Syllabus
Mechanisms of Organic Chemistry, 5328

1  CLASS INFO

TTh  9:30-10:45 (215 New Hall)

*The University of Iowa strongly encourages students, faculty, and staff to be vaccinated against COVID-19. The university also encourages students, faculty, and staff to wear a face mask while on campus, and strongly encourages the use of face masks in all classroom settings and during in-person office hours. However, face mask usage is not required except on CAMBUS and in specified research and healthcare settings.*

**Instructor:** Dr. Florence Williams (she, her)

**Online Materials:** ICON website, e-books as shown below

*This course will be a blended online course, meaning that some parts (discussions, group work, presentations) will occur synchronous to our scheduled class time, and some parts (lectures) will be available in video format for you to view at any time point.*

**Course Textbooks/Materials:**

- *Modern Physical Organic Chemistry*, Eric Anslyn and Dennis Dougherty (printouts will be available for specific reading sections upon request)

In addition, we will be covering several primary literature examples (i.e. journal articles). These books will help outline some of the topics we'll discuss.

2  INFO ABOUT PROF. WILLIAMS

**Contact:** florence-williams@uiowa.edu

**Office:** W285-CB

**Office hour location:** Zoom, unless otherwise scheduled

**Office hours:** Monday: 9:30-11:00 am (Meeting ID: 993 7146 8236; Passcode: 137405); Friday: 11-12 pm (Meeting ID: 965 3723 8650; Passcode: 036768); or by appointment

**When you can reach me:** I will respond to emails as I am able – M-F, 8 am-5 pm, except during holidays. **PLEASE INCLUDE CHEM5328 IN THE SUBJECT LINE.** If you send an email during normal
work hours, please expect a wait time of 24 hours for a response. If I have not responded within 24 hours, please feel free to resend the email (It may have gotten overlooked/lost in my inbox, despite my best efforts). Emails over the weekend will be replied to on the following school day.

** Prior to exams, I will guarantee a response to any question sent 48 hours before the exam time. After that there is no guarantee that I will respond, but I will try to do so if I am able. I highly recommend sending late questions to the discussion board on ICON. I monitor this as often as I am able to as well.**

* University policy specifies that students are responsible for all official correspondences sent to their standard University of Iowa e-mail accounts. Students should check this account frequently.*

Organic chemistry is often not easily communicated over email, as it is a very visual science. Therefore I encourage you to bring your questions to office hours.

## 3 Course Introduction

**Outline of Course Topics:** The dates for each section are intended to help calibrate your studying habits and may not be completely accurate for each lecture topic for a specific day.

<table>
<thead>
<tr>
<th>Approx Dates</th>
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<tbody>
<tr>
<td>Aug 24-26</td>
<td>Writing Reaction Mechanisms</td>
</tr>
<tr>
<td>31-Sept 7</td>
<td>Molecular Orbital, Perturbation, and FMO Theory</td>
</tr>
<tr>
<td>9 - 16</td>
<td>Energetics – Thermodynamics and Reaction Coordinates</td>
</tr>
<tr>
<td>21 - Oct. 5</td>
<td>Huckel Theory and Pericyclic Reactions</td>
</tr>
<tr>
<td>7 - 14</td>
<td>Conformational Analysis – Fragmentations and Cascades</td>
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<tr>
<td>19 – 26</td>
<td>Stereoelectronic Effects</td>
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<tr>
<td>28 - Nov. 4</td>
<td>Transition State Theory and Kinetics</td>
</tr>
<tr>
<td>9 - 16</td>
<td>KIE Experiments and Dynamic Kinetic Resolutions</td>
</tr>
<tr>
<td>18 - 30</td>
<td>Kinetics in Catalysis – Organometallic and Enzyme Reactions</td>
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<tr>
<td>Dec. 2-9</td>
<td>Radical Reactions and Carbenes/Nitrenes</td>
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**My Philosophy:** I am teaching this mechanism class with a significant focus on physical organic chemistry. Physical organic concepts explain why reactions occur the way they do, and therefore are the basis of mechanistic understanding. As a result, for this class you should focus less on memorizing specific reactions or problems and more on understanding why a reaction proceeds the way that it does, or why a particular molecule exhibits chemical characteristics.

