



Chemistry 343 – Organic Chemistry I (3 cr) Fall 2022

Online Course Website

The course website can be accessed through the general Canvas dashboard located at <https://canvas.wisc.edu>.

Course Designations

Breadth – Physical Sci. Counts toward the Natural Sci. req.
Level – Intermediate
L&S Credit – Counts as Liberal Arts and Science credit in L&S

Instructional Mode

The course is instructed with all sessions being face-to-face

Credit Hour Completion

The credit standard for this course is met by an expectation of a total of 135 hours of student engagement with the course learning activities (at least 45 hours per credit), which includes 4 hours of scheduled instructor: student meetings per week, reading, studying, and other student work as described in the syllabus.

Regular and Substantive Student-Instructor Interaction

Regular interactions include meeting with the instructional team during three whole-class meetings per week and meeting with teaching assistants during one small group meeting per week. Substantive interactions include direct instruction throughout whole-class meetings, guided group problem-solving during small-group meetings and feedback on written assessments.

Instructors and Teaching Assistants

Prof. Ryan Stowe (rstowe@chem.wisc.edu); office hours tbd.

Teaching assistants are assigned near the start of the semester.

Course Description

Principles of molecular structure and bonding applied to predict and explain the reactivity of alkanes, alkenes, alkynes, alkyl halides, alcohols, and thiols. Emphasis placed on rationalizing the stereochemical and regiochemical outcome of chemical processes.

Course Requisites: CHEM 104, 109, or 116

Course Learning Outcomes:

- Construct and use a transition state rendering to explain how donor-acceptor interactions result in the stereochemical or regiochemical outcome observed for a reaction
- Construct and use an electron pushing mechanism or reaction energy profile to evaluate the validity of claims as to the outcome of a chemical process
- Construct and use appropriate structural representations to explain observed differences in the physical and chemical properties of substances in terms of electrostatics, orbital overlap and energy
- Construct and use a reaction energy profile to justify why a particular reaction system is likely to produce the product formed most quickly or which is most stable
- Design and justify a multi-step synthetic route capable of feasibly generating a molecular target from specified starting materials

Textbook

Organic Chemistry 7th edition by Marc Loudon and Jim Parise

Graded Materials

Students' grades are determined by their achievement on three quizzes, three midterm examinations, and a final exam. The relative weighting of these assignments is given below

- *Quizzes:* 3 quizzes are worth 15% of the total points in the course
- *Mid-term Exams:* Three mid-term examinations are worth 65% of course points
- *Final Exam:* A final exam is worth 20% of course points

