



CHEM-101 – Fundamentals of Chemistry 1

University Arts and Science

Effective Term & Year: Fall 2022

Course Outline Review Date: 2025-04-01

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 can be used as lab science credits in an Associate of Arts (AA) or an Associate of Science (ASc) degree at COTR.

This course is designed for students seeking a degree or diploma in a field of science or technology. It is also suitable as an elective course for General Interest or Arts students. Note prerequisite requirements listed below.

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 1 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:
 - [MATH090](#) – Mathematics – Provincial Level
 - [PREC 12](#) – Pre-Calculus 12

Flexible Assessment: Yes

In some cases students may be able to apply for recognition of prior learning outside the classroom. This flexible assessment process provides equivalent course credit. It is a rigorous process that may include external evaluation, worksite assessment, demonstration, standardized test, self-assessment, interview, products/portfolio, and challenge exam, or other measures as appropriate. Tuition fees apply. 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 Columbia 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*. 10th 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 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.

This course should help students:

- use written and oral communication skills effectively, employing methods appropriate to message and content;
- think clearly and critically, fusing experience, knowledge and reasoning into considered

judgment;

- identify, interpret and solve problems, effectively implementing and evaluating proposed strategies;
- set goals and priorities in academic and personal life;
- set high performance standards;
- demonstrate initiative, motivation, and persistence to get the job done;
- comprehend and interpret detailed scientific and/or technical information from text;
- critically evaluate information for accuracy, relevance and importance;
- make generalizations (transfer knowledge and training to new situations);
- apply a variety of mathematical techniques with the degree of accuracy required to solve problems and make decisions;
- transfer the use of mathematical strategies from one situation to another;
- work effectively with others in a laboratory situation;
- receive, comprehend and interpret a sequence of instructions;
- plan and efficiently perform a number of overlapping activities;
- use equipment requiring careful procedures; and
- draw reasonable conclusions from observations.

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%
Quizzes & Assignments	3%

Total	100%
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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 2.4.3 Students with Documented Disabilities
- Policy 2.4.4 Student Conduct (plagiarism, other cheating, behavioral misconduct)
- Policy 2.5.8 Academic Performance
- Policy 2.5.3 Grade Appeal
- Policy 2.4.9 Student Concerns Re Faculty

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.