

**Prerequisites:** CHEM 163, CHEM 163L or CHEM 177, CHEM 177L or CHEM; credit or enrollment in CHEM 231L.

**Instructor:** Dustin Youmans (dyoumans@iastate.edu)

**Virtual Office Hours (Webex):**

Friday 4:00-5:00 pm (subject to change/add another hour a week if needed)

**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 1–9, 11–14, and 16–18 in the *Introduction to Organic Chemistry*, 6th Edition, by Brown and Poon. 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, quizzes, and the homework. 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 *Introduction to Organic Chemistry*, 6th Edition, by Lee is also available and recommended. You are encouraged to utilize a molecular model kit to help with clarity in 3-dimensional visualizations.

**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* 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 final exam will be administered on **Friday, August 5 (see schedule below for more information)**.

**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( $\geq 91$ ); A-( $\geq 86$ ); B+( $\geq 83$ ); B( $\geq 80$ ); B-( $\geq 75$ ); C+( $\geq 71$ ); C( $\geq 66$ ); C-( $\geq 61$ ); D( $\geq 50$ ); 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:** 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. No employee, student, applicant, or campus visitor is compelled to disclose their pronouns. Anyone may voluntarily disclose their own pronouns.

**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

After taking Chem 231 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 that their interactions with each other (like enzymes or DNA) can and does depend on these structural relationships.
- be able to recognize reactive parts of molecules. In particular, you should be able to identify **nucleophilic** and **electrophilic** centers. You should be able to understand how to make certain centers more nucleophilic or electrophilic, e.g., by **deprotonating** or **protonating** them.
- 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 metabolism class.
- have a good fundamental understanding of the common reactions that take place at several **functional groups** within organic molecules, such as **alcohols**, **carbonyls**, and **alkenes**.
- be able to **understand** and **interpret** complex **reaction mechanisms** if they are presented to you. You should be able to suggest reasonable reaction mechanisms for almost every reaction you know, based on the knowledge on

the reactive parts of molecules and reactive intermediates. You should be able to make a good guess about the mechanism of a new reaction presented to you. The level at which you can do this will be less sophisticated than if you took 331/332, but you should still be proficient at understanding organic reactions presented in other contexts, such as metabolism.

- have a reasonable repertoire of reactions that you can call upon to *synthesize* a molecule of modest complexity or follow its synthesis or biosynthesis as presented to you.
- be able to *apply basic principles* of small molecule organic chemistry to useful/common macromolecules like polymers/oligomers such as sugars, proteins, nucleic acids, and “traditional” organic polymers like polystyrene or PVC.

### Chem 231 Lecture Schedule

Week	Dates	Content	Activity
1	May 13 – May 17	Chapters 1, 2 & 11a	
2	May 20 – May 24	Chapters 3 & 4	
3	May 27 – May 31	Chapters 5 & 6	<b>Exam 1: Friday, 5/31 (10 am - 7 pm)</b>
4	June 3 – June 7	Chapters 7 & 8	
5	June 10 – June 14	Chapters 9 & 11b	<b>Exam 2: Friday, 6/14 (10 am - 7 pm)</b>
6	June 17 – June 21	Chapters 12 & 13	
7	June 24 – July 28	Chapters 14 & 16	<b>Exam 3: Friday, 6/28 (10 am - 7 pm)</b>
8	July 1 – July 5	Chapter 17 & 18	<b>Final Exam: Friday, 7/5 (10 am- 7 pm)</b>