Please do not hesitate to ask a question because you think it is too “simple.” Questions also help me gauge what I need to explain further and what the class seems to be understanding well.

If you feel overwhelmed and hopeless, please come to my office hours or make a special appointment with me before giving up on the class!! Often there is a fairly straightforward way for me to help you start to make sense of things.

**Studying:** Because this class is highly literature focused, and largely flipped, much of your learning will be done in a more independent manner than you may be used to. This class is designed to
prepare you for graduate level work. Learning how to teach yourself and how to distill important concepts from journal articles is a pivotal skill.

Please keep in mind that you cannot simply memorize your way through this class! You have to understand the concepts and then apply them in new ways. You should tailor your studying habits to support this ability. For instance, if after getting a problem set back, you realize that you did it incorrectly, make sure you fully understand what the right answer is and why. Make sure you could reach that correct answer on your own.

If you feel overwhelmed and hopeless, please come to my office hours or make a special appointment with me before giving up on the class!! Often there is a fairly straightforward way for me to help you start to make sense of things.

**Reading:** This class will require significant at-home learning before participating in class discussion. All major lecture sections will be posted online, for you to watch at your convenience. I will assign primary literature (journal articles) as well as book chapters on the topic that will be discussed, and will assume you have read the material before coming to discussion. If you do not do the reading you will fall behind in understanding.

**Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).**

### 4 Learning Objectives

1) Moderate understanding of a variety of central tenants of mechanistic rationale in organic chemistry, arising often from physical organic principles

2) Increased comfort with critical thinking at a graduate level, including comfort in self-learning from primary literature

3) An ability to propose reasonable arguments to explain or predict mechanistic outcomes, arising both from canonical transformations as well as non-canonical transformations

4) An understanding that not everything is known or understood, and that we can only propose mechanisms but never “prove” them to be true. As such, open discussion and intellectual exchange is necessary to advance mechanistic insight.
5 Grades

Grade Distribution: The following percentages reflect the weight each examination will have on your final status in this class:

<table>
<thead>
<tr>
<th>Examination Type</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>24%</td>
</tr>
<tr>
<td>Presentations</td>
<td>24%</td>
</tr>
<tr>
<td>Problem Sets</td>
<td>18%</td>
</tr>
<tr>
<td>Participation</td>
<td>10%</td>
</tr>
<tr>
<td>Final Exam Presentation</td>
<td>24%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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**Problem Sets Due:** Sept 7, Oct 7, Nov. 18

**Midterm:** Oct. 23, 9:30 am - 12:30 pm

**Final Exam Presentations:** Date, Time, TBD

Midterm: The midterm will be conducted with Zoom proctoring.

Final Exam: The final exam will be a final presentation. Further details will be provided in a separate document.

Phones and electronic communication devices of any type are prohibited during exams.

Grading Style: Each problem will have a set number of points associated with it, which will be annotated and clear. Students will be awarded partial credit, at the discretion of the grader, if parts of the problem are answered correctly and parts of the problem are not. While the annotation of the problem may show negative or deducted points, it is not possible to have less than zero points for a particular problem. The student only earns positive points or none overall for each question. This style is used for both the problem sets and the exams.

Presentations: Roughly every two-three weeks you will be tasked to present a topic to your classmates to walk them through an explanation or rationale. You will be given the topic in a previous class, and will have your assigned group. You will make slides (can be powerpoint, drawn and take a picture, etc) for your short (~10 min) presentation to the class. These presentations should be interactive and educational, and you are encouraged to ask questions of other people’s presentations.

Participation/Problem sets Credit: You are expected to participate in class on a regular (biweekly) basis. During our class time, I will often pose questions that you can volunteer to answer, or I may call on students specifically if they have not participated recently. If you display a clear lack of preparation (did not do the reading) or refuse to participate, this can result in a deduction of your participation credit. However, if you simply answer a question incorrectly but have clearly done the requisite reading, this will not impact your participation score.

