

Organic Chemistry II
Spring 2025
University of Mary Washington

Professor: Davis Oldham
Office: 438 Jepson
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Lecture: MWF 10:00 – 10:50 am, Jepson 229
Lab: 9:30 pm – 12:15 pm or 12:30 pm – 3:15 pm, Thursday, Jepson 213

Study Hrs: MWF 9 am – 10 am, MT 1 pm – 2 pm

Textbooks and Supplies

Required:

- Klein, D.K; Organic Chemistry. 4th edition. John Wiley and Sons Inc, New York. 2021
- Subscription to WileyPlus
- Mohrig, J.R.; Hammond, C.N.; Schatz, P.F. Techniques in Organic Chemistry 4th Edition. W.H. Freeman Company, New York. 2010
- Laboratory notebook, goggles, lab coat, sharpie marker (see lab policies document for details)
- \$20 for printing on your Eagle One card, or access to a printer

Recommended:

- Model kit
- Klein, D.K; Organic Chemistry I,II as a Second Language: Translating the Basic Concepts. Wiley, New York. 2007

Prerequisite: A C or better in CHEM 211.

Continuation to CHEM 317: A grade of C or better is required to take CHEM 317 (Biochemistry I).

Course website: I will make use Canvas to communicate with you regularly. Make sure that you know how to use Canvas and set up the needed alerts. Please keep your UMW mailboxes empty enough that you can receive any e-mails and keep this line of communication open. You are responsible for all communication from me in this class, whether it is in lecture, lab, or e-mail.

Course Description: CHEM 212 is more of a synthesis class than CHEM 211, which focused on the key principles of studying reaction mechanisms and basic lab skills. You will be assessed both on your ability to construct synthetic schemes and your understanding of *how* and *why* certain reactions take place. The reactions discussed in this semester will primarily focus on the reactions of the major functional groups of organic chemistry: alkenes, alkynes, alcohols, ethers, amines, and the carbonyl groups. Time permitting, carbohydrates and polymers will also be discussed.

Course Objectives

After completing the course, a student should

- Know the molecular structure, including the stereochemistry, and nomenclature of several classes of organic compounds, especially carbonyl-containing and aromatic molecules

- Understand how these functional groups can be interconverted through synthetic sequences
- Have developed laboratory techniques for the preparation and analysis of organic compounds, including spectroscopic methods (NMR and IR)

Class format:

This class is a flipped classroom, meaning that the initial exposure to the material will take place outside of class; class time will be used for group work (i.e. "homework") and mini-lectures or other methods of clarifying material.

Grades and Assignments:

Grade Weighting

Class prep	20 points
Homework	100 points
In class assignments	30 points
Exams (4 exams @ 100 points each)	400 points
Laboratory assignments	250 points
Final exam	200 points

Letter grades will be assigned based on the following scale. Grades are rounded to the nearest integer. No exceptions will be made!

A: > 925 points	A-: 895 – 924 points	
B+: 865 – 894 points	B: 825 – 864 points	B-: 795 – 824 points
C+: 765 – 794 points	C: 725 – 764 points	C-: 695 – 724 points
D+: 665 – 694 points	D: 595 – 664 points	
F: < 595 points		

Students with a course grade of 75% or less will receive a mid-semester unsatisfactory report.

Class prep

Before most class periods, there will be multiple choice quizzes available on Canvas. These quizzes are designed to test basic conceptual understanding which will be further developed in class.

Homework

Practice problems will be due most Wednesdays. These problem sets will be posted on Canvas.

Exams

There are 4 in-class 50-minute exams throughout the course of the semester. Each will cover the material covered in the classes prior to the exam. Exams will not be rescheduled without notification prior to the week of the exam; rescheduling is at the discretion of the instructor.

Laboratory Assignments:

Missing more than two labs will result in an automatic F for the class. If you must miss lab, please notify the instructor prior to the week of the lab. Making up labs may be done at the instructor's discretion.

Lab reports are due at the beginning of the next lab following the completion of the lab unless otherwise specified by the instructor.

Final Exam:

The final exam for this course is the comprehensive Organic Exam from the American Chemical Society. It is a 70 question, 120-minute multiple choice exam, including spectroscopy. The final exam for this course will be held in accordance with the schedule posted by UMW Academic Services. It is University policy that missing a final exam will result in a grade of F for the course. A review sheet and further information will be provided. A study guide for the ACS exams is available at the ACS exams website for \$25.00.

