

University of Arkansas – Fort Smith
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General Syllabus

CHEM 10001 Chemical Principles Laboratory

Credit Hours: 1

Lecture Hours: 0

Laboratory Hours: 2

Prerequisite: MATH 03174 Beginning and Intermediate Algebra or higher level MATH or exemption by placement.

Prerequisite or corequisite: CHEM 10003 Chemical Principles

Effective: 2018~2019

I. Course Information

A. Catalog Description

Application of the fundamental principles of chemistry as well as the collection and analysis of experimental data needed to solve chemistry problems

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

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

1. Use the concepts of precision and accuracy in measurement with the metric system.
2. Use dimensional analysis to solve a variety of mathematical problems relating to chemistry.
3. Describe the structure of atoms and explain how the structure determines the reactivity of elements.
4. Describe the structure of molecules and explain how the structure determines the reactivity of molecules.
5. Describe and explain the bonding of atoms to each other.
6. Define the physical states of matter in terms of structure, and describe the influence energy has on these states.
7. Solve mathematical relationships involving the pressure, volume, temperature, and molar quantity of gases.
8. Identify and write formulae for covalent and ionic compounds.
9. Write chemical equations to illustrate the basic classes of chemical reactions.
10. Work problems relating to concentration of solutions.

11. Explain the effects that different kinds of particles have on the solution process and the properties of solutions.
12. Distinguish between acids and bases in terms of physical and chemical properties.
13. Recognize the biologically important molecules and explain their biological functions on the basis of their structure.

B. University Learning Outcomes

Chemical Principles Laboratory 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. The student 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. The student 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. The 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. The 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. Molecular Motion
- B. Chemical Reactions
- C. Energy Measurements
- D. Making Compounds
- E. Metals and Their Activities
- F. Characteristics of Nonmetals
- G. Rates of Chemical Reaction
- H. Reversible Chemical Reactions
- I. Chemical Formulas
- J. Preparation of Solutions
- K. Acidity and Basicity
- L. Identification of an Unknown Salt

- M. Electrolytes and Electrochemistry
- I. Introduction of Organic Compounds
- J. Lipids
- K. Proteins
- L. Enzymes and Vitamins
- M. DNA, RNA, and Hormonal Action