

Effective Date: Summer 2004-2005

Course Description

Prerequisite: CHEM 2261. A continuation of CHEM 2261. (A grade of "C" or better is required to advance to any higher numbered chemistry course.)

Course Objectives

Students will:

1. Understand the implications of functional groups on reactivity, physical behavior, and chemical behavior.
2. Understand how structure, bonding, bond polarity, aromaticity, charge and steric effects affect the reactivity, physical behavior, and chemical behavior of organic molecules.
3. Understand the basic principles of mechanisms and their use in explaining why chemical reactions occur as they do.
4. Understand the synthetic relationships between functional groups.
5. Understand the principles of stereochemistry and their application to reactivity, product outcomes, and biological and physical behavior.
6. Understand the use of IR, NMR and mass spectroscopy in the elucidation of organic structures.
7. Be able to properly name organic molecules and draw structures from a name.

Procedures to Evaluate these Objectives

1. In-class problems after concept presentation
2. In-class exams
3. Cumulative final exam

Use of Results of Evaluation to Improve the Course

1. Student responses to in-class problems will be used to immediately help clarify any misunderstandings and to later adjust the appropriate course material.
2. All exams will be graded and examined to determine areas of teaching which could use improvement.
3. All evaluation methods will be used to determine the efficacy of the material presentation.

Detailed Topical Outline

1. Aromaticity
 - a. MO Theory
 - b. Spectroscopy
 - c. Electrophilic Aromatic Substitution
 - d. Other reactions

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2. Functional Groups: nomenclature, physical characteristics, synthesis, reactions, mechanisms of reactions
 - a. Alcohols and phenols
 - b. Ethers
 - c. Epoxides
 - d. Thiols and sulfides
 - e. Aldehydes
 - f. Ketones
 - g. Carboxylic acids
 - h. Carboxylic acid derivatives
 - i. Amines
 - j. Amides
 - k. Nitriles
 3. Biomolecules
 - a. Carbohydrates
 - b. Amino acids, peptides and proteins
 - c. Lipids
 - d. Heterocycles and nucleic acids