

ORGANIC CHEMISTRY I: CHEMISTRY 350 SYLLABUS

In-Person Class - FALL 2024

M-W-F 11:00-11:50 Classroom: Langseth118 Dr. Craig P. Jasperse Office: Hagen 407J Telephone: 477-2230 e-mail: mailto:jasperse@mnstate.edu	web: http://web.mnstate.edu/jasperse/Chem350/Chem350.html Zoom-Room: https://minnstate.zoom.us/j/8827046226 Office Hours: M 1-3; T 9-11:30; W 9-10:30; 1-3; F 9-10:30, 1-3
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Required/Recommended Text and Materials:

- 1) Required online "ACHIEVE/SAPLING" homework. <https://achieve.macmillanlearning.com/>,
Fall 2024 Course ID = **ycvc83**
- 2) Recommended Text: "Organic Chemistry", Wade+Simek", 9th edition, Pearson.
 - 8th or 7th editions of Wade are fine, and cheaper!!
 - Note: For more details and purchase links, see: <http://web.mnstate.edu/jasperse/Required-Text-and-Materials.pdf>
 - Problem listing from other textbooks: <https://web.mnstate.edu/jasperse/Chem350/Other-Textbooks.html>
- 3) Solutions Manual: Get a solutions manual that matches the textbook edition you get.

Test Schedule

Test #1: Monday, Sept. 25	Ch. 1 Introduction and Review Ch. 2 Structure and Properties of Organic Molecules Ch. 3 Structure and Stereochemistry of Alkanes
Test #2: Wednesday, Oct. 23	Ch. 4 The Study of Chemical Reactions Ch. 5 Stereochemistry Ch. 6 Alkyl Halides: Nucleophilic Substitution and Elimination
Test #3: Wednesday, Nov. 13	Ch. 7 Structure and Synthesis of Alkenes Ch. 8 Reactions of Alkenes
Test #4: Monday, Dec. 9	Ch. 15 Conjugated Systems and Orbital Symmetry Ch. 16 Aromatic Compounds Ch. 17 Reactions of Aromatic Compounds
Final Exam Wednesday, December 18, 11:30	Tuesday, 12/12 9am 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	27 points	C-/C/C+ ≥70%
On-Line Homework	73 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/Chem350/Chem350.html>

This will provide links to:

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

On-line "Achieve" 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 Achieve problems represent what I consider to be reasonable test-level problems. Achieve 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 Achieve 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; if there are errors, 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://www.mnstate.edu/sthandbook/POLICY/index.htm>)

ACCESSIBILITY: Minnesota State University Moorhead is committed to providing equitable access to learning opportunities for all students and strives to make courses inclusive and accessible in accordance with sections 504 and 508 of the 1973 Rehabilitation Act and the Americans with Disabilities Act. The University will make reasonable accommodations for students with documented disabilities. Accessibility Resources (AR) is the campus office that collaborates with students in need of special accommodations and assists in arranging 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 Accessibility Resources at (218) 477-4318 (V) or (800) 627.3529 (MRS/TTY) for more information, or stop by the AR office inside the Academic Support Center in Flora Frick Hall.
- If you are already registered with Accessibility Resources and have questions or concerns regarding your current Accommodation Letter, please contact Chuck Eade, Director, at: Charles.Eade@mnstate.edu or 218-477-2169.
- Additional information is available on the AR website: <http://www.mnstate.edu/accessibility>

ORGANIC CHEMISTRY I PROBLEMS

Based on Organic Chemistry (9th Edition) by L. G. Wade Jr

Note: if you have the 8th, 7th or 6th edition of Wade, or if you have a Klein textbook as used at NDSU, lists of problems are linked from the following website, or you can email me (jasperse@mnstate.edu) 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>

Note: for some links to buy variably new or perhaps older edition of the textbook and the associated solutions manuals, see: <https://web.mnstate.edu/jasperse/Required-Text-and-Materials.pdf>

