Organic Chemistry I — Fall 2018
CHEM 211 — Section 2 (CRN 80140)

Instructor:	Kelli M. Slunt		
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Office Hours: 9 am – 9:50 am M (Jepson 437)
9 am-10:50 am T and F (Jepson 437)
& by appointment (through EAB/Navigate https://umw.campus.eab.com)
Office hours are subject to change – when possible, changes will be announced in advance

Lecture 11:00-11:50 am MWF, Jepson 219
Laboratory 1:00-3:50 pm W, Jepson 213

Course Materials (required)

- Organic Chemistry, David Klein, 3rd edition and WileyPLUS– no traditional hardcopy – only looseleaf or e-Book
- Coursepack containing in-class exercises
- access to internet and Canvas – lecture materials will be posted on Canvas and Youtube (links will be provided)
- umw email account – it is expected that you will check your email and Canvas regularly
- money for printing on your Eagle One card or access to a printer – you may want to print materials for the lecture or will need to be able to view the materials on a computer, tablet or cell phone
- blue books – one for each exam (5 total for both lecture and lab)
- non-programmable scientific calculator – you need to bring this to you each day to lecture and lab
- cell phone, tablet, or computer that can access the internet during class for online exercises – access to Socrative program or website

(recommended)

- Model kit
- Klein, D.; *Organic Chemistry as a Second Language*
- ACS Organic Chemistry Exam Study Guide

You should bring your non-programmable calculator and computer, tablet, or cell phoneS to class each day in case it is required for a online quiz or in-class assignment. You will be required to bring a blank blue book and a non-programmable calculator for each exam. You are not permitted to have cellular phones, programmable calculators, or other electronic devices during an exam.

Course Description
Organic chemistry is designed to illustrate the principles of bonding and reactivity in carbon based molecules.

After completing the course, a student should

- understand the key concepts of molecular structure and reaction mechanisms
- be able to apply those key concepts
- have developed laboratory techniques for the preparation and analysis of organic compounds, including spectroscopic methods

Course Prerequisite

The prerequisite for CHEM 211 is completion of CHEM 112 with a grade of C or higher. You must further earn a grade of C or better in this course (CHEM 211) in order to proceed to CHEM 212 in spring 2016.

Grading

The grade in the course will be based on the number of points accrued throughout the term.

Grade Component

- Examinations (4, 100 points each) – 400 points total
- Chapter assignments (number varies per chapter, see text for details) – 140 points total
- Laboratory (see lab syllabus for more details) – total 250 points
- Cumulative Final Examination (ACS First-term Organic Chemistry Exam) – December 11, 2019 at noon – 210 points

The final grade in the course will be calculated out of 1000 points and will be based on the following point scale:

Points accrued	Letter grade	Points accrued	Letter grade
$\geq$ 930 points	A	769-730 points	C
929-900 points	A-	729-700 points	C-
899-870 points	B+	699-670 points	D+
869-830 points	B	669-600 points	D
829-800 points	B-	$\leq$ 599 points	F
799-770 points	C+		

A mid-semester report of unsatisfactory (U) will be reported if you have a C- or below in the course thus far.

The departmental policy for incomplete grades can be found on the chemistry department website (http://cas.umw.edu/chemistry/academic-procedures/).

Flipped or Scrambled Classroom

The flipped or scrambled classroom will be utilized this semester in CHEM 211. Outside of the classroom, students will watch a video, read the textbook material, and complete recommended practice problems. If a student needs more information on a given topic, they can either re-view the instructor's lecture or could view other online lectures and/or re-read the material in the textbook.