Homework

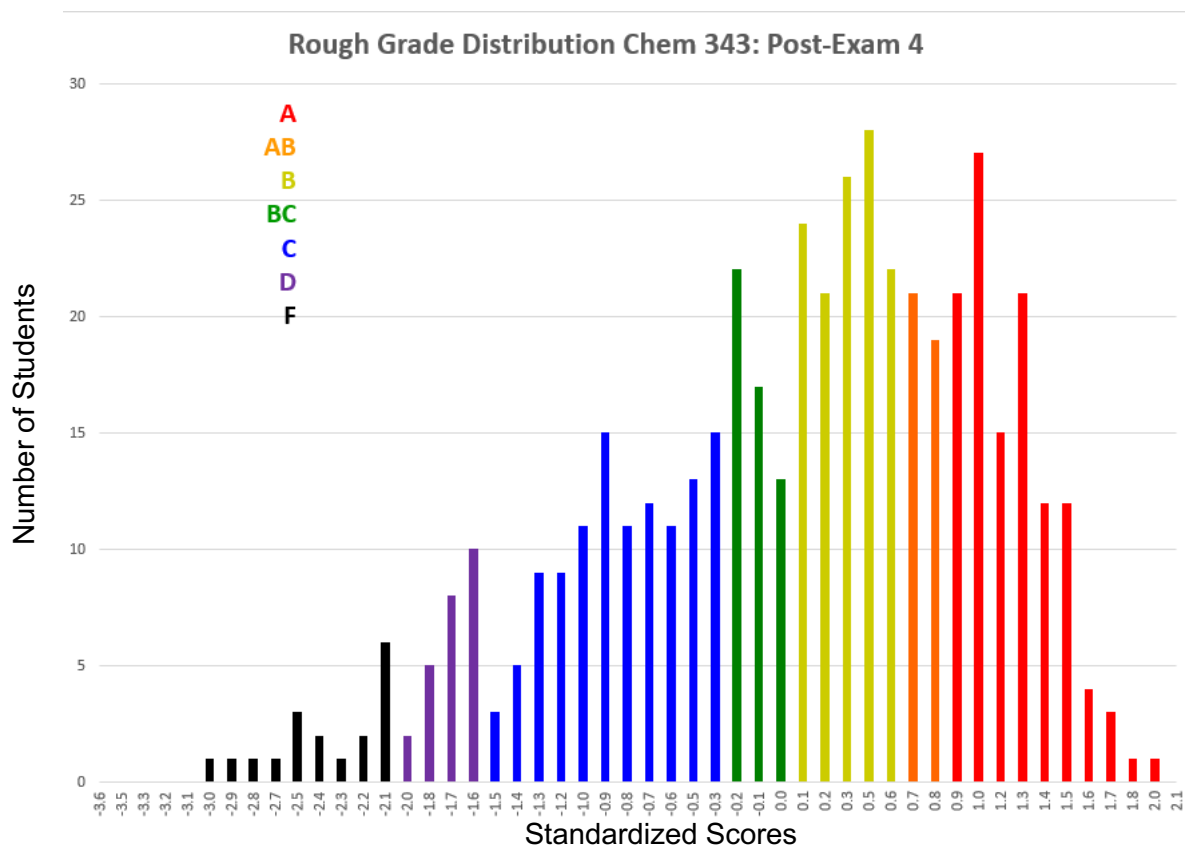
Additional homework assignments are provided to students to assist with preparation for graded assessments. Homework problems are written by the CHEM 343 instructional team and require students to connect structural and energetic ideas to explaining how and why chemical phenomena happen.

Discussion Sections

One TA-led 50-minute discussion section is held each week. Participation in discussion sections is not factored into students' grades. Discussion meetings are dedicated to collaboratively working through challenging problems.

Grading Policy

Grade boundaries will be determined based on the historic distribution of standardized scores in the course. The class mean score will be set to the B – B/C grade boundary. Other boundaries will be determined by standard deviations from this mean. Boundaries will be adjusted to ensure the number of students who earn each grade are consistent with historical distributions. An approximation of this historic distribution is shown by the histogram below.



Standardized scores on each assignment and the course overall are determined by the following formula:

$$\text{Standardized Score} = \frac{\text{Your score} - \text{mean score}}{\text{standard deviation}}$$

Accordingly, a standardized score of 0 represents the class mean.

Sample Schedule (from F21)

This schedule includes a list of recommended readings (from the 7th edition of *Organic Chemistry* by Marc Loudon and Jim Parise), topics, and assignments.

	Monday	Wednesday	Friday
	Sept 06	Sept 08	Sept 10
Textbook Sections	No Class Labor Day	1.1 – 1.3	1.4 – 1.7
Topics		Structure & Bonding	
Problem Sets		Start PS 1	
Discussion Section		Discussion Activity 1	
	Sept 13	Sept 15	Sept 17
Textbook Sections	1.8 – 1.9, 2.1, 2.2 2.7 – 2.9	2.3 – 2.6	3.1 – 3.3
Topics	Alkanes		Acids & Bases
Problem Sets	Start PS 2		Start PS 3
Discussion Section	Discussion Activity 2		
	Sept 20	Sept 22	Sept 24
Textbook Sections	3.4 – 3.5	3.6	4.1 – 4.5
Topics	Acids & Bases		Intro to Alkenes & Alkynes
Problem Sets			Start PS 4
Discussion Section	Discussion Activity 3		
	Sept 27	Sept 29	Oct 01
Textbook Sections	4.6 – 4.8	4.9	Live Lecture Q&A
Topics	Intro Alkenes & Alkynes		
Problem Sets			
Discussion Section	Discussion Activity 4		
	Oct 04	Oct 06	Oct 08
Textbook Sections	5.1 – 5.3	5.4 – 5.5	5.6 – 5.8

