









Syllabus
CHEM 1090
General Chemistry I
2022

Committee Members:

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Facilitator: Dr. Aaron McLean

The Institution agrees to the contents in this syllabus including course prefix, number, course description and other contents of this syllabus.

 Chief Academic Officer, Central Community College	04/14/2022	Adopt
 Chief Academic Officer, Little Priest Tribal College	03/28/2022	Adopt
 Chief Academic Officer, Metropolitan Community College	03/28/2022	Decline
 Chief Academic Officer, Mid-Plains Community College	03/28/2022	Adopt
 Chief Academic Officer, Nebraska Indian Community College	04/04/2022	Adopt
 Chief Academic Officer, Northeast Community College	03/28/2022	Adopt
 Chief Academic Officer, Southeast Community College	04/04/2022	Adopt
 Chief Academic Officer, Western Nebraska Community College	03/28/2022	Adopt



I. CATALOG DESCRIPTION

Course Number: CHEM1090

Course Title: General Chemistry I

Prerequisite(s): Intermediate Algebra or Appropriate College Level Math Score

Catalog Description: This is the first course of a comprehensive chemistry sequence. Topics include nomenclature, atomic structure, chemical reactions, essentials of bonding, periodic properties, Valence Shell Electron Pair Repulsion Theory (VSEPR) theory, modern bonding theories, stoichiometry, thermochemistry, and the chemistry of solids, liquids, gases.

Credit Hours: 4 Semester; 6 Quarter

Contact Hours: 45 (lecture) / 30 (lab)

II. COURSE OBJECTIVES / COMPETENCIES

Course will:

1. Implement basic dimensional analysis.
2. Introduce basic structure of the atom.
3. Disseminate the properties of elements.
4. Describe the quantum-mechanical model of the atom.
5. Identify the properties of molecular shapes.
6. Identify inorganic compounds using correct nomenclature.
7. Describe chemical reactions by symbolic, numeric, and verbal means.
8. Introduce simple reactions.
9. Elaborate on energy transfer and basic thermodynamic relationships.
10. Delineate stoichiometric relationships.
11. Convey properties of gases and gas laws.
12. Introduce the principles of solutions and their concentrations.
13. Familiarize the student with the properties of acids and bases.
14. Delineate safe and appropriate laboratory techniques.

III. STUDENT LEARNING OUTCOMES:

Students will be able to:

1. Calculate one quantity from another by use of dimensional analysis.
2. Describe the structure of an atom.
3. Explain periodic trends.
4. Describe the changes as energy interacts with an atom.
5. Compare and contrast covalent and ionic bonding.
6. Draw Lewis structures for atoms, ions, and molecules.
7. Determine the shape of a molecule.
8. Determine correct International Union of Pure and Applied Chemistry (IUPAC) names and chemical formulas of compounds.
9. Describe chemical reactions by symbolic, numeric, and verbal means.
10. Predict the products of simple reactions.
11. Perform enthalpy calculations.

12. Interpret energy diagrams.
13. Perform stoichiometric calculations.
14. Perform gas law calculations.
15. Calculate solution concentrations.
16. Determine properties of acidic and alkaline solutions.
17. Demonstrate the ability to perform lab experiments safely, to interpret the data collected, and to draw reasonable conclusions based on the data.

IV. COURSE CONTENT / TOPICAL OUTLINE

1. Matter and measurement
2. Atomic theory and the periodic table
3. Atoms, molecules, and ions
4. Chemical reactions
5. Mass, moles, and stoichiometric relationships
6. Gases and gas laws
7. Thermochemistry
8. Quantum theory of the atom
9. Electron configurations and periodicity
10. Chemical bonding
11. Molecular geometry and bonding theories
12. States of matter

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s) Suggested
1. OpenStax Chemistry, current ed.
 2. Chemistry, Burdge, current ed.
 3. Chemistry: A Molecular Approach, Tro, current ed.
 4. General Chemistry, McQuarrie, current ed.
 5. General Chemistry, Ebbing, current ed.
 6. Essentials of General Chemistry, Ebbing, current ed.
 7. Chemistry, Robinson et. al, current ed.
 8. General Chemistry: Atoms First, McMurry and Fay, current ed.
 9. Chemistry, Chang, current ed.
 10. Chemistry: The Central Science, Brown and LeMay, current ed.

VI. METHOD OF PRESENTATION/INSTRUCTION

1. Lecture
2. Discussion
3. Demonstration
4. Group activity
5. Application
6. On-Line
7. Distance education
8. Laboratory activities

VII. METHODS OF EVALUATION

Course grades, at the determination of the instructor, may be based on participation, assignments, exams, projects, papers, and lab work. Instructors will distribute and discuss evaluation and his/her grading policies with students at the beginning of each term.

VIII. INSTITUTIONAL DEFINED SECTION

(To be used at the discretion of each community college as deemed necessary)