

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	College Chemistry I & Lab
COURSE NUMBER	CHEM-0111
DIVISION	Math, Science, Business & Technology
DEPARTMENT	Chemistry
CIP CODE	24.0101
CREDIT HOURS	5
CONTACT HOURS/WEEK	Class: 3 Lab: 4
PREREQUISITES	Passing Grade of "C" or better in: MATH-0105, or MATH-0108, or MATH-0120, or MATH-0122, or MATH-0123, or

COURSE PLACEMENT Students must meet the correct placement measure for this course. Information may be found at:
<https://www.kckcc.edu/admissions/information/mandatory-evaluation-placement.html>

COURSE DESCRIPTION

Primarily for biological or physical science majors, College Chemistry I and Lab provides and introduction to the fundamental concepts of chemistry. The laboratory supports the concepts through practical application and develops scientific techniques.

KANSAS SYSTEMWIDE TRANSFER: CHM1010/1011/1012

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.

General Education Learning Outcome

- Basic Skills for Communication
- Mathematics
- Humanities
- Natural and Physical Sciences
- Social and Behavioral Sciences

Institutional Learning Outcomes

- Communication
- Computation and Financial Literacy
- Critical Reasoning
- Technology and Information Literacy
- Community and Civic Responsibility
- Personal and Interpersonal Skills

TEXTBOOKS

<http://kckccbookstore.com/>

METHODS OF INSTRUCTION

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE

- A. Explain the processes involved in the scientific method and be able to apply it to investigate natural phenomena.
- B. Explain the design and significance of experiments that led to the adoption of modern atomic theory.
- C. Recognize and interpret isotopic notation.
- D. Relate atomic mass to composition in terms of subatomic particles
- E. Descriptive chemistry of ionic and covalent compounds.
- F. Solutions
- G. Chemical reactions and stoichiometry
- H. Properties of solids, liquids, and gases
- I. Describe, define, and perform calculations involving the basic concepts of thermodynamics
- J. Conceptually and quantitatively relate spectroscopic observation of atoms to quantum mechanical theories
- K. Molecular bonding and structure
- L. Work in the laboratory in accordance with good laboratory practices
- M. Gather and record qualitative and quantitative data accurately
- N. Handle and evaluate data in logical, productive, and meaningful ways
- O. Correlate laboratory work with principle topics in Chemistry I lecture

COURSE LEARNING OUTCOMES

Upon successful completion of this course, the student will:

- A. Identify and differentiate between atoms, pure elements, compounds, and ions, and correlate chemical formulas with chemical names.

- B. Relate the periodic properties of the elements to their electronic structure using the quantum mechanical model.
- C. 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.
- D. 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.
- E. Identify predominant species present in an aqueous solution and identify the reactants and/or products of common aqueous reactions: acid/base, redox, precipitation, etc.
- F. Apply 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 relationship 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.

ASSESSMENT OF COURSE LEARNING OUTCOMES

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES

Student Handbook

<https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf>

College Catalog

<https://www.kckcc.edu/academics/catalog/index.html>

College Policies and Statements

<https://www.kckcc.edu/about/policies-statements/index.html>

Accessibility and Accommodations

<https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html>.