



Advanced Organic Chemistry

The University of Toledo
Department of Chemistry & Biochemistry, College of Natural Sciences and Mathematics
Chem 4400/6400/8400

Instructor:	Wei Li	Course Website:	N/A
Email:	Wei.Li@utoledo.edu	Class Location:	BO 2509
Office Hours:	Tues & Thurs 3-4 pm	Class Day/Time:	Tues & Thurs 8:00 am – 9:50 am
Office Location:	WO 3269	Lab Location:	N/A
Instructor Phone:	(419) 530-1507	Lab Day/Time:	N/A
Offered:	Fall 2021	Credit Hours:	4.0

CATALOG/COURSE DESCRIPTION*

Chem 4400/6400/8400 / Advanced Organic Chemistry

COURSE OVERVIEW/ TEACHING METHODOLOGY

This course is designed to solidify the fundamental principles of introductory organic chemistry and to build on these concepts in order to gain a deeper understanding of the role structure plays in determining reaction mechanism. We will discuss the major reactive intermediates, which are found to occur in the most common reaction mechanisms and cover methods used for determining reaction mechanism. This course will also allow students to apply the primary and review literature in organic chemistry.

STUDENT LEARNING OUTCOMES*

Upon completion of the course, students should be able to correlate structures with reactivity patterns in chemical reactions. Students will be able to identify key intermediates and draw arrow-pushing mechanisms for reactions of significant complexity. Common mechanistic methods can also be incorporated in their own research involving organic reactions.

PREREQUISITES AND COREQUISITES*

Organic Chemistry II

TEXTS AND ANCILLARY MATERIALS*

- A. Lecture Text: F. A. Carey and R. J. Sundberg, "Advanced Organic Chemistry, Part A: Structure and Mechanisms", ISBN-13: 978-0387683461, ISBN-10: 0387683461, Springer, Edition: 5th May 27, 2008
- B. Supplements: T. L. Gilchrist and R. C. Storr, "Organic Reactions and Orbital Symmetry", 2nd Edition, Cambridge University Press, Cambridge, 1979. On reserve in the Carlson library

Molecular Model Kit, HGS Polyhedron Molecular Model (highly recommended)

TECHNOLOGY REQUIREMENTS

Please view the [technology considerations](#) for this course, including technical skills needed, general technology requirements, and technology privacy policies.

ACADEMIC POLICIES



- Attendance is expected and you are responsible for all material, and problems covered in class.
- It is recommended that you *read the text before the lecture*.
- You are responsible for taking notes during class. If you miss a class it is your responsibility to acquire the notes from a colleague.
- In consideration for your fellow students, please arrive on time and **turn off your cell phone**.
- A listing of graded homework assignments from the lecture text and primary literature will be assigned periodically. These problems should be viewed as a *minimum*. Homework will account for 100 points (18%) of your grade.
- Make-up exams will only be given for excused absences. The final exam cannot be excused.
- Note: The last day to drop the class is Sept 8th and the last day to withdraw is Oct 30th

Exam Absence Policies

Students who will not be able to take an exam at the scheduled time due to an irresolvable conflict with a major responsibility must provide some **written** documentation to verify the conflict. This situation may occur for students on official university business, including athletes. The exam will be given at another arranged time. *Approval must be obtained before the scheduled test date.*

Students who do not take an exam due to illness, car accident, and death in the family or similar **extreme** circumstance should inform me of your difficulties within 24 hours of the exam. These difficulties must also be **documented** by a physician's note, an accident report, pastor's note, etc. **Contact information** for the police department, pastor, etc. must be included on the note or report. A telephone call or email within 24 hours of missing the exam is **also** required: 419-530-1507. In all other circumstances, a missed exam will result in a grade of 0. Exams cannot be excused for personal reasons. Examples of missing an exam due to personal issues include, but are not limited to: oversleeping, transportation problems, vacation plans, work schedule conflicts, child care issues, sick children, fire alarms in adjacent buildings, etc.

Undergraduate Policies: <http://www.utoledo.edu/policies/academic/undergraduate/>

Graduate Policies: <http://www.utoledo.edu/policies/academic/graduate/>

COURSE EXPECTATIONS

Students are expected to draw reasonable reaction mechanisms for many organic transformations. Students are expected to come up with reasonable reaction mechanisms for novel chemical transformations. Students are expected to be able correlate structures with reactivities and identify key intermediates in different reaction types. Students are expected to present and critic contemporary chemical reaction literature in a professional manner.

