

ORGANIC CHEMISTRY I: CHEMISTRY 350 SYLLABUS FALL 2003

Dr. Craig P. Jasperse
Office: 411 I Hagen Hall
Telephone: 477-2230
e-mail: jasperse@mnstate.edu

Office Hours: Mon 3-5
Tues-Wed-Fri 10-12
Fri 3-5
web: <http://www.mnstate.edu/jasperse/>

Required Text and Materials:

- 1) Text: "Organic Chemistry", 5th edition, by Wade
- 2) Solutions Manual: "Solutions Manual, Organic Chemistry, 5th Edition", by Simek, Wade

Test Schedule

Test #1: Friday, Sept. 19	Ch. 1 Introduction and Review Ch. 2 Structure and Properties of Organic Molecules Ch. 3 Structure and Stereochemistry of Alkanes
Test #2: Wednesday, Oct. 22	Ch. 4 The Study of Chemical Reactions Ch. 5 Stereochemistry Ch. 6 Alkyl Halides: Nucleophilic Substitution and Elimination
Test #3: Wednesday, Nov. 12	Ch. 7 Structure and Synthesis of Alkenes Ch. 8 Reactions of Alkenes
Test #4: Monday, Dec. 8	Ch. 10 Structure and Synthesis of Alcohols Ch. 11 Reactions of Alcohols
Final Exam Comprehensive	Wednesday, December 17 9:00-12:00. (a.m.)

Grading Summary:

		<u>Tentative letter grades</u>	
Tests	400 points (4 x 100)	A	89%
Final exam	150 points (1 x 150)	B	77%
Homework/Quizzes? ???		C	65%
+10 points extra credit possible for perfect attendance		D	53%

THE INSTRUCTOR MAY LOWER BUT WILL NOT RAISE THE PERCENTAGE REQUIRED FOR A LETTER GRADE

Attendance: Faithful attendance is important (and I do care if you come!) To reinforce your self-discipline, perfect attendance will be rewarded with 10 points of extra credit and a single absence with 5 points of extra credit. I will excuse absences at my discretion if the reason is good and I am notified. Be sure to sign the attendance sheet each day!

Final Exam: The final exam will be cumulative, covering all of the material tested previously on Tests 1-4.

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

This will include copies of handouts, quizzes, practice tests, and old notes. Copies of old tests and old notes will also be available in the library reserve and at Copies Plus. The Library Reserve call numbers: class notes (CHE-208), old tests (CHE-207), solutions manual (CHE-271).

Textbook website: http://wps.prenhall.com/esm_organic_wade_5

The textbook website has additional practice problems, practice exams, visualization helps, and links to other useful web-based study resources.

Homework/Quizzes: 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. The homework is a fun way to practice problem-solving, assess your progress, and prepare for tests. Since solutions are available, I will not collect the book homework. I may give some quizzes as time permits and need demands. Note: Putting off the extensive information in organic chemistry till the week of a test will only make it harder on you. After each class, try to work all of the assigned book problems at the back of the sections covered so that you will not only understand what you are doing at the time, but will remember how to do it weeks later! Do all of the assigned end-of-chapter problems as soon as a chapter is completed in class.

