

Organic Chemistry II
CHEM 332, Summer 2020
Online Only

Instructor: Prof. Levi Stanley (3101E Hach Hall, Phone: 515-294-3609, e-mail: lstanley@iastate.edu - please include 332 in the subject of messages)

Office hours: MTWThF 10 AM-noon or by appointment over Cisco Webex.

Communication: Email – I welcome your email with questions about the course. That said, I receive a large amount of email throughout the semester. To ensure your email is answered, please follow these rules: 1) always include “332” somewhere in the subject line; 2) always send your email from an iastate.edu address; and 3) DO NOT use Canvas to send me emails.

Textbook: *Organic Chemistry*, 3rd Edition, by David Klein. An optional *Student Study Guide & Solutions Manual for Organic Chemistry*, 3rd Edition is also available and is recommended. Students should consider buying a molecular model kit if you have trouble visualizing in 3-dimensions. Many students find *Pushing Electrons: A Guide for Students of Organic Chemistry*, 4th Ed. by Daniel Weeks and Art Winter to be a very helpful supplement.

Canvas: Course information including a course syllabus, lectures, previous exams, current exams, supplemental materials, announcements, and grades will be uploaded to Canvas. Please do not use Canvas to contact me. Please use my university email address to contact me.

Homework: We will use the Wiley online homework system in this course (wileyplus.com). A separate handout gives all the necessary information about purchasing a code and signing up for our “class” on the system. The homework is set up so you can get nearly all the points with due diligence. Although the online homework is the only graded homework, prior student performance suggests that working end-of-chapter problems from your text greatly improves understanding. **You are strongly encouraged to work as many end-of-chapter problems as possible!**

Grading: The course will be graded out of 400 points. The point breakdown is as follows: 100 points from online homework and 300 points from exams. Your final grade may be curved based on the performance of the class, but you are guaranteed the following grades: >85% for an A-, >75% for a B-, >60% for a C-, >50% for a D-.

Exams: There will be four 100-point exams. The exams are open-note and open-book exams. You may not work with other people on your exams. Exams will open on Canvas at 5 PM on the day prior to the scheduled exam date and close at 5 PM on the exam date. You will be required to upload a scanned copy of your exam to Canvas by 5 PM on the exam date. **All exams are cumulative.** The best three exam scores will be used in the calculation of your final grade. At my discretion, in-class exam scores may be adjusted upward to balance the difficulty of different in-class midterm exams. Cheating on an exam will earn a grade of zero for that exam. Such an exam score cannot be dropped. CHEM 332 exams from previous semesters are available in Canvas. Exams will be given only on the dates listed in the syllabus. **There will be no make-up exams.** Exams will be returned via email after they are graded.

Re-grade Requests: Grading of exams is not always perfect, and I believe you should receive the grade you deserve. Students may request an exam be re-graded within one week after the graded

exams are returned. To request an exam re-grade, please write on the front of the exam to describe the nature of your re-grade request.

Review Sessions: Optional review sessions may be held prior to each of the four midterm exams. Dates and times for review sessions will be announced in class and posted on Canvas. **Review sessions will be driven entirely by your questions. Please arrive prepared to ask questions!**

Course Content: We will cover chapters 12-13 and chapters 16-22 in *Organic Chemistry*, 3rd Edition, by David Klein. These chapters and the supplemental sections build upon themselves and represent a large amount of material. Thus, it is extremely important that you stay current with your reading and homework assignments. The material will be covered in the order listed in the syllabus. However, the timing may vary based upon student understanding of the material.

Learning Objectives: Organic Chemistry II will be a demanding course. You will be asked to digest a large amount of material in a relatively short time. In addition, you will be asked to master the basic language and fundamental concepts (such as reactivity trends, steric and electronic effects, and basic kinetic and thermodynamic effects) that are the required foundation to solve problems in organic chemistry. The sheer volume of information to be covered is such that rote memorization becomes impractical as a singular learning strategy. Thus, it is critical that you are able to connect to and build upon new and existing knowledge of fundamental principles and concepts in organic chemistry. The most successful students in organic chemistry are often those who understand basic reactivity (nucleophile or electrophile, acid or base) of common functional groups and reagents and are able to apply trends to new problems.

At the end of Chem 332, you will have been through as much organic chemistry as most beginning Ph.D. students in chemistry! That said, most of you have long-term learning and career goals in which chemistry is just a part. The following is a summary of what we want you to know or be able to do upon completion of the year sequence of organic chemistry.