Students will demonstrate mastery of material in several ways:

1) Online Socrative quizzes at the start of each lecture that test previously reviewed concepts
2) Pre-chapter assignments on Wiley Plus
3) In-class daily exercises completed as a group
4) Post-chapter assignments on Wiley Plus

The daily exercises (except on the days of exams) are designed to prompt critical thinking and discussion about key concepts learned outside of the classroom in the lectures and textbook. I will be circulating around the classroom during the problem solving process. After the problem is submitted, I will review the answers to each problem in the assignment and will use the time to address any misconceptions or challenges facing the students. Additional information about the format of the class can be found on *Canvas.*

The point values for each of the assignments above will vary each chapter. You may attempt as many of them as you wish. A maximum of 14 points per chapter will be recorded as part of your grade.

Note – the effectiveness of the flipped/scrambled classroom will be periodically evaluated throughout the semester and if adjustments are needed, I reserve the right to switch back to a more traditional lecture mode or a blended lecture mode. If adjustments will occur, this will be communicated to the students through an announcement in class and on *Canvas*.

Class Absences and Make-up Policy

Class attendance is important to your success in this course, especially because there will be daily quizzes and in-class assignments. You are responsible for all materials covered in class during your absence. You may only make-up an exam with appropriate documentation for the absence. The make-up must occur within one to two business days of the missed class period. If the make-up is scheduled after noon on the lecture day on which the corrected assessments are returned to the class, the student will complete an alternative assessment. Failure to meet these stipulations for the absence will result in a zero for the assignment. Consult the instructor *in advance* if you expect to be absent due to an intercollegiate athletic event, field trip for another class, attending a research conference, etc.

Lateness to the classroom is distracting to others and will impact the daily assessment. The daily quizzes will occur in the first five minutes of the class and will be collected five minutes after the quiz begins. A student arriving late to class will likely miss the Socrative assignment and these assignments cannot be made up. You will be able to earn points instead using the Wiley Plus assignments. Tardiness to an exam will result in less time allowed to complete the assignment.

Laboratory attendance is mandatory - students who miss more than 2 laboratories will automatically receive a failing grade in the course. Unexcused absences from laboratory

cannot be made up and will count as a zero lab grade. Excused absences may be made-up, if possible, at the **discretion of the instructor**. Consult the instructor *in advance* if you expect to be absent due to an intercollegiate athletic event, field trip for another class, attending a research conference, etc.

Exam Recaps
Exams (except for the lab and final exam) will be reviewed and returned to students with a check mark and score for answers that are 100% correct or an X indicating some part of the question is incorrect or incomplete; the specific error may not be indicated. If a student correctly answers 100% of the questions correctly, the assessment will be returned with a grade and the student will not complete the recap assignment. If a student missed an exam, they can elect to complete the recap assignment for partial credit.

It has been my experience that many students simply look at the final grade on the assignment and do not consider the written comments or critically think about their performance. Recently, I have found that students who receive returned work with feedback rather than a grade ultimately perform better than students who receive returned assessments with grades.

Details on the recap assignment are posted on *Canvas*. Students can earn points added to the exam grade by reviewing their answers, correcting the work, and identifying skills that need to be honed for the next assignment. The score on the recap questions will be averaged with the score on the original assessment and that will serve as the final score for the assessment. As there are a large number of assignments and the recap process requires that the papers be reviewed and graded twice, students will be permitted to recap one assignment per week. All assignments should be reviewed/recapped even if they are not submitted for a regrade. Students can meet during office hours to review assignments after regrades have been returned to the class.

Canvas and UMW Email
Canvas and the UMW email system will be utilized as the course management system and means of communication for the class and students should check both daily for updates and materials for the next day's lecture. For each day, a module in *Canvas* will be created. In the module, students will find a daily list of suggested readings from Klein, *Organic* Chemistry, 3rd edition, the youtube video link of the lecture, suggested practice problems from Klein, and any links to suggested supplemental material.

Cumulative Final Examination:
The final examination in this course is a cumulative standardized final examination developed by the American Chemical Society that will assess your knowledge about the organic chemistry topics covered this semester. A study guide for the ACS organic chemistry exams is available at the ACS exams website for $21.00 http://chemexams.chem.iastate.edu/guides/index.cfm.

