Bemidji State University

CHEM 1111: General Chemistry I

A. COURSE DESCRIPTION

Credits: 4
Lecture Hours/Week: 0
Lab Hours/Week: 0
OJT Hours/Week: *.*
Prerequisites: None
Corequisites: None

MnTC Goals: Goal 03 - Natural Science

A survey of chemistry covering basic concepts of inorganic chemistry. The laboratory component introduces techniques, methods, and instrumentation. [Core Curriculum Goal Area 3 (LC)] Student must register for CHEM 1111 (Lecture) and CHEM 1171 (Lab).

B. COURSE EFFECTIVE DATES: 09/03/2002 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Concepts of Central Science: Measurements, significant figures, unit conversions, density
2. Atoms and Matter: states of matter, atomic structure, subatomic particles, periodic table, periodic trends, orbitals, electron configurations
3. Chemical Bonds the Making of Molecules: ionic, polar covalent, non-polar covalent, electronegativity, naming binary molecular and covalent compounds, Lewis structures, molecular shape, molecular polarity
4. Chemical Reactions: Conservation of matter and balanced equations, classes of reactions (acid-base, redox, precipitation), moles and molar mass, reaction stoichiometry calculations, percent yield
5. Gases: Kinetic molecular theory, gas laws (individual, combined, and ideal), partial pressures, Molecular Interactions: Intermolecular forces, boiling point, phase changes, solubility
6. Solutions: Concentrations, dilutions, colligative properties
7. Rates and Equilibrium: Collision theory, reaction energy diagrams, altering reaction rate, dynamic equilibrium, equilibrium expressions, LeChatelier’s principle
8. Acid-Base Reactions: Conjugate acid-base pairs, acid equilibrium expressions, pH, acid-base titrations, buffers

D. LEARNING OUTCOMES (General)

1. apply scientific method, units, and dimensional analysis.
2. examine atomic structure and a molecule's bonding and geometric structure and how that influences its chemical behavior and/or physical behavior.
3. classify, examine, and prepare matter that has undergone a change forming products that have new chemical and physical properties and energy exchanges.
4. interpret intermolecular and electrostatic forces between molecules as related to their physical behavior.
5. calculate forms of stoichiometric, concentration, equilibrium, and gas law concentrations.
E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted