CHEM2430
Recitation for Organic Chemistry I

The University of Toledo
College of Natural Sciences and Mathematics
Department of Chemistry and Biochemistry
16656 – CHEM 2430 -003

TA/Instructor: Fenglang Wu
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Instructor Phone: 419-530-4934
Instructor Office Location: WO2268B

Instructor Office Hours: Tues: 10 – 11 am & Wed: 10 am – 12 pm (face-to-face)
Mon: 3 – 4 pm & Wed: 9 – 10 am (virtual)

Course Website: Blackboard Learn or https://blackboard.utdl.edu/webapps/login/

Class Day/Time:
Section 003: 4:10 – 5:05 pm, Thursday
Memorial Field House 2620

Credit Hours: 1

Offered: Spring, 2022

CATALOG/COURSE DESCRIPTION

Recitation sections that discuss concepts and solve practice questions in CHEM2410.

COURSE OVERVIEW

In Organic Chemistry I Recitation, you will be improving your understanding of organic chemistry through practice problems and group discussion. This course is designed as a supplement to your lecture course to help you further grasp the material through problem solving and interaction with your fellow students. Attendance and participation will be documented in order to decide your receiving credit for this course.

PREREQUISITES AND COREQUISITES

Organic Chemistry I (CHEM 2410) is a corequisite for this course.

Prerequisites: CHEM 1240 with a minimum grade of C-.

TEXTS AND ANCILLARY MATERIALS

Required Materials: The same materials used in CHEM2410 will be used in this course. This includes:

- An electronic copy of the textbook, *Organic Chemistry: Structure and Function* (8th Edition) by Vollhardt and Schore. Published by W.H. Freeman/Macmillan, ISBN-10: 1-319-07945-8; ISBN-13: 978-1-319-07945-1;
- ACHIEVE online homework

TEACHING METHODOLOGY

Students will work in groups on the assigned problems from the textbook. This course is designed to stimulate students through active learning by participating in solving provided problems through a think, pair, share process. Discussion is highly encouraged.

TECHNOLOGY REQUIREMENTS

Access to a properly functioning computer with internet access in order to login to Blackboard (https://blackboard.utdl.edu/webapps/login/).

Updated versions of plug-ins, recent software and the necessary tools to be kept free of viruses and spyware. Updated software is available from UToledo's Online Learning Download center (https://www.utoledo.edu/dl/main/downloads.html).

COURSE EXPECTATIONS

Attend and participate in all recitation sections.

OVERVIEW OF COURSE GRADE ASSIGNMENT

The attendance will be taken in all classes during the semester. You will receive credit for this course if you miss the class no more than 3 times. Otherwise, you will receive no credit. STUDENTS MUST ACTIVELY PARTICIPATE to receive credit for each session.

Drop, Withdrawal and Incomplete Grades Course drop and withdrawal procedures have been set by the University. *Dropped* courses do not appear on your transcript. The deadline for dropping is February 1st. You may *withdraw* from the course and receive a grade of W. The deadline for withdrawal is March 25th. W's do not affect your GPA.

A course grade of **Incomplete** is given only to those who have completed all but a small percentage of course requirements for an acceptable reason. The **Incomplete** must be removed before you take organic chemistry.

Midterm Grading

Students will be notified of their up-to-date attendance record. Students with more than 3 absences will receive a grade of no credit.

Final Grading

Students who attend and participated in a minimum of 11 sessions will get credit for this course.

ACADEMIC POLICIES

Make-up sessions or work will not be given.

Undergraduate Policies: http://www.utoledo.edu/policies/academic/undergraduate/
Graduate Policies: http://www.utoledo.edu/policies/academic/graduate/

UNIVERSITY POLICIES

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 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 affiliation with Office of Accessibility and Disability Resources and are experiencing disability access barriers or are interested in a referral to healthcare resources for a potential disability or would like information regarding eligibility for academic accommodations, please contact the Office of Accessibility and Disability Resources Office (http://www.utoledo.edu/offices/student-disability-services/) 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 scheduling assistance: Chemistry Department Secretary, Ms. Samples, is in Room BO 2022, telephone 419-530-2698. If you have further questions or if you need assistance, please talk to her. She takes care of all scheduling changes.

Chemistry Help Center, Room BO 2043, is where the teaching assistants hold their office hours so it is a great place to receive assistance. It is generally open all day Monday through Friday & evenings Monday through Thursday. A schedule will be posted early in the term. No appointment is necessary.

Tutoring support for all UT students is available through the **Learning Enhancement Center** located in the Carlson Library.

