

**CHM 5226**  
**ORGANIC REACTIONS**  
**Fall 2004**

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

Office Hours: MWF, 9–10AM, or walk-in  
Help Session/Arrow Pushing: Saturday 10AM–12PM

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

Grading: 3 tests (100 pts each), 1 project (50 pts), 1 final exam (150 pts), plus homework

Homework: assigned whimsically. Please consider the problems at the end of each chapter worthy of your attention.

Textbooks:

*Required:* Carey and Sundberg, “Advanced Organic Chemistry”, Part B, 4<sup>th</sup> Edition, 2001

*Recommended:* C&S “Advanced Organic Chemistry”, Part A, 4<sup>th</sup> Edition, 2000

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

Smith and March, “March’s Advanced Organic Chemistry”, 5<sup>th</sup> 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** Sept 29, 2004, 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

**Test #2** Oct 27, 2004, 7:00–8:30 pm

6. Organometallic Chemistry (**C&S 8**) 4 lectures
  - a. Palladium-catalyzed coupling (and related procedures)
  - b. Other important reactions
  - c. Olefin metathesis
7. Carbocations, radicals, and carbenes (**C&S 10, 11**) 4 lectures
  - a. Cation- $\pi$  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?

**Test #3** Nov 17, 2004, 7:00–8:30 pm

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
10. Develop original reaction proposal up to 3 lectures

**Original Reaction Proposal** Dec 3, 2004, 8:00–8:50 am (poster session format)

**Final Exam** Thurs, Dec 9, 2004, 10:00 am – 12:00 pm