



Intermediate Organic Chemistry CHEM 345-004
Honors Section
Spring 2019

Canvas Course URL: <https://canvas.wisc.edu/courses/125614>

Meeting Time and Location

Tuesday and Thursdays from 9:30 to 10:45 am in Room 2373 Chemistry

Discussion Sections: see page 2

Instructional Mode + Credit Hour Accounting

Instruction in this course will primarily occur in a lecture format, although some periods will be devoted to other modes. The three credit hours derive from the traditional Carnegie Foundation definition – we meet for lecture for the equivalent of 150 min per week (two 75-min periods of faculty-student instruction). In addition, success in this course will require additional hours of studying outside of lecture, for example there will be assigned readings from the required textbook and problem sets.

INSTRUCTORS AND TEACHING ASSISTANTS

Associate Professor Daniel J. Weix

Office hours: M 10 – 10:50 am; M 4:30 – 5:15 pm

Office: Rm 5132 Shain Tower, Chemistry

Phone: 262-0541

Email: dweix@wisc.edu (preferred)

While email is the preferred mode of contact, do not expect an immediate reply. Average turnaround will be about a day. In the rare event of an urgent matter, be sure to call me directly by telephone.

Andrew Maza

Office hours: Thursdays 4:35-6:15 and Friday 11-11:50

Email: amaza@chem.wisc.edu

a list of **all** 345 TA office hours will be posted when it is finalized to Canvas.

OFFICIAL COURSE DESCRIPTION

Course Description

Chemistry 345 is the second course of a two-semester sequence in organic chemistry. It covers diverse themes in organic reactivity, building on a foundation provided in Chemistry 343. Chemistry 341 does not satisfy the prerequisite for 345.

Requisites

Grade of C or better in CHEM 343. In addition, in almost all cases, students in this honors section of 345 have participated in the honors section of 343.

You are not engaged so much in acquiring knowledge as in making mental efforts under criticism. A certain amount of knowledge you can indeed with average faculties acquire so as to retain; nor need you regret the hours spent on much that is forgotten, for the shadow of lost knowledge at least protects you from many illusions. But you, go to school not for knowledge as much as for arts and habits; for the habit of attention, for the art of expression, for the art of assuming at a moment's notice a new intellectual posture, for the art of entering quickly into a person's thoughts, for the habit of submitting to censure and refutation, for the art of indicating assent or dissent in graduated terms, for the habit of regarding minute points of accuracy, for the habit of what is possible in a given time, for taste, for discrimination, for mental courage and mental soberness. Above all, you go to school for self-knowledge.

William Cory - Master at Eton College (1861)

Chemists are a strange class of mortals, impelled by an almost maniacal impulse to seek their pleasures amongst smoke and vapour, soot and flames, poisons and poverty, yet amongst all these evils I seem to live so sweetly that I would rather die than change places with the King of Persia.

Johann Joachim Becher, *Physica subterranea* (1667)

LEARNING OUTCOMES

Course Learning Outcomes

1. Use structural and spectroscopic information to evaluate reaction mechanisms.
2. Identify and explain reactivity trends for most common organic reactions, with an emphasis on conjugated systems, aromatic systems, and carbonyl chemistry.
3. Apply reactions taught in 343 and 345 towards the retrosynthesis of a complex target.
4. Apply knowledge towards writing reasonable organic reaction "arrow-pushing" mechanisms for reactions that have not been explicitly discussed in class.
5. Identify the ways in which organic chemistry intersects other disciplines.

GRADING

Grading in this course will be based upon your scores on quizzes, exams, and a cumulative final exam. While attendance at lectures and discussions is encouraged, it is not specifically required. Note that quizzes and exams will happen during lecture and discussion section times.

Grading	Format	Points
quizzes	[best 5 of 6] × 12	60
exams	150 × 3	450
final	250	250
	Total	760

Finally, although statistical tools will be used to assist in setting the grading scale, a simple curve will not be enforced. It is possible for everyone in the class to receive an A grade. If your scaled final exam score is better than your lowest midterm exam score, then your scaled final score can replace this midterm score. In this case, your final exam can count for up to 400 points, or more than ½ of your total points. This mechanism replaces makeup exams, which are not practical in most cases.

DISCUSSION SESSIONS

*There are weekly 50-min discussion sections led by Andrew Maza
TBD*

LABORATORY SESSIONS

CHEM 344 is the associated laboratory course, but concurrent registration is NOT required.

REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS

- **Required:** Organic Chemistry, 6th Ed. by Loudon and Parise (same as CHEM 343)
- **Recommended:** Study Guide and Solutions Manual to Accompany Organic Chemistry (same as CHEM 343). There are copies of this on reserve in the Steenbock and College Libraries
- **Supplemental:** Pushing Electrons by Daniel Weeks. If you are rusty on how to write reasonable mechanisms for chemical reactions, this is a classic, short primer. On reserve.
- **Molecular Model Kit:** Nearly any kit will suffice, such as the HGS "Organic Chemistry Basic" Set (Maruzen, ~\$28). Many other suppliers, including Darling and Duluth Labs.
- I will NOT be using Sapling
- I WILL be using Canvas

EXAMS, QUIZZES, PAPERS & OTHER MAJOR GRADED WORK

- All quizzes, exams, and the final are closed. You are being graded on your mastery of the material and all work must be your own. No outside assistance of any kind is permitted, such as notes, books, or electronics of any kind.
- Quizzes will happen in regular discussion sections and are un-announced.
- Exam 1: Feb 26 in class
- Exam 2: April 2 in class
- Exam 3: April 30 in class
- Final: May 9th, 10:05 am to 12:05 pm, room TBD
- Make up exams for planned, reasonable absences must be arranged in advance. Emergencies will be dealt with on a case-by-case basis in a humane way.

