CHE 173: MECHANISTIC ORGANIC CHEMISTRY II
Winter, 2001

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Office Hours: Mondays 3:00-5:00, Tuesdays 9:00-11:00, or by appointment.

Course Description: This is the second in a sequence of three courses designed to investigate what organic chemistry is and how it works, by emphasizing the relationship between structure and function of organic molecules. We will build on the foundation established in the Fall quarter with specific objectives that are listed as topics in the schedule below.

Text: *Organic Chemistry (7th edition)*, Solomons and Fryhle.

Quizzes:

- Quizzes will be given during the first 30 minutes of the quiz section on Tuesdays throughout the quarter. Missing a quiz will result in a grade of zero, unless an official medical excuse (from a doctor) is provided.
- The lowest quiz grade will be dropped, but in order for the quiz grade to be dropped, you have to have taken the quiz (i.e., missed quizzes that result in a grade of zero are not eligible for omission).
- The format for quizzes will be: 4 short-answer questions or problems (60 %, or 15 pts each)
  5 multiple choice questions (40 %, or 8 pts each).

Final Exam: The final exam will be on March 21, 2001 (11:45 a.m. – 2:00 p.m.). It will be cumulative.

Grades: Final grades will be based on the scale and distribution shown below. If the overall class average is not between 77 and 82, final grades will be curved accordingly so that the average grade is B-/C+.

100 – 93,	A	77 – 79,	C+		
90 – 92,	A-	73 – 76,	C	**Quizzes,**	**50 %**
87 – 89,	B+	70 – 72,	C-	**Final Exam,**	**25 %**
83 – 86,	B	67 – 69,	D+	**Lab,**	**25 %**
80 – 82,	B-	60 - 66,	D		
		< 60,	F		

Schedule and Objectives:

Date	Chapter	Topic
Jan. 8	Review	Introduction. Syllabus. Review Final Exam.
Jan. 9		Introduction to Lab, Dr. Murphy
Jan. 10	7.14-7.15, 8.1-8.3	Hydrogenation of Alkenes and Alkynes. Additions to Alkenes. Markovnikov's Rule. Stereochemistry of Ionic Addition.
Jan. 12	8.4- 8.8	Specific Additions to Alkenes and Associated Stereochemistry. Halohydrin Formation.
Jan. 15	8.9-8.15	Carbenes. Oxidation and Oxidative Cleavage of Alkenes. Additions to Alkynes. Synthetic Applications.
Jan. 16	**Quiz 1**	β-*Eliminations Lab (Gilbert and Martin, Ch. 10)*
Jan. 17	9.1-9.6	NMR Spectroscopy: Introduction. Chemical Shift. Integration. Signal Splitting.
Jan. 19	9.7-9.9	NMR Spectroscopy Continued: Chemical Shift Equivalent and Nonequivalent Protons. Signal Splitting. Rate Processes.
Jan. 22	9.10-9.11	NMR Spectroscopy Continued: Carbon-13 NMR. 2D Techniques.
Jan. 23	**Quiz 2**	*Spectroscopy Tutorial Lab*
Jan. 24	10.1-10.4	Radical Reactions: Homolytic Bond Cleavage. Reactions of Alkanes with Halogens. Mechanism.
Jan. 26	10.5-10.6	Energetics of Radical Reactions. Halogenation of Higher Alkanes.
Jan. 29	10.7-10.11	Stereochemistry of Radical Reactions. Radical Additions to Alkenes.
Jan. 30	**Quiz 3**	*Free Radical Chlorination Lab (Gilbert and Martin, Ch. 9)*
Jan. 31	11.1-11.5	Alcohols: Nomenclature. Physical Properties. Synthesis from Alkenes. Oxymercuration-Demurcuration.
Feb. 2	11.6-11.7	Hydroboration-Oxidation.
Feb. 5	11.8-11.14	Reactions of Alcohols: Mesylates, Tosylates in S_N2 Reactions. Conversion of Alcohols to Alkylhalides.
Feb. 6	**Quiz 4**	*Oxymercuration and Demercuration Lab (Handout)*
Feb. 7	11.15-11.16	Synthesis and Reactions of Ethers.
Feb. 9	11.17-11.18	Epoxides.
Feb. 12	11.19-11.21	Anti Hydroxylation of Alkenes. Crown Ethers. Summary.
Feb. 13	**Quiz 5**	*Reduction of a Ketone Lab (Gilbert and Martin, Ch. 17)*
Feb. 14	12.1-12.4	Alcohols from Carbonyls. Oxidation-Reduction Reactions. Reduction of Carbonyls. Oxidation of Alcohols.
Feb. 16	12.5-12.8	Organolithium and Organomagnesium Compounds. Grignard Chemistry.
Feb. 19	12.8 cont'd-12.10	Grignard Chemistry. Dialkylcuprates. Protecting Groups.
Feb. 20	**Quiz 6**	*Grignard Lab (Gilbert and Martin, Ch. 19)*
Feb. 21	13.1-13.4	Allylic Systems. Allyl Radical. Allyl Cation.

Feb. 23	13.5-13.9	Rules for Resonance. Diene Systems. UV-Vis Spectroscopy.
Feb. 26	13.10-13.11	1,4-Addition Reactions. Diels Alder Reaction.
Feb. 27	**Quiz 7**	*Diels Alder Lab (Gilbert and Martin, Ch. 12)*
Feb. 28	14.1-14.5	Aromatic Compounds: Nomenclature. Reactions. Stability of Benzene.
Mar. 2	14.6-14.8	Modern Theories. Hückel's Rule. Benzoids, C_{60} and C_{70}.
Mar. 5	14.9-14.11	Heterocycles. Aromatics in Biochemistry. Spectroscopy.
Mar. 6	**Quiz 8**	*Nitration of Bromobenzene Lab (Gilbert and Martin, Ch. 15)*
Mar. 7	15.1-15.5	Electrophilic Aromatic Substitution. Arenium Ions. Halogenation, Nitration, Sulfonation of Benzene.
Mar. 9	15.6-15.9	Friedel-Crafts Alkylation and Acylation. Limitations and Synthetic Applications.
Mar. 12	15.10-15.11	Substituent Effects.
Mar. 13	**Quiz 9**	**Lab Final Exam (30 min.)**
Mar. 14	15.12-15.16	Alkylbenzenes. Alkenylbenzenes. The Birch Reduction.
Mar. 16	Review.	Review.
Mar. 21	**Final Exam**	