

University of Arkansas – Fort Smith
5210 Grand Avenue
P. O. Box 3649
Fort Smith, AR 72913–3649
479–788–7000

General Syllabus

CHEM 1403 College Chemistry I

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0

Prerequisite: MATH 1403 College Algebra or higher level MATH course or CHEM 1303 Chemical Principles

Prerequisite or corequisite: CHEM 1401 College Chemistry I Laboratory

Effective: 2018~2019

I. Course Information

A. Catalog Description

Basic chemical background necessary for advanced courses in science, to include the theoretical basis of atomic structure and bonding, stoichiometric calculations, classification of elements, thermochemistry, and physical properties of matter. CHEM 1303 and CHEM 1301 are highly recommended for students who have never taken a chemistry course. (ACTS: CHEM 1414; must have CHEM 1403/1401)

II. Student Learning Outcomes

A. Subject Matter

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

1. Apply a scientific approach to chemical problems. Use significant figures in scientific manipulations.
2. Apply the basic principles of chemistry, including the law of conservation of matter and energy, the law of constant composition, and the law of multiple proportions.
3. Apply the current theory of atomic structure through the principle, angular momentum, magnetic, and spin quantum numbers to determine electron configurations.
4. Apply general principles of chemistry in a quantitative manner to do stoichiometric calculations on chemical reactions.
5. Apply the concepts of energy content of atoms, molecules, and compounds and the exchange of energy that occurs as chemical, physical, and nuclear processes occur.
6. Describe and discuss properties involved in nuclear stability including the processes unstable nuclei undergo in order to achieve stability.
7. Apply the physical laws of gases.

8. Describe the chemical bonding and shape of chemical substances.

B. University Learning Outcomes

College Chemistry I enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills: Students will identify a problem or issue and will research, evaluate, and compare information from varying sources in order to evaluate authority, accuracy, recency, and bias relevant to the problems/issues. Students will generate solutions/analysis of problems/issues evaluated and will assess and justify the solutions and/or analysis.

Communication Skills (written and oral)

Students will communicate proficiently. Students will compose coherent documents appropriate to the intended audience and effectively communicate orally in a public setting.

Ethical Decision Making

Students will model ethical decision-making processes. Students will identify ethical dilemmas and affected parties and will apply ethical frameworks to resolve a variety of ethical dilemmas.

Global & Cultural Perspectives

Students will reflect upon cultural differences and their implications for interacting with people from cultures other than their own. Students will demonstrate understanding or application of their discipline in a global environment and will demonstrate how their discipline impacts or is impacted by different cultures.

III. Major Course Topics

- A. Measurement, the Metric System, and Data Collecting and Treatment
- B. States of Matter
- C. Atomic Structure and the Periodic Table
- D. Chemical Reactions, Stoichiometry
- E. Nomenclature and Analysis
- F. Thermochemistry
- G. Atomic Structure, Electron Configuration, and Quantum Mechanics
- H. Chemical Bonding and Molecular Structure
- I. Gases and Their Behavior, gas law calculations.