

**I. COURSE INFORMATION**

- A. Chemistry 125 College Chemistry I
- B. 5 credit hours
- C. Kotz, P. Treichel, Townsend, and D. Treichel. *Chemistry & Chemical Reactivity*. 10<sup>th</sup> ed. Kentucky: Cengage Learning
- D. Prerequisites: Student must be eligible for the following courses: MAT 105 College Algebra, COL 101 English Composition I
- E. KRSN: CHM 1010 Chemistry I for Majors with Lab

The learning outcomes and competencies detailed in this course outline or syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups project for this course as approved by the Kansas Board of Regents.

**II. COURSE DESCRIPTION**

College Chemistry I is an integrated lecture and laboratory course for students planning to take additional courses in chemistry or as a chemistry major. This course covers the fundamental concepts of chemistry as they apply to the science of the composition and structure of matter and the changes that matter undergoes. The major areas include the study of elements, compounds, the physical states, calculations, chemical reactions, and nomenclature.

**III. LEARNING OUTCOMES**

- A. Identify and differentiate between atoms, pure elements, compounds, and ions, and correlate chemical formulas with chemical names
- B. Construct balanced chemical equations given a set of reactants and/or products, use a balanced chemical equation to solve stoichiometry problems, and analyze chemical reactions with regards to stoichiometry and thermochemistry
- C. Identify predominant species present in an aqueous solution and identify the reactants and/or products of common aqueous reactions: acid/base, redox, precipitation, etc.
- D. Relate the periodic properties of the elements to their electronic structure using the quantum mechanical model
- E. Apply VSEPR and Valence Bond Theory to predict the three-dimensional structure of molecules and relate macroscopic physical and chemical properties of matter to its atomic scale chemical bonding, intermolecular forces, and three-dimensional structure
- F. Apply the Kinetic Molecular Theory to describe an ideal gas and use the Ideal Gas Law to calculate a state variable for a given set of conditions
- G. Describe the relationships between heat, work, internal energy, and energy changes for chemical reactions and perform calculations involving these concepts
- H. Apply dimensional analysis and mathematical techniques to solve chemical problems, including significant figures throughout calculations in all content learning outcomes
- I. Execute laboratory skills in accordance with proper laboratory and chemical safety practices
- J. Collect, evaluate, and interpret qualitative and quantitative data from laboratory procedures in a productive and meaningful manner

**IV. MAJOR CONTENT AREAS**

- A. Matter, Metric System, Measurements, and Calculations, and Atoms and Molecules
- B. Chemical calculations and chemical reactions
- C. Quantum Theory of the Atom and the Periodic Table
- D. Compounds: bonding and structure
- E. The Physical States: liquids, solids, and gases
- F. Thermochemistry

**V. ASSIGNMENTS (may include but are not limited to)**

- A. Homework assignments

- B. Chapter quizzes and unit exams
- C. Laboratory exercises
- D. Final examination

**VI. EVALUATION METHODS** (may include but are not limited to)

- A. Quizzes and exams
- B. Lab exercises
- C. Assignments
- D. Attendance and participation
- E. Final exam