

### Course Information

Division	Science/Mathematics
Contact Hours	90
Lecture Hours	45
Lab Hours	45
Total Credits	4

### Prerequisites

MATH 105 or MATH 151 or qualifying score on accepted placement tests and CHEM 150 or one year of high school Chemistry

### Course Description

A study of the basic principles of general chemistry including classification and characterization of chemical particles, chemical bonding and molecular structure, chemical reactions, oxidation-reduction processes, reaction stoichiometry, inorganic nomenclature, and the qualitative behavior of common metals and their cations. Course requires laboratory work.

**This course is approved as a General Education competency satisfier.**

**General Education Goal:** Critical Thinking

**Competency:** Understand the elements of scientific inquiry and scientific principles in a natural science college laboratory course setting.

**Learning Outcome:** Students will use the scientific method to define a problem, utilize appropriate methods to solve the problem, and propose and evaluate a solution to the problem.

### General Education Learning Objectives

- Observe and describe natural phenomena and formulate hypotheses.
- Plan and implement scientific experiments to test hypotheses.
- Utilize scientific laboratory skills for data collection within a college laboratory setting.
- Evaluate experimental data and propose solutions based on this data.
- Evaluate the proposed implications of a solution.

### Course Outcomes

In order to evidence success in this course, the students will be able to:

- Define and apply the steps of the Scientific Method.  
Applies to General Education Objectives
  - Observe and describe natural phenomena and formulate hypotheses.
  - Plan and implement scientific experiments to test hypotheses.
- Show how experimentation led to an understanding of the structure of the atom.  
Applies to General Education Objectives
  - Observe and describe natural phenomena and formulate hypotheses.
  - Plan and implement scientific experiments to test hypotheses.
  - Evaluate experimental data and propose solutions based on this data.
  - Evaluate the proposed implications of a solution.

3. Determine empirical formulas from experimental data.

Applies to General Education Objectives

- B. Observe and describe natural phenomena and formulate hypotheses.
- C. Plan and implement scientific experiments to test hypotheses.
- D. Evaluate experimental data and propose solutions based on this data.
- E. Evaluate the proposed implications of a solution.

- 4.. Predict a limiting reagent using initial masses and the theoretical yield.

Applies to General Education Objectives

- A. Observe and describe natural phenomena and formulate hypotheses,
- B. Plan and implement scientific experiments to test hypotheses.
- C. Utilize scientific laboratory skills for data collection within a college laboratory setting.
- D. Evaluate experimental data and propose solutions based on this data.
- E. Evaluate the proposed implications of a solution.

5. Show how the kinetic theory explains Boyle's, Charles', Avogadro's, and Dalton's laws.

Applies to General Education Objectives

- A. Observe and describe natural phenomena and formulate hypotheses,
- B. Plan and implement scientific experiments to test hypotheses.
- D. Evaluate experimental data and propose solutions based on this data.
- E. Evaluate the proposed implications of a solution.

6. Calculate enthalpy changes with respect to the stoichiometry of chemical equations.

Applies to General Education Objectives

- A. Observe and describe natural phenomena and formulate hypotheses,
- B. Plan and implement scientific experiments to test hypotheses.
- D. Evaluate experimental data and propose solutions based on this data.
- E. Evaluate the proposed implications of a solution.

7. Show how the quantum mechanical model provides the basis for an understanding of the electron structure of the atom.

Applies to General Education Objectives

- A. Observe and describe natural phenomena and formulate hypotheses,
- B. Plan and implement scientific experiments to test hypotheses.
- D. Evaluate experimental data and propose solutions based on this data.
- E. Evaluate the proposed implications of a solution.

8. Show how the electron structure of the atom provides the basis for an understanding of chemical bonding.

Applies to General Education Objectives

- A. Observe and describe natural phenomena and formulate hypotheses,
- B. Plan and implement scientific experiments to test hypotheses.
- D. Evaluate experimental data and propose solutions based on this data.
- E. Evaluate the proposed implications of a solution.

# Course Outcome Summary

General Education Satisfier Course

## CHEM 151 General College Chemistry I

9. Show how Lewis structures can be used to predict molecular geometry and physical properties of molecules.

Applies to General Education Objectives

- A. Observe and describe natural phenomena and formulate hypotheses.
- B. Plan and implement scientific experiments to test hypotheses.
- D. Evaluate experimental data and propose solutions based on this data.
- E. Evaluate the proposed implications of a solution.

10. Use qualitative analysis techniques in the laboratory to determine the verity of a hypothesis.

Applies to General Education Objectives

- A. Observe and describe natural phenomena and formulate hypotheses.
- B. Plan and implement scientific experiments to test hypotheses.
- C. Utilize scientific laboratory skills for data collection within a college laboratory setting.
- D. Evaluate experimental data and propose solutions based on this data.
- E. Evaluate the proposed implications of a solution.