

Common Course Outline

CHEM 200

Organic Chemistry I

3 Semester Hours

The Community College of Baltimore County

Description

CHEM 200--3 Credits--Organic Chemistry I serves as a first-semester course for students needing a full year of organic chemistry; discusses the chemistry of saturated & unsaturated hydrocarbons & their derivatives, their synthesis, nomenclature, reactions, mechanisms, stereochemistry & uses.

3 lecture hours & 1 recitation hour per week

Prerequisites: Minimum grades of C in CHEM 123 and CHEM 124

Concurrent enrollment in CHEM 201 is highly recommended.

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. draw structures of organic compounds using atomic orbital overlap concepts, Lewis structures, skeletal, and 3-D representations;
2. identify the common functional groups associated with organic compounds;
3. describe the concept of acids and bases as they pertain to both organic and inorganic compounds;
4. predict the position of equilibrium of acid-base equations, given the pka's of the acids involved;
5. describe structural features, physical and chemical properties, stereochemistry, and nomenclature associated with alkanes, and cycloalkanes;
6. describe the nomenclature, structure, stereochemistry, formation and reactions of alkenes;
7. predict the stereochemistry and structure of the products and mechanisms involved, resulting from selected reagents with a given alkene;
8. describe the nomenclature, structure, formation, and reactions (including tautomerization) of alkynes;
9. define and give examples of the following concepts as they pertain to the stereochemistry of organic compounds--chiral atom, enantiomers, diastereomers, R&S system of nomenclature, optical purity, enantiomeric excess and resolution of optical isomers;

10. describe the preparations, reactions, and reaction mechanisms of alkyl halides including free radical halogenation, E1, E2, S_N1, and S_N2 mechanisms;
11. predict structure of an organic product and the mechanisms involved, from reactions of nucleophiles or bases with selected alkyl halides or alkyl sulfonates in a specified solvent;
12. describe the nomenclature, structure, formation, and reactions of alcohols;
13. predict the structure of the products, and mechanisms involved from the reaction of selected reagents with alcohols;
14. determine the reagents that are needed for a specific transformation such as ROH or RX to C=C; and
15. demonstrate understanding of basic concepts of IR and ¹H-NMR spectral interpretation.

Major Topics

- I. Covalent Bonding and Molecular Structure
- II. Acid/Base Equilibria of Organic Compounds
- III. Functional Groups & Classification of Organic Compounds
- IV. Alkanes and Cycloalkanes
- V. Stereochemistry
- VI. Alkenes, Dienes and Alkynes
- VII. Alkyl Halides
- VIII. Mechanisms of Organic Reactions--S_N1, S_N2, E1, E2 & Free Radical
- IX. IR and ¹H-NMR Spectroscopy Interpretation
- X. Alcohols

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will include at least two 1-hour exams and a 2-hour final exam.

Writing: Individual faculty member may decide to assign a term paper to replace one of the 1-hour exams.

Other Course Information

Individual faculty members may include additional course objectives, major topics, and other course requirements to the minimum expectations stated in the Common Course Outline.