

Chemistry 209 - Syllabus

Fall Term 2021

Date	Class Number - General Subject	Chapt.	
W 9/1 F 9/3	1 - Introduction and orgo I review X - Review, "friendly diagnostic exam"	review	<i>Counts as problem set 0 (PS0)</i>
M 9/6 W 9/8 F 9/10	2 - Orgo I review, exam highlights 3 - Alcohols 4 - Alcohols	10 10	<i>Labor day</i> <i>Achieve online homework</i> Problem Set (PS1) due 9/10,10AM
M 9/13 W 9/15 F 9/17	5 - Thiols, ethers 6 - Ethers, Sulfides, Epoxides 7 - Organometallics	10-11 11 11	PS2 due 10AM
M 9/20 W 9/22 F 9/24	8 - 9 - Carbonyl chemistry 10 - aldehydes and ketones	15 16 16	Wed evening problem session Quiz 1 In Class
M 9/27 W 9/29 F 10/1	11 - Carbonyl chemistry 12 - Acids, esters, amides 13	16-17 17 17	PS3 due 10AM
M 10/4 W 10/6 F 10/8	14 - Acids, esters, amides, etc. 15 - <i>no class</i>	17-18 18 X	PS4 due 10AM (short ps)
M 10/11 W 10/13 F 10/15	16 - exam review <i>C-bus day</i> Exam 1 6:30-8PM Small 110 class meets 18 - Enolates, enamines	18 18-19 19	
M 10/18 W 10/20 F 10/22	<i>No Class-Fall Break</i> 19 - Carbonyl chemistry 20 - Enolates, enamines	X 19 19	PS5 due 10AM
M 10/25 W 10/27 F 10/29	21 - Conjugated systems 22 23	20 part 20/21 20/21	Wed evening problem session Quiz 2 In Class
M 11/1 W 11/3 F 11/5	24 - Benzene and Aromaticity 25 - 26 -	21 21 22	<i>Last day to Withdraw</i> PS6 due 10AM
M 11/8 W 11/10 F 11/12	27 - Benzene continued... 28 29	22 22 22	PS7 due 10AM (short ps)
M 11/15 W 11/17 F 11/19	30 - exam review Exam 2 6:30-8PM 31 - Benzene / Amines 32 - Benzene / Amines	22 22-23 23	
M 11/22 W 11/24 F 11/26	33 - Amines <i>Thanksgiving Break</i> <i>No Class</i>	23	
M 11/29 W 12/1 F 12/3	34 - Amines / Carbon-carbon bond form 35 - (Pericyclic reactions) 36	23-20 20	Wed evening problem session Quiz 3 In Class
M 12/6 W 12/8 F 12/10	37 - Carbon-carbon bond formation 38 - Carbon-carbon bond formation 39 - Review/catch-up	20 20/24?	PS8 due 10AM
F 12/17	Final Exam 2-5 PM		