Chemistry 350, Jasperse, Fall 2003		Reading
Date	Topic	Assignment
Aug. 25	Intro. Octet Rule, Lewis Structure, Electroneg, Polarity, Formal Charge	1.1-1.6
Aug. 27	Resonance; Structural Formulas; Acids/Bases, Electrophiles/Nucleophiles	1.7-1.14
Aug. 29	Orbitals, π -Bonds, Hybridization + Shape; Drawing 3-D Shapes	2.1-2.6
Sept. 1	Labor Day Holiday	No Class
Sept. 3	Isomerism, Polarity, Intermolecular Forces, Solubility	2.7-2.11
Sept. 5	Classification of Organic Compounds. The Functional Groups.	2.12-2.14
Sept. 8	Classification, Formulas, Physical Properties, Nomenclature of Alkanes	3.1-3.5
Sept. 10	Conformations and Stability of Acyclic Alkanes and Cycloalkanes	3.6-3.12
Sept. 12	Conformations and Stability of Cyclohexanes	3.13-3.16
Sept. 15	Catchup	Catchup
Sept. 17	Alkane Chlorination. Factors to Think About in a Chemical Reaction.	4.1-4.9
Sept. 19	Test 1. Chapters 1-3.	Test
Sept. 22	Transition States, Multistep Reactions, Halogenation of Higher Alkanes.	4.10-4.14
Sept. 24	Reactive Intermediates (Radicals, Cations, Anions)	4.15-4.16
Sept. 26	Chirality, R/S Classification of Chiral Carbons.	5.1-5.3
Sept. 29	Miscellaneous Stereochemistry	5.4-5.10
Oct. 1	Diastereomers; More than ONE Chiral Carbon	5.11-5.16
Oct. 3	Catchup	Catchup
Oct. 6	Nomenclature, Structure, Properties, Reactivity of Alkyl Halides.	6.1-6.7
Oct. 8	The S_N2 Substitution Reaction.	6.8-6.12
Oct.10	No Class	
Oct.13	The S_N1 Substitution Reaction.	6.13-6.16
Oct.15	The $E1$ and $E2$ Elimination Reactions. Substitution vs. Elimination?	6.17-6.21
Oct.17	Catchup	Catchup
Oct.20	Alkenes: Structure, Nomenclature, Isomers.	7.1-7.6
Oct.22	Test 2. Chapters 4-6	Test
Oct.24	Alkene Stability; Synthesis.	7.7-7.10
Oct.27	Synthesis of Alkenes; Classifying/Recognizing Reaction Mechanisms; Alkenes	7.10-8.2
Oct. 29	Addition of H-Cl, H-Br, and H-OH to Alkenes.	8.1-8.5
Oct. 31	Oxymercuration/Dermercuration; Hydroboration/Oxidation; Hydrogenation	8.5-8.8
Nov.3	Addition of Halogens, Formation of Halohydrins; Epoxidation	8.9-8.12
Nov.5	Oxidation Reactions of Alkenes	8.12-8.16
Nov.7	Catchup; Practice Problems	Catchup
Nov. 10	Structure, Nomenclature, Properties, Weak Acidity of Alcohols	10.1-10.6
Nov. 12	Test 3. Chapters 7,8	Test
Nov. 14	Synthesis of Alcohols; Organometallic Reactions	10.7-10.9
Nov. 17	Side Reactions; Reduction of Carbonyl Compounds	10.10-10.12
Nov. 19	Catchup; Practice Problems	Catchup
Nov. 21	Oxidation of Alcohols	11.1-11.4
Nov. 24	Conversion of Alcohols to Tosylates or Halides; Uses of Tosylates and Halides	11.5-11.9
Nov. 26	Thanksgiving Break	No Class
Nov. 28	Thanksgiving Break	No Class
Dec. 1	Miscellaneous; Multistep Synthesis	11.10-11.14
Dec. 3	Catchup, Multistep Synthesis Problems	Catchup
Dec. 5	Review for Test 4	---
Dec. 8	Test #4 Covering Chapters 10,11	Test
Dec. 10	To be Announced	
Dec. 17	Final Exam. 9:00 a.m. WEDNESDAY	Final Exam

