

Prerequisites: CHEM 178 or CHEM 201, enrollment in CHEM 331L highly recommended.

Instructor: Dr. Joseph Awino (jkhadori@iastate.edu)

Virtual Office Hours (Webex): MW 5:00-5:50 pm or by appointment.

Teaching Assistant (For online homework inquiries): Justin Moore (asmoore@iastate.edu)

Course Delivery: We will use Canvas as the official electronic interface for the online delivery of this course. Please log in often for important announcements, posted lecture materials, previous exams, and grade information.

Course Format: For purposes of formatting, learning objectives, and Canvas Modules, we will follow the structure of chapters 1–11 and 14–15 in the *Organic Chemistry*, 4th Edition, by David Klein. The book is part of the *Immediate Access Program* at ISU. Each Course Content Module will contain material related to the learning objectives in that chapter, including lecture notes, assigned reading, videos, homework, practice problems, and the Questions and Answers Discussion. All assignments and exams for this course are open note and open book. Students are encouraged to collaborate on homework and all studying activities but are required to work alone on the Midterms and the Final Exam. An accompanying optional *Student Study Guide & Solutions Manual* of the *Organic Chemistry*, 4th Edition, by David Klein is also available and recommended. You are encouraged to utilize a molecular model kit to help with clarity in 3-dimensional visualizations. Some students also find *Pushing Electrons: A Guide for Students of Organic Chemistry*, 4th Ed. by Daniel Weeks and Art Winter to be a helpful supplement.

Required Technology: The requirements for this course are a reliable internet connection, access to Iowa State University (ISU) computer system and Canvas, access to a computer with a microphone and audio capability, and access to WileyPLUS online testing platform via ISU's Immediate Access Program.

Assessments

Online Assignments: Canvas-integrated WileyPLUS is our primary online assignment platform.

Exams: There are *three* midterm tests scheduled on **Tuesdays from 6:00 – 7:00 pm** on the following dates: **May 31; June 14; and June 28**. *There will be no make-up after the fact*. Those who have class schedule conflicts or are representing the university in various activities must contact the instructor at least 5 days before the actual exam date and present valid documentation. The 2-hour final exam will be administered on **Friday, July 8 from 11:00 am - 1:00 pm**.

Missed Exam: Excused absences ought to be supported by valid documentation. ISU's Thielen Student Health Center does not provide documentation for excuses to miss exams. Pre-booked family vacation flights do not count either. Students who miss two exams will be asked to drop the course. At the discretion of the instructor, and in exceptional cases, a grade considering proportionally higher weighting of the final exam may be assigned in lieu of a missed exam.

Grades: The grades will be assigned based on 50% midterm exams, 25% final exam, and 25% online homework. The instructor may curve the grades by taking into consideration the exam difficulty and overall class performance. However, the following cut-offs are guaranteed:

Grade (% Score): A(≥ 91), A-(86–90), B+(83–85), B(80–82), B-(75–79), C+(71–74), C(66–70), C-(61–65), D+(58–60), D(54–57), D-(50–53), and F(< 50).

Course Policies

Attendance: This course is offered asynchronously. You must study and turn things on time; complete the quizzes, online homework, and the exams by the due date. There are no attendance requirements, but you are encouraged to attend the student office hour sessions with the instructor (via WebEx) if you have any questions.

Feedback: The vast majority of the assignments are graded automatically and essentially instantaneously. In case there is a portion of the midterms, or the final exam that contains questions requiring human intervention, the grading in such circumstances will be completed within a couple of days after the due date. If you notice any discrepancies in your Canvas gradebook, please report the issue to the instructor immediately or within 7 days of receiving your grade.

Missed and Late Coursework: It is important to keep up with the pace of this course, therefore no late course work will be accepted. Rare extensions may be granted under extenuating circumstances, entirely at the discretion of the instructor. Coursework extensions are more likely to be granted if you approach the instructor in advance by presenting reasonably acceptable documentation.

Free Expression: Iowa State University supports and upholds the First Amendment protection of [freedom of speech](#) and the principle of [academic freedom](#) in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

Academic Misconduct: The [student disciplinary regulations](#) will be enforced for any form of academic misconduct. This includes but not limited to: Copying or sharing answers on tests/assignments/quizzes, altering graded exam papers and submitting for regrade, plagiarism, and bribery (offering someone else money or service to gain an academic advantage). Depending on the act, a student could receive a zero on the test/assignment, F grade for the course, and could be suspended or expelled from the University. See the [Conduct Code](#) for more details and a full explanation of the ISU Academic Misconduct policies. *Instances of suspected academic misconduct are to be reported to the Dean of Students' office.*

Other Policies: This course will adhere to university policies on accommodations, inclusiveness, academic integrity, and so on, as described in the Syllabus Statements.

Learning Objectives

At the end of Chem 331, you will have a good foundation in basic organic chemistry, however, the course is one full year in length, and it is intended that you will take both semesters.

1. At the end of Chem 331, 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 the 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 (functional groups). In particular, you should be able to identify nucleophilic and electrophilic centers. Your understanding of this will develop further in Chem 332.
3. By the time you finish 332, you should be able to recognize the 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 metabolism class. We will cover some of these reaction types in each semester.
4. You will have a fundamental understanding of what kinds of molecules are stable. Throughout 331 and 332, you will learn the general types of reactivity expected from typical reactive intermediates, such as cations, anions, and radicals.
5. By the end of Chem 332, 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. In Chem 331, you will learn the basics of reaction mechanisms as a formalism and begin to apply them in simpler/shorter sequences.
6. By the end of Chem 332, 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. In Chem 331, you will learn some of these reactions and be introduced to the concept of multistep synthesis; you should be able to apply this in selected examples.
7. Throughout Chem 331 and 332, you will learn to apply basic principles of small molecule organic chemistry to useful/common polymers/oligomers, such as sugars, proteins, nucleic acids, and “traditional” organic polymers like polystyrene or PVC.

Chem 331 Lecture Schedule

Week	Dates	Content	Activity
1	May 16 – May 20	Chapters 1 & 2	
2	May 23 – May 27	Chapters 3 & 4	
3	May 30 – June 3	Chapters 5 & 6	Memorial Day: Monday, 5/30 Exam 1: Tuesday, 5/31 (6-7 pm)
4	June 6 – June 10	Chapter 7	
5	June 13 – June 17	Chapters 8 & 9	Exam 2: Tuesday, 6/14 (6-7 pm)
6	June 20 – June 24	Chapters 10 & 11	
7	June 27 – July 1	Chapters 14 & 15	Exam 3: Tuesday, 6/28 (6-7 pm)
8	July 4 – July 8	Chapter 15 and the Final Exam Review	Independence Day: Monday, 7/4 Final Exam: Friday, 7/8 (11am-1 pm)