

COURSE OUTLINE

CHEM-202

Organic Chemistry II

4 Credits

Science Core Course

HOWARD COMMUNITY COLLEGE

Description

A course designed mainly for science majors and pre-professional students, Chemistry 202 will enable the student to answer questions and solve problems involving aromatic compounds and their derivatives, carbohydrates, amino acids, and fats. In the lab program, the student will acquire skills in laboratory techniques, prepare organic compounds, study their properties, and interpret data collected to identify unknowns. Prerequisite: CHEM-201. (3 hours lecture, 3 hours lab)

Statement on General Education and Liberal Learning

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

Overall Course Objectives

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

1. Define "aromaticity" and identify aromatic compounds.
2. Identify the benzene structure and analyze its derivatives.
3. Explain orientation in substituted benzene derivatives.
4. Identify aromatic compounds and their functional groups using spectroscopy as a tool.
5. Determine methods of synthesis for a given aromatic compound.
6. Identify an individual compound using physical properties and qualitative analytical data.
7. Identify benzene-like compounds that occur in nature. Discuss their usefulness.
8. Discuss organic compounds that are of biological importance and study their chemistry in relation to biological functions.
9. Identify the structures of nucleic acids.
10. Identify the structures of amino acids, proteins and hormones.
11. Evaluate adverse effects of organic compounds and discuss with respect to modern industries.
12. Apply skills to successfully carry out organic synthesis and analysis.
13. Write, using data collection and analysis techniques, a complete formal laboratory report.
14. Apply skills to evaluate an organic reaction, predict the proper mechanism, identify proper method to synthesize a compound and solve problems related to organic chemistry.

Major Topics

- I. Conjugated Systems, Aromatic Compounds and their Reactions
 - A. Conjugated Dienes and their Reactions
 - B. Huckel's Rule of Aromaticity
 - C. Structural Formulas and Names of Benzene Derivatives

- II. IR and NMR Spectroscopy
 - A. Electromagnetic Radiation and its Significance with Regard to Organic Compounds
 - B. Prediction of Structure from Spectroscopy

- III. Reactions of Carboxylic Acids, Amines and Their Derivatives
 - A. Synthesis and Properties of Carboxylic Acids and Amines
 - B. Derivatives of Carboxylic Acids and Amines

- IV. Polymers and Carbohydrates
 - A. Structure, Synthesis and Properties of Polymers
 - B. Structure, Synthesis and Properties of Carbohydrates

- V. Thiols, Lipids, Amino Acids, Proteins and Nucleic Acids
 - A. Structural Formula for Thiols, Thioethers, Fats, and Oils
 - B. Properties, Structure, and Synthesis of Amino Acids and Proteins
 - C. Structural Analysis of Proteins and Nucleic Acids

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will be calculated on the basis of exams, final exam, laboratory techniques, lab notebook, unknown evaluations and quizzes. Written formal lab reports will be required.

Writing: Specific writing assignments will be determined by the individual faculty but will include formal lab reports.

Other Course Information

This course is a Science core course, Science elective and an Arts and Sciences elective.