

CHEM 322
Organic Chemistry, 2nd Semester
University of Delaware
Spring 2011

Instructors: Prof. Mary Watson (237 BRL, mpwatson@udel.edu) (Weeks 1-6)
Prof. Donald Watson (205 LDL, dawatson@udel.edu) (Weeks 7-14)

Office Hours: Wed, 10–11am, 308 QDH

Lectures: **Section 010:** MWF 11:15 am – 12:05 pm, 101 BRL
Section 011: TuTh 2 – 3:15 pm, 101 BRL

Midterms: Sat, March 5, 10 am – 12 pm, Smith 120/130
Sat, April 9, 10 am – 12 pm, Smith 120/130
Sat, May 7, 10 am – 12 pm, Smith 120/130

Head TA: Craig Paquette (cmp@udel.edu)

TA's: Srimoyee Dasgupta
Amber Gietter
Peter Gildner
Tatsiana Haidzinskaya
Neo Hu
Jesse McAtee

Discussions: Mon, 1–2pm, 308 QDH (Paquette)
Thurs, 8–9am, 308 QDH (McAtee)

Website: <http://www.udel.edu/chem/CHEM322>

Textbooks: *Organic Chemistry, 4th Edition*
By Maitland Jones & Steven Fleming
Publisher: W. W. Norton & Co.

Chem 321/322 Organic Chemistry Lab Manual
By Wigal et al.

Molecular Models: Darling Models™ (www.darlingmodels.com)

Lab Notebooks: Hayden-McNeil Student Lab Notebook with carbonless duplicate sets

Grades: Midterms 40% (20% each for two highest scores)
Final Exam 40%
Labs 20%

Regrade requests must be submitted within 24 hours of the material being returned. Include a detailed written explanation of the suspected problem. Your midterms may be photocopied before they are returned. Do not change your midterms in any way if you are requesting a regrade. Altered exams returned for regrades will be considered an act of academic dishonesty. Please note: exams submitted for regrades will be regraded in their entirety.

I have always had the feeling that organic chemistry is a very peculiar science, that organic chemists are unlike other men, and there are few occupations that give more satisfactions [sic] than masterly experimentation along the old lines of this highly specialized science."

- Lawrence Joseph
Henderson

The lowest of your three midterms will be automatically dropped.

Missed exams can be made up only for official, University-approved absences. You must provide an official, documented excuse for missed exams. If you are missing an exam due to a University-sponsored athletic event, you must provide your athletic schedule within the first 2 weeks of the semester. If you miss a midterm without providing an official, documented excuse, this midterm grade will be your automatically dropped midterm. Any make-up exams will be scheduled for shortly after the original exam. You must take the final exam to receive a completed grade for the course.

A curve will be applied to the final grades, and a plus/minus grading scale will be used.

Academic Dishonesty

Academic dishonesty will not be tolerated. Any student who commits academic dishonesty will be punished according to the University of Delaware's guidelines (<http://www.udel.edu/stuguide/09-10/code.html#honesty>).

Approximate Class Outline

Week (Dates)	Topic	Reading
1 (2/7 – 2/11)	Conjugated π -systems	Ch. 12
2 (2/14 – 2/18)	Aromaticity	Ch. 13
3 (2/21 – 2/25)	Substitution of Aromatic Compounds	Ch. 13, 14
4 (2/28 – 3/4)	Substitution of Aromatic Compounds	Ch. 14
Sat, 3/5	Midterm 1	
5 (3/7 – 3/11)	Spectroscopy	Ch. 15
6 (3/14 – 3/18)	Spectroscopy	Ch. 15
7 (3/21 – 3/25)	Carbonyl Chemistry	Ch. 16
(3/28 – 4/1)	Spring Break	
8 (4/4 – 4/8)	Carbonyl Chemistry	Ch. 16, 17
Sat, 4/9	Midterm 2	
9 (4/11 – 4/15)	Carboxylic Acids and Derivatives	Ch. 17, 18
10 (4/18 – 4/22)	Carboxylic Acid Derivatives	Ch. 18
11 (4/25 – 4/29)	Carboxylic Acid Derivatives, Enols and Enolates	Ch. 18, 19
12 (5/2 – 5/6)	Enols and Enolates	Ch. 19
Sat, 5/7	Midterm 3	
13 (5/9 – 5/13)	Carbohydrates, Amino Acids	Ch. 22, 23
14 (5/16 – 5/19)	Carbohydrates, Amino Acids	Ch. 22, 23
TBA	Final Exam	

Recommended practice problems for each of the topics will be posted on the course website. It is strongly recommended that you work *all* suggested problems.

