

**CHEM 1024  
GENERAL CHEMISTRY II**

**INSTRUCTOR:** Dr. Les Battles  
Professor of Chemistry

**OFFICE HOURS:** See schedule posted on door

**OFFICE LOCATION:** SB 105

**TELEPHONE:** 882-8271

**E-MAIL:** LRBattles@ASUB.EDU

**METHODS OF INSTRUCTION:** Lecture, demonstration, discussion by instructor, guest presenters, and audio-video presentations

**REQUIRED MATERIALS:** Chemistry, 9<sup>th</sup> Edition by Raymond Chang

**SUGGESTED MATERIALS:** Calculators with scientific functions, study guide and solution manual for Chang; Programmable calculators **will not be allowed**.

**GRADING AND TESTING PROCEDURES:** A minimum of four tests will be given, each having a value of 100 points. Lab grades will be counted as 15% of your final grade. Homework and pop tests **may** count up to one test grade. The final will be comprehensive.

<b>GRADING SCALE</b>	90 - 100 A
	80 - 89 B
	70 - 79 C
	60 - 69 D
	59 AND BELOW F

**MAKE UP WORK:** Any test missed will result in your final as counting two tests. If you miss more than one test you will receive a zero (0) for the second test. If you have an exceptional emergency other arrangements may be made.

**CELL PHONES:** The classroom and the lab are no phone zones. Turn off you cell phones before you enter my class. Cell phones will not be accessible in the classroom for any reason.

**BASIC SKILL REQUIREMENTS**

1. Students should be able to read, write, and speak using basic college freshman English skills.

2. Math will be used as a tool to work problems
  - A. Students should be able to work simple linear equations
  - B. Have a basic understanding of the Metric System
  - C. Have an understanding and basic use of exponential notation
  - D. Students should have a knowledge of the quadratic equation
  - E. Knowledge and use of logarithms and antilogs
  - F. Students should be capable of using basic library skills for research projects
  - G. Students should read assignments before and after lecture

## CHEM 1024 CHEMISTRY II

### Course Description:

Continuation of CHEM 1014. Designed for chemistry and other science majors, and pre-professional students. Includes more in-depth study of chemical reactions. Lab required. **This is an algebra-based chemistry course and it is strongly recommended that the student should have completed College Algebra**

**Course Prerequisites:** CHEM 1014 General Chemistry I; MATH 1003 Intermediate Algebra (Recommended: College Algebra)

**Required/Supplementary Materials:** Chemistry, 9<sup>th</sup> Edition by Raymond Chang. Laboratory Manual for Principles of General Chemistry, 7<sup>th</sup> Edition by J.A. Beran. Calculators with scientific functions, study guide and solution manual for Chang. Programmable calculators **will not be allowed**.

### Minimum Course Requirements:

The student will explain, describe, discuss, recognize, and apply knowledge of the following:

- ⌚ Intermolecular forces
- ⌚ Properties of solutions
- ⌚ Thermodynamics
- ⌚ Chemical Kinetics
- ⌚ Mechanisms of chemical reactions
- ⌚ Acid/base theory
- ⌚ Equilibrium of chemical reactions, including solubility
- ⌚ Equilibrium of acid/base mixtures, including titration
- ⌚ Oxidation-reduction
- ⌚ Electrochemistry

## Course Outline

Chapter 11	Intermolecular Forces and Liquids and Solids
Chapter 12	Physical Properties of Solutions
Chapter 13	Chemical Kinetics
Chapter 14	Chemical Equilibrium
Chapter 15	Acids and Bases: General Properties
Chapter 16	Acid-Base Equilibria and Solubility Equilibria
Chapter 18	Entropy, Free Energy, and Equilibrium
Chapter 19	Electrochemistry
Chapter 23	Nuclear Chemistry

### **Chapter 11: Intermolecular Forces and Liquids and Solids**

#### GOALS:

1. Become familiar with different types of intermolecular forces and understand the phenomena that rely on these forces.
2. Learn about hydrogen bonding.
3. Learn about the unique properties of water.
4. Understand surface tension and viscosity.
5. Become familiar with different types of unit cells.
6. Learn about x-ray diffraction.
7. Study phase changes and phase diagrams.

### **Chapter 12: Physical Properties of Solutions**

#### GOALS:

1. Become familiar with the basic aspects of the solution process.
2. Learn the concentration units and their interconversions.
3. Learn about factors that affect the solubility of a substance.
4. Study the colligative properties of nonelectrolyte solutions.

