

Chemistry 2061

February 2006

Catalog Description:

CHEM 2061 – Organic Chemistry I 5 CR FALL, SPR Mechanisms and reactions of aliphatic compounds; stereochemistry, spectral analysis and relevant instrumentation. Lecture four hours, lab four hours.

Prerequisites:

Chemistry 1062

Outline of Major Content Areas:

1. Introduction and Review
2. Structure and Properties of Organic Molecules
3. Structure and Stereochemistry of Alkanes
4. The Study of Chemical Reactions
5. Stereochemistry
6. Alkyl Halides: Nucleophilic Substitution and Elimination
7. Structure and Synthesis of Alkenes
8. Reactions of Alkenes
9. Alkynes
10. Structure and Synthesis of Alcohols
11. Reactions of Alcohols
12. Ethers and Epoxides
13. Infrared Spectroscopy and Mass Spectrometry
14. Nuclear Magnetic Resonance Spectroscopy

Requirements:

Reading assignments, questions and problems from the textbook: *Organic Chemistry*, 6th edition, by Wade. Completion of laboratory assignments.

Course Objectives and Learning Outcomes:

1. The student will learn the nomenclature of organic chemistry. (Goal Three, Natural Sciences, Competency a)
2. The student will learn the reactions and methods of preparation of a variety of organic compounds. (Goal Two, Critical Thinking, Competencies a, b, c; Goal Three, Natural Sciences, Competency b)
3. The student will learn the mechanisms by which many organic reactions occur.
4. The student will learn to use stereochemistry to understand the mechanisms of several organic reactions.
5. The student will learn to develop synthetic methods used to prepare various classes of organic compounds. (Goal Three, Natural Sciences, Competency c)
6. The student will learn to use spectroscopic and instrumental methods used to identify organic compounds.

Experiments:

1. Physical Properties (2 lab sessions)
2. Recrystallization of Biphenyl
3. Isolation of Ethanol and Benzoic Acid from Listerine (2 lab sessions)
4. Thin-Layer Chromatography of Analgesics

5. Competing Nucleophiles
6. Synthesis of Cyclohexene
7. Cis-Trans Isomerism (Maleic and Fumaric Acids)
8. Synthesis of t-Pentyl Chloride
9. Synthesis of Cyclohexanone
10. Synthesis of Soap
11. Spectroscopy (MS, NMR, IR)

Methods of Evaluation:

1. Four or five one-hour exams
2. Questions and homework problems
3. Laboratory experiments (13 lab sessions)
4. Laboratory notebook
5. Comprehensive final exam

Grades:

A – 90% B – 80% C – 70% D – 50%

Assessment:

During the semester a number of assessments will be performed in order to monitor students' progress, provide students the feedback, and to identify areas that require additional attention.