Labs

You must come prepared with pre-lab questions and appropriate sections complete in your notebooks. Your complete lab write-up, including post-lab questions is due at the start of your next lab period.

Week (Dates)	Experiment	Reference	Assigned Questions
1 (2/7 – 2/11)	No labs		
2 (2/14 – 2/18)	Nitration of Methylbenzoate	REAC0716	Pre-lab 1–3, Post-lab 1–3
3 (2/21 – 2/25)	Isolating Clove Oil	TECH0722, handout	Pre-lab 1–3, Post-lab 1–3
4 (2/28 – 3/4)	Aldehydes and Ketones	ANAL0728	Pre-lab 2,3; Post-lab 1,2
5 (3/7 – 3/11)	Aldol Condensation	SYNT0720	Pre-lab 1–4; Post-lab 1–3
6 (3/14 – 3/18)	Aspirin	SYNT0745	Pre-lab 1–5; Post-lab 1–3
7 (3/21 – 3/25)	No labs		
Spring Break	No labs		
8 (4/4 – 4/8)	Fisher Esterification	SYNT0713	Pre-lab 1–4; Post-lab 1,4
9 (4/11 – 4/15)	Grignard	Handout	Questions in handout
10 (4/18 – 4/22)	Reduction of Vanillin	Handout	Questions in handout
11 (4/25 – 4/29)	Wittig	Handout	
12 (5/2 – 5/6)	Qualitative Analysis/Unknowns*	ANAL0727, handout	Pre-lab 1–7; Post-lab none
13 (5/9 – 5/13)	Qualitative Analysis/Unknowns*	ANAL0727, handout	

* You must finish the Qualitative Analysis/Unknowns lab to pass the laboratory portion of the class.

Lab safety: All students must wear appropriate personal protective equipment during all labs: safety goggles, gloves, long pants, and close-toed shoes. Lab safety will be taken *very seriously*. You will be penalized if you neglect safety:

For first offense of the semester: Lose 20% of the points for that lab

For second offense of the semester (not per lab) and beyond: Immediate dismissal from lab and 0% for that lab.

CHEM 322 Course Learning Goals

After successful completion of this course, a student should be able to:

1. Describe the frontier molecular orbitals for conjugated π -systems and carbonyl compounds. (1)*
2. Understand the stabilizing effect of conjugation on electrons in π -bonds. (1)
3. Predict products, propose reaction conditions, and draw arrow-pushing mechanisms for reactions of dienes and allyl systems. (1)
4. Understand the concept of aromaticity. (1)
5. Predict products, propose reaction conditions, and draw arrow-pushing mechanisms for reactions of aromatic systems. (1)
6. Determine the identity of a chemical compound based on spectroscopic data. (1, 6)
7. Predict products, propose reaction conditions, and draw arrow-pushing mechanisms for reactions of carbonyl compounds. (1)
8. Predict products, propose reaction conditions, and draw arrow-pushing mechanisms for reactions of carboxylic acids and their derivatives. (1)
9. Understand the biological importance, structure and reactivity of carbohydrates and sugars. (1)
10. Understand the biological importance, structure and reactivity of amino acids. (1)
11. Safely perform a chemical reaction in a laboratory, making qualitative and quantitative observations of the experiment. (2, 6, 7, 8)
12. Prepare a laboratory report of an experiment they have performed. (10)

(*Numbers in parentheses indicate the departmental learning goals with which each course goal is aligned. Please see: <http://www.udel.edu/chem/goals.html>.)