<u>Chapter Topic</u>	<u>Wade Chap</u>	<u>Wade 9 Problems In the Chapter</u>	<u>Wade 9 Problems Back of the Chapter</u>
Intro, Structure and Bonding	1	2a-h, 3a-h, 4, 5a-c, 6(omit boron ones), 7a-e, 8a,b, g, 9a, d, 11, 12, 15b, 16, 17, 18, 19, 22, 24a,b, 25	29a-g (ionic or not), 31a-e, 32, 33, 35, 37 (ID lone-pairs, and #-of-attached-hydrogens), 41a,b,d,e,g, 42a,b,d, 43a,c, 44a,b,e, 58a,c,e 59a-f 23, 25-29, 31, 34, 35.1, 36, 37, 40-43, (for 42 and 43, you should be able to process H ₂ SO ₄ by memory, the others by structure without needing to look at a list of acidity values), 45 (use nucleophile/electrophile designation, and definitely practice the arrow pushing), 46, 47a,b,d
Acids, Based, Functional Groups	2	5, 6b,c,d,e, 7, 13a,e, 24 (ignore the "cyclo" part), 25, 26(skip d,f), 27 (skip h),	31 (ignore the solubility-in-water prediction part), 32a-e, 33, 35a,b,e, 36(b,c,d only), 37(ignore HF), 38(ignore first two), 41a-c, 42a,c,f, 45a, 46a, 47a, 49, 55a-l, 56a-f, 57(ignore sulfide)
Alkanes	3	1a, 2a, 3, 4a-d,f, 5, 6a,b, 7a,b, 9a, 12, 16a,d,e, 17, 18, 25-27, 29	34, 35, 36(omit c and d), 37 (omit b), 39 (omit e,g,h), 41, 42b, 44, 45a,b, 46, 48, 51
Chemical Reactions	4	1a-c, 2, 4a, 9a, 11-13, 18, 19a-d, 24, 25, 28-32.	34-37, 40, 42-45, 47a,b,e
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	25, 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, 3.1.3, 6, 7 (the density of chloroform is 1.50), 8a, 10 S _N 2 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), S _N 1 Reactions: 22, 23, 24, 25, 27, 29 (very interesting. Probably not test fodder.)	30, 31a,c-e, 32a,b,e,f, 33*, 32("solvolysis" is substitution by solvent, and is always S _N 1), 35, 37-42, 45
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, 6a,d,e, 7a,e, 8a,c,e, 13b-d (more stable only. Skip the part about how much difference in energy), 16, 17a, 20a,b, 24, 25, 28, 29, 31, 32a, 33(skip f), 35a,b, 37	40, 41, 42a-c, 43a,b,d, 44 (for part c: how many rings does it have?), 49a, 50, 52a-c, 53, 56, 57, 58, 61a,
Alkene Addition Reactions	8	1-4, 6, 8-11, 13-20, 21a-d, 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	46 (skip f, i, k,o; good practice for "predict the product" reactions.), 47a-l, 49, 50 (good synthesis design practice), 51 (skip e,g,i), 56a, b, c,e,f, 61
Conjugated Systems	15	1, 2, 4, 5, 6, 7(skip c), 9, 10-11(NBS=Br ₂ /hv), 12, 14, 15 (skip d), 16 (ignore stereochem), 18	24, 25a-d,g-i, 27, 30, 31, 33a-f
Aromatic s	16	3(skip cyclooctatetraene), 5, 7b-d, 8, 12, 15, 16 (pyrrole picture on top of page, Fig 16.12), 17 (purine picture in section 16-9c), 19, 24a, c,e,g	26a-f, 27a-c,e,f, 28, 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, 3(p-xylene is 1,4-dimethylbenzene), 5, 6, 7, 8, 11, 12, 13, 14b(i-iv), 15a,c, 18, 19a, 20a-c, 43, 44, 46, 48	50a,b,d,f,h,j,l, 52a,b,e,f,g, 53b-f,h,i,j,l, 54, 57, 57, 64

ACHIEVE/SAPLING OnLine Homework, version 2024

- ACHIEVE/Sapling should be ready at least by August 15, and can be sooner by arrangement.

Getting on when you've already enrolled: (see lower down for enrolling at first)

1. Website: <https://achieve.macmillanlearning.com/>
2. Sign in
3. Have "VIEWING BY" set as "Assignments"
4. Miscellaneous:
 - You can try a problem as many times as you like. But the scoring will cost you only 5% of the points available (per problem) for each incorrect attempt.
 - **Jasperse can enter due-date extensions.**
 - Take some time with the introduction materials, including the "training assignment" and the "drawing tips and shortcuts" practice problems.
 - You do not need to complete a chapter assignment at a single time. You can do as much as you like; leave; and return as you like.
 - ACHIEVE scores will not appear in your D2L grade records until after you've completed all of the assigned ACHIEVE work.
 - For course points, your ACHIEVE points will equal $\text{ACHIEVE \%} \times 73$.
 - So, for example, $100\% \times 73 = 73/73$; $90\% \times 73 = 65.7/73$, etc..

How to enroll into the ACHIEVE/Sapling online homework problems required for this course:

Short Synopsis:

1. Go to: <https://achieve.macmillanlearning.com/>
2. Click on "**I Need to Enroll in a Course**"
3. Enter your course ID
 - a. Course ID for Fall 2024: **ycvc83**
4. You then have two options:
 - a. Purchase Access Online: Select the access period you want to buy. Add it to your cart. Create an account. Follow the check-out process.
 - b. Already have a code: Simply enter in the code you have either purchased or received. Create an account and you're in.

