ORGANIC CHEMISTRY I: CHEMISTRY 350 SYLLABUS
FALL 2017

M-W-F 11:00-11:50 Classroom: Langseth104
Dr. Craig P. Jasperse
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Office Hours: M/W/F 9-10:30, 1:00-2:00
Tues 10:30-12:00, 1:00-2:00

Required Text and Materials:

1) Text: "Organic Chemistry", 8th edition OR 7th edition OR 6th edition, by Wade (Note: if you have a different Wade edition, or a version of Carey's Organic Chemistry as used at NDSU, contact me in order to use what you have.)

Note: These aren't the newest versions, so you can buy used ones cheap on-line. See website for Amazon links to cheap copies: http://web.mnstate.edu/jasperse/Required%20Text%20and%20Materials.pdf

2) Solutions Manual: "Solutions Manual, Organic Chemistry." Get the edition that matches the textbook edition you buy. (In other words, if you have 8th edition test, make sure you get the 8th edition solution manual, etc.)

3) Online "Sapling" homework. http://www2.saplinglearning.com

Test Schedule

Test #1: Friday, Sept. 15	Ch. 1 Introduction and Review Ch. 2 Structure and Properties of Organic Molecules Ch. 3 Structure and Stereochemistry of Alkanes
Test #2: Friday, Oct. 13	Ch. 4 The Study of Chemical Reactions Ch. 5 Stereochemistry Ch. 6 Alkyl Halides: Nucleophilic Substitution and Elimination
Test #3: Monday, Nov. 6	Ch. 7 Structure and Synthesis of Alkenes Ch. 8 Reactions of Alkenes
Test #4: Monday, Dec. 4	Ch. 15 Conjugated Systems and Orbital Symmetry Ch. 16 Aromatic Compounds Ch. 17 Reactions of Aromatic Compounds
Final Exam Tuesday, December 12, 11:30	Comprehensive Final Exam

Grading Summary:

		Tentative letter grades	
Tests	400 points (4 x 100)	A/A-	≥90%
Final exam	150 points (1 x 150)	B-/B/B+	≥80%
Take-Home Quizzes	About 30 points prorated	C-/C/C+	≥70%
On-Line Homework	About 70 points prorated	D-/D/D+	≥58%

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

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

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

Jasperse website: http://web.mnstate.edu/jasperse/ This will provide links to:

Notes for use in class	Recorded Lectures	Sapling	Quizzes
Practice Tests	Jasperse Schedule	Textbook Info	Miscellaneous

On-line "Sapling" homework Problems: You will be required to buy access to an on-line homework system (see later page in syllabus for details.) These problems will be computer-graded, will give you some practice and sometimes tips, and will help to keep you from procrastinating.

Book Homework Problems: 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 manuals available, 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.

Recorded Lectures and On-Line Availability: I will try to record all of the regular class periods and post the movie-versions. I will also record and post **practice test sessions**, and perhaps extra problems or comments or pre-test tips.

Recorded on-line lectures WILL be used on Snow Days/Flood Cancelled Days. (Sorry! ☺)

Homework and Study Strategy: All assigned book and Sapling problems represent what I consider to be reasonable test-level problems. Sapling provides correct answers and some feedback, and the textbook Solutions Manual provides answers to book problems. **The homework is a great way to practice problem solving, learn how to solve problems, assess your progress, and prepare for tests.**

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 some Sapling and book problems so that you will not only understand what you are doing at the time, but will remember how to do it weeks later! After each chapter is completed in class, try to do all of the assigned end-of-chapter problems in the book.

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 defaults to your official mnstate e-mail address. If that isn't what you actually use, contact me.

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

Course Description CHEM 350 Survey of Organic Chemistry: Part I (3 credits)

Introduction to the classification, structure, reactions, and reaction mechanisms of carbon compounds. **Prerequisite:** Chem 210

- Note: Organic Chemistry Laboratory I, Chem 355, 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 classification, structure, nomenclature, reactions, reaction mechanisms, and synthesis of carbon compounds including halocarbons, alkenes, and alcohols. 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 5, 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 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://wwwmnstate.edu/sthandbook/POLICY/index.htm)

Special Accommodations Minnesota State University Moorhead is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

