

### Course Information

Section 1: MWF: 9:55-10:45 AM – 1210 Lebaron

Section 2: TR: 2:10-3:30 PM – 1002 Gilman

Professor: Mason Koeritz

2756 Gilman Hall

515-294-8860

mkoeritz@iastate.edu [Write “Chem 3320” on the subject]

Head TA: Kat Tucker (krt@iastate.edu) will handle logistics related to this class such as the online homework and exam regrades.

**Textbook:** *Organic Chemistry*, 5<sup>th</sup> Edition, by David Klein (available as Ebook and physical book). Chapters 12, 13, 16-22, 24, and 25. The book is part of the Immediate Access Program at ISU. Each Course Content Module in Canvas will contain the learning objectives in the chapters, lecture videos, lecture notes, assigned readings, homework problems, and practice problems. An accompanying optional Student Study Guide & Solutions Manual 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.

**Canvas:** We will be using Canvas for this course. Recorded lectures, previous exams, grades, homework assignments, and class announcements will be posted there.

**Online Homework:** We will use the online homework system called Aktiv, which is accessed through Canvas. The homework is worth 10% of your final grade. In addition to the homework, there will be weekly quiz assignments for each chapter worth 10 points each. These quizzes will be worth 5% of your grade. Extra credit opportunities may be made available at the discretion of the instructor

**Top Hat:** We will be using the Top Hat program during lectures as a means of practice, but the questions will not be graded. It is expected that you will engage with the class and answer the questions, but the results will not impact your overall grade for the course. The Top Hat program is initially accessed via Canvas and will not cost anything additional. During lecture, the Top Hat program may be accessed via an app on your phone or laptop.

**Grading:** Grades will be assigned based on 60% midterm exams, 25% final exam, 10% online homework, and 5% quizzes. There will be four mid-semester exams (60% of total grade) and a cumulative final exam (25% of total grade). The course grade will be based on the **three best mid-semester exam** scores plus the final exam score (which cannot be dropped), the online homework (10%), and any midweek quizzes (5%). The lowest score on a mid-semester exam will be automatically dropped. Missing an exam for any reason will result in that exam being dropped. Cheating on an exam will earn a zero for that exam, which **cannot** be dropped. You are guaranteed the following grades: >92% A, > 88% A-, >85% B+, >80% B, > 75% B-, >70% C+, >60% C, >50% D; <50% F. Thus, in principle everyone in the class can earn an A. Since an exam will be dropped, it is not possible to tell you exactly where you stand grade-wise until all exam grades have been submitted. ***Any errors in points or grades posted on Canvas should be addressed to [mkoeritz@iastate.edu](mailto:mkoeritz@iastate.edu) within a week from the date posted. It is your responsibility to monitor your score in Canvas.***

**Exams:** All exams are scheduled to held in-person on Monday nights from 6:45 – 7:45 PM. More details will be communicated the week before the exam. In addition to the Final Exam, there will be **four midterm exams** (100 pts each). Any re-grades on an exam must be requested within one week after receiving the graded exam. **Missing an exam for any reason will result in that exam being dropped.** The reason that I drop an exam is that it allows

you to miss an exam for a personal or family emergency (such as an illness, a death in the family, car troubles, etc), or for other legitimate cause without suffering a grade penalty.

**Exam Dates:** 6:45-7:45 PM on February 9<sup>th</sup>, March 2<sup>nd</sup>, March 30<sup>st</sup>, and April 27<sup>th</sup>. The final exam will be a combined exam with both sections, so the final exam time is not set until later in the semester. Do not make any prior travel plans before knowing when the final exam will be.

**Co-requisite:** Chem 3320 is a co-requisite for Chem 3320L. The lecture may be taken without the lab, depending on the degree program, but the lab cannot be taken without the lecture unless credit for the lecture course has been previously received.