Longer with More Step-by-Step Details:

1. Go to: <https://achieve.macmillanlearning.com/>
2. Click on "**I Need to Enroll in a Course**" (in the lower left quadrant)
3. **Enter the Course ID** (this is specific/unique to each course).
 - a. Course ID for Fall 2024: **ycvc83**
4. Click "**Purchase Achieve Access**" button
 - This is the most direct, cheapest payment and the way to go.
 - The "enter access code" would apply if you purchased access from the bookstore. Hopefully the bookstore will have access code cards, but I'm not totally sure?
5. **Add it to your cart.**
 - If first time using "Achieve", you may need to fill in account information, with email and password and stuff at this point? Or maybe that will happen later....
 - Note: *IF* it's Organic I you are adding, there will be an option to buy two-semester's worth of access at a reduced cost.
 - If it's O2 you are adding and you'd previously paid for 2-semester's access, you'll get a button that prompts you to use that previous payment.
6. **Checkout.**
7. **Create Account** or Sign In

Achieve Technical Support: <https://macmillan.force.com/macmillanlearning/s/chat-with-us>

Organic Chemistry 1, Jasperse, Wade Version 9 For other editions of Wade, or some other usable textbooks, see: http://web.mnstate.edu/jasperse/Chem350/Other-Textbooks.html			
	Date	Topic	Reading
1	Aug. 26	Intro. Why Carbon is Special, Normal bonding, Lewis Structures in Organic	1.1-1.6
2	Aug. 28	1. Normal Bonding. 2. Formal Charge and Abnormal Bonding. 3. Electronegativity	1.7, 1.4-1.8
3	Aug. 30	1. Structural formulas: Full, Condensed, and Skeletal 2. Resonance Structures	1.9-1.11
	Sept. 2	Labor Day Holiday	No Class
4	Sept. 4	1. Mechanism/Arrow-pushing. 2. Acid-Base Chemistry. 3. Anion Stability Patterns.	2:4-7,12
5	Sept. 6	VSEPR 3D Shape. Drawing 3D; Hybridization; Pi bonds; Isomers,	1:12-1-19
6	Sept. 9	Polarity IMF, Boiling Points, Solubility. Catchup. Functional Groups	2.1-3
7	Sept. 11	Functional Groups. Alkane Nomenclature	2.15-2.17
8	Sept. 13	Alkane Nomenclature. Newman Projections; Torsional and Steric Strain; Cycloalkanes	3.1-3.9
9	Sept. 16	Cyclohexane Chairs, Cis-and-Trans, Structural Isomers	3.9-3.16
10	Sept. 18	Catchup/Practice. First 38 minutes of video 10. Then start Test 2.	4.1-4.7
11	Sept. 20	Rate Laws, Transition States, Stability-Reactivity Principles	4.7-4.13
	Sept. 23	Test 1. Chapters 1-3.	Test
12	Sept. 25	Radical Brominations. Major product, mechanism, structure isomers. Stability patterns for carbon radicals, cations, and anions.	4.13-4.16
13	Sept. 27	Chiral vs achiral, Enantiomers, Recognizing/Drawing Mirror Images.	5.1-5.3
14	Sept. 30	Chiral Carbons; Attachment Priorities; R/S Designation; Drawing Chiral Molecules	5.3-5.8
15	Oct. 2	Racemic Mixtures, Optical Activity, Meso, Molecules with More than One Chiral Center	5.11-5.16
16	Oct. 4	Drawing Stereoisomers, Meso Compounds. Alkyl Halides Intro, Classification, and Naming	6.1-6.7
		Skip 5.10	
17	Oct. 7	The Sn2 Substitution Reaction.	6.8-6.12
18	Oct. 9	The Sn1 Substitution Reaction	6.13-6.16
19	Oct. 11	SN1 REactions in More Depth. Elimination Reactions	7.9-7.15
	Oct. 14	Non-instructional Day.	No class
20	Oct. 16	E1 and E2 Reactions in More Depth; Recognizing Which Reaction Will Occur. Catchup, Practice.	Catchup
21	Oct. 18	Catchup/Practice. Intro to alkenes, Elements of Unsaturation (EU), First ??? minutes of video 21.	7.1-7.6
22	Oct. 21	Hydrogenation + Isomers; Alkene Nomenclature. E/Z; Heats of Hydrogenation	7.7-7.10
	Oct. 23	Test 2. Chapters 4-6	Test
23	Oct. 25	Alkene Synthesis. From RX. Bulky Bases. From Alcohols via Acid-Catalyzed E1. Mechanism Recognition.	7.10-8.2
		Skip 7.11	
24	Oct. 28	Addition reactions to Alkenes. Addition of HBr; Acid-Catalyzed HOH Addn.	8.1-8.5
25	Oct. 30	Acid-Catalyzed HOH Addn; Indirect HOH Addn (Hydroboration-Oxidation). Synthesis Design	8.4-8.7
26	Nov. 1	anti-Mark HBr and HOH addition; Synthesis Design, H2 addn; Br2 addn	8.5-8.7,8-10
		Skip 8.11	
27	Nov. 4	Br2 and BrOH additions and mechanisms; epoxidation	8.8-8.9
28	Nov. 6	Epoxidation, Dihydroxylation, Ozonolysis. Stereospecific Alkene Reactions. Synthetic Design.	8.12-8.16
29	Nov. 8	Catchup/Practice. Conjugation, Molecular Orbitals, Dienes, , Allylic Cations (15-3 will be covered only very briefly; skim briefly)	15.1-6
	Nov. 11	Non-instructional Day. Veterans Day.	No class
	Nov. 13	Test #3 Covering Chapters 7,8	Test 3
30	Nov. 15	Conjugation, Molecular Orbitals, Dienes, , Allylic Cations	15.1-6
31	Nov. 18	Allylic cations and 1,2/1,4-addn to Dienes. NBS and Allylic radicals. Acidity and Allylic Anions.	15.7-11
32	Nov. 20	Diels-Alder Reaction; Aromaticity	15.11, 16.1-7
33	Nov. 22	Aromaticity; Huckel's Rule and Complex Aromatics (Skip "endo rule" section in 15.11A, p. 684; Skip 15.12,13). Skip 16.11,14,15)	16.8-11, 13
34	Nov. 25	Electrophilic Aromatic Substitution: Intro, Mech, Kinetic Effects	17.1,6-8
	Nov. 27	Thanksgiving Break	No class
	Nov. 29	Thanksgiving Break	No class
35	Dec. 2	Catchup	17.2-5,10,11
36	Dec. 4	Catchup; Addition to Disubstituted Benzenes; Synthetic Applications	17.9, practice
37	Dec. 6	Side Chain Reactions; Retrosynthesis; Synthetic Applications; Practice	17.14
	Dec. 9	Test #4 Covering Chapters 15-17	Test
	Dec. 18	Final Exam, Cumulative. Wednesday, 11:30 am, Langseth 118	Final Exam

