

CHEM 348 Organic Chemistry II
Fall 2014

Instructors:

Prof. Rob Ronald, Fulmer 415A (enter through 417 Lab)
Chongjie (Jackie) Zhu, Fulmer 416 (Workshops Coordinator)

Stockroom Manager:

Andrea Kirchner Loewus, Fulmer 435A

Prerequisite: A letter grade of C or better in Chem 345 or the equivalent course transfer.

Contacting Instructors and TAs:

Prof. Rob Ronald rcc@wsu.edu
Jackie Zhu zhuzicj@wsu.edu

Chase Crawley chase.crawley@wsu.edu
Charlie Murray charles.murray@wsu.edu

Office Hours:

- Immediately after class **or** by appointment (see contacting instructors above).
- TAs office hours are held in Fulmer 401 as well as Stevenson tutoring center. A schedule will be posted on the course website as well as on the door to Fulmer 401 no later than the first week of class.

Class Meeting:

- MWF 1:10-2:00pm Fulmer 438
- Workshops: check schedules.wsu.edu for time and location

Course Website: All course material is on our website at:

- <http://organic.chem.wsu.edu/348-2/>

Course Materials: This term will use Bruice's Organic Chemistry (7th edition). If you have another text from your previous course in Organic Chemistry, you may use that text, but you may find things in a somewhat different order. You may purchase the Bruice's book at Crimson & Gray or at the Bookie.

In addition to the text you may find an organic modeling kit very useful in studying organic chemistry. An inexpensive molecular modeling kit is available: http://www.darlingmodels.com/Individual-Orders-Molecular-Model-Kits/KIT-3-ISBN-978-09648837-4-1-MOLECULAR-VISIONS-Organic-Kit/prod_7.html. Modeling kits can also be purchased on eBay or Amazon for a reasonable price.

Course Objectives and Description: Students completing Chem 348 will be able to

- 1) Rationalize molecular reactivity based on functional groups.
- 2) Use Spectroscopic methods (Infrared Spectroscopy and NMR spectroscopy) to assign structures.
- 3) Develop syntheses (on paper) for moderately complex organic molecules based on methods presented in class.
- 4) Use organic chemistry as a platform for developing problem solving strategies.

Lecture Course Description: The Chem 348 curriculum will be based on using simple spectroscopic methods to understand structure and reactivity. We will cover some basic functional group families and also introduce some more recent topics such as catalysis, and organometallic chemistry into the curriculum. Please consult the lecture topic outline section of the course web site and keep up with reading and homework.

Student Learning Outcomes:

- Use Infrared spectroscopy and NMR spectroscopy to visualize chemical structure.
- Describe chemical reactivity in terms of organic functional group chemistry, including functional group transformation.
- Interpret structural changes within a chemical framework considering bond making and bond breaking.
- Propose reasonable mechanisms that convert starting materials to product
- Interpret stereochemical data that provides a basis for a mechanistic hypothesis.
- Plan organic syntheses using a retrosynthetic approach based on known chemical reactions.

Assignments & Grading Policy: This course will be graded on the basis of homework, two midterm exams, a comprehensive final exam, and Workshop participation.

Homework: Homework assignments will account for 10% of your grade.

Midterm exams: Two “midterm” exams will be administered to assess subject mastery. These exams will not have multiple choice questions. Exams from semesters are provided on the course website. The second “midterm” exam and the final exam are comprehensive. Each “midterm” exam is 17.5% of your grade. Exams from **previous** semesters are provided on the course website.

Final exam: A two-hour comprehensive final exam will be administered at the end of the course. The final exam is worth 30% of your grade. You must take the final examination to receive a passing grade in Chem 348.

Workshops: Chem 348 provides you an opportunity to develop your chemical problem solving skills through small group workshops. These workshops have limited enrollment and are run by senior teaching assistants, and coordinated by Jackie Zhu. By participating in these workshops, you will learn useful ways of solving synthesis, spectroscopy, and mechanism problems that directly relate exams and homework: 25% of your grade in Chem 348 will be based on attendance and participation in the workshops. Attending and participating in at least 10 workshops will give you 100% of your workshop grade (25% of your total grade). You will lose 10% of your workshop grade each time you miss one more workshop or not actively participate in problem solving and discussion.

There will be 12 workshops throughout the semester where attendance is required. In these workshops you will be provided with problem sets that cover important nomenclature, structures, reactions, and mechanisms that you will be responsible to learn. These problem sets and keys will be posted on the course website the following week. If you come to office hours for help on these problem sets, you must bring your work. In other words, do not bring blank pages and ask me or a TA to solve the problem for you. This does not help you learn organic chemistry or prepare you for exams.

