COURSE OUTLINE
CHEM-104
Fundamentals of Organic and Biochemistry
4 Credits

HOWARD COMMUNITY COLLEGE

Description

This one semester course is designed mainly for pre-professional science students who are interested in the allied health field. This course will provide the student with an introduction to organic and biochemistry. The student will be able to answer questions and solve problems involving nomenclature, physical properties, and the synthesis of aliphatic compounds such as alkanes, alcohols, carboxylic acids, aldehydes and ketones. The major organic biomolecules such as lipids, proteins and carbohydrates, including their function in cells and tissues, will be studied. The laboratory component will develop skills necessary to synthesis and analyze organic compounds. Prerequisite: CHEM-101 or CHEM-103. (3 hours lecture, 3 hours lab)

Overall Course Objectives

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

1. Demonstrate an appreciation for scientific inquiry.
2. Apply chemical principles in explaining practical chemistry applications.
3. Explain the structure and bonding of the carbon atom in organic molecules.
4. Identify different families of organic compounds.
5. Write names of compounds using the IUPAC system.
6. Apply problem-solving skills which would provide the proper framework to begin the study of organic chemistry.
7. Determine the products of typical reactions in organic chemistry.
8. Identify various biomolecules and discuss their structure, bonding and function.
9. Discuss the role of these biomolecules in carbohydrates, lipids, and proteins.
10. Apply the theoretical concepts acquired in the lecture to the laboratory experiments.
11. Conduct various reactions and synthesis in the laboratory.
12. Interpret and analyze laboratory data in order to reach logical conclusions.

Major Topics

I. Organic Chemistry
   - A. Structure
     1. Bonding
     2. Resonance
     3. Isomerism

B. Hydrocarbons
    1. Alkanes
    2. Alkenes
    3. Alkynes
    4. Cyclic Hydrocarbons
C. Alkyl Halides
    1. Substitution Reactions
    2. Elimination Reactions
D. Aromatic Compounds
E. Carbonyl Compounds
    1. Aldehydes
    2. Ketones
    3. Carboxylic Acids
F. Alcohols and Ethers
G. Amines and Amides

II. Biochemistry
A. Carbohydrates
    1. Citric Acid Cycle
B. Lipids
    1. Cholesterol
    2. Lipoproteins
    3. Fatty Acids
    4. Triglycerides
    5. Steroids
C. Proteins
    1. Amino Acids
    2. Enzymes
    3. Hormones
    4. 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, lab quizzes, lab experiments, and lab notebooks.

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

Other Course Information

Students whose programs require two or more years of chemistry should register for CHEM-201 and CHEM-202. This course is a Science elective, and an Arts and Sciences elective.