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:
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-[sic] 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