Instructor Office Hours are times when you can stop by my office (no appointment needed) with questions about the course material, grades, and any concerns with the course. My office hour times and location are listed at the top of the syllabus. I will do my best to respond to email within 24 to 48 hours.

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COURSE SCHEDULE

WEEK	DATE	TOPIC	SLOs (Listed p.5-8)
1	1/20	Chapter 1 Structure and Bonding in Organic Molecules **Ch 1 End of Chapter problems:** 25-31, 33-34, 37, 39-46, 49, 52, 53, 58	1.1 – 1.2
2	1/27	Chapter 1 Continued and Chapter 2 Structure and Reactivity **Ch 1 End of Chapter problems:** 25-31, 33-34, 37, 39-46, 49, 52, 53, 58 **Ch 2 End of Chapter problems:** 33-36, 38-39, 42-50, 52, 55-56, 62-63, 65-66	2.1 – 2.3
3	2/3	Chapter 2 Continued and Chapter 3 Reactions of Alkanes **Ch 2 End of Chapter problems:** 33-36, 38-39, 42-50, 52, 55-56, 62-63, 65-66 **Ch 3 End of Chapter problems:** 15-16, 22-23, 27-29, 48	2.4 – 2.6, 3.1 – 3.2
4	2/10	Chapter 3 Continued and Chapter 4 Cycloalkanes **Ch 3 End of Chapter problems:** 15-16, 22-23, 27-29, 48 **Ch 4 End of Chapter problems:** 21-22, 25, 27, 31-32, 34, 37, 44, 58-59	3.3 – 3.5, 4.1
5	2/17	Chapter 4 Continued and Chapter 5 Stereoisomers **Ch 5 End of Chapter problems:** 32-42, 44-47, 50-52, 54-56, 65, 68-71	4.2, 5.1 – 5.3
6	2/24	Chapter 5 Continued, Chapter 6 Properties and Reactions of Haloalkanes (S_N2) **Ch 5 End of Chapter problems**: 32-42, 44-47, 50-52, 54-56, 65, 68-71 **Ch 6 End of Chapter problems**: 31-39, 41, 43-47, 49-50, 56, 61, 65	5.4 – 5.7
7	3/3	Chapter 6 Continued and Chapter 7 Further Reactions of Haloalkanes (S_N1 and E_X Reactivity) **Ch 7 End of Chapter problems:** 25-28, 30, 32-36, 43-52, 61, 67-70	6.1 – 6.6, 7.1 – 7.2
	3/10	Spring Break	
8	3/17	Chapter 7 Continued and Chapter 8 Hydroxy Functional Group: Alcohols **Ch 8 End of Chapter problems:** 24-25, 29-31, 34-36, 40, 42-46, 48, 53, 55-56, 64-65	7.3 – 7.6, 8.1 – 8.2

WEEK	DATE	TOPIC	SLOs (Listed p.5-8)
9	3/24	Chapter 8 Continued and Chapter 9 Further Reactions of Alcohols and the Chemistry of Ethers **Ch 9 End of Chapter problems:** 34-40, 42-44, 49-51, 56, 60, 65-66, 84-86	8.3 – 8.5, 9.1 – 9.2
10	3/31	Chapter 9 Continued and Chapter 11 Alkenes **Ch 11 End of Chapter problems:** 33-35, 42-43, 45, 54, 74, 76	9.3 – 9.5, 11.1 – 11.4
11	4/7	Chapter 12 Reactions of Alkenes **Ch 12 End of Chapter problems: 41-43, 46, 48-53, 55, 58, 61, 67-68, 70, 81, 83-85** **Ch 13 End of Chapter problems:** 29-30, 38-52, 61-63	12.1 – 12.6
12	4/14	Chapter 12 Continued and Chapter 13 Alkynes **Ch 13 End of Chapter problems:** 29-30, 38-52, 61-63	12.7 – 12.10, 13.1 – 13.3
13	4/21	Chapter 13 Continued **Ch 13 End of Chapter problems:** 29-30, 38-52, 61-63	13.4 – 13.7
14	4/28	Chapter 14 Delocalized Pi Systems **Ch 14 End of Chapter problems: 32-33, 39-42, 46, 49-52, 54, 58, 60, 63, 76, 79**	14.1-14.3

STUDENT LEARNING OUTCOMES

Following the completion of this course students will be able to:

1.1 Interpret Valence Bond Theory, Lewis Structures, condensed structural formulas, bond-line (skeletal) notation, bolded wedge and hashed wedge notation, and resonance structures.
1.2 Recognize and assign formal charges to atoms in molecules and ions.
2.1Interpret potential energy diagrams including enthalpy, activation energies, intermediates, the rate determining step, the number of reaction steps, and transition states.
2.2 Represent electron-pair movement with curved-arrow notation in reaction mechanisms and resonance structures.
2.3 Define and identify alkanes, functional groups, electrophiles, nucleophiles, acids, and bases
2.4 Predict the relative strengths of acids and bases
2.5 Name organic molecules using systematic nomenclature and common names
2.6 Interpret Newman projections and apply them to compare conformational mobility of different molecules

3.1 Distinguish heterolytic from homolytic bond dissociation and understand the reaction pathways available to non-functionalized molecules such as alkanes
3.2 Define and identify radicals and radical reactions
3.3 Define hyperconjugation and recognize its influence on radical stabilities and the relative ease of radical formation
3.4 Recognize the interrelationships between the three stages of radical chain reaction mechanisms: initiation, propagation, and termination
3.5 Predict results of alkane halogenation reactions on the basis of concepts of reactivity and selectivity
4.1 Name cyclic alkanes
4.2 Describe and identify the structural and thermodynamic differences between cis and trans isomers of substituted cycloalkanes
4.3 Interpret different conformations of cyclohexane including substituted derivatives
5.1 Differentiate constitutional isomers from stereoisomers
5.2 Recognize the property of chirality in a molecule, including the presence of stereocenters
5.3 Apply optical rotation measurements to the determination of enantiomeric excess
5.4 Assign the absolute configurations of chiral structures
5.5 Model stereoisomers in the form of Fischer projections
5.6 Define and identify diastereoisomers, enantiomers, meso compounds, conformers, and identical structures in molecules with multiple chiral centers
5.7 Apply the principles of stereoisomerism to the stereochemical outcome of chemical reactions
6.1 Identify nucleophiles and the site of nucleophilic attack in a molecule
6.2 Use electron-pair arrows to draw the product of reaction between a nucleophile and a substrate
6.3 Deduce the transition state structure of nucleophilic substitution S_N2 by following the stereochemical changes during the course of the reaction
6.4 Summarize the relationship between basicity and leaving group ability
6.5 Define the factors that govern nucleophilicity and recognize steric hindrance as a controlling element in S_N2 reactivity
6.6 Distinguish protic from aprotic solvents 7.1 Define and identify solvolysis
7.2 Interpret the mechanism of the S_N1 reaction and its variables: solvent, leaving group, nucleophile, and alkyl substituents
7.3 Compare the S_N1 and S_N2 processes including stereochemistry
7.4 Summarize the factors that determine carbocation stabilization through hyperconjugation
7.5 Interpret elimination mechanisms and distinguish between $E1$ and $E2$ mechanisms
7.6 Predict the dominant course of the reaction of haloalkanes with nucleophiles/bases (elimination or substitution) and the underlying mechanism (S_N1, S_N2, $E1$, or $E2$)
8.1 Identify and name alcohols and the properties of alcohols, including acid and base properties
8.2 Apply nucleophilic substitution mechanism for the preparation of alcohols

8.3 Relate alcohols, aldehydes, and ketones and how to use oxidation-reduction chemistry to synthesize alcohols, aldehydes, ketones, and carboxylic acids.
8.4 Predict the products formed when hydride and organometallic reagents are added to aldehydes and ketones.
8.5 Apply retrosynthetic analysis to synthesis problems
9.1 Predict the products formed when alcohols are treated with base
9.2 Predict the products formed when alcohols undergo substitution and elimination reactions in acidic conditions
9.3 Predict carbocation rearrangements and determine what structural changes occur as a result of carbocation rearrangements
9.4 Apply inorganic reagents to effect substitution of the hydroxy group in alcohols and predict the products when inorganic reagents are reacted with alcohols
9.5 Name and synthesize ethers
11.1 Name alkenes including stereochemistry
11.2 Identify and interpret stereochemistry in alkenes
11.3 Relate stability of alkenes to structure
11.4 Apply basic energetic principles to predict isomeric products in elimination reactions
12.1 Describe why alkenes undergo addition reactions and correlate mechanisms of addition with predictions of stereochemical outcomes
12.2 Predict the products of hydrogenation and recognize what catalysts and reagents are required
12.3 Predict the products of electrophilic addition to the π bond and recognize what reagents are required
12.4 Relate carbocation stability to regiochemistry of addition: Markovnikov's rule
12.5 Model and interpret mechanisms for HX addition and acid-catalyzed hydration
12.6 Predict the products of the hydration, oxymercuration-demercuration, and hydroborationoxidation of alkenes and recognize what reagents are required to carry out these transformations.
12.7 Identify reagents for conversion of alkenes to cyclopropanes, oxacyclopropanes, and 1,2-diols and predict what products are formed.
12.8 Predict the products of alkene ozonolysis and recognize what reagents are required to carry out oxonolysis.
12.9 Recognize under what conditions radical addition may occur, and predict the products formed.
12.10 Describe and model alkene polymerization and predict the polymers formed.
13.1 Name alkynes according to the IUPAC rules and identify properties of alkynes based on structure
13.2 Identify starting molecules and reagents used to synthesize alkynes
13.3 Compare addition reactions of alkynes to those of alkenes and predict the products formed as a result of addition reactions.
13.4 Distinguish processes that lead to single versus double addition
13.5 Model and interpret mechanisms for electrophilic addition reactions to alkynes
13.6 Compare Markovnikov to anti-Markovnikov alkyne hydrations
13.7 Relate alkenols to their carbonyl tautomers