Homework: There will be 12 homework assignments during the semester of which 10 will be graded. The graded homework (parts being graded will be randomly picked) will account for 10% of your course grade. If you complete all 12 assignments some of the points from the two “extra” assignments will be added to your grade as extra credit. The assignments, and answer keys, will be posted online. Homework turned in late will receive a 5% penalty for each 24 hour period they are late. Homework assignments will not be accepted for grading after the answer key is posted.

Assessment: Student Learning Outcomes will be assessed using hand-graded exams. We do not use multiple choice exams so we can assign partial credit for reasonable answers.

Grades are based on a combination of two night, comprehensive hour exams, a comprehensive final exam, homework, and Workshop participation.

<i>Exams schedule and Grade weight</i>		
	<i>schedule</i>	<i>weight</i>
Mid-term Exam I	Tuesday September 30 th from 5:30 to 7:15 pm (Fulmer 438)	17.5%
Mid-term Exam II	Tuesday, Tuesday November 4 th from 5:30 to 7:15 pm (Fulmer 438)	17.5%
Workshops		25%
Homework		10%
Final Exam	Wednesday, December 17, 2014 from 3:10 to 6:10 pm (location TBD)	30%
		100 %

There will be no make-up exams for the night exams. If you miss an exam for any reason, your final exam will account for 57.5% of your final grade. If you are on a WSU sponsored trip, you may take your exam through your academic counselor. You must make arrangements to do this by the second week of class.

You must take the final examination to receive a passing grade in Chem 348.

Grade Scale: There will be no curving of the grades: **A**, 100-92; **B**, 91-77; **C**, 76-60; **D** 59-55; **F** <55. While +/- grades may be given, there are no set ranges for these and they will be assigned on a case by case basis. They are used to mainly to recognize trends in individual performance throughout the semester.

Important things to know about grading and exams:

- I reserve the right to make adjustments to the grade breakdown; however the minimum scores for grade categories will not be raised – if, for example, your composite score is 77.0 you will earn a B grade.
- We do our best to grade fairly and impartially, especially when we are assigning partial credit on examination papers. While it may seem to you that your incorrect answer on your exam was as least as good as another person’s incorrect answer, and should have received the same, or greater, number of partial credit points, we will not negotiate the grading on partial credit points assignments.

Test Schedule: All tests and exams are evening exams. If you are off campus due to a university sponsored event, you may arrange for an academic counselor to proctor the exam. You must make these arrangements within the first two weeks of the semester. If you miss an hourly exam, the final exam will count at 57.5%.

- Test 1, Tuesday September 30th from 5:30 to 7:15 pm in Fulmer 438
- Test 2, Tuesday November 4th from 5:30 to 7:15 pm in Fulmer 438
- Final Exam, Wednesday December 17th from 3:10 to 6:10 pm (location TBD)

Officially approved and scheduled night examinations have priority over all other academic and non-academic evening activities. (Academic Rule 76). If you have a conflict with another evening academic activity such as a biology or physics lab course, talk with the lab instructor and ask for an alternate time. There is no penalty for missing a “midterm” exam as it simply increases the weight of the final exam. Do not make travel plans before the final exam. Your travel cannot be accommodated.

Test Policy and Regrades: Bring only your student ID, a model kit, and pens to the exams. Exams must be written in non-erasable ink to qualify for any type of reconsideration of your grade. You may write in pencil, but your paper will not be regarded. You will be provided scratch paper. You may not bring any electronic or internet connected device to the exam – turn your phones off during the exam. Using any electronic devices during an exam will result in a failing grade and be interpreted as a breach of academic integrity and will be reported. Once exams have been graded, you may pick them up from the stockroom. Look over the exam carefully and make sure the points have been added correctly. If you find an error or have a question about the grading of the exam, return it to the stockroom attendant with a regrade request form attached (you can get these from the stockroom or on the course website) – we will not re-grade an exam once you remove it from the stockroom. Be very clear when completing the regrade form. For example, “there is an error in my total points” or “on question 2, I drew the correct intermediate structure....” Avoid requests that include “I feel as if I deserve more points.”

Grade Summary: The breakdown for each of graded component is show below, along with their weight in percentage. A sample calculation is also provided.

