NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
CHM 121-122 - HEALTH SCIENCE CHEMISTRY I-II (4 CR.) (4 CR.)

Course Description

Introduces the health science student to concepts of inorganic, organic, and biological chemistry as applicable to the allied health profession. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose

The purpose of this course is to provide a general background in chemistry for those students who do not intend to enroll in further courses in chemistry.

CHM 121 - HEALTH SCIENCE CHEMISTRY I

Course Prerequisites/Corequisites

Prerequisites for CHM 121 are satisfactory placement scores for MTH 151 (or completion through unit 5 in an MTT course) and ENG 111.

Course Objectives

As a result of the learning experience provided in this course, the student should be able to:

- Define and apply basic terminology
- Balance simple chemical equations
- Apply principles of scientific method and measurement
- Use symbols, formulas and nomenclature correctly
- Perform simple stoichiometric calculations
- Demonstrate an understanding of the principles of atomic structure and the periodic table
- Solve simple gas law problems
- Determine the type of bonding and polarity of simple compounds
- Determine solution concentration and pH
- Relate concentration and temperature of reaction rate
- Recognize and explain the system aspects of our environment
- Predict and explain the effects of air and water pollution
- Predict and explain the effects of pollutants on living organisms

Major Topics to be Covered

- Matter and energy
  - nature of matter
  - state of matter
  - identification of matter
  - types of energy

- Introduction to scientific measurement
  - SI units
  - Scientific notation
  - Significant figures
  - Accuracy and precision
  - Energy

- Atomic structure and the periodic table
  - Development of modern theory of atomic structure
  - Nuclear and electronic structure
  - Relation between electronic structure and chemical properties

- Chemical nomenclature
  - Naming compounds
  - Writing formulas for compounds

- Stoichiometry
  - Balancing chemical equations
  - Mass and mole calculations based on chemical equation

- Heat and calorimetry
  - Energy (enthalpy) relations in chemical processes
  - Calorimetry

- Chemical bonding
  - Ionic bonding
  - Covalent bonding
  - Electronegativity and polarity

- Physical states of matter
  - Properties of gases
  - Properties of liquids
  - Properties of solids

- Aqueous solutions
  - Solubility of solids, liquids and gases
  - Solution concentration calculations
  - Colligative properties
  - Electrolytes and non-electrolytes
  - Reactions in aqueous solutions

- Acids and bases
  - Definitions
  - Neutralization and titration
  - pH
  - Buffers

- Chemical dynamics
  - Relation of concentration and temperature to reaction rate
  - Catalysts

- Oxidation - reduction
  - Oxidation numbers
  - Redox reaction sin solution
  - Balancing redox equations

- Nuclear chemistry
  - Types of radiation
  - Biological effects of radioactivity
  - Mass-energy relationships

Optional Topics

- Environmental chemistry
- Descriptive chemistry of metals and non-metals

CHM 122 - HEALTH SCIENCE CHEMISTRY II

Course Prerequisites/Co-requisites

Prerequisite for CHM 122 is CHM 121.

Course Objectives

As a result of the learning experiences provided in this course, the student should be able to:

- Recognize the properties of simple organic compounds
- Predict and explain the typical reactions of simple organic compounds
- Name and write formulas for simple organic compounds
- Recognize the characteristic structures of carbohydrates, lipids, fats, hormones, vitamins, proteins, nucleic acids, enzymes
- Recognize the metabolism and functions of the above compounds in life processes

Major Topics to be Covered

- Nature of organic compounds
  - Classification
  - Nomenclature
  - Structure and physical properties
  - Chemical properties
  - Isomerism—
    - Structural
    - Geometric
    - Optical
    - Uses and hazards

- Classes of organic compounds
  - Saturated and unsaturated hydrocarbons
  - Aromatic hydrocarbons
  - Halogen derivatives of hydrocarbons
  - Alcohols
  - Ethers
  - Aldehydes
  - Ketones
  - Acids
  - Esters
  - Amides
  - Amines
  - Organic compounds of phosphorus and sulfur

- Biochemistry
  - Structures and reactions of
    - Carbohydrates
    - Lipids
    - Proteins
    - Nucleic acids

Optional Topics

- Enzymes and their mechanisms
- DNA and protein synthesis
- Digestion
- Metabolism
- Hormones and vitamins
- Bodily fluids
- Environmental chemistry

Lab Objectives

As a result of the laboratory learning experiences, the student should be able to:

- Practice safe procedures in the laboratory
- Achieve competencies in:
  - Precise weighing
  - pH measurement
  - Volume measurement
  - Quantitative measurement
  - Titration
  - Distillation