Chemistry (CHEM) 217

Chemical Principles I (Revision 11)

Status:	Replaced with new revision, see the **course listing** for the current revision
Delivery mode:	**Individualized study online** with a **Home Lab**. You can order the **Laboratory Kit** online. Students may be eligible for a **lab exemption**. This course is charged a **lab fee**. Delivered via Brightspace.
Credits:	3
Area of study:	Science
Prerequisites:	Chemistry 30 or an equivalent high school chemistry course is strongly recommended but not required. This course is open only to students with previous chemistry experience.

Precluded:	None
Challenge:	CHEM 217 is not available for challenge.
Faculty:	**Faculty of Science and Technology**
Notes:	Note: Home lab kits can be shipped within Canada only. Students who live outside Canada are required to attend **supervised laboratories** on site at Athabasca University, Alberta.

Overview

CHEM 217 provides an introduction to chemistry from both a theoretical and practical point of view. Topics in CHEM 217 include chemical reactions and equations; energy in chemical systems; and the structure and properties of atoms, molecules, gases, liquids, solids, and solutions. The combination of CHEM 217 and **CHEM 218** is the equivalent to first-year university chemistry.

Outline

- Unit 1 – Units of Measurement for Physical and Chemical Change

- Unit 2 – Atoms and Elements
- Unit 3 – Molecules, Compounds, and Nomenclature
- Unit 4 – Chemical Reactions and Stoichiometry
- Unit 5 – Gases
- Unit 6 – Thermochemistry
- Unit 7 – The Quantum–Mechanical Model of the Atom
- Unit 8 – Periodic Properties of the Elements
- Unit 9 – Chemical Bonding I: Lewis Theory
- Unit 10 – Chemical Bonding II: Molecular Shapes, Valence Bond Theory, and Molecular Orbital Theory
- Unit 11 – Liquids, Solids, and Intermolecular Forces
- Unit 12 – Solutions

Note: Units 1 to 4 are for review purposes only, covering content from prerequisite high school–level chemistry.

Learning outcomes

Upon successful completion of this course, you should be able to

- name chemical compounds and interpret chemical formulas.
- solve problems in chemical stoichiometry.

- describe the properties of gases and perform calculations using gas laws.
- use thermochemical data to solve chemical problems involving heat, work, and enthalpy.
- detail the quantum–mechanical model of the atom and the historical atomic models that preceded it.
- recognize the periodic properties of the elements and explain them using the quantum–mechanical model of the atom.
- discuss chemical bonds using the Lewis theory, valence bond theory, and molecular orbital theory, and predict molecular shapes using the valence shell electron pair repulsion theory.
- describe intermolecular forces and apply them to explain the properties of liquids, solids, and gases.
- summarize the properties of solutions in terms of intermolecular forces and perform calculations involving the colligative properties of solutions.
- perform qualitative and quantitative chemical experiments and record and interpret results.

Evaluation

To **receive credit** for CHEM 217, you must achieve at least 50 percent on each of the two examinations, an average grade of at least 50 percent on the oral quizzes, an average grade of at least 60 percent on the laboratory component, and an overall course composite grade of at least **D (50 percent)**.

The weighting of the composite grade is as follows:

Activity	Weight
Assignments 1–8 (2.5% each)	20%
Oral quizzes 1–4 (5% each)	20%
Laboratory work	20%
Midterm examination	15%
Final examination	25%
Total	**100%**

The **midterm and final examinations** for this course must be requested in advance and written under the supervision of an AU-approved exam invigilator. Invigilators include either ProctorU or an approved in-person invigilation centre that can accommodate online exams. Students are responsible for payment of any invigilation fees. Information on exam request deadlines, invigilators, and other exam-related questions, can be found at the **Exams and grades** section of the Calendar.

You must complete 32 hours of **laboratory work**, using a home lab kit, to obtain credit in this course.

Materials

Digital course materials

Links to the following course materials will be made available in the course:

Tro, N. J., Fridgen, T. D., & Shaw, L. E. (2023). *Chemistry: A molecular approach* (4th Canadian ed.). Pearson.

Platforms

This course also uses Mastering Chemistry.

Other Resources

The course resources also include a home lab kit (to be borrowed from the AU Science Lab) with a home laboratory manual.

You will also need to purchase an electronic calculator capable of handling logarithms and exponentials. **Remember:** Take your calculator with you whenever you write an examination.

Important links

- Academic advising
- Program planning
- Request assistance
- Support services at AU
- Chemistry Lab Resources

- **Chemistry Lab Exemptions**

Athabasca University reserves the right to amend course outlines occasionally and without notice. Courses offered by other delivery modes may vary from their individualized study counterparts.

Opened in Revision 11, March 10, 2025

Updated April 9, 2026

View **previous revision**