There will be three problem sets this fall semester. You may return the problem sets in class, deliver the problem sets to my office (there will be a place near my door), or you can scan them, or take a
picture and send me the pictures. I will grade them and provide a score based on your work, along with feedback on what you might focus your attention on moving forward.

**Return and Re-grading of term Exams:** Any requests for a re-grade must be made in writing. When making a request for a re-grade, please note that I will often re-grade the entire exam, not just the questions that you feel were graded incorrectly.

**Final Grade Calculations:**
Weighted totals for each student will be computed (sum of each assessment multiplied by its weight) and all students will be ranked based on their overall total.

- The instructor will look at the overall totals to assess variations in achievement (i.e. excellent, good, satisfactory, poor and failure performances) and convert the numeric scores into letter grades.
- Where possible, the instructor will use natural breaks in the grade distribution to set grade boundaries.
- There is no preset grade distribution (i.e. no policy is in place that the top 10% of class receives an A and so on). Performance and demonstration of mastery of the topic will determine absolute grades.
- After the midterm, I will show a histogram of the overall grade distribution of the class including all evaluated assessments to that point. I will outline the letter grades that I would assign to each section of the histogram as if the class ended that day to provide further insight into how performance is converted to letter grade.

### 6 Academic Honesty

**University Policy:** We are bound by the Code of Academic Honesty, in which each of us agreed to do, “My own academic work and to excel to the best of my abilities, upholding the IOWA Challenge (http://thechallenge.uiowa.edu/meet/index.html). I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty."

Students are expected to follow the Code of Student Life; academic dishonesty will be reported to University College and the student may be placed on disciplinary probation for the remainder of his or her undergraduate work at the University of Iowa. If I determine that any assignment was not written solely by the student, the student will receive a zero (0) on the assignment. In general, the decision of the Instructor may be appealed to the Associate Dean of University College, and then to the Provost, and so on in accordance with University Policy.

**Examples:** Plagiarism and cheating include *but are not limited to* the following:

- Copying from another student’s exam or report
- Copying from primary published literature
- Altering a graded exam and handing it back for regrade

**Plagiarism:** I define plagiarism of written documents as using 7 or more consecutive words from the primary source, or using small “chunks” of wording (3-6 words) frequently (3 or more times within a 3 sentence sequence). Technical phrases that are generically used are not considered plagiarism
and are acceptable. If you are unsure, don’t hesitate to ask about any specific situations in office hours.

There are several methods used to monitor academic dishonesty, including online writing comparison/search software and photocopying of graded exams before they are passed back.

I have a zero tolerance policy for cheating and plagiarism in my class

7 Problem Sets

Problem set assignments will be available on ICON up to one week prior to the due date. They will be graded within two weeks and sent back to you digitally or through a pickup location.

8 Special Accommodations

Due to unusual circumstances in 2021 (Covid-19, inclement weather effects, economic changes, etc), there may be sudden changes to your living and educational environment that will have or may have already created barriers to your learning. Please communicate with me early and often regarding any changes to your situation that would affect your performance or participation in this class. It is my intent to make this class as equitable and accessible as possible.

I want to hear from anyone who has a disability that may require some modification of class requirements. Please contact me by e-mail. Special academic arrangements for students with disabilities are handled in cooperation with Student Disability Services (www.uiowa.edu/~sds). Students who feel they need special accommodations for any aspect of the course are encouraged to contact SDS and to speak with the instructor early in the semester, so that accommodation can be made as soon as possible. Note that accommodations are not granted retroactively but from the time of the student’s request to the instructor onward; additionally, accommodations must be requested at least two weeks in advance of the related assignment or exam (https://sds.studentlife.uiowa.edu/)

9 Mental Health

Students are encouraged to seek help as a preventive measure or if feeling stressed or overwhelmed. Students should talk to their instructors for guidance with specific class-related concerns and are encouraged to contact University Counseling Service (UCS) at 319-335-7294 during regular business hours to schedule an appointment. USC offers group and individual therapy as well as counseling for couples about relationships while making referrals to other resources (https://counseling.uiowa.edu/). Student Health can also address related concerns (https://studenthealth.uiowa.edu/).

