

DEPARTMENT OF CHEMISTRY
Common Course Outline
CHEM 099 – Introductory Chemistry

Course Description

A treatment of fundamental chemical mathematics, computational methods, metric system, matter, energy, chemical and physical properties, law of conservation of mass-energy, foundations of atomic theories, elements, compounds, formulas, and stoichiometry. Other topics may be covered at the discretion of the instructor.

Assessment Level(s): ELAI 990 / ENGL 101 / ENGL 101A, MATH 050, READ 120.

Credits – 3 semester hours. *Not applicable to a degree or certificate. May not be used to satisfy degree requirements. Not included in GPA calculation.*

Course scheduling

Sections offered at all campuses every Fall, Spring and may be offered in Summer sessions. Saturday sections (Takoma Park campus) and Distance Learning sections available.

Broad Course Outcomes

Upon successful course completion, a student will be able to:

- Perform mathematical operations relevant to chemical problems
- Describe the chemical nature of atoms, ions, and molecules
- Apply rules of nomenclature to simple chemical compounds

Specific Course Objectives

Upon successful course completion, a student will be able to:

- Use dimensional analysis to solve problems; report answers with appropriate significant figures.
- Identify the states of matter and describe common physical properties of each state.
- Identify and distinguish between physical and chemical properties/changes.
- Describe the major components of the atom and write symbols for atoms, ions, and isotopes
- Name and write formulas for ionic and covalent compounds.
- Convert moles, masses, and numbers of particles.
- Determine percent composition and understand and apply the mole concept to determine empirical and molecular formulas.
- Balance chemical equations, classify reaction types, and determine products of reactions.
- Use balanced equations and stoichiometry to determine amounts and masses of substances used and produced during a chemical process. Determine percent yields.
- Determine solution concentrations and calculate amounts of materials in aqueous reactions.
- Analyze and solve problems that include a combination of concepts.

Major Lecture Topics

Scientific laws and theories, the scientific method, measurements, numbers, scientific notation, base and derived units, significant figures in measurements and calculations, dimensional analysis, temperature, states of matter, physical and chemical properties/changes, atomic theory, atomic structure and symbolism, atomic mass, the periodic table, ions, compounds, acids, formula mass, the mole, molecular composition, empirical and molecular formulas, representing chemical reactions, classifying chemical reactions, stoichiometry, yields, limiting reagents, aqueous solutions, molarity, dilutions, stoichiometry in solution, and titrations.

Course Requirements

Grading procedures will be determined by the individual faculty instructor, but will include the following *minimum* criteria:

- Minimum of three examinations
- Homework, quizzes, or other assignments/projects as assigned by the instructor
- Comprehensive common final exam

Grading Policy

The following letter grade policy is used to determine the final course grade:

A 100 – 90% **B** 89 – 80% **C** 79 – 70% **U** < 70%

Required Textbook

Introductory Chemistry (Open Educational Resource, free online access through MC Blackboard LMS)

Textbook Chapter Coverage

Chapter 1 – Introduction to Chemistry
Chapter 2 – Measurements
Chapter 3 – Matter
Chapter 4 – Atoms and Elements
Chapter 5 – Molecules and Compounds
Chapter 6 – Counting Atoms
Chapter 7 – Chemical Reactions
Chapter 8 – Stoichiometry
Chapter 9 – Aqueous Solutions

MC Student Code of Conduct and Academic Honesty

Montgomery College Syllabus Information