NOTE: A student who has not taken a required final examination has not completed the course requirements and therefore fails the course. Pleases see the academic policies section

of the academic catalog for the procedure for rescheduling a final exam (https://academics.umw.edu/registrar/students/final-examinations/).

University Policies about Honor Code, Disability Resources, Title IX and Recording of Class Lectures

Please see the following website and review all of the policies that apply to this course (https://cas.umw.edu/chemistry/university-policy-statements-for-selected-courses/).

List of Topics to be covered – Klein Chapters 1-10, 14 and 15

Fundamentals

- Structural theory, Lewis structures, isomers, basic resonance theory
- Atomic, molecular, and hybrid orbitals, covalent bonding, shapes of molecules
- Polarity of molecules and bonds
- Physical properties and intermolecular forces
- Functional groups and families of organic compounds
- Acid and base properties, equilibria, and relative acid/base strengths
- Potential energy diagrams of reactions, activation energies of reactions

Introduction to Mechanisms and Synthesis

- Introduction to mechanisms
- Curved arrow notation
- Basic retrosynthetic analysis
- Synthesis of alkanes, alkenes, and alkynes

Organic Nomenclature

- IUPAC Nomenclature of alkanes, cycloalkanes, bicycloalkanes, alkenes, cycloalkenes, alkynes, alkyl halides, and alcohols
- R/S Nomenclature system for chiral molecules
- E/Z Nomenclature system for alkenes

Stereochemistry and Chirality

- Optical activity, specific rotation, optical purity, enantiomeric excess
- Enantiomers, diastereomers, meso compounds
- Stereochemistry in reactions
- Resolution of a racemic mixture

Hydrocarbons (Alkanes, cycloalkanes, alkenes, and alkynes)

- Structure and physical properties
- Conformational analysis of ethane and higher alkanes
- Relative stabilities of alkenes and alkynes
- Ring strain and conformations of cycloalkanes

Reactions

- Nucleophilic substitution reactions (S_N2 and S_N1)
- Elimination reactions (E2 and E1)
- Hydrogenation of alkenes and alkynes
- Reduction of alkyl halides
- Alkylation of terminal alkynes

- Dehydrohalogenation of alkyl halides, Zaitsev and Hofmann rules
- Dehydration of alcohols
- Rearrangements of carbocation intermediates
- Debromination of vicinal dibromides
- Addition of hydrogen halides, sulfuric acid, water, and halogens to alkenes and alkynes
- Formation of halohydrins
- Oxidations of alkenes and alkynes, syn hydroxylation, oxidative cleavage, ozonolysis

Tentative Course Calendar

Mondays	**Wednesdays**	**Fridays**
August 26 *First Day of Class* Course overview	August 28 Chapter 1	August 30 *Last date to add courses by 5 pm* Chapter 1
September 2 *Labor Day observed (no class)*	September 4 Chapter 1	September 6 Chapter 2
September 9 Chapter 2	September 11 Chapter 3	September 13 *Last day to drop the course without a grade of W* Chapter 3
September 16 **Exam 1**	September 18 Chapter 3	September 20 Chapter 4
September 23 Chapter 4	September 25 Chapter 4	September 27 Chapter 5
September 30 Chapter 5	October 2 Chapter 5	October 4 Chapter 5
October 7 Chapter 6	October 9 Chapter 6	October 11 Chapter 6
October 14 Fall Break (no class)	October 16 Chapter 7	October 18 **Exam 2**
October 21 Chapter 7	October 22 Chapter 7	October 24 *Last day to withdraw from the course* *Last day to change to/from a pass/fail grade (note that courses for a major, minor must be graded)* Chapter 7