<i>graded components</i>	<i>weight</i>	<i>sample calculation</i>			
		<i>% score</i>	<i>x</i>	<i>weight</i>	<i>Grade points</i>
homework	10%	70	x	0.10	= 8.5
test 1	17.5%	77	x	0.175	= 13.5
test 2	17.5%	88	x	0.175	= 15.4
final	30%	84	x	0.30	= 25.2
Workshop	25%	92	x	0.25	= 23.0
	100%	sum			85.6 (Grade = B)

Proposed Lecture Schedule for Chem 348 Fall 2014

1	Aug 25 Introduction Syllabus and Class business Review: General principles, functional groups, and bonding. Solving chemical structures - Cocaine See: Bruice Part 1	Aug 27 Lecture 1d Review: acidity and basicity, pKa's, nomenclature. Solving Chemical Structures - Cocaine See: Bruice Part 1	Aug 29 2d Review: Chirality and stereochemistry, aldehydes, ketones, acids. Solving Chemical Structures - Cocaine See: Bruice Part 2, Bruice Part 5
2	Sept 1 Labor Day Holiday	Sept 3 3d Review: Chirality, stereochemistry, halides, and alcohols Solving Chemical Structures - Cocaine See: Bruice Part 2, Bruice Part 5	Sept 5 4d Introduction to Spectroscopy. Predicting Spectra - Cocaine See: Bruice Part 4
3	Sept 8 5d Introduction to Spectroscopy See: Bruice Part 4	Sept 10 6d Introduction to Spectroscopy See: Bruice Part 4	Sept 12 7d Introduction to Spectroscopy See: Bruice Part 4
4	Sept 15 8d Introduction to Spectroscopy See: Bruice Part 4	Sept 17 9d Bonding and orbitals See Bruice Part 1 Chap 1	Sept 19 10d Organic reactions See Bruice Part 2 Chap 5
5	Sept 22 11d Alkenes, See Bruice Chap 6	Sept 24 12d Alkenes , See Bruice Chap 6	Sept 26 13d Alkenes , See Bruice Chap 6
6	Sept 29 14d Special topic – Asymm Hydro	Tuesday Sept 30 5:30 pm Comprehensive Hour Exam I	Oct 3 15d Alkenes, See Bruice Chap 6
7	Oct 6 16d Alkenes, See Bruice Chap 6	Oct 8 17d Special Topic – Asymm. Epox.	Oct 10 18d Alkynes, See Bruice Chap 7
8	Oct 15 19b Alkynes, See Bruice Chap 7	Oct 17 20d Dienes, Hückel See Bruice Chap 8	Oct 19 21d Dienes, Diels-Alder See Bruice Chap 8
9	Oct 20 22d Special Topic Organometallic Chemistry See Bruice Chap 12	Oct 22 23d Special Topic Organometallic Chemistry See Bruice Chap 12	Oct 24 24d Special Topic Organometallic Chemistry See Bruice Chap 12
10	Oct 27 25d Aromatic Chemistry See Bruice Chap 8 and 19	Oct 29 26d Aromatic Chemistry See Bruice Chap 8 and 19	Oct 31 27d Aromatic Chemistry See Bruice Chap 8 and 19
11	Nov 3 28d Aromatic Chemistry See Bruice Chap 8 and 19	Tuesday Nov 4 5:30 pm Comprehensive Hour Exam II	Nov 7 29d Special Topic – Click Chem
12	Nov 10 30d Alcohols, Phenols, Ethers See Bruice Chap 11	Nov 12 31d Alcohols, Phenols, Ethers See Bruice Chap 11	Nov 14 32d Carbonyl Compounds See Bruice Part 5
13	Nov 17 33d Carbonyl Compounds See Bruice Part 5	Nov 19 34d Carbonyl Compounds See Bruice Part 5	Nov 21 35d Review
	Nov 24 Thanksgiving Vacation	Nov 26 Thanksgiving Vacation	Nov 28 Thanksgiving Vacation
14	Dec 1 36d Carbohydrates See Bruice Part 7	Dec 3 37d Carbohydrates See Bruice Part 7	Dec 5 38d Oligopeptide and Oligonucleotide synthesis See Bruice Part 7
15	Dec 8 39d Oligopeptide and Oligonucleotide synthesis See Bruice Part 7	Dec 10 40d Oligopeptide and Oligonucleotide synthesis See Bruice Part 7	Dec 12 REVIEW
16		Wednesday Dec. 17 3:00PM Comprehensive Final Exam	

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist

Academic Integrity: You are encouraged you to work with classmates on assignments, however, each student must turn in original work. No copying will be accepted. Students who violate WSU's Standards of Conduct for Students will receive an F as a final grade in this course, will not have the option to withdraw from the course, and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions. In addition, if during an exam you use an internet connected or other electronic devices, you will fail the exam and be reported as described above.

Safety Statement: Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (<http://safetyplan.wsu.edu/>) and visit the Office of Emergency Management web site (<http://oem.wsu.edu/>) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of the campus community.