CHEM 112 Course Goals and Learning Objectives

Chem 112 Course Objectives
This course will:

1. Predict and explain macroscopic behavior and properties using knowledge of microscopic properties of a substance.
2. Use chemical data and knowledge of concepts to make conclusions about the spontaneity of a chemical process.
3. Describe how energy changes in a system are related to electronic transitions, physical changes, and chemical changes.
4. Use problem-solving skills to apply chemical and physical knowledge toward the solution of contemporary challenges.

Learning Goals for CHEM 112
After completing this course students will be able to do the following:

1. Use graphical information to describe or predict the behavior of a chemical system.
2. Use kinetic data to describe the relationship of the concentration of chemical components to time and temperature as a chemical reaction proceeds. Derive rate laws and simple mechanisms from experimental data.
3. Describe and predict the nuclear chemistry of a substance, analyze applications related to energy and medicine, and use radioactive dating to determine age.
4. Describe the properties and predict the behavior of acid-base equilibria. Quantitatively determine the pH of aqueous solutions of acids, bases, salts, and buffers.
5. Describe the properties and predict the behavior of solubility and complex ion equilibria.
6. Develop an understanding of entropy and free energy. Use thermodynamic data to predict the spontaneity of a chemical process and the amount of work required or produced.
7. Analyze the chemistry of redox reactions to describe the components and behavior of an electrochemical or electrolytic cell. Determine the spontaneity of a redox process and the amount of work required or produced.
8. Describe the behavior and properties of transition metal complexes and chelates, and analyze applications of these concepts.
9. Compare and analyze the structure and bonding in solid materials, and connect these concepts to electrical and physical properties.