### **Chapter 13: Chemical Kinetics**

#### GOALS:

1. Understand the general ideas related to the rate of a reaction.
2. Understand the rate laws of reactions of different orders.
3. Understand the Collision Theory as applied to Chemical Kinetics.
4. Become acquainted with reaction mechanisms.
5. Appreciate the importance of catalysts.

## **Chapter 14: Chemical Equilibrium**

### **GOALS:**

1. Understand the concept of equilibrium.
2. Learn to write the expressions for equilibrium constants for all types of equilibria.
3. Learn the relationship between  $K_C$  and  $K_P$ .
4. Become proficient at doing equilibrium calculations.
5. Learn to apply Le Chatelier's Principle.

## **Chapter 15: Acids And Bases: General Properties**

### **GOALS:**

1. Become familiar with the definitions of acids and bases.
2. Learn to use the pH scale.
3. Understand the strength of acids and its relation to molecular structure.
4. Learn to classify the various types of acid-base reactions.
5. Become familiar with the process of titration and work titration problems that involve oxidation-reduction and well as acid-base.

## **Chapter 16: Acid-Base Equilibria**

### **GOALS:**

1. Learn about weak acids and bases, and become proficient at calculations involving these weak electrolytes.
2. Become familiar with conjugate acids and bases.
3. Learn about equilibria for the ionization of polyprotic salts.
4. Learn about buffers.
5. Learn about acid-base titrations and indicators.
6. Learn about salt hydrolysis.
7. Learn about  $K_{SP}$  and its relationship to solubility
8. Learn the basic definitions and convention of signs in Thermodynamics.
9. Understand the concept of Entropy.
10. Learn about energy, enthalpy, heat, and work associated in a process.

## **Chapter 18: Entropy, Free Energy, and Equilibrium**

### GOALS:

1. Learn the basic definitions and convention of signs in Thermodynamics.
2. Understand the concept of Entropy.
3. Learn about energy, enthalpy, heat, and work associated in a process.
4. Learn 3 laws of thermodynamics

## **Chapter 19: Electrochemistry**

### GOALS:

1. Review of redox reactions from chemistry 1 and balance equations.
2. Examine the essentials of galvanic cells.
3. Examine different types of batteries and fuel cells.
4. Work emf problems using the Nernst equations.
5. Study the electrochemical process.

## **Chapter 23: Nuclear Chemistry**

### GOALS:

1. Review the structure of the nucleus.
2. Learn about nuclear stability and how to calculate mass defect and nuclear binding energy.
3. Learn to write and balance nuclear equations.
4. Study the kinetics of radioactive decay.
5. Learn about nuclear fission and fusion.
6. Become familiar with the application of isotopes.
7. Study the effect or radiation of living systems.

### Disability Services:

It is the policy of ASU-Beebe to accommodate students with disabilities, pursuant to federal law and state law. Any student with a disability, who would like to request accommodations, should contact Counselor/Coordinator of Disability Services at (501) 882-8263 at the ASU-Beebe campus. Documentation review and accommodations for all ASU-Beebe system students with disabilities are authorized by the Counselor/Coordinator of Disability Services.

**ASU-Beebe Academic Services:**

**ASU-Beebe Learning Center**  
**Student Center, Room 200, (501) 882-8267**  
**learningcenter@asub.edu**

The Learning Center is located on the second floor of the Student Center and provides academic support to all Arkansas State University-Beebe students. All services are free and no appointments are necessary. Students in every department, from developmental through advanced courses, are encouraged to utilize these services. Tutor schedules and resource materials are listed on the Learning Center website, which can be accessed through “Current Students” on the ASU-Beebe website.

*Services:* The Learning Center offers academic support in most subjects through one or more of the following methods:

- Individual Tutoring
- Small Group Tutoring
- Workshops
- Collaborative Learning
- Educational Technology
  - Computer Lab with Internet access and course-specific materials
  - Audio/Video Tutorials

*Hours of Operation:* 8:00-8:00 M-R and 8:00-4:00 Fridays during the Fall and Spring semesters  
During breaks, intersession, and summer sessions: 8:00-5:00 daily

There is also help with **Student Support Services** located in State Hall. You may wish to ask them about qualifications for their programs.

**As a courtesy to others we ask that cell phones and pagers have the ringer turned off during class time.**