October 28 Chapter 7	October 30 Chapter 7	November 1 Chapter 7
November 4 Chapter 8	November 6 NCHC (no class)	November 8 NCHC **Exam 3**
November 11 Chapter 8	November 13 Chapter 8	November 15 Chapter 9
November 18 Chapter 9	November 20 Chapter 9	November 22 Chapter 10
November 25 Chapter 10	November 27 *Thanksgiving Break (no class)*	November 29 *Thanksgiving Break (no class)*
December 2 **Exam 4**	December 4 Chapter 10 **Lab Exam**	December 6 *Last day of class* *Last day to withdraw from the University* Final Exam Review
	December 11 **Final Exam Noon – 2 pm**	

Organic Chemistry Laboratory — Fall 2019
CHEM 211 Lab — Section 2 (CRN 80140)

Instructor: Kelli M. Slunt
Office: Jepson 437/Lee 316 654-1406/1716 kslunt@umw.edu

Office Hours: 9 am –9:50 am M (Jepson 437)
9 am-10:50 am T and F (Jepson 437)
and by appointment (through EAB/Navigate)
Office hours are subject to change – when possible, changes will be announced in advance

Lab: 1:00-3:50 pm W, Jepson 213

Course Materials (required):
Mohrig, JR, Hammond, CN, and Schatz, PF, *Techniques in Organic Chemistry*,4th edition, W.H. Freeman and Company, 2014
Coursepack containing copies of laboratory materials
approved laboratory goggles
approved laboratory coat
duplication laboratory notebook
three-ring notebook (1 or 1.5")
access to a three-hole punch
non-programmable scientific calculator
blue or black pen (NO PENCILS or COLORED PENS)
blue or black Sharpie
blank blue book for lab exams (1)
access to *Canvas*

Grading
Your laboratory grade will be determined as follows:

Nine (9) Notebook pages (pre-lab, during lab, post-lab analysis), 7 points each	63 points
Nine (9) Post-lab questions, 7 points each	63 points
Two (2) only questions for labs without notebook assignments, 20 points each	40 points
Nine (9) Abstracts, 6 points each	54 points
Laboratory Exam	35 points
Technique Grade	15 points
Total Laboratory Grade	**250 points**

Lab Notebook and Abstracts
For each of the laboratory exercises, you are required to keep a written record of your experiments in a duplication laboratory notebook and keep hardcopies of procedures and data and the carbon copies from the duplication notebook in a three-ring notebook. The portion of the notebook pages completed before the laboratory begins will help guide you to complete the experiments. Follow the guidelines posted on *Canvas* and in your coursepack as well as the information on pages 32-39 of *Techniques in Organic Chemistry* for writing notebook entries. All

entries should be written in blue or black ink, not pencil. Please write legibly, but you do not need to be perfect. You cannot write on a separate piece of paper and then copy the information into the notebook. Learn to write directly into the notebook. If you make an error, draw through the mistake with a single line. If the writing is unclear or scribbled out, points will be deducted from your notebook grade.

At the start of each laboratory period, unless noted in the lab write-up, the pre-laboratory notebook pages must be checked by the instructor before you can begin the experiment. The pre-lab notebook entries will be graded at the conclusion of the experiment.

At the conclusion of the laboratory exercise, unless otherwise noted, you are required to complete data analysis in the notebook, answer post-laboratory and write an abstract. Details on writing and submitting the abstract are in coursepack.

The laboratory notebook pages, answers to questions, and abstracts are due by the start of the next laboratory period.

Laboratory Exam

The date of the laboratory exam is given on the tentative schedule. The laboratory exam will test your understanding on the theory, data analysis and safety of all of the techniques covered in the course. You will be required to bring a blank blue book and a non-programmable calculator for each exam. You may be required to conduct an experiment as part of the exam. You are not permitted to have cellular phones, programmable calculators, or other electronic devices during the exam.

Technique Grade

The technique grade is based upon your general laboratory performance including attendance, promptness, preparedness, organization, safety practices, use of laboratory notebook, and cleanliness of lab space and drawer. Excessive breakage of glassware or equipment, wasting of chemicals or reagents, failure to clean-up the lab properly, ill-preparation for lab, will result in a reduction of the technique grade.

