



C-ID Descriptor

General Chemistry for Science Majors I, with Lab

Descriptor Details

- **Descriptor Title:** General Chemistry for Science Majors I, with Lab
- **C-ID Number:** 110
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General Description

This is the first semester of a one-year course in chemistry intended for majors in the natural sciences (chemistry, biochemistry, biology, physics, pre-medicine), mathematics, and engineering.

Prerequisites

CHEM 101; Intermediate algebra or higher or eligibility for transfer-level mathematics

Corequisites

None

Advisories

Content

The first semester of the complete one-year course must include:

- Nomenclature
- Atomic Structure
- Basic Quantum Theory and Electronic Structure
- Periodic Properties
- Chemical Reactions
- Stoichiometry
- Gas Laws
- Molecular Structure and Bonding
- States of Matter
- Aqueous Solutions

These topics may be revisited and expanded upon in the second semester.

Additional topics including items typically taught in the second semester may be introduced as well.

It is strongly recommended that both semesters be completed at a single institution before transfer.

Lab Activities

The laboratory sequence will support the above topics including primarily (?80%) hands-on qualitative and quantitative experiments that incorporate data analysis. Experimental activities appropriate for the course include safety training, solution preparation, chemical measurements, titration, gravimetric analysis, and spectrophotometry. One or more of these may occur during the second semester course.

Objectives

At the conclusion of this course, the student should be able to:

Course Objectives may be reported in a wide variety of valid ways. Learning Outcomes should be aimed at preparation for higher-level course work and should include statements related to the following:

(Note these are illustrative outcomes adapted from ACS and are not intended to be prescriptive nor are they necessarily comprehensive)

Students will:

- Demonstrate an understanding of the fundamental principles of chemistry, including: Atomic and Molecular Structure, bonding, basic treatment of Quantum Theory, Periodic Properties, Stoichiometry, Gas Laws, States of Matter and an introduction to Solutions
- Apply mathematics to solving Chemistry problems
- Analyze experimental data
- Formulate solutions to quantitative problems
- Anticipate, recognize, and respond properly to hazards in laboratory procedures and managing chemical waste
- Keep accurate and complete experimental records
- Perform accurate and complete experimental records
- Perform accurate quantitative measurements
- Interpret experimental results and draw reasonable conclusions
- Analyze data statistically, assessing the reliability of experimental results, and discussing the sources of systematic and random error in experiments
- Communicate effectively through oral and written reports

As all of these basic skills are repeated throughout a Chemistry curriculum, one or more of these skills may be saved for the second semester of General Chemistry. These topics and skills are expected to be at a level higher than when first introduced in Introductory Chemistry. (Adapted from the ACS Curriculum recommendation: [link to acs resource](#))

Evaluation Methods

A variety of assessment techniques that include examinations and written responses to lab activities and may also include active learning activities, projects, homework problems, and laboratory practicals.

Textbooks

Chemistry, McMurry & Fay, Prentice Hall

General Chemistry: The Essential Concepts, Chang and Overby, McGraw-Hill

Principles of Chemistry: A Molecular Approach, Tro, Prentice Hall

Chemical Principles, Atkins & Jones, W.H. Freeman

Chemistry in the Laboratory, Postma, Roberts & Holenberg, W.H. Freeman

Chemistry: The Central Science, Brown, LeMay, Bursten, Murphy, & Woodward,
Prentice Hall

Laboratory Experiments for Chemistry: The Central Science, Brown, LeMay,
Bursten, Murphy, Woodward, Nelson & Kemp, Prentice Hall