

CHEM 200

Organic Chemistry I

3 Credits: 3 lecture hours and 1 recitation hour per week

Community College of Baltimore County

Common Course Outline

Description

CHEM 200 – Organic Chemistry I: Serves as a first semester course for students needing a full year of organic chemistry; discusses the chemistry of saturated and unsaturated hydrocarbons and their derivatives, their synthesis, nomenclature, reactions, mechanisms, stereochemistry and uses.

Pre-requisites: Minimum grades of C in CHEM 123 and CHEM 124

Co-requisites: Concurrent enrollment in CHEM 201 is highly recommended.

Overall Course Objectives

Upon completion of this course, students 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 systems of nomenclature, optical purity, enantiomeric excess, and resolutions 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;
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;

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For more information, see your professor's syllabus.

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 will be determined by the individual faculty member, but shall include the following, at minimum:

- Two (2) 1-hour exams and a 2-hour final exam.
- Individual faculty member may decide to assign a term paper to replace one of the 1-hour exams.

Written assignments and research projects: Students are required to use appropriate academic resources in their research and cite sources according to the style selected by their professor.

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.

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