

Virginia Western Community College

CHM 102

Introductory Chemistry II

Prerequisites

CHM 101.

Course Description

Emphasizes experimental and theoretical aspects of inorganic, organic, and biological chemistry. Discusses general chemistry concepts as they apply to issues within our society and environment. Designed for the non-science major. Part II of II.

Semester Credits: 4

Lecture Hours: 3

Laboratory Hours: 3

Required Materials

Textbook: Timberlake, General, Organic, and Biological Chemistry, Structures of Life, Volume Two (Third Custom Edition for NVCC)

Pearson Publishing. ISBN: 9781323138113

Lab: In-home kit purchased from eScience Labs (can be purchased through bookstore; sent to student in mail)

Lab notebook, 100 carbonless copy sets, Hayden. ISBN: 9781930882744

Course Outcomes

At the completion of this course, the student should be able to:

- Identify the properties of simple organic compounds
- Name and write formulas for simple organic compounds
- predict and explain the typical reactions of simple organic compounds
- Recognize different organic functional groups
- Understand polymerization from monomers
- identify the characteristic structures of carbohydrates, lipids, fats, hormones, vitamins, proteins, nucleic acids, enzymes
- Illustrate the metabolism and functions of the above compounds in life processes
- Discuss environmental impact due to the pollution of air and water
- Demonstrate proper handling of chemicals and glassware in a safe manner

Topical Description

Nature of organic compounds

- 1 . Classification
- 2 . Nomenclature
- 3 . Structure and physical properties
- 4 . Chemical properties
- 5 . Isomerism
 - a. structural
 - b. geometric
 - c. optical
- 6 . Uses and hazards

B. Classes of organic compounds

- 1 . Saturated and unsaturated hydrocarbons
- 2 . Aromatic hydrocarbons
- 3 . Halogen derivatives of hydrocarbons
- 4 . Alcohols
- 5 . Ethers
- 6 . Aldehydes
- 7 . Ketones
- 8 . Acids
- 9 . Esters
10. Amides
11. Amines
12. Organic compounds of phosphorus and sulfur

C. Biochemistry: Structures and reactions of:

- 1 . Carbohydrates
- 2 . Lipids
- 3 . Proteins and DNA
- 4 . Enzymes
- 5 . Metabolism
- 6 . Hormones and vitamins

D. Environmental chemistry

Optional Topics

- Digestion
- Bodily fluids
- Nutritional chemistry

Laboratory Topics

Experiments are performed at home with kits purchased from Hands-On Labs. Information regarding the kits are available from the bookstore or the instructor.

Kit ID code: LP-3063-CK-01 (CHM 102 only)

Experiments:

Naming Organic Compounds
Drawing Organic Compounds
Functional Groups in Organic Chemistry
Stereochemistry I
Stereochemistry II
Molecules of Life: Testing for Sugar and Starch
Synthesis and Analysis of Soap
Macromolecules of Life: Testing for Lipids
Macromolecules of Life: Testing for Amino Acids
Enzymes: Temperature, pH, and Specificity
Ultraviolet Radiation and Sunscreen

Notes to Instructors

1. Attendance in the laboratory is mandatory at the scheduled time. In case of an unavoidable situation, the student should contact the instructor beforehand to be excused and to see if any arrangements can be made to make up the laboratory. It may or may not be possible. Approved safety glasses must be worn in the laboratory **over the eyes** as required by state law.
2. Laboratory reports are due at the beginning of the next lab period. The report consists of the data report sheets included in the lab manual or handout. To aid not only the instructor but also especially the students, reports will not be accepted two weeks after the lab was assigned. Completion of the lab experiment followed by turning in the data and calculations on the due date with appropriate write-up ensures a good grade. Grading scales for laboratory reports are at the professor's discretion, but will count towards the overall grade for the course.