TENTATIVE SCHEDULE


II. Hybrid Orbitals and Covalent Bonding: Atomic and Molecular Orbitals, Hybrid Atomic Orbitals - σ and π Bonds, Conjugated versus Nonconjugated π Bonds, Bonding in Benzene and Resonance (Electron Delocalization), Drawing Resonance Structures.

III. Structural Effects on Acidity: Effects of Atom Hybridization, Effects of Resonance with π Systems, Effects of Resonance with Substituents Attached to π Systems.


V. Stereochemistry: Geometric Isomerism (cis and trans versus E and Z Designations), Conformations of Alkanes and Cycloalkanes, Chirality, Fischer Projections, Optical Activity, Absolute Configuration (R/S Assignments), Molecules with Two or More Chiral Carbons, Meso isomers and Conformational Enantiomers, Chiral Molecules without Chiral Carbons, Prochirality (Pro-R versus Pro-S Hydrogens, Enantiotopic versus Diastereotopic Hydrogens, Stereospecificity of Enzymes Towards Enantiotopic Hydrogens), Racemate Resolution.

VI. Alkyl Halides: General Classifications, Nucleophilic Substitutions, S_N2 Mechanism (Stereochemistry, Kinetics, Energy Diagrams), Factors Affecting Rates of S_N2 Reactions (Alkyl Halide Structure, Leaving Group, Nucleophile, and Solvent), S_N1 Mechanism (Stereochemistry, Kinetics, Energy Diagrams), Factors Affecting Rates of S_N1 Reactions (Alkyl Halide Structure - Carbocation Stabilities, Leaving Group, and Solvent), Carbocation Rearrangements, S_N2 and S_N1 Reactions on Benzylic and Allylic Halides, β-Eliminations, E1 Mechanism and Regioselectivity, E2 Mechanism (Kinetic Isotope Effect, Stereochemistry, and Regioselectivity), Factors Affecting Substitution Versus Elimination, Synthesis with S_N2 and E2 Reactions.
VII. **Free-Radical Reactions**: Free-Radical Structures, Halogenations (Mechanism, Halogen Reactivities, Stereochemistry, Radical Stabilities and Selectivity, Selectivity of Bromine versus Chlorine and the Hammond Postulate, Allylic and Benzylic Bromination with NBS), Alkane Pyrolysis, Autoxidations with Oxygen (Conversion of Cumene into Phenol and Acetone), Inhibitors (Phenol, BHT, BHA, Vitamins E and C), Alkene polymerizations (Homopolymers, Copolymers, LDPE versus HDPE, Natta-Ziegler Type Catalysts).

VIII. **Alcohols**: Classification, Brief Review of Nomenclature, Acid-Base Reactions and formation of Metal Alkoxides, Nucleophilic Substitutions Reactions with HX, SOCl₂, and PBr₃ Sulfonate Esters (Preparation and Substitution Reactions), Sulfate and Nitrate Esters, Eliminations via Dehydrations and Sulfonate Esters, Oxidations with Chromates and Permanganates, Selective Oxidations with Pyridinium Chlorochromate (PCC), Biological Oxidations via NAD, Preparation of Organometallics (Grignard reagents and Alkylolithiums), Grignard Syntheses of Alcohols.

IX. **Ethers, Epoxides, Thiols, and Sulfides**: Nomenclature, Williamson Ether Syntheses, Epoxide Syntheses (Peroxycacids with Alkenes and via Halohydrins), Nucleophilic Substitutions (Ether Cleavages with HX and Ring Opening of Epoxides), Crown Ethers, Thiol and Sulfide Syntheses, Oxidations of Sulfur Compounds.

**Quizzes and Exams:**

There will be four 1-hour exams (short-answer type, 100 pts. each). The exams will be in-class exams and are scheduled for **Thursday, May 19, Tuesday, June 7, Monday, June 20** and **Friday, June 24**. My exams are designed to test your ability to apply what you have learned, not to test your ability to simply regurgitate information. I will also be handing out a number of self-assessment quizzes throughout the semester.

**Grades:**

Your course grade will be determined by the percentage of the 400 possible total points earned. I do not have any set percentage-letter grade equivalencies, but from past experience, I expect the beginning percentages for A, B, C, and D to be the following: A ~ 85%, B ~ 72%, C ~ 50%, D ~ 40%.

**Problems:**

Selected in-chapter and end-of-chapter problems are assigned for each of the chapters covered and are listed below. In addition to the text problems, I will pass out my own problem sets as a form of review of the material covered. These will also provide examples of the type of questions you should expect to see on my exams. The problems will not be collected or graded. It is to your advantage to work as many of the assigned (and unassigned) problems as possible because working problems is the best way that I know for you to gauge your understanding of organic chemistry. If you truly understand how to work the problems assigned in the text and on the problem sets, you should have little (if any) trouble on the exams.
Assigned Problems

Chapter 1: 1.6, 1.8-1.11, 1.13b,d, 1.14, 1.15, 1.17, 1.18, 1.19a,b, 1.26, 1.27, 1.29b,c, 1.30-1.32, 1.34, 1.35, 1.37e,f, 1.39-1.41, 1.45-1.47, 1.51-1.53, essay.

Chapter 2: 2.4, 2.5, 2.9c, 2.10, 2.11, 2.13, 2.15, 2.16, 2.18, 2.19, 2.23, 2.24, 2.27, 2.28, 2.30, 2.31b,c,d,f, 2.32a,b,f, 2.33, 2.37, 2.38, 2.40, 2.42, 2.45, 2.46d,f, 2.47, 2.48, essay. Also 14.22-14.24, 14.25b, 14.25a,c-e.

Chapter 3: 3.2, 3.3, 3.7, 3.8, 3.9,3.16, 3.17b,c,d, 3.19, 3.22, 3.23, 3.24c,d,e,f, 3.25, 3.26a,c,d, 3.27a,c, 3.28, 3.30-3.32, 3.34, 3.37, essay.

Chapter 4: 4.1, 4.4-4.9, 4.15, 4.16, 4.20-4.22, 4.27, 4.28c, 4.29-4.31b, 4.32a,c, 4.33-4.35, 4.36b,c, 4.37,d,e, 4.40, 4.42b,d,e, 4.43, 4.45, 4.46, 4.49-4.51, 4.53, 4.54a,c,e, 4.55, 4.58, 4.59, 4.64-4.67, 4.69, 4.70, essay.

Chapter 5: 5.1, 5.2, 5.6, 5.7, 5.10, 5.11, 5.14, 5.15b, 5.18, 5.20, 5.23-5.27, 5.29, 5.31-5.39, 5.41, 5.42, 5.44-5.49, 5.52, 5.54, 5.55, 5.58b,c,d,e, 5.59, 5.61, 5.62, essay.

Chapter 6: 6.5-6.10, 6.16-6.21, 6.22a-d,f, 6.23, 6.24b, 6.25, 6.26a,b,d, 6.27b,c, 6.28, 6.30, 6.32, 6.33, 6.35, essay.

Chapter 7: 7.1, 7.3, 7.7, 7.9b, 7.11, 7.13, 7.22a,e,g,h, 7.24, 7.25a,c, 7.27, 7.28, 7.33, 7.35, 7.36, 7.40a-c, 7.41a,b,f,i, 7.42a,b,c-f, 7.43a-g-i, 7.44, 7.46, 7.47c,d, 7.48, 7.49, 7.51b, 7.52-7.55, essay.

Chapter 8: 8.1a,c,d, 8.3b,d, 8.6, 8.7a, 8.12, 8.13-8.25, 8.27, essay.