

Minnesota State College Southeast

CHEM 1430: Principles of Chemistry I

A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 3

Lab Hours/Week: 2

OJT Hours/Week: *.*

Prerequisites:

This course requires the following prerequisite
CHEM 0510 - Fundamentals of Chemistry

Corequisites: None

MnTC Goals: Goal 02 - Critical Thinking, Goal 03 - Natural Science

This is the first semester of an in-depth study of general chemistry. Topics covered include measurements, stoichiometry, solutions, gases, atomic and electronic structure, chemical bonding and thermochemistry. Lab is practical applications of topics covered in class, emphasizing collection, reporting, and interpretation of data. (Fulfills MnTC Goals 2 and 3) (Prerequisite: CHEM0510 or recent high school or college chemistry with permission of instructor) (4 credits: 3 lecture/1 lab)

B. COURSE EFFECTIVE DATES: 07/20/2016 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Atomic theory, quantum mechanics, and chemical bonding
2. Changes in matter on a molecular/atomic scale including thermodynamics and equilibrium
3. Apply chemical principles and theories to problems
4. Communicate and relate chemical principles to everyday life using a chemical vocabulary
5. Collect, organize, and analyze scientific data in laboratory

D. LEARNING OUTCOMES (General)

1. Classify matter from the perspective of modern atomic theory
2. Make measurements, propagate uncertainty, and use dimensional analysis to convert units
3. Classify and name ionic and covalent inorganic compounds
4. Write, classify, and predict products of chemical reactions
5. Complete chemical calculations including limiting reactant, percent yield
6. Calculate solution concentrations including dilutions and titrations
7. Describe reactions in aqueous solution
8. Describe behavior of ideal gases using kinetic molecular theory
9. Calculate enthalpy changes of chemical reactions, including calorimetry and Hess's law
10. Relate electron configurations, quantum numbers, and atomic orbitals to periodicity
11. Predict shape and polarity of compounds using VSEPR
12. Describe bonding using valence bond theory and molecular orbital theory

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 02 - Critical Thinking

1. Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and conscious of possible bias in the information selected.
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives which can give alternative meanings or solutions to given situations or problems.
3. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.

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

This course was previously CHEM 2530.