<http://shopping.na1.netsuite.com/examsinstitute>. Practice exams are also available at the same website.

Please bring **only** pencils and erasers. No calculators, cellphones, or anything else will be permitted. All backpacks/bags and electronic devices will be placed around the perimeter of the classroom during the exam.

Classroom Policies:

Attendance:

Attendance is not taken daily. However, there will often be group assignments (quizzes or other worksheets) which are collected and graded. These assignments cannot be made up, as they are designed for students to be working together.

Tardiness

Entering class late is a distraction to your classmates, and I discuss "class business" during the first 5 minutes of the class, therefore it is important that you arrive on time. If you are late, enter and get organized quietly. If you need to leave the room during class, please go and return quietly. Attendance policies in lab are outlined in the laboratory syllabus. Importantly, if you are late to lab, you will not be allowed to enter.

Electronic devices: Cell phones or other electronic devices are not to be used in class or in lab. They must be turned off during class sessions. Laptops and tablets are only permitted in class for note-taking purposes. These devices won't be needed in lab; furthermore, the lab is not a safe place for them. Please make sure they are stored away from your work area, so they are not damaged by reagents or solvents. It is a policy of the chemistry department that headphones are not to be worn in the laboratory at any time.

Academic Dishonesty: The honor system, as outlined on the UMW Fredericksburg Honor Council Website will be strictly enforced in this course. Students are reminded of their obligation to abide by the code, including reporting observed violations to the Honor Council. The honor pledge will be written on all graded work. Books, notes, cell phones, PDAs and other electronic devices are not allowed during exams. A calculator may be used, but it must not contain any chemical information that could be used during an exam. All written work is to be prepared "in your own words". Guidelines for source use must be followed.

<http://www.umw.edu/honor/fredericksburg/default.php>

ADA: The Office of Disability Resources has been designated by the college as the primary office to guide, counsel, and assist students with disabilities. If you receive services through the Office of Disability Resources and require accommodations for this class, make an appointment with me as soon as possible to discuss your approved accommodation needs. Bring your accommodation letter, along with a copy of our class syllabus with you to the appointment. I will hold any information you share with me in strictest confidence unless you give me permission to do otherwise.

If you have not made contact with the Office of Disability Resources and have reasonable accommodation needs, (note taking assistance, extended time for tests, etc.), I will be happy to refer you. The office will require appropriate documentation of disability.

Title IX

University of Mary Washington faculty are committed to supporting students and upholding the University's *Policy on Sexual and Gender Based Harassment and Other Forms of Interpersonal Violence*. Under Title IX and this Policy, discrimination based upon sex or gender is prohibited. If you experience an incident of sex or gender-based discrimination, we encourage you to report it. ***While you may talk to me, understand that as a "Responsible Employee" of the University, I MUST report to UMW's Title IX Coordinator what you share.*** If you wish to speak to someone confidentially, please contact the below confidential resources. They can connect you with support services and help you explore your options. You may also seek assistance from UMW's Title IX Coordinator. Please visit <http://diversity.umw.edu/title-ix/> to view UMW's *Policy on Sexual and Gender Based Harassment and Other Forms of Interpersonal Violence* and to find further information on support and resources.

Policy on Recording of Class

In this class, students may not make audio or video recordings of any course activity unless the student has an approved accommodation from the Office of Disability Resources permitting the recording class meetings. In such cases, the accommodation letter must be presented to the instructor in advance of any recording being done and all students in the course will be notified whenever recording will be taking place. Students who are permitted to record classes are not permitted to redistribute audio or video recordings of statements or comments from the course to individuals who are not students in the course without the express permission of the faculty member and of any students who are recorded. Distribution without permission is a violation of educational privacy law. This policy is consistent with UMW's Policy on Recording Class and Distribution of Course Materials.

Recommended problems: In addition to assigned problems, I recommend practicing problems from your textbook. Complete as many as you can, choosing different types of problems from different sections. Once you have completed those problems, you are welcome to seek out additional problems in other organic textbooks in the library, or my office. Repetition is the key to success in organic chemistry, especially to move beyond simple memorization.

Suggestions for success:

I hope that you have realized, after taking CHEM 211, that organic chemistry is one of the most challenging but rewarding branches of chemistry. This course, by necessity, moves quickly to cover all the material necessary for success in future classes (especially

biochemistry and other biology classes). To not fall behind, I recommend reading through the strategies presented below. If you are not approaching this class as a part-time, if not a full-time job, you are not spending enough time with the material.