Tentative
Letter
Grades:
A: 89%
B: 77%
C: 65%
D: 53%

CHEMISTRY 350 PROBLEMS FALL 2003

Dr. Craig P. Jasperse

Ch	In Chapter Problems	End of Chapter Problems
1	1(Si only), 2a-f, 3a-g, 4, 5a-c, 6(all!), 7a,b,d,e,g, 8a,e,f,g,h, 9, 10d-h, 11, 15, 17a, 18a-c, 19a-f [determine which is the "nucleophile" (electron pair donor) and which is the "electrophile" (electron pair receiver), and draw the arrows to show bond making and breaking. Do not do the "Bonsted-Lowry" discussion.]	21, 23, 25-29, 31, 32, 34-37, 40-43, 44 (use nucleophile/electrophile designation, and definitely practice the arrow pushing), 46
2	1b, 2 (skip part about 104.5° angle as opposed to 109° angle), 3, 4, 5a-f, 7a,b, 8, 9 (three do, three don't; beware of "e", which is deceptive), 10, 16, 17 (omit a), 18-20, 21 (skip d), 22 [Note: for functional group problems, skip the "cyclic" designation!]	27, 28, 29 (we will see this is crucial to the performance of all proteins!), 30, 31, 33-35, 38-40, 41 (skip c), 42, 44
3	1a, 2a, 3, 4a-e, 5, 6a,b, 7a,b, 9a, 11- 13, 15b-d, 16, 17a,b, 18-21, 25-29	33, 34 (omit c and d), 35 (omit b), 37 (omit e,g,h), 38, 39, 40b, 42, 43a,b, 44, 46
4	1a-c, 2, 3, 4a, 9a, 11-13, 15, 16, 18, 19a-d, 24, 25, 28-32.	35-39, 41, 42a, 43, 44, 46 (skip d) (Be Sure to do 46, very important)
5	2 (label as chiral or achiral. If chiral, also draw the enantiomer.), 3 (star chiral C's, identify each chiral molecule, and be able to draw the enantiomers.), 4, 5 (assign as chiral or achiral), 6 [skip f,g. For all others, give the (R)/(S) designations.], 14, 20a-e, 21 (skip f), 22, 23c	26a,c,d,j-p , 27, 30d, f-h 31a, f-i, 36
6	1, 2c,e,f, 3 (parts 1 and 3), 6, 7 (the density of chloroform is 1.50), 8a, S _N 2 Reactions: 11-13, 14a,b,d,e, 15(skip b,g), 16, 18, 19a,b, 20(skip c,e), 21 [(the catch here is to understand why inversion can occur if (S) goes to (S)] S _N 1 Reactions: 22, 23, 24a-c, 25, 26 (skip the mechanisms, but note how rearrangement forms a more stable cation), 27, 29 (very interesting. Probably not test fodder.) Elimination reactions: 30, 31a-c, 33b-d, 34-36, 37a,d, 38, 40	42a,c-e, 43a-c,e,f, 44**, 45("solvolysis" is substitution by solvent, and is always S _N 1), 46, 48-54, 56, 59-61

<u>Ch</u>	<u>In Chapter Problems</u>	<u>End of Chapter Problems</u>
7	1 (for b, counting geometric isomers, I count 14 possible alkene isomers and 15 possible cyclic isomers! The answer book only shows a few of the possibilities.), 4, 5a,b,c,f,g,h, 6a,d,e, 7a,c,e(name is ambiguous), 8a,c,e, 10a-d (more stable only. Skip the part about how much difference in energy), 12a,c, 13, 16, 17, 18, 19, 24, 25, 27-29 (note: in 28a, 29c, cation rearrangements occur. I won't ask for mechanisms with cation rearrangement on your test, but a simple elimination of H ₂ O such as 29b or c is extremely likely.)	31, 32a,b,d, 33, 34a,b (for part b: how many rings does it have?), 36a-c, 38 (try to predict the major product. For test purposes I usually wouldn't want the minors), 39a,b (the point is to predict the major product), 44, 45
8	1-5, 8d,f, 9b,c (for b the halide is unusually hindered for a 2°, so it undergoes pretty clean E2), 10b,d,f, 11, 13a,c, 14-16, 17a,b, 23, 24a,b, 25, 26, 27a-d (look at answer to e, just for interest sake), 28 (for b, book answer is poor. Should use a hindered base), 29, 30 (mech for ring-opening only), 32b,d, 34, 35 (d,l means racemic mix of chiral products), 36, 37	47 (good practice for "predict the product" reactions.), 48a, b, c,e,f, 49a,b,c,d,e,f,g, 50, 58-61, 68
10	1, 5d, 6, 8, 10, 12a,b,d, 13-16, 17 (esters only), 18-20, 22-26	31, 33a-d, 34b,c, 35a,c, 36b,c, 37 (review from chapter 8), 38a-l, 39, 40, 42(skip c), 43
11	1a,b,d, 2, 3, 5 (skip KMnO ₄), 6, 9, 10, 11, 12a, 13, 14, 22, 23, 27a,b, 33, 34, 35, 36, 37, 38	40 (do the bromides only), 41 (skip g), 42, 43, 44, 48a, b, c, f, g, h, 49, 50, 52, 53, 56