OVERVIEW OF COURSE GRADE ASSIGNMENT*

The following is the distribution of possible points in the course:

Attendance and Participation	50 pts
Presentation	50 pts
Homework Assignments 5 @ 10 points each	50 pts
Midterm Exams 3 @ 100 points each	300 pts
Final Exam	150 pts
Total:	600 pts

Generalized Grading Scale:

A =average+ 1.0 STDEV; A- = average+ 0.5 STDEV; B+ =average; B =average -0.5 STDEV; B- = average -1 STDEV; C+ = average-1.5 STDEV; C =average- 2 STDEV

UNIVERSITY POLICIES



Federal law requires the university to have an Institutional Attendance Policy that requires faculty to track student participation by the census date, which varies for each POT, these dates can be found here: <https://www.utoledo.edu/offices/provost/mandatory-attendance-tracking.html>, for federal financial eligibility and disbursement, please include **ONE** of the following Institutional Attendance Policy statements on your syllabus based on the POT of Term your course is offered.

Institutional Classroom Attendance Policy

Please be aware that the university has implemented an attendance policy, which requires faculty to verify student participation in every class a student is registered at the start of each new semester/course. For this course, if you have not attended/participated in class (completed any course activities or assignments) within the first 14 days, I am required by federal law to report you as not attended. Unfortunately, not attending/participating in class impacts your eligibility to receive financial aid, so it is VERY important that you attend class and complete course work in these first two weeks. Please contact me as soon as possible to discuss options and/or possible accommodations if you have any difficulty completing assignments within the first two weeks.

Policy Statement on Non-Discrimination on the Basis of Disability (ADA) The University is an equal opportunity educational institution. Please read [The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance](#). Students can find this policy along with other university policies listed by audience on the [University Policy webpage](#) (<http://www.utoledo.edu/policies/audience.html/#students>).

Academic Accommodations The University of Toledo embraces the inclusion of students with disabilities. We are committed to ensuring equal opportunity and seamless access for full participation in all courses. For students who have an Accommodations Memo from the Office of Accessibility and Disability Resources, I invite you to correspond with me as soon as possible so that we can communicate confidentially about implementing accommodations in this course.

For students who have not established accommodations with the Office of Accessibility and Disability Resources and are experiencing disability access barriers or are interested in a referral to health care resources for a potential disability, please connect with the office by calling 419.530.4981 or sending an email to StudentDisability@utoledo.edu.

ACADEMIC AND SUPPORT SERVICES

Please follow this link to view a comprehensive list of [Student Academic and Support Services](#) (<http://www.utoledo.edu/studentaffairs/departments.html>) available to you as a student.

SAFETY AND HEALTH SERVICES FOR UT STUDENTS

Please use the following link to view a comprehensive list [Campus Health and Safety Services](#) available to you as a student.

INCLUSIVE CLASSROOM STATEMENT

In this class, we will work together to develop a learning community that is inclusive and respectful. Our diversity may be reflected by differences in race, culture, age, religion, sexual orientation, gender identity/expression, socioeconomic background, and a myriad of other social identities and life experiences. We will encourage and appreciate expressions of different ideas, opinions, and beliefs so that conversations and interactions that could potentially be divisive turn, instead, into opportunities for intellectual and personal development.


COURSE SCHEDULE*

WEEK	DATES	TOPIC
1	Aug 31	Structure and models of bonding
2	Sep 2	Structure and models of bonding
3	Sep 7	Strain, stability, and conformational analysis
4	Sep 9	Strain, stability, and conformational analysis
5	Sep 14	Stereochemistry
6	Sep 16	Stereochemistry
7	Sep 21	Mechanism
8	Sep 23	Mechanism
9	Sep 28	Exam 1 (Thursday)
10	Sep 30	Addition/Elimination Reactions
11	Oct 5	Addition/Elimination Reactions
12	Oct 7	Carbonyl Reactions
13	Oct 12	Fall Break – No class
14	Oct 14	Carbonyl Reactions
15	Oct 19	Carbenes
16	Oct 21	Aromaticity
17	Oct 26	Aromaticity
18	Oct 28	Exam 2 (Tuesday)
19	Nov 2	Nucleophilic Substitution
20	Nov 4	Nucleophilic Substitution
21	Nov 9	Free radicals
22	Nov 11	Carbanions and Organotransition Metal Reactions
23	Nov 16	Carbanions and Organotransition Metal Reactions
24	Nov 18	Exam 3 (Tuesday)
25	Nov 23	Thanksgiving – No Class
26	Nov 25	Pericyclic Reactions
27	Nov 30	Pericyclic Reactions
28	Dec 2	Pericyclic Reaction
29	Dec 7	Photochemistry
30	Dec 9	Presentations
31	Dec 14	Final Exam (Tuesday)