Organic Chemistry II – Course Overview

Course Instructor	Jonathan R. Scheerer Integrated Science Center 2045 (office)	jrscheerer@wm.edu (757) 221-2551										
Meetings	MWF 10AM—Boswell 20 (formerly Morton 20) Exam times: W 6:30–8 pm, Small 110 (2 total, see calendar for dates) Office hours: Wed 11AM–12PM ISC2018 (2 nd floor chem conf room) TA: Andrea Zourou Thurs 10–11AM ISC0261 evening review: preceding quizzes (see dates) Office hours may also be arranged by appointment. <i>Don't hesitate to contact me to schedule a time to meet!</i>											
Course Objectives	The objective of the second semester of organic chemistry (chemistry 209) is to understand the structure and reactivity carbon-containing molecules, with particular emphasis on the most biologically-relevant functional groups that contain the carbonyl motif. Interconversion between different functional groups, reaction mechanism, and reactive intermediates will be discussed.											
Course Eligibility	Students must have taken the first semester of the organic sequence (chemistry 206) or an equivalent course.											
Course Assessments	<table> <tr> <td>Hour exams (2 x 125 pts):</td> <td>250 pts (41%)</td> </tr> <tr> <td>Final exam:*</td> <td>200 pts (33%)</td> </tr> <tr> <td>Problem Sets (7 of 9 x 15 pt)</td> <td>105 pts (17%)</td> </tr> <tr> <td>Quizzes (2 of 3 x 30 pts)</td> <td>60 pts (10%)</td> </tr> <tr> <td>Total Points*</td> <td>615 points</td> </tr> </table> <p>*Weighting Scheme: I want to grade you on your best effort and give you (and me) flexibility for completion of some exercises in this class. Accordingly, I will adhere to the following plan: at the completion of the course, your lowest mean-relative quiz and PS will be dropped. This also includes the diagnostic exam which was scored as PS0</p>		Hour exams (2 x 125 pts):	250 pts (41%)	Final exam:*	200 pts (33%)	Problem Sets (7 of 9 x 15 pt)	105 pts (17%)	Quizzes (2 of 3 x 30 pts)	60 pts (10%)	Total Points*	615 points
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Exams	<p>There will be 2 “hour-long” exams, one administered roughly every 5-6 weeks. Exams will focus on recent topics and are held in the evening time slot. You will be given 75 min to complete (rather than 50 for an in-class exam). This is intended to help relieve some concerns that you have about time. Your exams will be graded and returned to you through gradescope:</p> <p>https://www.gradescope.com access code: JB2Y2Y There will also be a comprehensive final exam (T 5/17 2pm) that will be worth 200 points.</p>											
Problem Sets / Quizzes	<p>Problem sets (8) will be available about one week in advance and will be due at the indicated time (generally F 10AM). Problem sets will be completed through <i>Achieve (Formerly Sapling, see more info below)</i>. I will often post additional practice problems on Sapling. Each problem set will be worth 15 points. No late problem sets will be accepted. You are allowed to drop your lowest problem sets score; only 7 of 8 PS count (nb. This will not be reflected in your BB score). The diagnostic exam is also 15 points (aka PS0) can serve to replace one missed assignment or a low PS assignment score. Thus, 7 of 9, 15pt PS items count.</p> <p>“In-class” 20-25-minute quizzes (3) will be given periodically throughout the term. These are intended to provide some time pressure to your problems to get you comfortable with the pace that you will want to work during exams. There are no makeup quizzes. Each quiz will be scaled to 30 points. You may drop your lowest quiz score; only 2 of 3 quizzes will count toward your final grade (nb. This omission with quizzes/PS will not be reflected in your BB gradebook).</p>											

Grading

Final grades will be determined by the sum of your points throughout the semester by the following scale:

A-/A	87-100% (>90 A)
B-/B/B+	77-86.9% (>80 B; >84 B+)
C-/C/C+	67-76.9% (>70 C; >74 C+)
D-/D/D+	57-66.9% (>60 D; >63 D+)

Due to exam curving these thresholds may go down; they will not go up.

Class Attendance

In accord with College policy, class attendance is expected. See undergraduate catalog for more information. Please notify me of any absences by email. To the extent possible, classroom activities will be recorded and posted to BB.

**Disability/
Accommodations**

Students with disabilities or requiring accommodations must contact the Dean of Students office to obtain approval. Please contact me one week prior to any exam or other assessment for which you are seeking accommodations. You must complete the exam the day it is scheduled for the class (or earlier if this is not possible). If you plan on using the Watson lab, you should reserve an appropriate time more than one week in advance of the assessment.

Honor Code

All students are bound by the Honor Code. Incidences of cheating will be reported to the Honor System. See the student handbook for more information on the Honor Code. As noted earlier, you may not post any content from class to any website other than our BB site (or possibly our Gradescope course site).

Textbooks:

Recommended: *Organic Chemistry 8th Edition*. Brown, Foote, Iverson, Anslyn. *Student Study Guide and Solutions Manual for Organic Chemistry, 8th Ed.*

Brown, Foote, Iverson, Anslyn. *You may also use the older 6th or 7th Ed, which is virtually unchanged in content (but graphics are somewhat altered in places).*

Recommended:

Organic Chemistry as a Second Language. (2ndsemester topics) Klein. 4th edition is current (5th is also current). *It is hard to find earlier Eds, but these would be okay if you are willing to be accommodating to small differences in pg # and problem #.*

Model Kits:

Model kits may be used on exams. Model kits are useful, but not as essential to orgo 2 as orgo 1.

**Class Participation
and Etiquette**

- Please do not come to class if you are ill. If I am ill, I will not have in-person class.