13.8 Predict the products of the organometallic chemistry of alkenyl halides and identify organometallic reagents

14.1 Model and interpret π delocalization

14.2 Compare kinetic versus thermodynamic product formation in the electrophilic attack on conjugated dienes

14.3 Predict the products of the Diels-Alder cycloaddition and its stereochemistry

SPECIAL COURSE EXPECTATIONS DURING COVID-19

Maintaining a safe campus during the ongoing COVID-19 pandemic remains a top priority. UToledo continues to follow the guidance of the U.S. Centers for Disease Control and Prevention and Ohio Department of Health to keep our campus safe.

ATTENDANCE

The University of Toledo has a missed class policy. It is important that students and instructors discuss attendance requirements for the course. Before coming to campus each day, students should take their temperature and complete a self-assessment for symptoms of COVID-19, such as cough, chills, fatigue or shortness of breath. Anyone with a temperature at or above 100.0 degrees Fahrenheit or who is experiencing symptoms consistent with COVID-19 should not come to campus and should contact their primary care physician or the Main Campus Health Center at 419.530.3451 or Health Science Campus Student Health and Wellness Center at 419.383.5000. For more information on the symptoms of COVID-19, please go to https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

COVID-19 testing for sick students is available on both Main Campus and Health Science Campus. Call 419.383.4545 for an appointment. Absences due to COVID-19 quarantine or isolation requirements **are** considered excused absences. Students should notify their instructors and follow the protocols summarized in this document on Navigating COVID-Related Course Concerns.

In the event that you have tested positive for COVID-19 or have been diagnosed as a probable case, please review the CDC guidance on self-isolation and symptom monitoring, and report the disclosure to the Division of Student Affairs by emailing StudentAffairs@utoledo.edu or by connecting with their on-call representative at 419.343.9946. Disclosure is voluntary and will only be shared on a need to know basis with staff such as in the Office of Student Advocacy and Support, The Office of Residence Life, and/or the Office of Accessibility and Disability Resources to coordinate supportive measures and meet contact tracing requirements.

FACE COVERINGS

Face coverings are required while on campus, except while eating, alone in an enclosed space, or outdoors practicing social distancing. Students will not be permitted in class without a face covering. If you have a medical reason preventing you from wearing a face covering due to a health condition deemed high-risk by the CDC, submit an online application to request an accommodation through the

Office of Accessibility and Disability Resources. Students will need to provide documentation that verifies their health condition or disability and supports the need for accommodations. Students already affiliated with the Office of Accessibility and Disability Resources who would like to request additional accommodations due to the impact of COVID-19, should contact their accessibility specialist to discuss their specific needs. You may connect with the office by calling 419.530.4981 or sending an email to StudentDisability@utoledo.edu.

VACCINATION

Doctors and other health care professionals agree that the best way to protect ourselves and each other is to get vaccinated. Case data clearly show that vaccines remain highly effective at preventing serious illness from COVID, including the highly contagious delta variant. If you have not yet received your COVID vaccine, the University encourages you do so as soon as possible. No appointment is needed to get the shot at the UTMC Outpatient Pharmacy, University Health Clinic or Main Campus Pharmacy. Once you receive the COVID vaccination, please register on the COVID Vaccine Registry site at: https://utvaccinereg.utoledo.edu/.

SPECIAL NOTES

It's important to note, that based on the unpredictability of the COVID-19 virus, things can change at any time. So please be patient and understanding as we move through the semester. Please refer to https://www.utoledo.edu/coronavirus/ on a regular basis for updates to current requirements or mandates. I also ask that you keep me informed of concerns you may have about class, completing course work/assignments timely and/or health concerns related to COVID.