

CHEM 5393: Advanced Organic Chemistry

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Overview and Class Goals

Organic chemistry provides a foundation for understanding: 1) the mechanisms of biochemical processes; 2) most aspects of drug design, including the recognition of small molecules by enzymes and other receptors as well as the synthesis of new pharmaceutical and agricultural compounds; and 3) the synthesis of polymers. As such, I sincerely desire for this class to become a springboard, launching you to successful careers in both science and medicine.

I have dual objectives for the class: 1) Provide a sound understanding of fundamental organic principles (especially including mechanistic principles), thereby leaving you with the ability to comprehend and organize the chemical reactions which you may encounter outside of this class (e.g. in Biochemistry, Medicinal Chemistry, and other classes). 2) Provide as broad as possible an overview of current synthetic methodology, a field that continues to develop at rapid pace.

The emphasis on fundamentals will include a thorough review of sophomore organic chemistry. This review will entail your working problems from the Wade textbook and will consume approximately one third of the semester. The first exam will require you to utilize the problem-solving skills you have developed.

Learning Outcomes: Upon successful completion of this course, a student will be able to organize organic chemical reactions by mechanism and to employ fundamental organic chemical reactions in the synthetic design of new molecules having potential utility as pharmaceuticals or as materials.

Topics covered:

Structure and Bonding

Conformation

Configuration

Nucleophilic Substitution

Addition and Elimination Reactions

Carbanions, Carbonyl Compounds, and Carboxylic Acid Derivatives

Condensation and Substitution Reactions of Carbonyl Compounds

Reactions of Aromatic Compounds

Radicals and their reactions

Transition-Metal Catalyzed Reactions

Textbooks

Required Texts: Part A and Part B of Advanced Organic Chemistry by Francis Carey and Richard Sundberg (Fifth Edition). Part A ISBN 978-0-387-68346-1 Part B ISBN 978-0-387-68354-6

Highly Recommended Reference: Organic Chemistry by L. G. Wade Jr. Sixth Edition (I will refer to this text regularly in developing the basic principles and will take many homework assignments and even some exam questions from this text). ISBN 0-13-147871-0

Recommended Text: The Art of Writing Reasonable Organic Reaction Mechanisms, Second Edition, by Robert B. Grossman. ISBN 978-0-387-95468-4.

Responsibilities:

As regards the **student's responsibilities** for his/her own comprehension of the material: 1) the student must complete extensive reading assignments in a timely manner; 2) must test that knowledge by completing written problem assignments. Organic chemistry is a subject that simply cannot be learned without substantial work outside of class.

As regards the **professor's responsibilities** in the explanation of the material: 1) provide clear, well-organized lectures; 2) Be open to all questions during class (I really enjoy it when the students feel confident enough to become part of my lecture); 3) Provide meaningful homework assignments which illustrate the degree of understanding expected of the student; 4) Be available outside of class for questions (I plan to continue my usual habit of regular problem sessions); 5) Give fair exams.

Exams (Fall 2010):

Exam#1 (25% of grade)	Thurs, Sept. 30th
Exam#2 (25% of grade)	Thurs., Nov. 4th
Final Exam (25% of grade)	Wed., Dec. 15 th , 3:00 PM
Homework (25% of grade)	Collected daily

The final exam will be comprehensive, but is strongly weighted toward the material covered in the second half of the semester. This is due to the fact that the first third of the semester is typically review of organic fundamentals and those same fundamentals must be employed to work problems from the more advanced material covered later in the semester.

Notable Dates (Fall 2010):

October 11-12	Fall Break
November 5	Last day to drop a class
November 25-26	Thanksgiving holiday
December 2	Last day of instruction for this class

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