

CHM 5226
ORGANIC REACTIONS
Fall 2005

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Office: 604 DLC
MWF, 8:00–8:50AM
213 HTL

Office Hours: MWF, 9–10AM, or walk-in

Arrow Pushing Sessions: Saturdays, 10AM–12PM, as announced

Course Objective: To provide you with the knowledge of general tactics in organic synthesis to allow future design and execution of synthetic strategies.

Grading:

2 tests (100 pts each), 1 final exam (200 pts), plus homework

Exams:

Cumulative, and they assume a thorough understanding of undergraduate organic chemistry. However, specific exams will focus on the most recent material.

Homework:

Assigned whimsically, including arrow pushing. Please consider the problems at the end of each chapter worthy of your attention.

Textbooks:

Required: Carey and Sundberg, “Advanced Organic Chemistry”, Part B, 4th Edition, 2001

Recommended: C&S “Advanced Organic Chemistry”, Part A, 4th Edition, 2000

R. B. Grossman, “The Art of Writing Reasonable Organic Reaction Mechanisms”

Smith and March, “March’s Advanced Organic Chemistry”, 5th Edition, 2001

Eliel, Wilen, and Mander “Stereochemistry of Organic Compounds”

Re-read your undergraduate organic textbook!

Molecular Models:

Recommended: HGS Models, Biochemistry 5000 Series, Bio-organic Set, 264 pieces

<http://www.maruzenusa.com/>

Topics: (associated reading assignments in **bold**)

1. Diels-Alder reaction and Review (**C&S 6.1, 3, 4.1–4.3, 4.8**) 4 lectures
 - a. Best reaction ever!
2. Oxidations (**C&S 4.4–4.7, 12**) 5 lectures
 - a. Oxidation of alcohols
 - b. Epoxidation of olefins
 - c. Dihydroxylation of olefins
 - d. Miscellaneous oxidations
 - e. C–H activation

3. Reductions (**C&S 4.9, 5**) 3 lectures
 - a. Hydrogenation and hydrogenolysis
 - b. Hydride reagents
 - c. Hydroboration of olefins

Test #1 Oct 4, 2005, 7:00–8:30 pm

4. Reactions of carbonyls with nucleophiles (**C&S 7, 9, 2.3–2.7**) 6 lectures
 - a. Metallation reactions
 - b. Nucleophilic addition to carbonyls
 - c. Olefination of carbonyls
5. Reactions of carbonyls with electrophiles (**C&S 1, 2.1–2.2**) 5 lectures
 - a. Formation of enolates
 - b. Enolate alkylation
 - c. Aldol reactions
 - d. Miscellaneous
6. Organometallic Chemistry (**C&S 8**) 4 lectures
 - a. Palladium-catalyzed coupling (and related procedures)
 - b. Other important reactions
 - c. Olefin metathesis

Test #2 Nov 17, 2005, 7:00–8:30 pm

7. Carbocations, radicals, and carbenes (**C&S 10, 11**) 4 lectures
 - a. Cation- π cyclizations
 - b. Aromatic substitution
 - c. Carbenes
 - d. Radical reactions
8. Organocuprate conjugate additions 1 lecture
 - a. So they add 1,4... what else is new?
9. Pericyclic Reactions (**C&S 6**, see also C&S Part A, Chapter 11) 4 lectures
 - a. Electrocyclic reactions
 - b. Sigmatropic rearrangements
 - c. Cycloadditions
 - d. Ene and retro-ene reactions

Final Exam Mon, Dec 12, 2005, 10:00 am – 12:00 pm