

Instructor: Dr. Joseph Awino (q331@iastate.edu)

Office: 2760 Gilman Hall **Phone:** 4-5562

Lecture: MWF 9:55–10:45 AM in 1002 Gilman

Delivery Mode: Face-to-face

Office Hours: M 11:00 –11:50 AM, and immediately after each lecture on MWF, or by appointment.

Head TA: Shengkai Wei (q331@iastate.edu)

Canvas: The official electronic interface for this course is Canvas. Please login often for important announcements, course materials, and grade information.

Course format: The course follows 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 in Canvas contains the learning objectives in the chapters, lecture notes, assigned readings, homework problems, and practice problems. 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.

Assessments

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

Exams: There are *five* exams in total; four midterm exams and a final exam. The midterm exams are scheduled at **6:45 – 7:45 p.m.** on Mondays of the following dates: **Sep. 12; Sep. 26; Oct. 24, and Nov. 14.** The 2-hour final exam (check it later at the registrar's website) will be offered only at the specified time on the scheduled date. **Do not make any prior travel plans!** Each midterm exam will focus on the material from the relevant modules but will also assume a reasonable understanding of the previous material. At the end of the semester, you will keep the best 3 out of the 4 midterm scores. In other words, the lowest midterm score will be dropped. The final exam will be cumulative and cannot be dropped. There will be no make-up for missed exams. Those who have class schedule conflicts or are representing the university in various activities must contact the instructor at least 10 days before the actual exam date and present a valid documentation. Thielen Student Health Center does not provide documentation for excuses to miss exams. Pre-booked family vacation flights do not count either. In exceptional cases, and at the discretion of the instructor, a grade considering proportionally higher weighting of the final exam may be assigned in lieu of a midterm missed due to excused absence. Graded copies of midterm exams will be returned during the lecture session immediately following the exam. Because the exams are hand-graded, it is not possible to rule out errors. To place a **regrade request**, include a description of the nature of your request on the exam paper and send the whole exam copy as a single pdf attachment to the Head TA with your *section number* included in the subject line. The request will be accepted up to one week after the exams are returned.

Grades: Grades will be assigned based on 60% midterm exams, 25% final exam, and 15% online assignments. The instructor may curve the grades by taking into consideration the exam difficulty and the overall class performance. However, the following cut-offs are guaranteed:

Grade (% Score): **A**(≥89); **A-**(≥84); **B+**(≥82; **B**(≥79); **B-**(≥74); **C+**(≥70); **C**(≥60); **D**(≥49); **F**(<49).

Course Policies

Lectures: Attendance of lectures is strongly recommended. If you miss a lecture, it is your responsibility to find out any information that was passed across in class by getting in touch with your colleagues.

Classroom Etiquette: Use of mobile phones, tablets, and laptops is prohibited except when asked to do so during the administration of quizzes/tests. They must be kept in the pocket or backpack in complete silent mode. *Any disruptive behavior/activities in the class that might affect your concentration and that of fellow students will not be tolerated and may have severe consequences including a zero in the assignment or quiz associated with the class, or an F grade for the course, and your behavior will be reported to the Dean of student's office.*

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.

Additional Course Resources

Chemistry Help Center: Teaching assistants are in 1761 Gilman; M–R (10 AM–5 PM), and F (10 AM–1 PM).

Supplemental Instruction: Information on supplemental instruction can be found on the [SI website](#).

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 each semester.
4. You will have a good 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.

Tentative Lecture Schedule (Chem 331)

Week	Dates	Chapter
1	Aug. 22 – 26	Chapter 1: Review of General Chemistry
2	Aug. 29 – Sep. 2	Chapter 2: Molecular Representation Chapter 3: Acid-Base Chemistry
3	Sep. 5 – 9	Chapter 4: Alkanes and Cycloalkanes (No class on Sep. 5)
4	Sep. 12 – 16 Monday, Sep. 12	Chapter 5: Stereoisomerism Exam 1 (6:45 – 7:45 PM)
5	Sep. 19 – 23	Chapter 6: Chemical Reactivity and Mechanisms
6	Sep. 26 – Sep. 30 Monday, Sep. 26	Chapter 7: Substitution and Elimination Reactions Exam 2 (6:45 – 7:45 PM)
7	Oct. 3 – 7	Chapter 7: Substitution and Elimination Reactions
8	Oct. 10 – 14	Chapter 8: Addition Reactions of Alkenes
9	Oct. 17 – 21	Chapter 8: Addition Reactions of Alkenes
10	Oct. 24 – 28 Monday, Oct. 24	Chapter 9: Alkynes Exam 3 (6:45 – 7:45 PM)
11	Oct. 31 – Nov. 4	Chapter 10: Radicals
12	Nov. 7 – 11	Chapter 11: Synthesis (Problem Solving) Chapter 14: IR Spectroscopy and Mass Spectrometry
13	Nov. 14 – 18 Monday, Nov. 14	Chapter 15: NMR Spectroscopy Exam 4: 6:45 – 7:45 PM
14	Nov. 21 – 25	<i>Thanksgiving Break, No Classes</i>
15	Nov. 28 – Dec. 2	Chapter 15: NMR Spectroscopy
16	Dec. 5 – 9	Prep Week, Final Exam Review
17	Dec. 12 – 15	Comprehensive Final Exam*

* To be determined. Do NOT make prior travel plans until after the final exam has been scheduled.