

Organic Chemistry I

CHEM-2411

Spring 2021 Section E01 3 Credits 01/09/2021 to 05/11/2021 Modified 01/12/2021

Description

The first course of a two semester sequence which provides a broad introduction to the basic principles, theories and applications of the chemistry of carbon compounds. Topics will include modern structural theory, organic nomenclature, stereochemistry, reaction mechanisms and kinetics, and an introduction to functional group chemistry. Also covers the interpretation of IR, NMR, and mass spectroscopy for the structure determination of organic compounds. CHEM 2411L may be taken concurrently.

Requisites

Prerequisites:

(CHEM 1212 Minimum Grade: B and CHEM 1212L Minimum Grade: C) or CHEM 1212K Minimum Grade: B

Corequisites:

CHEM 2411L

Contact Information

Instructor: Dr. Partha Ray

Email: psray@westga.edu

Please do not use the CourseDen email as these will not be read.

Office Hours

Virtual Office Hours: MTRF: 10 AM – 12 PM (please email me to set up a time: psray@westga.edu (please do not use CourseDen email as these will not be read).

Meeting Times

Online Course

Materials

Organic Chemistry: Structure, Mechanism, and Synthesis

Author: Robert J. Ouellette and J. David Rawn

Publisher: Elsevier

Edition: First

ISBN: 978-0-12-800780-8

Availability: Free online

Price: Free online

A "how to access and read" guide for the above free online textbook can be found under Content in CourseDen.

ACS Questions and Study Guide

Preparing for Your ACS Examination in Organic Chemistry: The Official Guide, by Dwaine & Lucy Eubanks (2002).

Availability: Bookstore

Outcomes

1. Reason and think analytically in solving problems and making decisions in matters involving organic chemistry. Attainment of this learning outcome will be reflected by the students ability to:
 - Select reagents to accomplish appropriate functional group transformations.
 - Draw the product of a chemical reaction.
 - Indicate the appropriate stereochemistry of organic molecules.
2. Apply a basic understanding of the systematic methods of scientific inquiry, principles and procedures to investigate problems. Attainment of this learning outcome will be reflected by the students ability to:
 - Describe the mechanism of particular organic reactions.
 - Analyze IR, NMR and Mass Spectral signals to determine the structure of unknown organic molecules.
3. To communicate organic chemistry with clarity.

Successfully complete quizzes, tests and final examination.

Course Objective: The goal of this course is for you learn the fundamental concepts, rules, and language of Organic Chemistry and use them to solve Organic Chemistry problems. Organic Chemists communicate mostly by drawing structures and mechanisms and by interpreting physical data, particularly, spectroscopic data. It is hoped that you will learn how to begin communicating as an Organic Chemist and I hope that you will build on this foundation in Organic Chemistry II (CHEM 3422). Hopefully, you will realize how understanding the basic concepts and rules used in Organic Chemistry helps us to comprehend biological and chemical processes and the essential role of Organic Chemists in the discovery and manufacture of medicines, crop-protection chemicals, and polymers without which our lives would be far more precarious.

Evaluation

Quizzes, Tests and Final Exam

There will be a quiz and a test each week according to the schedule shown. Each quiz and test will be available on CourseDen (under Assessments then Quizzes) from 12:00 AM (00:00) – 11:00 PM (23:00) on the dates shown below in the Table. Both quizzes and tests will consist of 10 multiple choice questions. While you will have 60 minutes to complete a quiz, you will have 20 minutes to complete a test. Please note that the American Chemical Society (ACS) allows 1.57 minutes per question on its Organic Chemistry multiple choice exams. For the tests and the final exam you will not be able to move backwards through question pages. You may see the questions you answered incorrectly during a 12h window the day after the quiz/test starting at 10 AM. There are no make-up quizzes or tests, so please make sure that you remember the dates (Wednesdays for quizzes and Mondays for tests). Please note that the first test can be taken on Monday, January 18 or Tuesday, January 19, since January 18 is Martin Luther King Jr. Day. Also, there is a 5 minute grace period for quizzes and a 3 minute grace period for tests. Make sure that you submit your quiz/test before the grace period expires.

The final exam, consisting of 35 multiple choice questions, will be available from 12 AM (00:00) to 11:00 PM (23:00) on Wednesday, May 5. You will have 60 minutes to complete the final exam. You must take the final exam to pass the class.

All quizzes and tests, and the final exam are open book and open notes, but closed neighbor and internet (see Academic Honesty below).

Grades: A: 85-100; B: 75-84; C: 60-74; D: 50-59; F: 0-49.

Breakdown

Your grade will be based on the average of quizzes (10%), tests (70%) and final exam (20%).

At the end of the semester, if your overall score is short of a higher grade by less than 1%, I will look at your viewing history of my video lectures on CourseDen to decide if you are deserving of the higher grade. Your viewing history must be at least 90% to qualify for this consideration.

Note: Extra credit is not allowed for this class, and work completed for another class will not be accepted in this class.

Assignments

Video Lectures

I have made video lectures for most topics to help you learn and understand the material. They are posted on CourseDen under Content. Chapter 4 videos 1 – 10 are from the Khan Academy (you should watch these before the Molecular Modeling Lab).

Note: I have not made any videos regarding functional groups (Ch2, part 1), you need to memorize the structures of the different functional groups. Regarding nomenclature of alkanes, please read sections 4.1 – 4.3 before looking at the worked examples video for Chapter 4.

Schedule

Quiz/Test Schedule and Topics

#	Quiz Dates	Test Dates	Chapter(s)/Sections	Video Lecture Topics (see Content in CourseDen)
1	01/13	01/18 or 01/19	Ch1 (Structure & Bonding): 1.2 – 1.6, 1.12 – 1.19	1. sp^3 hybridization 2. sp^2 & sp hybridization 3. Formal charges, polar covalent bonds, dipole moments
2	01/20	01/25	Ch1 (Structure & Bonding): 1.7 – 1.9 Ch2: Part 1 All sections	4. Resonance Note: questions on dipole moments will appear on this quiz/test
3	01/27	02/01	Ch3 (Intro to Reaction Mechanisms): 3.1, 3.3, 3.4, 3.8, 3.9, 3.12	1. Acid Base Chemistry 2. Reaction Mechanisms 3. Stability of Carbon Intermediates

4	02/03	02/08	Ch4 (Alkanes & Cycloalkanes): All sections except 4.10	1. Conformations of ethane 2. Conformations of propane 3. Conformations of butane 4. Newman projections practice 1 5. Newman projections practice 2 6. Conformations of cyclohexane 7. Drawing chair conformations 8. Monosubstituted cyclohexane 9. Disubstituted cyclohexane 10. Polysubstituted cyclohexane 11. Conformations of cyclohexane 12. Chlorination of alkanes 13. Worked examples
5	02/10	02/15	Ch5 (Alkenes: Structure and Properties): All sections	1. Alkenes-structure & properties 2. Reduction & stability of alkenes
6	02/17	02/22	Ch6 (Alkenes: Addition Reactions): 6.1 – 6.6 (includes oxymercuration & hydroboration, see video lectures)	1. Addition of HX to alkenes 2. Addition of X ₂ to alkenes 3. Hydration of alkenes
7	02/24	03/01	Ch6 (Addition Reactions): 6.7 – 6.10	4. Reactions with carbenes & RCO ₃ H 5. Reactions with OsO ₄ , O ₃ & KMnO ₄
8	03/03	03/08	Ch7 (Alkynes): All sections (includes oxymercuration & hydroboration, see video lectures)	Reactions of alkynes
9	03/10	03/22	Ch8 (Stereochemistry): All sections except 8.12	1. Chirality and optical activity 2. Fischer projections, Diastereomers & meso compounds 3. Production of Stereogenic Centers 4. Resolution of Enantiomers

10	03/24	03/29	Ch9 (Organohalides): 9.1, 9.2, 9.4, 9.6, 9.13 Ch11: (p370 – 373; allylic bromination) Ch17: 17.2 (Gilman Reagent)	1. Alkyl halides from Alcohols 2. Allylic bromination 3. Grignard & Organolithium Reagents 4. Gilman Reagents
11	03/31	04/05	Ch14: 14.1 – 14.10 (NMR)	1. Proton NMR Part 1 2. Proton NMR Part 2 3. Carbon-13 NMR
12	04/07	04/12	Ch9: 9.7 – 9.9, Ch10: 10.1, 10.3, 10.4 (Substitution Reactions)	1. SN2 Reactions 2. SN1 Reactions
13	04/14	04/19	Ch9: 9.14 – 9.16, Ch10: 10.5, 10.6 (Elimination Reactions)	1. E2 Reactions 2. E1 Reactions & Summary
			Review	Review videos will be posted
			Final Exam: Wednesday, May 5	

* Course Policies and Resources

Announcements and Communications

All announcements will be posted on CourseDen and communications should be via campus mail (myUWG), and not via CourseDen as these will not be read. You are expected to check for announcements on CourseDen and check your UWG email daily.

Academic Honesty:

The exams are open book, “closed-neighbor”. You are permitted to refer to your textbook and notes and use scratch paper to work out problems (these should be destroyed after each test and the final exam). However, you are NOT allowed to use the open internet or other people for answers to the questions. You may not take pictures of the questions. Behavior following the UWG honor code is expected.

Institutional Policies

Academic Support

Accessibility Services: Students with a documented disability may work with UWG Accessibility Services to receive essential services specific to their disability. All entitlements to accommodations are based on documentation and USG Board of Regents standards. If a student needs course adaptations or accommodations because of a disability or chronic illness, or if he/she needs to make special arrangements in case the building must be evacuated, the student should notify his/her instructor in writing and

provide a copy of his/her Student Accommodations Report (SAR), which is available only from Accessibility Services. Faculty cannot offer accommodations without timely receipt of the SAR; further, no retroactive accommodations will be given. For more information, please contact [Accessibility Services \(https://www.westga.edu/student-services/counseling/accessibility-services.php\)](https://www.westga.edu/student-services/counseling/accessibility-services.php).

Center for Academic Success: The [Center for Academic Success \(http://www.westga.edu/cas/\)](http://www.westga.edu/cas/) provides services, programs, and opportunities to help all undergraduate students succeed academically. For more information, contact them: 678-839-6280 or cas@westga.edu.

University Writing Center: The [University Writing Center \(https://www.westga.edu/writing/\)](https://www.westga.edu/writing/) assists students with all areas of the writing process. For more information, contact them: 678-839-6513 or writing@westga.edu.

Online Courses

UWG takes students' privacy concerns seriously: technology-enhanced and partially and fully online courses use sites and entities beyond UWG and students have the right to know the privacy policies of these entities. For more information on privacy and accessibility for the most commonly used sites, as well as technology requirements visit the [UWG Online \(https://uwgonline.westga.edu/\)](https://uwgonline.westga.edu/) site.

Students enrolled in online courses can find answers to many of their questions in the [Online/Off-Campus Student Guide \(http://uwgonline.westga.edu/online-student-guide.php\)](http://uwgonline.westga.edu/online-student-guide.php).

If a student is experiencing distress and needs help, please see the resources available at the [UWG Cares \(http://www.westga.edu/UWGCares/\)](http://www.westga.edu/UWGCares/) site. [Online counseling \(https://www.westga.edu/student-services/counseling/index.php\)](https://www.westga.edu/student-services/counseling/index.php) is also available for online students.

Honor Code

At the University of West Georgia, we believe that academic and personal integrity are based upon honesty, trust, fairness, respect, and responsibility. Students at West Georgia assume responsibility for upholding the honor code. West Georgia students pledge to refrain from engaging in acts that do not maintain academic and personal integrity. These include, but are not limited to, plagiarism, cheating, fabrication, aid of academic dishonesty, lying, bribery or threats, and stealing.