Topics	Addition Reactions of Alkenes & Alkynes		
Problem Sets	Start PS 5		
Discussion Section	Discussion Activity 5		
Exam		<u>EXAM 1 (Ch 1-4)</u> 5:30 – 7:00 pm	
	Oct 11	Oct 13	Oct 15
Textbook Sections	6.1 – 6.3	6.4 – 6.10	7.7 – 7.8
Topics	Principles of Stereochemistry		Cyclic Compounds
Problem Sets	Start PS 6		Start PS 7
Discussion Section	Discussion Activity 6		
	Oct 18	Oct 20	Oct 22
Textbook Sections	7.1, 7.5	7.2 – 7.4	7.6
Topics	Cyclic Compounds		
Problem Sets			
Discussion Section	Discussion Activity 7		
	Oct 25	Oct 27	Oct 29
Textbook Sections	8.1 – 8.5	8.6 – 8.8	Live Lecture Q&A
Topics	Noncovalent Intermolecular Interactions		
Problem Sets	Start PS 8		
Discussion Section	Discussion Activity 8		
	Nov 01	Nov 03	Nov 05
Textbook Sections	9.1 – 9.4	9.4	9.5
Topics	Chemistry of Alkyl Halides		
Problem Sets	Start PS 9		

Discussion Section	Discussion Activity 9		
Exam	EXAM 2 (Ch 1-8) 5:30 – 7:00 pm		
	Nov 08	Nov 10	Nov 12
Textbook Sections	9.6 – 9.9	10.1 - 10.4	10.1 - 10.4
Topics	Chem. of Alkyl Halides	Chemistry of radical, carbene, and organometallic reagents	
Problem Sets		Start PS 10	
Discussion Section	Discussion Activity 10		
	Nov 15	Nov 17	Nov 19
Textbook Sections	10.5 - 10.7	11.1 – 11.3	11.4 – 11.5
Topics	Chem. of radical, carbene and organometallic reagents	Chemistry of alcohols and thiols	
Problem Sets		Start PS 11	
Discussion Section	Discussion Activity 11		
	Nov 22	Nov 24	Nov 26
Textbook Sections	11.6 – 11.13	12.1 – 12.3	No Class Thanksgiving Break
Topics	Chem. of alcohols and thiols	Chem. of ethers, epoxides, glycols and sulfides	
Problem Sets		Start PS 12	
Discussion Section	Discussion Activity 12		
	Nov 29	Dec 01	Dec 03
Textbook Sections	12.4 – 12.5	12.6 – 12.11	Live Lecture Q&A
Topics	Chemistry of ethers, epoxides, glycols and sulfides		
Problem Sets			

Discussion Section	Discussion Activity 13		
	Dec 06	Dec 08	Dec 10
Textbook Sections	Chapters 1-12 Review	15.1 –15.4	15.5 – 15.7
Topics	Semester review	Conjugation and Aromaticity	
Problem Sets		Start PS 15	
Discussion Section	Discussion Activity 14		
Quiz/Exam	EXAM 3 (Ch 1-11 & 14) 5:30 – 7:00 pm		
	Dec 13	Dec 15	Dec 17
Textbook Sections	15.8	Live Lecture Q&A	No Class
Topics	Conjugation and Aromaticity		
Problem Sets			
Discussion Section	Discussion Activity 15		

Accommodations for Students with Disabilities

McBurney Disability Resource Center syllabus statement: “The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.” ([Windschitl, 2002](#))

Diversity & Inclusion

Institutional statement on diversity: “Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion

enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.” <https://diversity.wisc.edu/>