

CHM 131 Introduction to Chemistry

COURSE DESCRIPTION:

Prerequisites: DMA 010, DMA 020, DMA 030 or MAT 003, and DRE 097 or ENG 002.

Corequisites: CHM 131A

Course description. This course introduces the fundamental concepts of inorganic chemistry. Topics include measurement, matter and energy, atomic and molecular structure, nuclear chemistry, stoichiometry, chemical formulas and reactions, chemical bonding, gas laws, solutions, and acids and bases. Upon completion, students should be able to demonstrate a basic understanding of chemistry as it applies to other fields.

This course has been approved to satisfy the Comprehensive Articulation Agreement for transferability as a general education course in Natural Science. This course has been approved for the transfer under the ICAA as a general education course in Natural Science.

Course Hours per Week: Class, 3 hours. Semester Hours Credit, 3.

LEARNING OUTCOMES:

Upon completing requirements for this course, the student will be able to:

1. Students will demonstrate knowledge of metric prefixes, use proper units, convert units, and use scientific notation.
2. Students will demonstrate knowledge of the atom, chemical reactions, gas laws, basic chemical kinetics, and pH.

OUTLINE OF INSTRUCTION:

- I. Chemistry in our lives
 - A. What is chemistry and what are chemicals
 - B. Scientific method
 - C. Math skills and scientific notation
- II. Chemistry and measurement
 - A. Significant figures
 - B. Prefixes and equalities
 - C. Density
- III. Matter and Energy
 - A. Classification of matter
 - B. States and properties of matter
 - C. Temperature
 - D. Energy and Nutrition
 - E. Specific Heat
 - F. Changes of State
- IV. Atoms and Elements
 - A. Elements and symbols
 - B. The periodic table
 - C. The atom

- D. Atomic number and atomic mass
 - E. Electron configurations
 - F. Trends in periodic properties
- V. Nuclear Chemistry
- A. Radioactivity
 - B. Nuclear reactions
 - C. Half-lives
 - D. Nuclear fission and fusion
- VI. Ionic and Molecular Compounds
- A. What are ions and ionic compounds
 - B. Naming and writing ionic formulas
 - C. Polyatomic ions
 - D. Molecular compounds and covalent bonding
 - E. Lewis dot structures
 - F. Electronegativity and bond polarity
 - G. Intermolecular forces in compounds
- VII. Chemical Reactions and Quantities
- A. Writing balanced chemical equations
 - B. Types of chemical reactions
 - C. Oxidation-Reductions reaction basics
 - D. The mole and molar mass
 - E. Mole relationships in chemical reactions
 - F. Limiting reactants and percent yield
 - G. Energy in chemical reactions
- VIII. Gases
- A. Properties of gases
 - B. The ideal gas law
 - C. How to derive all other parameters that affect gases from the ideal gas law
 - D. Volume and moles
 - E. Using balanced chemical equations and mole ratios to solve problems regarding gasses
 - F. Partial pressure
- IX. Solutions
- A. Define solution, solute, and solvent
 - B. Electrolytes and nonelectrolytes
 - C. Solubility basics
 - D. Solution concentrations (m/m, m/v, v/v, and molarity)
 - E. Dilutions
 - F. Properties of solutions
- X. Reaction Rates and Chemical Equilibrium

- A. Rates of reactions
 - B. Chemical equilibrium
 - C. How to write and solve for equilibrium constants
 - D. Le Chatelier's principles
- XI. Acids and Bases
- A. Defining acids and bases, mainly using the Bronsted-Lowry definition
 - B. Strengths of acids and bases
 - C. Dissociation of water
 - D. The pH scale, how to calculate
 - E. Reactions of acids and bases
 - F. Buffers basics

REQUIRED TEXTBOOK AND MATERIAL:

The textbook and other instructional material will be determined by the instructor.