1. You should have a good understanding of molecular structure. This includes sigma and pi bonding, strain, aromaticity, and stereochemistry. You should have a good grasp of three-dimensional structure of molecules and should understand that intermolecular interactions depend on structural relationships.
2. You should be able to recognize the reactive parts of molecules. In particular, you should be able to identify nucleophilic and electrophilic centers. You should understand how to make certain centers more nucleophilic or electrophilic, e.g., by deprotonating or protonating them.
3. You should be able to recognize types of reactions that you see in different contexts. For example, you should recognize substitutions, additions, oxidations, and reductions, no matter whether you see them in organic chemistry or in a biochemistry class.
4. You will have a good fundamental understanding on the chemical reactivity of several common classes of reactive intermediates, especially cationic and anionic centers.
5. You should be able to understand complex reaction mechanisms if they are presented to you. You should be able to suggest reasonable reaction mechanisms for almost every reaction you know, and – based on knowing something about the reactive parts of molecules and reactive intermediates – make a good guess about the mechanism of a new reaction presented to you.
6. You should have a reasonable repertoire of reactions that you can call upon to imagine how to synthesize a molecule of modest complexity or follow its synthesis or biosynthesis as presented to you. In practice, many of you will find this most useful in biological and biochemical contexts.

7. From Chemistry 332 in particular, you should develop a thorough understanding of carbonyl chemistry, including addition, reduction, and oxidation. You will learn several ways in which carbonyl compounds can be used to construct new carbon-carbon bonds. Yes, there are many other functionalities covered in 332, but this is the heart of the reactivity we examine.

Learning Environment: My goal for this course is to create an active learning environment. To accomplish this goal, you as students must be willing to engage in the learning process. This goal will be a bit more challenging in an online format, but I encourage you to bring questions to office hours each day.

Academic Dishonesty: The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office (<http://www.dso.iastate.edu/ja/academic/misconduct.html>).

Accessibility Statement: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to meet with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes. Eligible students will be provided with a Notification Letter for each course and reasonable accommodations will be arranged after timely delivery of the Notification Letter to the instructor. Students are encouraged to deliver Notification Letters as early in the semester as possible. SAS, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.sas.dso.iastate.edu. Contact SAS by email at accessibility@iastate.edu or by phone at 515-294-7220 for additional information.

Discrimination and Harassment: Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email eooffice@iastate.edu

Religious Accommodation: Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide a reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the Dean of Students Office at 515-294-1020 or the Office of Equal Opportunity at 515-294-7612.

Contact Information: If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu

Schedule

Date	Chapter	Topic
5/18/20	12	Alcohols and Phenols
5/19/20	12	Alcohols and Phenols
5/20/20	12	Alcohols and Phenols
5/21/20	13	Ethers and Epoxides; Thiols and Sulfides
5/22/20	13	Ethers and Epoxides; Thiols and Sulfides
5/25/20		No Class, University Holliday
5/26/20	13	Ethers and Epoxides; Thiols and Sulfides
5/27/20	16	Conjugated Pi Systems and Pericyclic Reactions
5/28/20	16	Conjugated Pi Systems and Pericyclic Reactions
5/29/20	16	Conjugated Pi Systems and Pericyclic Reactions
6/1/20	16	Conjugated Pi Systems and Pericyclic Reactions
6/2/20		Exam 1 (Chapters 12, 13 and 16)
6/3/20	17	Aromatic Compounds
6/4/20	17	Aromatic Compounds
6/5/20	17	Aromatic Compounds
6/8/20	18	Aromatic Substitution Reactions
6/9/20	18	Aromatic Substitution Reactions
6/10/20	18	Aromatic Substitution Reactions
6/11/20	18	Aromatic Substitution Reactions
6/12/20	18	Aromatic Substitution Reactions
6/15/20		Exam 2 (Chapters 17 and 18)
6/16/20	19	Aldehydes and Ketones
6/17/20	19	Aldehydes and Ketones
6/18/20	19	Aldehydes and Ketones
6/19/20	20	Carboxylic Acids and Their Derivatives
6/22/20	20	Carboxylic Acids and Their Derivatives
6/23/20	20	Carboxylic Acids and Their Derivatives
6/24/20	20	Carboxylic Acids and Their Derivatives
6/25/20	20	Carboxylic Acids and Their Derivatives
6/26/20		Exam 3 (Chapters 19 and 20)
6/29/20	21	Alpha Carbon Chemistry: Enols and Enolates
6/30/20	21	Alpha Carbon Chemistry: Enols and Enolates
7/1/20	21	Alpha Carbon Chemistry: Enols and Enolates
7/2/20	21	Alpha Carbon Chemistry: Enols and Enolates
7/3/20		No Class, University Holiday
7/6/20	21	Alpha Carbon Chemistry: Enols and Enolates
7/7/20	22	Amines
7/8/20	22	Amines
7/9/20	22	Amines
7/10/20		Exam 4 (Chapters 21 and 22)