

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
CHM 101 - INTRODUCTORY CHEMISTRY I (4 CR)

Revised 8/2018

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 I of II. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week. **This is a Passport Transfer Course.**

General Course Purpose

The purpose of this course is to provide a general background in chemistry for non-science majors and for students who would benefit from a review of the foundational knowledge prior to enrollment in College Chemistry.

Course Prerequisites/Corequisites

Prerequisites: Satisfactory placement scores for ENG 111 and MTH 154.

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
- Explain the principles of atomic structure and predict trends in periodic table
- Solve simple gas law problems
- Determine the type of bonding, shape and polarity of simple compounds
- Determine solution concentration and pH
- Relate concentration and temperature of reaction rate
- Predict and explain the effects of air and water pollution on environment

Major Topics to be Included

- A. Matter and energy
 - 1. Nature of matter
 - 2. States of matter
 - 3. Identification of matter
 - 4. Types of energy

- B. Introduction to scientific measurement
 - 1. SI units
 - 2. Scientific notation
 - 3. Significant figures
 - 4. Accuracy and precision

- C. Atomic structure and the periodic table
 - 1. Development of modern theory of atomic structure
 - 2. Nuclear and electronic structure
 - 3. Relation between electronic structure and chemical properties

- D. Chemical nomenclature
 - 1. Naming compounds
 - 2. Writing formulas for compounds

- E. Stoichiometry
 - 1. Balancing chemical equations and classifying types of chemical reactions

2. Mass and mole calculations based on chemical equation
- F. Heat and calorimetry
1. Energy (enthalpy) relations in chemical processes
 2. Calorimetry
- G. Chemical bonding
1. Ionic bonding
 2. Covalent bonding
 3. Electronegativity and polarity
- H. Physical states of matter
1. Properties of gases
 2. Properties of liquids
 3. Properties of solids
- I. Aqueous solutions
1. Solubility of solids, liquids, and gases
 2. Solution concentration calculations
 3. Colligative properties
 4. Electrolytes and non-electrolytes
 5. Reactions in aqueous solutions
- J. Acids and bases
1. Definitions
 2. Neutralization and titration
 3. pH
 4. Buffers
- K. Chemical dynamics
1. Relation of concentration and temperature to reaction rate
 2. Catalysts
- L. Gases
1. Gas Laws
 2. Ideal gas equation ($PV=nRT$)
 3. STP Conditions
 - Mixture of gases (Dalton's Law)
- M. Nuclear chemistry (optional)
1. Types of radiation
 2. Biological effects of radioactivity

CHM 101 Lab Objectives

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

1. Practice safe procedures in the laboratory
2. Demonstrate competencies in:
 - precise weighing
 - Interpretation of graphical data
 - pH measurement
 - volume measurement
 - quantitative measurement
 - titration
 - qualitative analysis