- If you have, or think you may have, a disability (e.g. mental health, attentional, learning, chronic health, sensory or physical) please contact the DRC at (218) 477-4318 (V) or (800)627.3529 or 711 (MRS/TTY) to schedule an appointment for an intake.
- **Additional information is available on the DRC website: http://www.mnstate.edu/disability/**

- **CHEMISTRY 350 PROBLEMS, Based on Wade Version 7**

- FALL 2017 Dr. Craig P. Jasperse (Note: if you have the 8th or 6th edition of Wade or a Carey textbook, lists of problems are linked from my website, or you can email me to get the list.) Contact me if that's your situation, or see the following link:
- http://web.mnstate.edu/jasperse/Chem350/Other-Textbooks.html

Chapter Topic	Ch	Wade 7 Problems In the Chapter	Wade 7 Problems Back of the Chapter
Intro and Review	**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, (for 42 and 43, you should be able to process H_2SO_4 by memory, the others by structure without needing to look at a list of acidity values), 44 (use nucleophile/electrophile designation, and definitely practice the arrow pushing), 46
Structure and Properties	**2**	1b (draw), 2 (skip part about 104.5° angle as opposed to 109° angle), 3, 4, 5a-f, 7a,b, 8, 9, 10 (three do, three don't; beware of "e", which is deceptive), 11, 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
Alkanes	**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
Chemical Reactions.	**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)
Stereo chemistry	**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
Alkyl Halides: SN2, SN1, E2, E1 Reactions	**6**	1, 2c,e,f, 3 (parts 1 and 3, don't classify B or name k), 6, 7 (the density of chloroform is 1.50), 8a, 10 S_N2 Reactions: 11-13, 14a,b,d,e, 15(skip b,g), 16, 18 (skip neopentyl bromide. And, substitution is more important than leaving group), 19a,b, 20(skip c,e,f), 21 [(the catch here is to understand why inversion can occur if (S) goes to (S)] S_N1 Reactions: 22, 23, 24, 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, 31, 32, 33b-d, 34-39, 40	42a,c-e, 43a-c,e,f, 44**, 45("solvolysis" is substitution by solvent, and is always S_N1), 46, 48-54, 56, 59-61
Alkenes	**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,d cation rearrangements occur. I won't ask for mechanisms with cation rearrangement on your test, but a simple elimination of H_2O such as 29b or c is extremely likely.)	31, 32a,b,d, 33, 34 (for part c: 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,d (the point is to predict the major product), 44, 45
Alkene Addition Reactions	**8**	1-4, 6, 8-11, 13-21(look at answer to e, just for interest sake), 22 (for b, book answer is poor. Should use a hindered base), 23, 24, 29, 30 (mech for ring-opening only), 32b,d, 33, 34b-f, 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,h, 50a-l, 59-61, 68
Conjugated Systems	**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
Aromatics	**16**	3(skip cyclooctatetraene), 5, 7b-d, 8, 9a, 10, 11, 12, 15, 16 (purine picture on top of page), 19, 24a, c,e,g	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
Aromatic Reactions	**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

Sapling OnLine Homework, version 2017

Sapling's chemistry questions are delivered in a web browser to provide real-time grading, response-specific coaching, improvement of problem-solving skills, and detailed answer explanations. Dynamic answer modules enable one to interact with 3D models and figures, utilize drag-and-drop synthetic routes, and draw chemical structures - including stereochemistry and curved arrows. Altogether, Sapling is cheaper than a tutor, provides more value than a solutions manual, and goes beyond a mere assessment exercise to give a learning experience.

Enrolling at the beginning

1. Go to http://saplinglearning.com and click on your country ("US Higher Ed") at the top right.
2. a. If you already have a Sapling Learning account, log in and skip to step 3. Otherwise:
   2b. **If you have Facebook account, you can use it to quickly create a SaplingLearning account.** Click "Create an Account", then "Create my account through Facebook". You will be prompted to log into Facebook if you aren't already. Choose a username and password, then click "Link Account". You can then skip to step 3.
   2c. Otherwise, click "create account". Supply the requested information and click "Create my new account". Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
3. Find your course in the list (you may need to expand the subject and term categories) and click the link.
4. If your course requires a key code, you will be prompted to enter it. Select a payment option and follow the remaining instructions.
   - NOTE: Sapling Learning costs $40.00 for a single semester or $69.99(I think, not sure) for two semesters. You will be prompted before payment and asked if you would like to purchase two semesters for a discount. You will need to purchase two semesters in advanced to receive the multi-course discount. There is a 14 day grace period to access your courses before payment, and there is a 60 day refund policy.
5. Work on the Sapling Learning training materials. The activities, videos, and information pages will familiarize you with the Sapling Learning user environment and serve as tutorials for efficiently drawing molecules, stereochemistry, etc. within the Sapling Learning answer modules. These training materials are already accessible in your Sapling Learning course.

- Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments.
- During sign up - and throughout the term - if you have any technical problems or grading issues, send an email to support@saplinglearning.com explaining the issue. The Sapling support team is almost always more able (and faster) to resolve issues than your instructor.

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Getting on when you've already enrolled:

1. Website: http://www.saplinglearning.com/
2. Login
3. Click on your class
4. Click on "Activites and Due Dates" in the upper left corner for list of assignments.
5. Miscellaneous:
   - After you open an assignment, there is an option to "print" it.
   - You can try a problem as many times as you like. But the scoring will cost you 5% of the points available (per problem) for each incorrect attempt.
   - **Jasperse can enter due-date extensions.**
   - Take some time with the introductory training materials.

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		Organic Chemistry 1, Jasperse, Wade Version 7 (43 class days, 39 lectures) Other version of Wade, or other textbooks: • http://web.mnstate.edu/jasperse/Chem350/Other-Textbooks.html		Reading
	Date	Topic		Assignment
1	Aug. 21	Intro. Why Carbon is Special, Normal bonding, Lewis Structures in Organic		1.1-1.6
2	Aug. 23	1. Normal Bonding. 2. Formal Charge and Abnormal Bonding. 3. Electronegativity		**1.7**, 1.4-1.8
3	Aug. 25	1. Structural formulas: Full, Condensed, and Skeletal 2. Resonance Structures		1.9-1.12
4	Aug. 28	1. Mechanism/Arrow-pushing. 2. Acid-Base Chemistry. 3. Anion Stability Patterns.		**1.13**-14
5	Aug. 30	VSEPR 3D Shape. Drawing 3D; Hybridization; Pi bonds; Isomers,		2.1-2.8
6	Sept. 1	Polarity IMF, Boiling Points, Solubility. Catchup. Functional Groups		2.9-2.11
	Sept. 4	Labor Day Holiday		No Class
7	Sept. 6	Functional Groups. Alkane Nomenclature		2.12-2.14
8	Sept. 8	Alkane Nomenclature. Newman Projections; Torsional and Steric Strain; Cycloalkanes		3.1-3.9
9	Sept. 11	Cyclohexane Chairs, Cis-and-Trans, Structural Isomers		3.9-3.15
10	Sept. 13	Radical Halogenation; Mechanism; Radicals; Bond Energies; Reaction Energies		4.1-4.7
	Sept. 15	**Test 1. Chapters 1-3.**		**Test**
11	Sept. 18	Rate Laws, Transition States, Stability-Reactivity Principles		4.7-4.13
12	Sept. 20	Radical Brominations. Major product, mechanism, structure isomers. Stability patterns for carbon radicals, cations, and anions.		4.13-4.16
13	Sept. 22	Chiral vs achiral, Enantiomers, Recognizing/Drawing Mirror Images.		5.1-5.3
14	Sept. 25	Chiral Carbons; Attachment Priorities; R/S Designation; Drawing Chiral Molecules		5.3-5.8
15	Sept. 27	Racemic MIxtures, Optical Activity, Meso, Molecules with More than One Chiral Center		5.11-5.16
16	Sept. 29	Drawing Stereoisomers, Meso Compounds. Alkyl Halides Intro, Classification, and Naming Skip 5.10		6.1-6.7
17	Oct. 2	The Sn2 Substitution Reaction.		6.8-6.12
18	Oct. 4	The Sn1 Substitution Reaction.		6.13-6.16
19	Oct. 6	SN1 REactions in More Depth. Elimination Reactions		6.17-6.21
20	Oct. 9	E1 and E2 Reactions in More Depth; Recognizing Which Reaction Will Occur. Catchup, Practice.		Catchup
21	Oct. 11	Intro to alkenes, Elements of Unsaturation (EU), Hydrogenation + Isomers; Alkene Nomenclature		7.1-7.6
	Oct. 13	**Test 2. Chapters 4-6**		**Test**
22	Oct. 16	Alkene Nomenclature; E/Z; Heats of Hydrogenation; Bulky Bases for Hofmann Elimination		7.7-7.10
23	Oct. 18	Alkene Synthesis. From RX. From Alcohols via Acid-Catalyzed E1. Mechanism Recognition.		7.10-8.2
24	Oct. 20	Addition reactions to Alkenes. Addition of HBr; Acid-Catalyzed HOH Addn. Skip 7.11		8.1-8.5
25	Oct. 23	Acid-Catalyzed HOH Addn; Oxymercuration/Demercuration; Anti-Markovnikov Hydroboration-Oxidation; Synthesis Design		8.5-8.7,8-10
26	Oct. 25	anti-Mark HBr and HOH addition; Synthesis Design, H2 addn; Br2 addn		8.8-8.9
27	Oct. 27	Br2 and BrOH additions and mechanisms; epoxidation Skip 8.11		8.12-8.16
28	Oct. 30	Epoxidation, Dihydroxylation, Ozonolysis. Stereospecific Alkene Reactions. Synthetic Design.		Catchup
29	Nov. 1	Conjugation, Molecular Orbitals, Dienes, Allylic Cations, Additions to Dienes		15.1-6
30	Nov. 3	More allylic cations/radicals/conjugation and Applications; (15-3 will be covered only very briefly; skim briefly)		15.7-11
	Nov. 6	**Test #3 Covering Chapters 7,8**		**Test 3**
31	Nov. 8	Diels-Alder Reaction; Aromaticity		15.11, 16.1-2
	Nov. 10	Veteran's Day, NO CLASS (Skip "endo rule" section in 15.11A, p. 684; Skip 15.12,13)		No Class
32	Nov. 13	Aromaticity; Huckel's Rule and Complex Aromatics		16.1-7
33	Nov. 15	Complex Aromaticity, Application, Nomenclature		16.8-11, 13
34	Nov. 17	Electrophilic Aromatic Substitution: Intro, Mech, Kinetic Effects (Skip 16.11,14,15)		17.1,6-8
35	Nov. 20	Reactions in Detail: Halogenation, Nitration, Sulfonation, Alkylation, Acylation		17.2-5,10,11
	Nov. 22	Thanksgiving Break		No class
	Nov. 24	Thanksgiving Break		No class
36	Nov. 27	Catchup; Addition to Disubstituted Benzenes; Synthetic Applications		17.9, practice
37	Nov. 29	Side Chain Reactions; Retrosynthesis; Synthetic Applications; Practice		17.14
38	Dec. 1	Review for Test 4		---
	Dec. 4	**Test #4 Covering Chapters 15-17**		**Test**
	Dec. 12	**Final Exam, Cumulative. 11:30 TUESDAY**		**Final Exam**