The University of West Georgia maintains and monitors a confidential Academic Dishonesty Tracking System. This database collects and reports patterns of repeated student violations across all the Colleges, the Ingram Library, and the School of Nursing. Each incidence of academic dishonesty is subject to review and consideration by the instructor, and is subject to a range of academic penalties including, but not limited to, failing the assignment and/or failing the course. Student conduct sanctions range from verbal warning to suspension or expulsion depending on the magnitude of the offense and/or number of offenses. The incident becomes part of the student's conduct record at UWG.

Additionally, the student is responsible for safeguarding his/her computer account. The student's account and network connection are for his/her individual use. A computer account is to be used only by the person to whom it has been issued. The student is responsible for all actions originating through his/her account or network connection. Students must not impersonate others or misrepresent or conceal their identities in electronic messages and actions. For more information on the University of West Georgia Honor Code, please see the [Student Handbook \(https://www.westga.edu/administration/vpsa/handbook-code-of-conduct.php\)](https://www.westga.edu/administration/vpsa/handbook-code-of-conduct.php).

UWG Email Policy

University of West Georgia students are provided a MyUWG e-mail account. The University considers this account to be an official means of communication between the University and the student. The purpose of the official use of the student e-mail account is to provide an effective means of communicating important university related information to UWG students in a timely manner. It is the student's responsibility to check his or her email.

Credit Hour Policy

The University of West Georgia grants one semester hour of credit for work equivalent to a minimum of one hour (50 minutes) of in-class or other direct faculty instruction AND two hours of student work outside of class per week for approximately fifteen weeks. For each course, the course syllabus will document the amount of in-class (or other direct faculty instruction) and out-of-

class work required to earn the credit hour(s) assigned to the course. Out-of-class work will include all forms of credit-bearing activity, including but not limited to assignments, readings, observations, and musical practice. Where available, the university grants academic credit for students who verify via competency-based testing, that they have accomplished the learning outcomes associated with a course that would normally meet the requirements outlined above (e.g. AP credit, CLEP, and departmental exams).

HB 280 (Campus Carry)

UWG follows University System of Georgia (USG) guidance: http://www.usg.edu/hb280/additional_information# (http://www.usg.edu/hb280/additional_information)

You may also visit our website for help with USG Guidance: <https://www.westga.edu/police/campus-carry.php> (<https://www.westga.edu/police/campus-carry.php>)

Mental Health Support

If you or another student find that you are experiencing a mental health issue, free confidential services are available on campus in the [Counseling Center](#). Students who have experienced sexual or domestic violence may receive confidential medical and advocacy services with the Patient Advocates in [Health Services](#). To report a concern anonymously, please go to [UWGcares](#).

ELL Resources

If you are a student having difficulty with English language skills, and / or U.S. culture is not your home culture, specialized resources are available to help you succeed. Please visit the [E.L.L. resource page](#) for more information.

COVID-19

Proctored Exams/Online Instruction: Students should be aware and plan ahead for the possibility of having to complete all courses and/or exams online or in a proctored environment. This means talking with your instructors about what minimum technical requirements (software and hardware) will be required should your class move online or a student's personal needs dictate. This also includes making plans for internet access at whatever location participation may occur.

Virtual or in-person proctored exams, if your instructor should require them, may result in an additional cost to the student. Please discuss these details with your instructor or see the information provided here.

Face Coverings: Effective July 15, 2020, University System of Georgia institutions, including the University of West Georgia, will require all faculty, staff, students, and visitors to wear an appropriate face covering while inside campus facilities/buildings where six feet social distancing may not always be possible. Face covering use will be in addition to and is not a substitute for social distancing.

Face coverings are not required in campus outdoor settings where social distancing requirements are met. Anyone not using a face covering when required will be asked to wear one or must leave the area.