These visits are free to students. After hours, students are encouraged to call the Johnson County Community Crisis Line at (319) 351-0140 or dial 911 in an emergency.
10 **Severe Weather**

In severe weather, class members should seek appropriate shelter immediately. The class will continue, if possible, when the event is over. For more information on Hawk Alert and the siren warning system, visit http://hawkalert.uiowa.edu or http://police.uiowa.edu.

11 **Sexual Harassment**

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff; all members of the UI community are expected to conduct themselves in a manner that maintains an environment free from sexual harassment and sexual misconduct. Those experiencing sexual harassment are strongly encouraged to report the incidents and to seek help (https://osmrc.uiowa.edu/).

12 **Non-Discrimination in the Classroom**

The University of Iowa is committed to making the classroom a respectful and inclusive space for people of all gender, sexual, racial, religious, and other identities. Toward this goal, students are invited in MyUI to optionally share the names and pronouns they would like their instructors and advisors to use to address them. The University of Iowa prohibits discrimination and harassment against individuals based on race, class, gender, sexual orientation, national origin, and other identity categories indicated by the University’s Human Rights policy. Contact the Office of Equal Opportunity and Diversity at https://diversity.uiowa.edu/division/office-equal-opportunity-and-diversity-eod.

13 **Concerns About the Instructor**

Students with a complaint or problem in the course should first visit with me (if requested by either party, in a recorded zoom session) and then, should the issue remain unresolved, with, Dr. Andrew Beckett, Associate Dean of University College. Complaints must be made within six months of the incident.

14 **Class Behavior Expectations**

Students are expected to comply with University policies regarding appropriate classroom behavior as outlined in the Code of Student Life.

In the event that a student disrupts the classroom environment through the failure to comply with the reasonable directive of an instructor or the University, the instructor has the authority to ask that the student immediately leave the space for the remainder of the class period. Additionally, the instructor is asked to report the incident to the Office of Student Accountability for the possibility of additional follow-up. Students who need a temporary alternative learning arrangement related to COVID-19 expectations should contact Student Disability Services arrangements/; +1 319 335-1462) (https://sds.studentlife.uiowa.edu/fall-2020/covid-19-temporary-learning-arrangements/).
ATTENDANCE AND CLASSROOM EXPECTATIONS
Students are responsible for attending class and for knowing an instructor’s attendance policies, which vary by course and content area. All students are expected to attend class and to contribute to its learning environment in part by complying with University policies and directives regarding appropriate classroom behavior or other matters.

ABSENCES
Students are responsible for communicating with instructors as soon they know that an absence might occur or as soon as possible in the case of an illness. Delays in communication could result in a forfeit of what otherwise might be an excused absence.

ABSENCES: ILLNESS, UNAVOIDABLE CIRCUMSTANCES, AND UNIVERSITY SPONSORED ACTIVITIES
Students who are ill, in an unavoidable circumstance affecting academic work, or who miss class because of a University sponsored activity are allowed by UI policy to make up a missed exam. Documentation is required by the instructor except in the case of a brief illness. Students are responsible for communicating with instructors as soon as the absence is known (https://opsmanual.uiowa.edu/students/absences-class#8.1).

ABSENCES: HOLY DAYS
Reasonable accommodations are allowed for students whose religious holy days coincide with their classroom assignments, tests, and attendance if the student notifies the instructor in writing of any such religious Holy Day conflicts within the first days of the semester and no later than the third week. (See the University Operations Manual: https://opsmanual.uiowa.edu/students/absences-class#8.2).

ABSENCES: MILITARY SERVICE OBLIGATIONS
Students absent from class due to U.S. veteran or U.S. military service obligations (including military service-related medical appointments, military orders, and National Guard Service obligations) must be excused without penalty. Instructors must make reasonable accommodations to allow students to make-up exams or other work. Students must communicate with their instructors about the expected possibility of missing class as soon as possible. (For more information, see https://opsmanual.uiowa.edu/iv-8-absences-class%C2%A0-%200).