MSUM Sexual Violence Policy: Acts of sexual violence are intolerable. MSUM expects all members of the campus community to act in a manner that does not infringe on the rights of others. We are committed to eliminating all acts of sexual violence.

MSUM faculty and staff are concerned about the well-being and development of our students. We are obligated to share information with the MSUM Title IX Coordinator in certain situations to help ensure that the students' safety and welfare is being addressed, consistent with the requirements of the law. These disclosures include but are not limited to reports of sexual assault, relationship violence, and stalking.
If you have experienced or know someone who has experienced sexual violence, services and resources are available. You may also choose to file a report. For further information, contact Lynn Peterson, Coordinator of Sexual Assault Services at Hendrix Clinic and Counseling Center, 218-477-2211, or Ashley Atteberry, Title IX Coordinator in Owens Hall 208 (218-477-2174; ashley.atteberry@mnstate.edu). Additional information is available at: www.mnstate.edu/titleix

Course Summary:

- See: http://web.mnstate.edu/jasperse/Online/Chem350-CourseSummary.pdf

Course and Test Learning Objectives:

- See http://web.mnstate.edu/jasperse/Online/Objectives%20Organic%20Chemistry%20350.pdf

Use of Other Textbooks:

- See: http://web.mnstate.edu/jasperse/Chem350/Other-Textbooks.html

Jasperse Normal Schedule:

- See: http://web.mnstate.edu/jasperse/Online/NormalSchedule.pdf