

NorthWest Arkansas Community College  
Division of Science & Mathematics

**CHEM 1104 College Chemistry I**

**Catalog Description:** The first course of a two-semester sequence designed to provide background for further study in such majors as pre-agriculture, pre-professional, pre-science, pre-engineering, or mathematics. The course provides an introduction to the study of inorganic, organic, analytical, and physical chemistry from a more concentrated viewpoint than offered in CHEM 1024. Three hours lecture and three hours laboratory weekly

**Prerequisites:** Intermediate Algebra (MATH 0103), or higher math or minimum placement score for College Algebra

**Credit hours/ Contact hours/ Load hours:** 4/ 6/ 5

**Target Audience/Transferability:** Designed for students majoring in a science field and has been approved by ADHE to satisfy 4 hours in the Laboratory Science division of the 35-hour core requirements that is transferable between state institutions which will apply toward the general education core curriculum requirements for baccalaureate degrees at state supported institutions of higher education. This course will transfer directly to the University of Arkansas as CHEM 1103 (University Chemistry I) and CHEM 1101L (University Chemistry I Laboratory).

**Student Learning Outcomes:** Students completing this course will:

- Demonstrate knowledge of nomenclature in balancing chemical equations and quantitative relationships in the composition of compounds and stoichiometry.
- Evaluate written problems and utilize algebraic skills and scientific calculator to solve specific scientific problems.
- Explain the periodic law and properties of atoms describing the electronic structure and predicting the manner in which atoms bond to form compounds.
- Demonstrate proper technique in the laboratory, utilize appropriate measuring devices, and collect and interpret experimental data.

**Required Texts:**

- Chang, Chemistry, 10<sup>th</sup> edition, 2010
- Slowinski, Wolsey, Masterton, NWACC CHEM 1104/1124 College Chemistry 1 and 2, Custom Lab Manual, Updated 2010

**Required equipment:** Scientific calculator

**Optional Texts:** Chang, Student Solutions Manual, 10<sup>th</sup> edition, 2010

**Topics:**

Chapter	Concepts
1	Chemistry: The Study of Change
2	Atoms, Molecules, and Ions
3	Mass Relationships in Chemical Reactions
4	Reactions in Aqueous Solution

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5	Gases
6	Thermochemistry
7	Quantum Theory and the Electronic Structure of Atoms
8	Periodic Relationships Among the Elements
9	Chemical Bonding I: Basic Concepts

**Optional Topics:**

Chapter	Concepts
10	Chemical Bonding II: Molecular Geometry and Hybridization of Atomic Orbitals

**Required Instructional Activities:** This course includes a required laboratory component.

• **Sample Laboratory Experiments**

- Safety in the laboratory (Video, Lecture, Quiz)
- The Densities of Liquids and Solids
- Resolution of Matter into Pure Substances I. Paper Chromatography
- Determination of a Chemical Formula
- Identification of a Compound using Mass Relationships
- Properties of Hydrates
- Molar Mass of a Volatile liquid
- Chemical Reactions in Aqueous Solutions
- The Atomic Spectrum of Hydrogen
- Heat Effects and Calorimetry
- Classification of Chemical Substances
- Preparation of Copper(I) Chloride
- Preparation of Aspirin

**Forms of Assessment:** None

**Resources:**

- Online Learning Center: [www.mhhe.com/physsci/chemistry/chang9](http://www.mhhe.com/physsci/chemistry/chang9)
- Essential Study Partner: [www.mhhe.com/physsci/chemistry/chang9/student/olc/esp.mhtml](http://www.mhhe.com/physsci/chemistry/chang9/student/olc/esp.mhtml)
- Learning Lab Tutors