-c, 5b,c, 6a-c, 15, 16, 17, 25b,d,f,g, 26, 27, 28, 30a-c, e-g, 31	36a-e, 37, 39a,c,d, 41a,b,h,i, j,l,m, 42 (skip e), 44a,d,g, 47, 48, 50a-c, 51a,c
20	1b-d,g, 2a-c, 3, 4, 5, 6, 11 b,c,d,f, 12, 13, 15b,c, 16a,b, 18, 19, 20, 21, 23, 24	26 (not d,g, i), 28a,e,f,h,i, 29 (skip b), 30a,d,e, 31, 32a,c,d, 33, 35a-e,i,j,k, 36a-c,e,f, 37, 38, 39, 41, 42, 43, 47, 48, 49, 50
21	1a-c, 6-14,16, 18, 31, 32a,b	44a,c,d,e,f, 45, 46, 47a,e,f, 48a,b, 49a,b,d, e, 50a,b,c,e,f,g,h, j, l, 51, 54a,c,d,f,j, 55, 57a-c

Chemistry 360, Jasperse, Spring 2009 (43 class days)		Reading Assignment
Date	Topic	
12-Jan	Intro; Conjugation, Molecular Orbitals, Dienes, Allylic Cations, Additions to Dienes	15.1-6
14-Jan	More allylic cations/radicals/conjugation and Applications; Diels-Alder Reaction	15.7-11
16-Jan	Diels-Alder Reaction; Aromaticity (15-3 will be covered only very briefly; skim briefly)	15.11, 16.1-2
19-Jan	No Class. Martin Luther King Day.	no class
21-Jan	Aromaticity; Huckel's Rule and Complex Aromatics	16.1-7
23-Jan	Complex Aromaticity, Application, Nomenclature (Skip "endo rule" section in 15.11A, p. 684; Skip 15.12,13)	16.8-11, 13
26-Jan	Electrophilic Aromatic Substitution: Intro, Mech, Kinetic Effects, Directing Effects	17.1,6-8
28-Jan	Reactions in Detail: Halogenation, Nitration, Sulfonation, Alkylation, Acylation	17.2-5,10,11
30-Jan	Catchup; Addition to Disubstituted Benzenes; Synthetic Applications (Skip 16.11,14,15)	17.9, Practice
2-Feb	Side Chain Reactions; Retrosynthesis; Synthetic Applications; Practice	17.14, Practice
4-Feb	Catchup	-
6-Feb	Integrated practice problems (Skip 17.12,13,15)	-
9-Feb	¹ H NMR Overview: Chemical Shift, Integration, and Splitting; ¹ H NMR Problem Solving	13.5-8
11-Feb	Test #1 Covering Chapters 15-17.	Test 1
13-Feb	¹ H NMR Problem Solving	13.5-8
16-Feb	More Problem Solving; Complex Splitting; Stereochemical Nonequivalence of Protons	13.9-10
18-Feb	¹³ C NMR; Infrared Spectroscopy	13.12-13; 12.11-12
20-Feb	Spectroscopy Catchup, Integrated Problems (Focus on 13.5-8, 12-13; Skim 13.1-4, 9, 10; Skip 11, 14)	catchup
23-Feb	Ketones/Aldehydes. Nomenclature, Properties, Intro.	18.1-7
25-Feb	Test #2 Covering Chapters 12-13. 50 points.	Test 2
27-Feb	Synthesis of Ketones/Aldehydes.	18.7-11
2-Mar	Reactions of Ketones/Aldehydes	18.12, 14-17, 18-19
4-Mar	Reactions of Ketones/Aldehydes	18.20-21
6-Mar	Catchup; Enols and Enolates Intro. Acid/Base Considerations; Proton as Electrophile (Skip 18.13, for now....)	22.1-2, 22.15
9-Mar	Enols and Enolates Intro. Acid/Base Considerations; Proton as Electrophile	22.1-2, 22.15
11-Mar	Halogenation; Alkylation; Double Activation; Ester Hydrolysis; Decarboxylation	22.3, 5, 15-17
13-Mar	The Aldol Reaction (Aldehyde/Ketone as Electrophile)	22.7-11
16-Mar	Spring Break	
18-Mar	Spring Break	
20-Mar	Spring Break (Skip 22.4,6. 18, 19)	
23-Mar	Claisen Reaction (Ester as Electrophile)	22.12-17
25-Mar	Catchup	
27-Mar	The Wittig Reaction and Alkene Synthesis; Catchup	18.13
30-Mar	Catchup, Integrated Practice Problems.	Catchup
1-Apr	Amines. Intro, Nomenclature, Properties; Basicity of Amines; Structural Factors; Salts	19.1-7
3-Apr	Test #3 Covering Chapters 18 and 22.	Test 3
6-Apr	Reactions of Amines	19.10-13, 17-18
8-Apr	Diazonium Chemistry; Amine Synthesis by Reductive Amination of Carbonyls	19.17-19
10-Apr	No Class, Easter Monday (Skip 19.8-9,14-16,24-25)	-
13-Apr	No Class, Easter Monday	-
15-Apr	More Synthesis of Amines	19.19
17-Apr	Carboxylic Acids: Nomenclature; Properties; *ACIDITY*; Salts; Soap; SYNTHESIS	20.1-5
20-Apr	Acid Synthesis; Reactions	20.8-11
22-Apr	Reactions of Acids: Nucleophilic Acyl Substitution; Carboxylic Acid Derivatives	20.13-15; 21.1-3
24-Apr	Interconversions Among Acids and Derivatives; Synthesis and Mechanism; Catchup (Skip 20.6,7,12)	21.5-7
27-Apr	Interconversions Among Acids and Derivatives; Synthesis and Mechanism; Catchup	21.5-7
29-Apr	Practice Problems	-
1-May	Test #4 Chapters 19-21 (Skip 21.4)	Test 4
4-May	Significant Special Topics; Preview of ACS Final Exam; Course Evaluations	Practice
13-May	Final Exam, 12 noon, Wednesday	Final Exam