CHEM-101 – Fundamentals of Chemistry 1

University Arts and Science

Effective Term & Year: Fall 2025
Course Outline Review Date: 2030-04-01

Program Area: Math and Sciences

Description:

This course presents the fundamental principles of chemistry with particular reference to acid-base and redox chemistry, electronic structure of atoms and molecules, properties of liquids, gases, solids and their solutions, phase changes, and thermochemistry. The associated laboratory exercises emphasize proper experimental techniques, data collection and analysis, safety and technical writing skills.

Program Information:

CHEM 101 and CHEM 102 form a typical university-level first-year chemistry curriculum. Both courses can be used as lab science credits in an Associate of Arts (AA) or an Associate of Science (ASc) degree at COTR.

Delivery Methods: On-campus (Face-to-Face)

Credit Type: College of the Rockies Credits

Credits: 3

Course type/s: Sciences, Lab Sciences

Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	45
Seminar/Tutorials	
Laboratory/Studio	45

Practicum/Field Experience	
Co-op/Work Experience	
Other	
Total	90

Course Requisites:

- Complete all of the following
  - Completed at least 1 of the following:
    - CH 12 – Chemistry 12
    - CHEM090 – Chemistry – Provincial Level (3)
    - CHEM100 – Introduction to Environmental Chemistry (3)
  - Completed at least 1 of the following:
    - PREC 12 – Pre-Calculus 12
    - MATH090 – Mathematics – Provincial Level

Prior Learning and Recognition: Yes

Students are able to request formal recognition of their prior learning or experience outside the classroom. Challenge examination, portfolio-assisted assessment, work-based assessment or a combination of assessments that is appropriate to identify, assess, and recognize prior skills, competencies, and knowledge to achieve course credit. Tuition fees apply, refer to Policy 2.5.5 Prior Learning Assessment and Recognition (PLAR) or contact an education advisor for more information.

Course Transfer Credit:

For information about receiving transfer credit for courses taken at either British Columbia or Alberta institutions, please see https://www.bctransferguide.ca/ or https://transferalberta.alberta.ca . For more transfer credit information, please visit https://www.cotr.bc.ca/Transfer

All requests for course transfer credit from institutions in British Columba or elsewhere should go to the College of the Rockies Enrolment Services office.

Textbook Resources:

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

Petrucci, Herring, Madura and Bissonnette. *General Chemistry: Principles & Modern Applications*. 11th ed. Prentice Hall.

Course Manual for Chemistry 101. (available in COTR Bookstore).

A scientific calculator is required, but **programmable** calculators are **not allowed on exams.**

Please see the instructor's syllabus or check COTR's online text calculator https://textbook.cotr.bc.ca/ for a complete list of the currently required textbooks.

Learning Outcomes:

Upon the successful completion of this course, students will be able to:

- apply chemical knowledge to integrate knowledge gained in other courses and to better make the connections between the various branches of science;
- identify and utilize the terminology and concepts of chemistry to acquire and communicate scientific information and to solve basic chemical problems;
- apply a thorough understanding of the details of modern atomic theory and the experiments which support this theory in order to correctly predict the chemical and physical properties of the elements;
- perform calculations associated with acid-base and redox reactions;
- provide IUPAC names for typical inorganic species and draw their Lewis structures with the correct geometry using VSEPR theory;
- use knowledge of intermolecular forces to predict the physical properties of molecular- and extended-network elements and compounds;
- solve problems involving the physical properties of matter in the solid, liquid and gaseous states;
- demonstrate knowledge of the properties of mixtures and perform related calculations;
- apply knowledge of thermochemistry to calculate enthalpy changes associated with chemical and physical processes;
- perform several common laboratory procedures safely, efficiently and accurately;
- recognize random and systematic errors in experimental procedures; and
- precisely record laboratory data, correctly perform associated calculations and present the results in a professional format.

Course Topics:

- Introduction to atomic structure
- Nomenclature of inorganic compounds
- Qualitative aspects of aqueous solutions

- Oxidation and reduction
- Electronic structure of atoms
- Chemical bonding and molecular geometry
- Intermolecular forces
- Properties of gases, liquids, solids and their solutions
- Thermochemistry

See instructor syllabus for the detailed outline of weekly readings, activities and assignments.

Evaluation and Assessments

Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Assignments	5%
Midterm Tests	40%
Final Examination	32%
Laboratory Reports	13%
Laboratory Test	7%
Lab Quizzes & Assignments	3%
Total	100%

Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	<50

Pass requirements: A passing average (50% or higher) in both the theory and practical components.

Evaluation Notes: A grade of “D” grants credit, but may not be sufficient as a prerequisite for sequential courses.

Evaluation Notes Comments:

Note: Attendance at all laboratory sessions and exams is required. However, arrangements can be made for documented illness or bereavement. Lecture attendance is strongly recommended and students are responsible for all course material covered in lecture and assigned readings. In order to pass the course, a passing grade (50% or greater) is required for both the laboratory portion and lecture portion of the course.

Exam Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will

consider other written requests. Any student who misses a scheduled exam without prior approval will receive a “0” on the exam.

Academic Policies:

College of the Rockies policies related to courses can be found at https://cotr.bc.ca/about-us/college-policies/ and include the following:

- Policy 2.1.4 Course Audit
- Policy 2.4.1 Credential Framework
- Policy 2.4.3 Students with Documented Disabilities
- Policy 2.4.4 Student Rights, Responsibilities and Conduct
- Policy 2.4.8 Academic Performance
- Policy 2.4.9 Student Feedback and Concerns
- Policy 2.4.11 Storage of Academic Works
- Policy 2.5.3 Student Appeal
- Policy 2.5.5 Prior Learning Assessment and Recognition (PLAR)

Course Changes:

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.