Safety & Procedural Information

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, Title IX Coordinator, petersnly@mnstate.edu; 218-477-2967, or Ashley Atteberry, Director of Student Conduct & Resolution, ashley.atteberry@mnstate.edu 218-477-2174; both located in Flora Frick 153. Additional information is available online mnstate.edu/titleix.

Bias Incident Statement: A bias incident is an act of bigotry, harassment, or intimidation that is motivated in whole or in part by bias based on an individual's or group's actual or perceived race, color, creed, religion, national origin, sex, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, or familial status. If you are a student who has experienced or witnessed a hate or bias incident, we want to address the incident and provide you with resources. Contact the Campus Diversity Officer, Jered Pigeon (jered.pigeon@mnstate.edu, 218-477-2047, 114 CMU) or the Dean of Students, Kara Gravley-Stack (kara.gravleystack@mnstate.edu, 218-477-4222, 153 Flora Frick Hall). Additional information is available at: <https://www2.mnstate.edu/oscar/>.

Student Grievance/Complaint Process: This general procedure is applicable only to those administrative actions for which no special grievance procedure has been established. Special procedures have been established for certain academic (e.g., graduation, grades), student conduct, discrimination/harassment, and employment related matters. Students desiring to appeal actions or procedures of University administrative offices must meet with the following officials, continuing up the hierarchy as necessary to resolve the issues.

Academic Affairs

1. Department Chair of the academic discipline in which the problem arose
2. Dean of that college discipline
3. Provost and Senior Vice President for Academic Affairs
4. President

Administrative Affairs

1. Director of specific area
2. Vice President for Administrative Affairs
3. President

Student Affairs

1. Director of specific area
2. Vice President for Student Affairs
3. President

This process can also be found in the Policies and Procedures section of the [Student Handbook](#) (p. 12) (mnstate.edu/student-handbook/).

Building Emergency Plans: Whether taking your courses online, hybrid, Hyflex, or face-to-face, you may find yourself on campus at some point, so best to be prepared and aware. Building floor plans showing emergency exit routes, fire extinguisher locations and fire alarm pull stations are conspicuously located in classrooms, labs, conference rooms, departmental main offices and residence halls. The Emergency Preparedness Guides (flip style booklets) are located with the maps. Please review the floor plans as well as the guide so you know how to respond in an emergency to help protect yourself and others. If you have questions, please contact Ryan Nelson, Director of [Public Safety](#), at ryan.neslon@mnstate.edu or 218-477-5869. (mnstate.edu/public-safety/)

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>