

## CHEM 345 Organic Chemistry I Spring 2014

### Instructors:

Dr. Greg Crouch, Fulmer 414

### Stockroom Manager:

Andrea Kirchner Loewus, Fulmer 435A

### Contacting Instructors:

email only at [chem.345@wsu.edu](mailto:chem.345@wsu.edu). If you wish to set up a meeting, provide several choices of times that you can meet.

**Contacting TAs:** All TAs can be reached by email using their respective section numbers. The email addresses are Chem.345.##@wsu.edu. Use your section number in place of ## and remember to add a zero in front of single digit section numbers (e.g. to reach your lab section 4 TA, you would email Chem.345.04@wsu.edu).

### Office Hours:

- Dr. Crouch: M/W/F 11:10–12:00 **and** 14:00–14:45 **and** by appointment (see contacting instructors above).
- TAs office hours are held in Fulmer 401 as well as Stevenson Down Under. 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:

- Section 1 MWF 13:10-14:00, Heald G3
- Lab meeting times depend on section. All labs meet in Fulmer 438 beginning the second week of the term. There is no lab meeting required the first week of class.

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

- [www.wsu.edu/~crouch](http://www.wsu.edu/~crouch)
- In addition, we have a course Facebook group page at: <http://www.facebook.com/groups/chem.345>

**Required Textbook:** *Fundamentals of Organic Chemistry*, 7th Edition by John E. McMurry & Eric E. Simanek. An older edition may be substituted. This course requires a molecular model kit.

**Course Objective:** To provide Chem 345 students with a working knowledge of organic chemistry and prepare those students who will be taking Chem 348 with the basic requirements for success. To acquaint students with the basic experimental and synthetic techniques used in organic chemistry

### Learning Outcomes:

- 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 informs a mechanistic hypothesis.
- Plan an organic synthesis using a retrosynthetic approach based on known chemical reactions.
- Develop skill in safe chemical handling, measurements, experimental technique, and simple synthesis.

**Lecture Course Description:** The Chem 345 curriculum is based on the “survey of functional groups” approach to teaching organic reactions and mechanisms. Each week we will be exploring a different type of organic compound. Please consult the lecture topic outline section of the course web site and keep up with reading and homework.

**Lab Course Description:** Chem 345 has a laboratory component that meets once per week for 3 hours. In order to pass the course, you must complete and pass all of the labs. You are not required to purchase any lab manuals as all printed materials are freely available on the course website. You are required to purchase a lab coat as well as goggles.

**Lab Policies:** You must complete and turn in all of the labs in order to pass this course. In other words, failure to turn in a lab report at the end of the term will result in an automatic failing grade. Lab attendance is mandatory. If you miss a lab, there will be a make-up session at the end of the semester; you may make up a maximum of two labs. If you miss more than two labs during the semester without an excellent reason, you will automatically fail the course. If you cannot attend lab, you must contact your TA before the scheduled lab time.

All labs must be turned in directly to your TA the week following their completion or to the Organic Stockroom Fulmer 435 (Manager, Andrea Kirchner-Loewus). Your TA will sign the report acknowledging receipt and Andrea or the Organic Stockroom staff will date-stamp them.

*Early Policy:* You will receive 0.25 points EXTRA CREDIT for each day you turn in your lab prior to the due date (maximum of 1 point per lab). If you wish to turn in a lab early, give it to your TA directly or Andrea/Organic Stockroom staff in 435 from 10-4 pm, Monday-Thursday (closed Fridays).

*Late Policy:* There is none. It has been superseded by the Early Policy. Labs turned in after the due date will be scored as a 0 (zero) and counted as a completed lab and thus cannot be made up at the end of the semester. If no stockroom personnel are present to accept your lab, you may drop it through the mail slot on the door to Fulmer 435A.

**Grading Policy:** This course will be graded on the basis of the two midterm exams, a comprehensive final exam, and lab. Each hourly exam is worth 20% of your grade; the final exam is worth 35%, and the lab is worth 25%. We use a weighted average to calculate grades. For example, if you earned an 89% on test 1, a 74% on test 2, a 78% on the final, and a 91% in lab, your overall grade would be 83%

	score	weighing factor	weight
test 1	89%	.2	17.8%
test 2	74%	.2	14.8%
final	78%	.35	27.3%
lab	91%	.25	22.75%
		1.0	round to 83%

The composite or weighted grade would give a letter grade of B according to the following scale:

A	91-100	B	78-82	C	63-67	D	50-54
A-	87-90	B-	74-77	C-	59-62	F	<50
B+	83-86	C+	68-73	D+	55-58		

In addition, we will also consider your final grade alone and if that grade is better than the composite grade, that will be the grade awarded. For example, if your composite score was 70 (a letter grade of C+ above) but your comprehensive final exam score was 75, you would be awarded a grade of B- from the scale above. Remember, these are only examples.

Please note that the above grade scale is not absolute and changes slightly from year-to-year. We do not give make-up exams. If you miss one hourly exam, the final exam will increase to 55% of your course grade. To pass this course, you must complete all of the labs. If you miss a lab, there will be make-up times available.

