

ORGANIC CHEMISTRY ESSENTIALS II CHEMISTRY 2059 COMMON COURSE OUTLINE

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Chemistry 2059

February 2006

Catalog Description:

CHEM 2059 Organic Chemistry Essentials II 4 CR Summer Session II Aromaticity and reactions of aromatic compounds; heterocyclic compounds; spectral analysis and relevant instrumentation; carbonyl polyfunctional compounds (aldehydes, ketones, carboxylic acids); the aldol reaction; carbohydrates; structure of synthetic polymers; amino acids, and proteins. Lecture eight hours, lab eight hours.

Prerequisites:

Chemistry 2058 or 2061

Outline of Major Content Areas:

1. Aromatic Compounds
2. Reactions of Aromatic compounds
3. Infrared Spectroscopy and Mass Spectrometry
4. Nuclear Magnetic Resonance Spectroscopy
5. Ketones and Aldehydes
6. Carboxylic Acids
7. Alpha Substitutions and Condensations of Enols and Enolate Ions (the aldol reaction)
8. Carbohydrates
9. Synthetic Polymers
10. Amino Acids, Peptides, and Proteins

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 to use spectroscopic and instrumental methods used to identify organic compounds.
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. (Goal Three, Natural Sciences, Competency a)
4. The student will learn to develop synthetic methods used to prepare various classes of organic compounds. (Goal Three, Natural Sciences, Competency c)
5. The student will become familiar with the chemistry of natural products and compounds containing a variety of functional groups.
6. The student will receive the necessary background to take additional courses in organic chemistry and biochemistry.

Experiments:

1. Isolation of Caffeine from Tea
2. Oxidation of Toluene (Preparation of Benzoic Acid)
3. Friedel-Crafts Synthesis of p-Tert-butylphenol
4. Reduction of Acetophenone (Preparation of 1-Phenylethanol)
5. Spectroscopy (MS, NMR, IR)
6. Grignard Synthesis of Triphenylmethanol
7. Aldol Synthesis of Tetraphenylcyclopentadienone
8. Carbohydrates (Qualitative Analysis and Polarimetry)

9. Synthesis of Nylon and Polystyrene
10. Synthesis of Luminol

Methods of Evaluation:

1. Four one-hour exams
2. Questions and homework problems
3. Laboratory experiments (10 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.