



## CHEM-102 – Fundamentals of Chemistry 2

University Arts and Science

**Effective Term & Year:** Fall 2022

**Course Outline Review Date:** 2026-09-01

---

**Program Area:** Math and Sciences

**Description:**

Together with CHEM 101, CHEM 102 provides a solid foundation in fundamental chemical principles. Topics include equilibrium, thermodynamics, kinetics, electrochemistry, chemistry of the main group elements and the chemistry of organic and biomolecules. The associated laboratory exercises emphasize proper experimental technique, 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 Studies or Arts students.

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

**Credit Type:** College of the Rockies Credits

**Credits:** 3

**Course type/s:** Lab Sciences, 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:**

- Completed at least 1 of the following:
  - CHEM101 – Fundamentals of Chemistry 1 (3)
  - CHEM115 – Chemistry for Engineering (3)

**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 102. (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;
- utilize the terminology and concepts of chemistry to acquire and communicate scientific information and to solve basic chemical problems;
- apply the qualitative principles of equilibrium, thermodynamics and kinetics to make quantitative predictions about chemical reactions;
- solve quantitative problems involving equilibrium, thermodynamics and kinetics;
- explain and apply the concepts of aqueous equilibrium to problems involving salt solubility, the behaviour of electrolytes, pH and buffers;
- use a knowledge of electrochemistry to construct an electrochemical cell and predict the cell potential;
- explain the significance of electrochemistry in industrial processes and corrosion;
- predict the structures and chemical properties of main-group compounds and explain their industrial and biological significance;
- use a knowledge of valence bond theory to describe the structures of organic molecules;
- use IUPAC nomenclature to name organic molecules with various functional groups;
- predict the products of simple organic reactions;
- perform several common laboratory procedures safely, efficiently and accurately; and
- recognize random and systematic errors in experimental procedures; 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:

- Equilibrium
- Thermodynamics
- Kinetics
- Qualitative and quantitative aspects of aqueous solutions
- Electrochemistry
- Main Group Chemistry
- Introduction to organic chemistry
- Introduction to biomolecules

*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%

### 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.