- Almost all classes will be recorded. In-person class instruction is planned, but please be flexible with any necessary moves to remote instruction. General guidelines and expectations for any synchronous remote sessions:

- To the extent possible and when not disruptive to the class, please have your video on for Zoom sessions and remain on mute unless actively participating. There are many reasons that turning your video off is appropriate or necessary. To name a few: you may be in an environment that is distracting to me and other students. You may have slow internet connectivity that is exacerbated by using the video function, and you may not have the hardware (*i.e.*, a webcam) needed to enable use of the video function. Let me know any hardware or access issues that you have.

- Please use your name on your screen for live class components, not an informal account name.

- Please refrain from eating during class.

- The use of a virtual background is not recommended, unless you feel that a virtual background is less distracting than your normal background or showing your background would cause you stress or discomfort.

- Please do not email or post content related to or from class to other sites or to other individuals

Online Homework

Homework and additional practice problems will be completed Achieve (which is the new template for Sapling learning) see:

<https://achieve.macmillanlearning.com/start>.

I have also created a link to the platform in BB. Once in Achieve, follow the process to enroll in the class. You can try this out for ~14 days (until add/drop) and you will then need to pay the access fee (~\$42). The following links may prove useful.

Student enrollment details:

<https://macmillan.force.com/macmillanlearning/s/article/Achieve-Join-a-course>

Student Support:

<https://macmillan.force.com/macmillanlearning/s/chat-with-us>

Extra Credit Opportunities

Several opportunities exist for extra credit (and you should take full advantage of them). You may turn in an info sheet (+3 point) to gradescope. This sheet and instructions (as well as an example sheet) can be located in BB.

You may attend any relevant organic themed departmental seminars (+3). I am unsure of the calendar for these events this fall, but there may be one or two that are relevant. I will alert you if this is the case.

Additional opportunities for EC are available by completing BACON tutorials (see below) and separate BACON info sheet (under syllabus on BB). EC points will not be reflected in your BB grade.

What does BACON stand for? **B**iology **A**nd **C**hemistry **O**nline **N**otes

What does BACON teach? BACON illustrates that organic chemistry is all around. BACON connects organic chemistry to things like biology, real world applications, and pop culture. Watch the video embedded here to learn more about BACON: <https://learnbacon.com/>

Is BACON difficult for students? BACON is designed to be a low stress and fun way for you to gain a greater appreciation for organic chemistry and the remarkable impact it has on our everyday lives. The Bacon information sheet notes when tutorials can be completed and when they align with what we are learning in class. Signing up for BACON and completion of each tutorial (6 for orgo 2) will give you insight, provide some context to what you are learning and 2 pt EC each. There is a small cost (\$6) for administration of the program.

Pin# **WM209**

Extra Credit summary:

Info + 6 Bacon + dept seminar? = 15-18 points = ~3% of grade

Everybody likes **BACON**, another extra credit opportunity (see handout/bb)

Tutorial Name	Number	Release Date	Closing Date
Alcohols & Epoxides	1.	9/1	9/20 (10PM)
Aldehydes & Ketones	2.	9/20	9/27
Carboxylic Acids & Derivatives	3.	9/27	10/10
Enols & Enolates	4.	10/13	10/25
Aromaticity & Electrophilic Aromatic Substitution	5.	10/29	11/21
Diels–Alder Reactions	6.	11/27	12/8

Strategies to help with Orgo II:

- 1) The second semester of organic chemistry focuses more on reactions and mechanism than orgo I. Your study habits will likely have to change. The course moves at a faster pace and is exponentially more complex. If you are having trouble with the material, get help early.
- 2) Review your class notes carefully. Actively read the text (take notes, highlight, outline concepts) and compare with your class notes. You need to conceptually unify ideas and concepts that are related. Often this is best accomplished by making an outline. Some people prefer flash cards to understand key reactions. If you make flash cards, you still need to group and organize them into conceptually united blocks. There are too many reactions, reagents, and mechanisms to memorize them all.
- 3) *Work many problems.* Organic chemistry is a problem-intensive, visually descriptive, and drawing-demanding course. You will be graded on your problem solving. When working problems, *Do not look at the answer until you have worked the problem.* It is very easy to look at the answer and convince yourself that you know how to work and solve the question. You should work problems without having to refer to the book for guidance. It is one skill to understand the concept and quite another to apply your understanding and work problems effectively (and under time constraint!). Repetition is the key exercise.

