

**Prerequisites:** Chem 331; enrollment in Chem 332L highly recommended.

**Instructor:** Dr. Joseph Awino      **E-mail:** jkhadori@iastate.edu

**Virtual Office Hours:** *Mondays* 10:00-10:50 am, *Thursdays* 2:10 -3:00 pm, or *by appointment*.

**Head TA:** Komadhie Muhandiramlag

**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 12, 13, 16–22 and 24–25 in the *Organic Chemistry*, 3rd 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*, 3rd Edition, by David Klein is also available and recommended. You may consider buying a molecular model kit or accessing [free resources](#) if you have trouble visualizing in 3-dimensions. 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*

**Homework and Practice Problems:** Canvas-integrated WileyPlus is our primary online testing platform. The TA would be ready to help and offer guidance on homework and practice problem related questions. For each chapter covered, there is a fixed due date for each assignment.

**Exams:** There are *three* midterm tests scheduled at **6:45–7:45 pm** on the following dates: **Tuesday, Feb. 9; Tuesday, Mar. 2; and Tuesday, Apr. 6.** *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 10 days before the actual exam date and present valid documentation. 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.

**Missed Exam:** Excused absences ought to be supported by valid documentation. Thielen Student Health Center does not provide documentation for excuses to miss exams. Pre-booked family vacation flights do not count either. If you miss *one* midterm exam due to excused absence, you will be given an opportunity to replace the zero score by taking an **optional comprehensive exam** scheduled on **Tuesday, Apr. 27 at 6:45 p.m.** Those who miss two exams will be asked to drop the course. Students who did not miss an exam but would like to take the optional exam to replace their lowest score are encouraged to do so. However, they must commit to study because the score from an optional exam will still count even if it is lower than the score they intended to replace. Such students must sign up with the Head TA at least 10 days prior to the actual exam day. 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 replacement exam.

**Grades:** The grades will be assigned based on 45% midterm exams, 20% final exam, 20% homework, and 15% practice problems & discussion quizzes. 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-(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-(51–53), and F( $\leq 50$ ).

**Reporting Errors:** Despite our best efforts, occasionally mistakes survive our editing process. If you believe there is an error in your Canvas Gradebook or in assigned work or answer, please send an email to [q322@iastate.edu](mailto:q322@iastate.edu). *It is a prerogative of the student to confirm the accuracy of their grades and to report errors encountered within 7 days after the grades for an assignment or an exam are posted.* Students also occasionally run into problems with browsers, or other related matters that may require technical assistance. If you have a problem of this sort, email [q332@iastate.edu](mailto:q332@iastate.edu) immediately.

### **Course Policies**

**Attendance:** This course is offered asynchronously. You are to turn things in on time and complete the midterm quizzes by the due date. There are no attendance requirements, but *you are encouraged to attend the scheduled WebEx sessions with the instructor* to review the chapter contents.

**Feedback:** The vast majority of the assignments are graded automatically and essentially instantaneously. A portion of the midterms, and the final exam may contain questions that require human intervention. In such circumstances, the grading 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 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.

**Prep week:** This course follows the University Prep Week policy. For this course, an online assignment and an optional midterm exam may be due on the prep week.

**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 [here](#).

### **Supplemental Instruction (SI)**

The materials for SI sessions are solely prepared by the SI Leader. Students are encouraged to attend the SI sessions to ask questions about course content and to develop learning/study strategies. For information about the days, times, and locations for SI sessions, refer to the [SI website](#).

**Learning Objectives:** 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 career goals in which chemistry is just a part. So here is a summary of what we want you to know or be able to do at the end of the year sequence of organic chemistry.

- 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.
- 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 be able to understand how to make certain centers more nucleophilic or electrophilic, e.g., by deprotonating or protonating them.
- 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 metabolism class.
- You will have a good fundamental understanding on the chemical reactivity of several common classes of reactive intermediates, especially cationic and anionic centers.
- 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.
- 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.
- From chemistry 332 in particular, you should develop a thorough understanding of carbonyl chemistry, including addition, reduction, and oxidation. You will see 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.
- You will learn to apply basic principles of small molecule organic chemistry to useful/common polymers/oligomers, such as sugars, proteins, and “traditional” organic polymers like polystyrene or PVC.

### Tentative Lecture Schedule (Chem 332)

Week	Dates	Chapter	Week	Dates	Chapter
1	Jan. 25 – 29	Chapter 12: Alcohols and Phenols	9	Mar. 22– 26	Chapter 21: Alpha Carbon Chemistry
2	Feb. 1 – 5	Chapter 13: Ethers and Epoxides; Thiols and Sulfides	10	Mar. 29 – Apr. 2	Chapter 21: Alpha Carbon Chemistry
3	Feb. 8 – 12 <b>Tuesday, Feb. 9</b>	Chapter 16: Conjugated Pi Systems and Pericyclic Reactions <b>Exam 1 (6:45 – 7:45 PM)</b>	11	Apr. 5 – 9 <b>Tuesday, Apr. 6</b>	Chapter 22: Amines <b>Exam 3 (6:45 – 7:45 PM)</b>
4	Feb. 15 – 19	Chapter 17: Aromatic Compounds	12	Apr. 12 – 16	Chapter 24: Carbohydrates
5	Feb. 22 – 26	Chapter 18: Aromatic Substitution Reactions	13	Apr. 19 – 23	Chapter 25: Amino Acids, Peptides, and Proteins
6	Mar. 1 – 5 <b>Tuesday, Mar. 2</b>	Chapter 19: Aldehydes and Ketones <b>Exam 2 (6:45 – 7:45 PM)</b>	14	Apr. 26 – 30 <b>Tuesday, Apr. 27</b>	Review <b>Exam 4 (6:45 – 7:45 PM)</b>
7	Mar. 8 – 12	Chapter 20: Carboxylic Acids and Their Derivatives	15	May 3 – 7	Final Exam*
8	Mar. 15 – 19	Chapter 20: Carboxylic Acids and Their Derivatives			

\* Date to be determined. Do NOT book your vacation travel until after the final exam is scheduled.