

**Chemistry 678**  
**“Mechanism and Theory in Organic Chemistry”**  
**Fall 2007**  
**Frederick A. Luzzio**  
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- Meeting Time/  
Room:** 9:30AM-10:45AM; Monday/Wednesday  
Chemistry Building, LL-16
- Text/Course Materials:** March and Smith “Advanced Organic Chemistry” 6<sup>th</sup> Ed (required)  
Selected Articles from Journals/Class Handouts
- Examinations/Grading:** The course grades will be determined on basis of two (2) hour examinations worth 200 points; problem sets worth 150 points and the final examination which is worth 150 points. The final grades will be computed on basis of the % total of 500 points:  
90-100%, A; 80-89%, B; 70-79%, C; 60-69%, D; 59% and below, F.
- Examination Dates:** Hour Examination 1: October 10, 2007.  
Hour Examination 2: November 14, 2007.  
Final Examination: Friday, December 7, 2007; 8:00AM-10:30AM
- Course Description:** The course will focus on the mechanism and theory of classical and contemporary organic reactions. The specific reaction types will include acid and basic catalysis, pericyclic reactions, metal-mediated reactions, radical and photochemical reactions, enzyme catalysis and carbenium ion rearrangements. Topics for discussion within many of the reaction types will include, free energy relationships, kinetic analysis, isotope effects, and the use of stereochemistry and spectroscopic techniques as applied to the elucidation of organic reaction mechanisms.
- Prerequisites:** One year of undergraduate organic chemistry and one year of introductory undergraduate chemistry. One semester of undergraduate physical chemistry may be helpful but not absolutely necessary

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**Lecture/Class Discussion Outline**

<b>Lecture/Class</b>	<b>Topic</b>
August 20	Introduction to Chemistry 678, Review of Syllabus
August 22	Diagnostic Session
August 27	Introduction to Writing Reaction Mechanisms
August 29	Acid-Base Theory; Polar Bonds
September 3	Labor Day
September 5	Acid-Base Theory
September 10	Acid-Catalyzed Reactions
September 12	Acid-Catalyzed Reactions
September 17	Cationic Rearrangements
September 19	Cationic Rearrangements
September 24	Rearrangements involving Electron-Deficient Oxygen
September 26	Rearrangements involving Electron-Deficient Nitrogen

**Chemistry 678 (continued)**

October 1	Nucleophilic Substitution Addition-Elimination
October 3	Electrophilic Substitution, Substituent Effects
October 8	Mid-Semester Break
October 10	<b>Hour Examination I</b>
October 15	(Review Examination 1) Stereoelectronic Effects Neighboring Group Effects
October 17	Symmetry Elements/Desymmetrization
October 22	Pericyclic Reactions
October 24	Pericyclic Reactions Strained Hydrocarbons
October 29	Physical Effects on Organic Reactions
October 31	Nucleophilic Reactions (Intramolecular)
November 5	Nucleophilic Reactions (Intermolecular)
November 7	Aromaticity
November 12	Anionic Reactions/Organic Bases/Base Strengths
November 14	<b>Hour Examination II</b>
November 19	(Review of Examination II) Reduction Reactions

**Chemistry 678 (continued)**

November 21	Thanksgiving Break
November 26	Anionic Reactions/Rearrangements
November 28	Carbene Reactions/Rearrangements
December 3	Radical Reactions (Last Class Meeting)
December 7	<b>Final Examination (8:00-10:30AM)</b>