HOMEWORK & OTHER ASSIGNMENTS

There are no formally graded homework assignments for this course, but there will be assigned problems and readings. Students are expected to complete all readings and work all problems according to the attached schedule. Additional studying, such as working extra problems, flash cards, writing (and re-writing) summaries of topics, and team-based learning, will be required to obtain a high grade in this course.

RULES, RIGHTS & RESPONSIBILITIES

Beyond the normal duties of doing assignments (the [Guide's to Rules, Rights, and Responsibilities](#)), attending lecture, and trying your best, I expect you all to:

1. *Do readings before lecture.* I will not exhaustively cover every aspect of the text in lecture, but instead cover the more difficult concepts and add supplemental material not found in the book. You will only be able to keep up if you are on top of the readings!
2. *Ask questions.* I am bound to cover some topic poorly or make a mistake, leading to confusion. If you are brave enough to ask, your fellow students and I will be grateful. This is usually only possible if you have done #1.
3. *Do the homework problems.* The schedule has suggested problems, but I will not grade them. Successful students will do ALL of the assigned problems and then do extra problems in areas where they are having trouble. I cannot emphasize enough how important practice problems are: there is no better way to learn organic chemistry than by working problems! Pro tips: DO NOT look at the answers until after you have completed the problems. The library has many other organic chemistry textbooks with extra problems, if you exhaust your supply in Loudon. I think Vollhardt and Schore has problems most like how I write my exam problems.
4. *Participate in the discussion section.* Andrew will *not* tell me if you make a mistake or don't understand a concept, nor would I ever think less of someone who has the courage to participate. So, please, join the discussion!

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to studentconduct.wiscweb.wisc.edu/academic-integrity/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

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 Prof. Weix 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. Prof. Weix will work either directly with the 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. <http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>

DIVERSITY & INCLUSION

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/>

2019 CHEMISTRY 345H – Lecture and Exam Schedule

Lecture	Date	Topic	Reading (before lecture, including in-chapter problems)	Textbook problems (additional practice after)
1	Jan 22	Course Introduction + sort out recitation sections	syllabus	
2	Jan 24	Alkyne Chemistry	14 (all)	26-35, 37, 38, 40, 41, 42, 44, 45, 46
3	Jan 29	Diels-Alder, Additions, Resonance	15.4-end, <u>28.1A-B</u> , <u>28.3</u>	42-44, 46-48, 57, 61, 62, 65, 68, 69, 71, 73, 79, 80, 84
4	Jan 31	Aromaticity, Electrophilic Aromatic Substitution	16 (all)	35-37, 39-41, 43, 44, 45, 46, 47, 53, 54, 58, 61, 63, 67
5	Feb 5	Finish up EAS		
6	Feb 7	Allylic and Benzylic Reactivity	17.1-17.5	
7	Feb 12	Terpenes, Vinyl Halides and Nucleophilic Aromatic Substitution	17.6-18.4	22-24, 26-36, 46, 49, 56
8	Feb 14	Transition-metal-catalyzed Reactions	18.5-18.6	
9	Feb 19	Chemistry of Phenols	18.7-end	46, 47, 49, 50, 52, 53, 54, 56-58, 62, 57, 69, 70, 74, 76, 78, 83, 84, 92
10	Feb 21	Catch-up and Review		
Exam 1	Feb 26	Exam 1 CH 14-18		
11	Feb 28	Intro to Aldehydes and Ketones	19.1-19.6	
12	Mar 5	Additions of Nucleophiles to Carbonyls, Acetals	19.7-19.9	
13	Mar 7	Imines and Enamines, Olefination, Catch-up	19.10-end	40-42, 44-48, 50-56, 63, 64
14	Mar 12	Carboxylic Acids, Synthesis and Reactions	20.1-end	
15	Mar 14	Synthesis of Esters, Reactions of Esters, Begin Chapter 21	20.8-20.9	27-29, 31-34, 37-39, 42, 46, 48-50, 52, 59, 60
	Mar 19	<i>Spring Break – No Lecture</i>		
	Mar 21	<i>Spring Break – No Lecture</i>		
16	Mar 26	Reactions of Carboxylic Acid Derivatives	21.1-21.6	
17	Mar 28	Finish up Chapter 21	21.7-21.12	33-35, 38, 40, 44, 48, 49, 53-58
Exam 2	April 2	Exam 2 CH 19-21		Summarize main material, do extra book problems
18	April 4	Ch 22 – Introduction to Enolates	22.1-22.3	

19	April 9	Ch 22 – Aldol Reaction	22.4-22.8	
20	April 11	Ch 22 – Aldol continued + Conjugate Additions	22.9-end	55, 56, 58, 60, 62, 64, 66, 69, 70, 73, 74, 77, 78, 82-84, 87, 88
21	April 16	Ch 23 – Chemistry of Amines	23 (whole chapter)	
22	April 18	Ch 23 – Chemistry of Amines		44-46, 50, 52, 53, 55, 59, 61, 65, 66, 68, 71, 74, 75, 78, 79, 80, 81
23	April 23	Ch 28 – Pericyclic Reactions	28 (whole chapter)	
24	April 25	Ch 28 – Pericyclic Reactions		29-31, 33-35, 38, 41, 42, 44, 46, 49
Exam 3	April 30	Exam 3 CH 22, 23, 28		Summarize main material, do extra book problems
25	May 2	Semester Wrap-Up		
Final	May 9	FINAL EXAM (10:05 am)		

Not covered in this course: Chapter 24 (Carbohydrates), Chapter 25 (Phosphates and Sulfates), Chapter 26 (Heterocycles), Chapter 27 (Peptides). These are covered in some detail in biochemistry courses and, generally, introduce few new concepts. They are very interesting, however!