1 CLASS INFO

**TTh 9:30-10:45 (Zoom Meeting ID: 982 5168 8913 Password: 646327)**

Link: [https://uiowa.zoom.us/j/98251688913?pwd=ZTFsaG1pU3R3czVWYVI1amR6Mk5mUT09](https://uiowa.zoom.us/j/98251688913?pwd=ZTFsaG1pU3R3czVWYVI1amR6Mk5mUT09)

**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:**

- The Art of Writing Reasonable Organic Reaction Mechanisms, Robert Grossman (available as e-book from UIowa Library)
- Modern Physical Organic Chemistry, Eric Anslyn and Dennis Dougherty (printouts will be available for specific reading sections upon request)
- Molecular Orbitals and Organic Chemical Reactions, Student Edition Ian Fleming (available as e-book from UIowa Library)

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

**Office hours:** Monday: 9:30-11:00 am (Meeting ID: 985 3066 6687; Passcode: 646327); Thursday: 3-4:30 pm (Meeting ID: 946 7976 7279; Passcode: 646327); 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><strong>Aug 25-27</strong></td>
<td>Writing Reaction Mechanisms</td>
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<tr>
<td><strong>Sept 1-8</strong></td>
<td>Molecular Orbital, Perturbation, and FMO Theory</td>
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<tr>
<td>10-17</td>
<td>Energetics – Thermodynamics and Reaction Coordinates</td>
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<tr>
<td>22- Oct. 6</td>
<td>Huckel Theory and Pericyclic Reactions</td>
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<tr>
<td>8-15</td>
<td>Conformational Analysis – Fragmentations and Cascades</td>
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<tr>
<td>20-27</td>
<td>Stereoelectronic Effects</td>
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<tr>
<td><strong>29- Nov. 5</strong></td>
<td>Transition State Theory and Kinetics</td>
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<tr>
<td>10-17</td>
<td>KIE Experiments and Dynamic Kinetic Resolutions</td>
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<tr>
<td>19-24</td>
<td>Kinetics in Catalysis – Organometallic and Enzyme Reactions</td>
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<tr>
<td><strong>26- Dec. 3</strong></td>
<td>Radical Reactions and Carbenes/Nitrenes</td>
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<tr>
<td><strong>Dec. 8-10</strong></td>
<td>Cations – Classical and Nonclassical</td>
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<td>Pending Timing</td>
<td>Photochemistry and PCET Reactions</td>
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<tr>
<td>Pending Timing</td>
<td>Supramolecular Chemistry</td>
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<tr>
<td>Pending Timing</td>
<td>Design of Experiment</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 online, 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</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>24%</td>
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<tr>
<td>Presentations</td>
<td>24%</td>
</tr>
</tbody>
</table>
Problem Sets 18%
Participation 10%
Final Exam Presentation: 24%
Total: 100%

**Problem Sets Due:** Sept 8, Oct 6, Nov. 19
**Midterm:** Oct. 24, 9:30-12:30 pm
**Final Exam:** 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 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:** Exams will be returned to you digitally. 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 **Class Notes**

Synchronous class meetings (discussions, presentations, etc) will be recorded on zoom and posted. Students may request sections of these recordings to be edited out prior to posting. In such event, the student should make their request immediately following the recorded class session.

9 **Administrative Home**

University College is the administrative home of this course and governs matters such as add/drop deadlines, grading guidelines, absences and other related matters. If you are unclear about the policies that govern you or this course, contact the Associate Dean of University College in 310 Calvin Hall.

10 **Special Accomodations**

Due to unusual circumstances in 2020 (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.

11 **Severe Weather**

In severe weather, class members should seek appropriate shelter immediately, leaving synchronous zoom sessions. 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.

12 **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 have a responsibility to uphold this mission and
to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately even if they are uncertain whether a violation of this policy has occurred. See the UI Comprehensive Guide on Sexual Harassment (Operations Manual: http://www.uiowa.edu/~our/opmanual/ii/04.htm) for assistance, definitions, and the full University policy.

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. This includes the policies and procedures that all students have agreed to regarding the Steps Forward for Fall 2020 in response to the COVID-19 pandemic. Particularly, all students are required to wear a face covering when in a UI building, including a classroom. In addition, the density of seats in classrooms has been reduced. In some instances, this will allow 6 feet or more of distance while in other cases, it may be less. Regardless, wearing a face covering and maintaining as much distance as possible are vital to slowing the spread of COVID-19.

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/).

15 CLASS RECORDINGS: PRIVACY AND SHARING

Some of the sessions of a course could be recorded or live-streamed. Such recordings/streaming will only be available to students registered for this class. These recordings are the intellectual property of the faculty, and they may not be shared or reproduced without the explicit, written consent of the faculty member. Further, students may not share these sessions with those not in the class or upload them to any other online environment. Doing so would be a breach of the Code of Student Conduct, and, in some cases, a violation of the Federal Education Rights and Privacy Act (FERPA).