Honor Code and Organic Chemistry Laboratory

Alteration of data or copying data from another individual is an honor offense as well as scientifically unethical. You may discuss how to do the calculations with other students or get help from the instructor, but your final analysis and discussion in your notebook must be your own work. In addition, all pre-laboratory notebook pages and experimental notebook pages must be completed individually without consulting with your classmates. You may use your laboratory manual, textbook, and video clips to complete the assignments. All references utilized to answer the questions must be cited.

Attendance

Attendance in the laboratory is mandatory. **Unexcused absences from laboratory cannot be made up and will count as a zero lab grade**. Excused absences may be made-up, if possible, at the discretion of the instructor. If you have to miss a laboratory due to an **emergency** or if you expect to be absent due to an intercollegiate athletic event, field trip for another class, attending a conference, etc., you should inform the instructor as soon as possible.

You are required to complete the laboratory exercises. If you fail to attend and complete the laboratory portion of the course, you will receive a failing grade in CHEM 211. **More than two absences from lab, WILL result in an AUTOMATIC failing grade in CHEM 211.**

It is also imperative that you be on time for the laboratory. Prior to beginning the experiment, the instructor will provide a briefing about safety and precautions associated with each experiment.
Routine lateness to the lab briefing will result in an inability to complete an experiment and **could** result in a failing grade in the course.

You should complete as much of the work and planning of your experiments as possible during the assigned laboratory time. No unauthorized access to the laboratory is permitted.

Safety
Safety in the chemistry laboratory is extremely important. Safe laboratory practices will be presented during the first laboratory period and are outlined in your lab packet and lab manual. You will sign a safety agreement with the school. **Violations of safety procedures will result in removal from the lab and a grade of zero for that day's work**. Repeated violations will result in a meeting with the Chemistry Department Safety Officer and Chair and **could** result in failure of the course.

Safety goggles, a lab coat and closed toed shoes are required for this course, and will be worn whenever you are in the lab. Contact lenses are strongly discouraged. It is your responsibility to select prudent and appropriate attire for your work in the lab.

Electronic Devices in the Laboratory
Electronic devices (cell phones, iPods, etc.) are a distraction to you and your classmates and pose a safety hazard in the laboratory. They are to be turned off and properly stored for the entire laboratory period. Headphones are not to be worn in the lab at anytime.

Access to the Laboratory
There will be occasions on which you must return to the laboratory outside of class time to complete some simple laboratory tasks such as obtaining a melting point, weighing a sample, or characterizing the sample by spectroscopy. You **must** complete this work during the hours of 9 am and 4 pm M-F or during another organic laboratory section with permission of the instructor of that section. You may not request access to the organic lab door except for from a chemistry faculty member. Do not ask any other faculty or the building secretary for this access. *As much as possible, please let me know if advance your plan for when you enter the laboratory to perform the experiments.* **If there is no one in the laboratory at the time you plan to work, you must be accompanied by another student.** This student does not have to be enrolled in organic but must be responsible. This rule is in place for your safety. Your buddy can call for help if an accident occurs. When you are finished in the lab, the lab door must be closed. Failure to abide by these policies and/or conduct yourself appropriately in the lab during these out of lab access period could result in a zero for that laboratory exercise, result in a meeting with the Chemistry Department Safety Officer and Chair, or failure of the course.

Laboratory Schedule

Date	Topic
8/28	Introduction and Safety, Mock Notebook Pages
9/4	IR Spectroscopy Theory and Exercise
9/11	Extraction
9/18	Recrystallization
9/25	Extraction Part 2
10/2	Stereochemistry
10/9	Thin Layer Chromatography
10/16	NMR Spectroscopy
10/23	Integrated Spectroscopy
10/30	Distillation and GC
11/6	No lab (NCHC)
11/13	Nucleophilic Substitution
11/20	Bromination of Cinnamic Acid
11/27	*Thanksgiving – NO LAB*
12/4	Lab exam and lab check-out