**Drops and Audits:** Students taking Chem 3320L will be required to drop the lab if they drop or decide to audit Chem 3320 lecture course. Auditing does not count towards full-time student status.

## Schedule for Chem 3320 (Spring 2025)

Week	Dates	Chapter
1	Jan 20-23	Chapter 12: Alcohols and Phenols
2	Jan 26-30	Chapter 12: Alcohols and Phenols Chapter 13: Ethers and Epoxides; Thiols and Sulfides
3	Feb 2-6	Chapter 13: Ethers and Epoxides; Thiols and Sulfides
4	<b>Monday, Feb 9th</b> Feb 9-Feb 13	<b>Exam 1, 6:45-7:45pm (Covers Chapters 12 &amp; 13)</b> Chapter 16: Conjugated Pi Systems and Pericyclic Reactions
5	Feb 16-Feb 20	Chapter 17: Aromatic Compounds Chapter 18: Aromatic Substitution Reactions
6	Feb 23-Feb 27	Chapter 18: Aromatic Substitution Reactions
7	<b>Monday, Mar 2nd</b> Mar 2-6	<b>Exam 2, 6:45-7:45pm (Covers Chapters 16, 17, &amp; 18)</b> Chapter 19: Aldehydes and Ketones
8	Mar 9-Mar 13	Chapter 19: Aldehydes and Ketones Chapter 20: Carboxylic Acids and their Derivatives
9	Mar 16-Mar 20	<b>SPRING BREAK; No Classes</b>
10	Mar 23-Mar 27	Chapter 20: Carboxylic Acids and their Derivatives
11	<b>Monday, Mar 30th</b> Mar 30-Apr 3	<b>Exam 3, 6:45-7:45pm (Covers Chapters 19 &amp; 20)</b> Chapter 21: Alpha Carbon Chemistry
12	Apr 6-Apr 10	Chapter 21: Alpha Carbon Chemistry Chapter 22: Amines
13	Apr 13-Apr 17	Chapter 22: Amines
14	Apr 20-Apr 24	Chapter 24: Carbohydrates
15	<b>Monday, Apr 27th</b> Apr 27-May 1	<b>Exam 4, 6:45-7:45pm (Covers Chapters 21 &amp; 22)</b> Chapter 25: Amino Acids, Peptides, and Proteins
16	May 4-May 8	Prep Week: Review for Final Exam – Lecture is Optional
17	May 11-May 14	Final Exam (Time to be Determined)

**The Final Exam Schedule will be posted by April 1<sup>st</sup>. Do not schedule end-of-semester travel plans before knowing when the Final Exam will take place.**

### The three most important tips for doing well in this class:

1. Work as many practice problems as you can! We're building pattern recognition skills that will help you work on solving more complex problems, so the more you practice, the better you will be at applying those patterns to new systems.
2. Don't forget the foundational concepts from Organic Chemistry I. These concepts continuously build on each other, so you may need to brush up on topics like acid/base chemistry or basic arrow pushing.
3. Ask questions! If you don't understand something, it's ok to reach out and ask for help! It's better to get the assistance you need than to stress over the problem and fall behind.

### 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 3320, 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 3320 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 3320, but this is the heart of the reactivity we examine.

## Mandatory Syllabus Statements:

### 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>

### Disability Accommodation

Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact (instructor name) to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Retroactive requests for accommodations will not be honored.

### Prep Week

This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook <http://www.provost.iastate.edu/resources/faculty-handbook> .

### Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, [Student Assistance](#) at 515-294-1020 or email [dso-sas@iastate.edu](mailto:dso-sas@iastate.edu), or the [Office of Equal Opportunity and Compliance](#) at 515-294-7612.

### Religious Accommodation

If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the [Dean of Students Office](#) or the [Office of Equal Opportunity and Compliance](#).

### 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.

### Contact Information

If you are experiencing, or have experienced, a problem with any of the above issues, email [academicissues@iastate.edu](mailto:academicissues@iastate.edu).