ACADEMIC MISCONDUCT
Plagiarism and the process for addressing academic misconduct of graduate students are defined in Section IV, Article F “Plagiarism by Graduate Students” of the UI Graduate College Manual of Rules and Regulations. Please contact the CLAS Associate Dean for Graduate Education for any necessary assistance in navigating the process mandated by the Graduate College.

ACADEMIC ACCOMMODATIONS
UI is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as a mental health, attention, learning, vision, and a physical or health-related condition) through the Student Disability Services (SDS) office. The student is responsible for discussing specific accommodations with the instructor. Note that accommodations are not granted retroactively but from the time of the student’s request to the instructor onward; additionally, accommodations must be requested at least two weeks in advance of the related assignment or exam (https://sds.studentlife.uiowa.edu/). Graduate students serving as Teaching Assistants, Research Assistants, or Fellows must contact Faculty and Staff Disability Services (https://hr.uiowa.edu/support/faculty-and-staff-disability-services) for assistance with accommodations.

CLASS RECORDINGS: PRIVACY AND SHARING
Course lectures and discussions are sometimes recorded or live-streamed. These are only available to students registered for the course and the intellectual property of the faculty member. These materials may not be shared or reproduced without the explicit written consent of the instructors. Students may not share these recordings with those who are not enrolled in the course; likewise, students may not upload recordings to any other online environment. Doing so is a breach of the Code of Student Conduct and could be a violation of the Federal Education Rights and Privacy Act (FERPA); also see https://dos.uiowa.edu/policies/code-of-student-life/.
COMMUNICATION: UI EMAIL
Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community (Operations Manual, III.15.2). Emails should be respectful and brief, with complex matters addressed during the instructor’s drop-in hours, for example. Faculty are not expected to answer email after business hours or during the weekends.

FREE SPEECH AND EXPRESSION
The University of Iowa supports and upholds the First Amendment protection of freedom of speech and the principles of academic and artistic freedom. We are committed to open inquiry, vigorous debate, and creative expression inside and outside of the classroom. Visit Free Speech at Iowa for more information on the University’s policies on free speech and academic freedom: https://freespeech.uiowa.edu/.

COMPLAINTS ABOUT ACADEMIC MATTERS
Students with a complaint about a grade or a related academic matter should first visit with the instructor and then with the course supervisor (if applicable), and finally with the director of the school, department, or program offering the course. If a graduate student has not been able to resolve the issue through the director of the school, department, or program, they should contact the associate dean for graduate education in the College of Liberal Arts and Sciences.

FINAL EXAMINATION POLICIES
The final exam schedule is published during the fifth week of the fall and spring semesters or on the first day of summer classes; students are responsible for knowing the date, time, and place of their final exams. Students should not make travel plans until knowing this information. A student with exams scheduled on the same day and time or who have more than two final exams on the same day should visit this page for how to resolve these problems by the given deadline (https://registrar.uiowa.edu/makeup-final-examination-policies). No exams are allowed the week before finals, but with some exceptions made for labs, language courses, and off-cycle courses (https://registrar.uiowa.edu/final-examination-scheduling-policies).

HOME OF THE COURSE
The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the policies and procedures for its courses. Graduate students, however, must adhere to the academic deadlines set by the Graduate College. See https://grad.uiowa.edu/academics/deadlines.

MENTAL HEALTH
Students are encouraged to seek help as a preventive measure or if feeling stressed or overwhelmed. Students should talk to their instructors for guidance with specific class-related concerns and are encouraged to contact University Counseling Service (UCS) at 319-335-7294 during regular business hours to schedule an appointment. UCS offers group and individual therapy as well as counseling for couples about relationships while making referrals to other resources (https://counseling.uiowa.edu/). Student Health can also address related concerns (https://studenthealth.uiowa.edu/). These visits are free to students. After hours, students are encouraged to call the Johnson County Community Crisis Line at (319) 351-0140 or dial 911 in an emergency.

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