**Test Schedule:** All tests and exams are evening exams. If you 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 55%.

- Test 1, Tuesday February 18<sup>th</sup> from 5:30 to 7:15 pm in Todd 116
- Test 2, Tuesday April 1<sup>st</sup> from 5:30 to 7:15 pm in Todd 116
- Final Exam, Thursday May 8<sup>th</sup> from 7:00 to 9:00 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 an hourly exam as it simply increases the weight of the final exam.

**Test Pickup and Regrades:** 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.”

**Homework:** Homework is not assigned in Chem 345, however there are worksheets on the course website that outline important nomenclature, structures, and reactions that you will be responsible for learning and demonstrating on exams. These worksheets will not be graded and will serve as pretests for the hourly exams. Keys will not be provided – see your course instructor or a TA to check your work. Do not bring in blank worksheets and ask for assistance as we must see your work in order to assist in problem solving.

### Lecture Schedule

Week	Starting	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	January 13	Lecture 1		Lecture 2		Lecture 3
Week 2	January 20	Martin Luther King Jr Day		Lecture 4		Lecture 5
Week 3	January 27	Lecture 6		Lecture 7		Lecture 8
Week 4	February 3	Lecture 9		Lecture 10		Lecture 11
Week 5	February 10	Lecture 12		Lecture 13		Review
Week 6	February 17	President's Day	Test 1 5:30-7:15pm	<b>No Lecture</b>		Lecture 14
Week 7	February 24	Lecture 15		Lecture 16		Lecture 17
Week 8	March 3	Lecture 18		Lecture 19		Lecture 20
Week 9	March 10	Lecture 21		Lecture 22		Lecture 23
	March 17	<b>Spring Break</b>				
Week 10	March 24	Lecture 24		Lecture 25		Lecture 26
Week 11	March 31	Review	Test 2 5:30-7:15pm	<b>No Lecture</b>		Lecture 27
Week 12	April 7	Lecture 28		Lecture 29		Lecture 30
Week 13	April 14	Lecture 31		Lecture 32		Lecture 33
Week 14	April 21	Lecture 34		Lecture 35		Lecture 36
Week 15	April 28	Review		Review		Review
Finals	May 7				Final Exam 7-9 pm	

**Lecture Topics:** A brief outline is presented below. More detailed coverage is presented on the course website.

1. *Chapter 1*
  - a. Structure and bonding
  - b. Periodic Table trends
  - c. Molecular orbitals and hybridization theory
  - d. Acids and bases – chemical equilibrium
2. *Chapter 2*
  - a. Functional groups
  - b. Alkanes and cycloalkanes
  - c. Nomenclature
  - d. Conformational analysis
3. *Chapter 3*

- a. Alkenes, structure and nomenclature
  - b. Addition reactions
  - c. Mechanism, transition state, reactive intermediates, and reaction coordinates
  - d. Oxidation/reduction reactions of alkenes
4. *Chapter 4*
- a. Further reactions of alkenes
  - b. Alkynes, structure and nomenclature
  - c. Alkynes as acids, carbon-carbon bond forming reactions
5. *Chapter 5*
- a. Structure and properties of benzene
  - b. Nomenclature
  - c. Aromatic theory, heterocyclic aromatic compounds, ionic aromatic compounds.
  - d. Electrophilic aromatic substitution and directing effects
  - e. Multistep Synthesis
6. *Chapter 6*
- a. Terminology
  - b. Stereochemistry and mechanism
  - c. Newman and Fisher projections
7. *Chapter 7*
- a. Mechanism of substitution and elimination
  - b. Synthesis
8. *Chapter 8*
- a. Alcohols, ethers, and sulfur containing compounds
  - b. Nomenclature
  - c. Reactions and synthesis, redox chemistry
9. *Chapter 9*
- a. Aldehydes and ketones
  - b. Nomenclature
  - c. Reversible and irreversible reactions; mechanism and multistep synthesis
  - d. Hydrolysis
10. *Chapter 10*
- a. Carboxylic acids and derivatives
  - b. Nomenclature
  - c. Reactions and multistep synthesis
  - d. Hydrolysis
11. *Chapter 11*
- a. Enol and enolate chemistry
  - b. Condensation reactions
  - c. Multistep synthesis
12. *Chapter 12*
- a. Amine chemistry and nomenclature
  - b. Acid/base chemistry of amines
  - c. Reactions and synthesis
  - d. Heterocyclic amines

**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. If you have a testing accommodation, you must speak with the course instructor by the second week of the course. All hourly and final exam access accommodations are held in Fulmer and require advanced scheduling.

**Academic Integrity:** Academic integrity will be strongly enforced in this course. Any student caught cheating on any assignment will be given an F grade for 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: <http://conduct.wsu.edu/default.asp?PageID=338>

**Safety Statement:** The following websites detail the WSU Safety policy and plan. The content of these sites will be discussed on the first day of the term

- <http://safetyplan.wsu.edu>
- <http://alert.wsu.edu>
- <http://oem.wsu.edu>