

**Course Outline for:** CHEM 1062 Principles of Chemistry 2**A. Course Description**

1. Number of credits: 5
2. Lecture hours per week: 4  
Lab hours per week: 3
3. Prerequisites: CHEM 1061 (C or higher)
4. Corequisites: None
5. MnTC Goals: Goal #3 – Natural Sciences

This course is a continuation of Chemistry 1061. Students will learn the physical properties of solutions, chemical equilibrium, kinetics, reaction mechanisms, acid-base chemistry, thermodynamics, electrochemistry, qualitative analysis, and nuclear chemistry. Lecture 4 credits; 3-hour lab 1 credit.

**B. Date last reviewed/updated:** March 2023**C. Outline of Major Content Areas**

1. Properties of aqueous solutions
2. Chemical kinetics and mechanisms
3. Chemical equilibrium
4. Acids and Bases: theory, equilibria, and buffer solutions
5. Solubility equilibrium
6. Thermodynamics
7. Electrochemistry
8. Nuclear Chemistry
9. *Optional: Chemistry in the Atmosphere*
10. *Optional: Transition Metal Chemistry and Complex Ions*

**D. Course Learning Outcomes**

Upon successful completion of the course, the student will be able to:

1. Interpret chemical reactions, using concepts of kinetics and energy. (Goal 3a)
2. Use equilibrium calculations to interpret the behavior of aqueous solutions containing acids, bases, and salts. (Goal 3c)
3. Apply the concepts of electrochemistry to real life situations.
4. Solve quantitative problems involving matter and energy in mixtures, physical processes, and chemical reactions. (Goal 3a, 3b)
5. Demonstrate competence in safely collecting, interpreting and communicating laboratory information. (Goal 3b, 3c)
6. Explain nuclear processes such as radioactivity, fission and fusion in terms of kinetic and thermodynamic principles. (Goal 3a)
7. Critically evaluate societal and environmental issues using principles of chemistry. (Goal 3d)

**E. Methods for Assessing Student Learning**

Methods for assessment may include, but are not limited to, the following:

1. Exams
2. Quizzes, homework, and/or a lab practical exam
3. Laboratory experiments including the following general topics:
  - a. Lab Safety
  - b. Determination of Molar Masses
  - c. Observations of Chemical Reactions
  - d. Equilibria in aqueous solutions
  - e. Oxidation-reduction reactions
  - f. Titration
4. Comprehensive final exam

**F. Special Information**

None