Reasonable accommodations may be made for those who are unable to wear a face covering for documented health reasons.

Student FAQs: For more information about UWG COVID-19 guidance for students visit the [Student FAQ webpage](#) (<https://www.westga.edu/student-services/health/coronavirus-info/return-to-campus/students-faq-return-to-campus.php>).

Additional Items

Supplemental Instruction (SI)

Mr. Lay Patel is the Student Instructor for this class, and he will contact you with more information about this useful resource and you are encouraged to attend as many sessions as you can.

Advice on How to Study For This Class

1. Take notes while looking at the video lectures (pause often). There is no better way to learn and **retain** the material than to make your own. Reading notes made by someone else is not a good way to **understand** the material in this class. Notes are only useful **after** you have understood the material.
2. Read the appropriate material in the textbook of the sections you viewed in the videos and add to your notes.
3. I recommend re-watching the videos multiple times until the material really sinks in. (Warning: You most likely will not find my videos entertaining. If you are looking for entertainment, I suggest watching a movie: Gladiator perhaps!) Seriously though, I do think you will find the lecture videos instructive and useful and I cannot overstate the importance of taking the time to watch them and giving them your undivided attention. I do go through the material at a fairly slow pace (my many years of experience of teaching Organic Chemistry has taught me that most students appreciate this), however, if the pace is to slow for you, the solution is simple: just speed up the video.
4. Work the in-chapter problems and check your answers at the end of the book.
5. Test yourself with the multiple-choice problems from the ACS book (the relevant problem numbers are posted on CourseDen (Under Content then ACS Questions)).
6. If you have time, work on some of the end of chapter problems related to the topics you studied (the problems are grouped in sections based on topic).
7. Take the quiz on CourseDen on Wednesdays (starting 1/13). You will have 60 minutes to complete the quiz. Review the topics for questions you answered incorrectly. You must understand **why** the answer is what it is. The answers to your incorrect responses will be available for 12h starting at 10 AM the day after each quiz and test.
8. Take the test on the following Monday (starting on 1/18). Remember, you have 20 minutes to answer 10 questions (ACS allows for 1.57 minutes per question for its multiple-choice tests), and you will not be allowed to move backwards through the questions.
9. When you tackle multiple-choice questions, the best strategy is NOT to look at the given answers (when possible). Work out the solution using rules, concepts, mechanisms, synthetic strategies, and/or spectral data as appropriate. Provided you understand what you are doing, the answer you arrive at should be the correct answer. No need to waste time looking at the other options, move on to the next question. Remember, time is a factor in an exam. Also, you should become so familiar with simple mechanisms, that you should be able to visualize the mechanism without drawing it all out which takes up valuable exam time. This comes with practice after you have drawn out similar mechanisms several times while working on several problems. Do not just memorize the mechanism, try and understand the concepts behind the mechanistic arrow pushing. Yes, this class will take a lot of your time. Unfortunately, there are no quick and easy ways to learn and understand this material. You must have self-discipline and good study habits to succeed in this class. I am sure that there are a hundred and one things that you would be rather doing than reading about organic chemistry. It is my hope, however, that once you begin to understand the material, you may actually begin to enjoy the subject!
10. Organic chemistry builds on itself, meaning that the rules and concepts you learn in the earlier chapters will be reused and built upon in later material including Organic Chemistry II. As we proceed throughout the semester, it will be assumed you have understood the rules and concepts from earlier material. So, the better you understand when and how to use the rules and concepts this semester, the better prepared you will be for Organic Chemistry II.
11. Attend as many of the Student Instruction (SI) sessions as you can. These sessions are there to help you learn the material, but they can only be effective if you do your part and participate and ask questions. If your questions are not answered to your satisfaction during the SI sessions, don't hesitate to contact me at psray@westga.edu (please do not use CourseDen email, as these will not be read).
12. Repeat steps 1-8 for each quiz/test according to the schedule above.