**Syllabus**

**CHEM1090**

**GENERAL CHEMISTRY I**

**2016**

**Committee Members:**

No Representative, Central Community College
No Representative, Little Priest Tribal College
Dylan Wilhelm, Metropolitan Community College
Aaron McLean, Mid-Plains Community College
No Representative, Nebraska Indian College
Dave Heidt, Northeast Community College
Alan Earhart, Southeast Community College
Dave Nelson, Western Nebraska Community College

Alan D. Earhart
Alan D. Earhart (Mar 9, 2017)

Facilitator

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

Deborah Brennan — adopt
Deborah Brennan (Mar 7, 2017)
Chief Academic Officer, Central Community College

Betty Red Leaf Collett — Not Offered
Betty Red Leaf Collett (Mar 8, 2017)
Chief Academic Officer, Little Priest Tribal College

Thomas J McDonnell — Decline
Thomas J McDonnell (Mar 7, 2017)
Chief Academic Officer, Metropolitan Community College

Jody Tomanek — Adopt
Jody Tomanek (Mar 7, 2017)
Chief Academic Officer, Mid-Plains Community College

Leland Henke — Adopt
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John Blaylock — Adopt
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Dennis Headrick — Adopt
Dennis Headrick (Mar 7, 2017)
Chief Academic Officer, Southeast Community College

Kim Kuster Dale — Adopt
Kim Kuster Dale (Mar 7, 2017)
Chief Academic Officer, Western Nebraska Community College

## 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 AND 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:

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. General Chemistry, McMurry and Fay, current ed.
8. Chemistry, Chang, current ed.
9. 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)*