The most important piece of advice I can give to you is to devote enough time to the course. We will be covering one chapter per week in class. Most students will require at least 12 hours per week outside of class to sufficiently grasp the material and receive a grade of B. Take a very honest look at your class and work schedules and personal obligations and make any necessary adjustments. How you spend your 12 hours is another very important factor. I find organic chemistry to be most like learning a foreign language. To become fluent, there are things you need to memorize and things you need to learn.

Recommended strategies

1. Read (or at least scan) the chapter before class. I put this first because this is honestly one of the most important things you can do.
2. Be attentive and participate in class. Don't be afraid to ask questions, or to offer an answer. Students who sit near the front of class, ask, and answer questions usually do much better in class than students who sit at the back and sleep. I don't take points off or even judge students who volunteer incorrect information.
3. Re-read your notes within 24 hours of lecture. Re-work all reactions and examples covered in class. Use your book to fill in any gaps. Discuss the material with your classmates.
4. Bring any questions to me during office hours. I love talking about organic chemistry. I can't give you the answers to homework, but I will work with you until the material "clicks".
5. Work the in chapter problems as you work on each section. Work the end of chapter problems. Work 2 or 3, then check them using the solutions manual. If you don't get it write, rework the problem so that you are actively writing down the correct answer.
6. Study both individually and in groups. Working in groups forces you to explain your thinking to others, which is one of the best methods of learning.
7. As the exam comes closer, re-work problems that gave you difficulty.
8. Come to office hours as soon as you realize that you are not understanding, falling behind, or getting confused.

Tentative course schedule, Spring 2025

Week	M		W		F	
1	Jan 13	Orgo 1. review	Jan 15	Alcohols	Jan 17	Alcohols
2	Jan 20	NO CLASS - MLK	Jan 22	Alcohols HW 1	Jan 24	Alcohols
3	Jan 27	Ethers and epoxides	Jan 29	Ethers and epoxides HW 2	Jan 31	Exam 1
4	Feb 03	Ethers and epoxides	Feb 05	Aldehydes / ketones HW 3	Feb 07	Aldehydes / ketones
5	Feb 10	Aldehydes / ketones	Feb 12	Carboxylic acid derivatives HW 4	Feb 14	Carboxylic acid derivatives
6	Feb 17	Carboxylic acid derivatives	Feb 19	Carboxylic acid derivatives HW 5	Feb 21	Exam 2
7	Feb 24	Enolates	Feb 26	Enolates	Feb 28	Enolates
	Mar 03	SPRING BREAK	Mar 05	SPRING BREAK	Mar 07	SPRING BREAK
8	Mar 10	Enolates	Mar 12	Enolates HW 6	Mar 14	Dienes
9	Mar 17	Dienes	Mar 19	Dienes HW 7	Mar 21	Aromaticity
10	Mar 24	Aromaticity	Mar 26	EAS HW 8	Mar 28	Exam 3
11	Mar 31	EAS	Apr 02	EAS	Apr 04	Amines
12	Apr 07	Amines	Apr 09	Amines HW 9	Apr 11	Bioorganic
13	Apr 14	Bioorganic	Apr 16	Bioorganic HW 10	Apr 18	Exam 4
14	Apr 21	Review	Apr 23	Review	Apr 25	R & C

Final exam: Friday, May 2nd, 8:30 am

Tentative Chem 212 Lab Schedule

The order of labs may change at instructor's discretion

Week	Day	Lab activity	Assignments due
Week 1	Jan 16	Lab review	
Week 2	Jan 23	Grignard synthesis	
Week 3	Jan 30	Grignard synthesis or computational chemistry	Grignard synthesis
Week 4	Feb 06	Carvone epoxidation	Grignard synthesis or computational chemistry
Week 5	Feb 13	Horner-Wadsworth-Emmons synthesis	Carvone epoxidation
Week 6	Feb 20	Unknown identification	Horner-Wadsworth-Emmons synthesis
Week 7	Feb 27	Unknown identification	
	Mar 06	SPRING BREAK	
Week 8	Mar 13	Unknown identification	
Week 9	Mar 20	Aldol condensation	Unknown identification
Week 10	Mar 27	Diels-Alder reaction	Aldol condensation
Week 11	Apr 03	Polystyrene synthesis	Diels-Alder
Week 12	Apr 10	Acetylferrocene synthesis	Polystyrene synthesis
Week 13	Apr 17	Column chromatography	
Week 14	Apr 24	Lab final	Column chromatography