Problems/chapter numbers in black reference Organic Chemistry 8th edition, Authors: Brown, Iverson, Anslyn, Foote. I use shorthand B&F to describe this text.

B&F Suggested In-chapter Problems: **All**

These are the best problems—very fundamental and core to learning the basics

Problems/chapter notation for Klein supplement is noted in italics (and green highlight). I am using 4th ed, Organic Chemistry as a second language. The book is split from 1st semester topics and 2nd semester topics. We will be referencing both semester books. At W&M we contend with spectroscopy in orgo 1, but Klein treats this as a 2nd sem topic. We (W&M) start off orgo 2 with alcohols and ethers/epoxides. In Klein, this is covered in 1st sem topics, Chapters 13, 14.

Chapter and Suggested End-of-chapter Problems:

Alcohols: Chapter 10 questions 26-31, 35-40, 42, 44-45, 51-52, 57

*Chapter 13: alcohols (1st sem topics). Section 13.1-13.4: questions 13.18-22
13.8-13.9: 13.58-68*

Ethers/epoxides: Chapter 11 questions 15, 16, 21, 25-27, 31-33, 38, 43-46

*Chapter 13: alcohols (1st sem topics). Section 13.10: questions 13.69-71
Chapter 14: ethers/epoxides (1st sem topics) 14.1-14.5: questions 14.1-25, 14.27-14.32*

Organometallic compounds: Chapter 15 questions 8, 21-22, 25

Exclusions: carbenes, section 15.3

Chapter 14: ethers/epoxides (1st sem topics) question 14.31

Aldehydes / ketones: Chapter 16 q 18-21, 24, 32-34, 37, 39, 43, 46, 55, 59, 64, 69, 74-75,
78

Exclusions: 16.12 reactions at alpha-carbon. We will cover this with enol/enolates, Ch19
*Chapter 6: ketones/aldehydes Sections 6.1-6.4, 6.7, 6.9: questions 6.1-30, 47-69, 80-84,
88-90, 92-93, 95-97, 100-103, 105-109, 112.*

Exclusions: S-nucleophiles 6.5: questions 6.33-46, S ylides, questions 6.70-73, Baeyer-Villiger oxidation, section 6.8: questions 6.75-6.79. and associated ending problems that employ these topics.

Carboxylic Acids: Chapter 17 questions 11-12, 15, 18-20, 22, 26, 32, 34, 39, 47-48, 50
Chapter 7: carboxylic acid derivatives questions are best addressed with following chapter

Derivatives of Carboxylic Acids: Chapter 18 19-20, 26-27, 30, 33, 36, 38, 43, 49, 52, 63-67
Chapter 7: carboxylic acid derivatives All sections apply.

Enolates anions: Chapter 19 questions 19, 21, 25, 27, 29, 31, 33, 45, 49-51, 56, 58, 71, 75
Chapter 8: enols and enolates All sections apply

Benzene and Aromaticity: Chapter 21 questions 8a-c, 34, 35, 38, 51, 53, 59
Chapter 1: Aromaticity questions 1.8-1.15

Reaction of Benzene Derivatives: Chapter 22 q 15, 19, 20-23, 31, 33, 35-38, 40, 43, 45, 47, 52
Chapter 4: Electrophilic Aromatic Substitution All sections apply
Chapter 5: Nucleophilic Aromatic Substitution All sections apply

Amines: Chapter 23 q 16, 17, 26, 28, 30, 32, 34, 37, 39, 40, 44, 45-47, 49-50, 56, 60, 62, 72
Chapter 9: Amines questions TBD

Conjugated Systems, Pericyclic Reactions: Chapter 20 (Diels-Alder reaction)
Questions 27, 30, 34-35, 38, 39, 46, 50, 52, 53b, 54
Exclusions: other pericyclic reactions, e.g., Sigmatropic shifts.
Take Advanced Orgo if you want to learn about that topic
Diels-Alder Reactions: Chapter 10. Questions 10.1-16.

I don't anticipate that we will get to the following, but it would be nice if we did...
(Catalytic reactions: Chapter 24) 9-18