



## Fundamentals of Chemistry 1 - CHEM 101

University Studies Program

### Course Outline

COURSE IMPLEMENTATION DATE: Pre 1998  
OUTLINE EFFECTIVE DATE: September 2020  
COURSE OUTLINE REVIEW DATE: April 2025

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#### GENERAL COURSE 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.

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**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.

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**Delivery:** This course is delivered face-to-face.

**COTR Credits:** 3

**Hours for this course:** 90 hours

#### Typical Structure of Instructional Hours:

Instructional Activity	Duration
Lecture Hours	45
Seminars / Tutorials	
Laboratory / Studio Hours	45
Practicum / Field Experience Hours	
Other Contact Hours	
<b>Total</b>	90

#### Practicum Hours (if applicable):

Type of Practicum	Duration
On-the-job Experience	N/A
Formal Work Experience	N/A
Other	N/A
<b>Total</b>	

**Course Outline Author or Contact:**

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Signature

**APPROVAL SIGNATURES:**

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Department Head Signature

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Dean Signature

EDCO

Valid from: September 2020 – April 2025

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Education Council Approval Date

**COURSE PREREQUISITES AND TRANSFER CREDIT:**

**Prerequisites:** Either Chemistry 12, CHEM 090, CHEM 100, or equivalent.  
Either Math 090, Pre-Calculus 12, Principles of Mathematics 12, or equivalent.

**Corequisites:** None

**Flexible Assessment (FA):**

Credit can be awarded for this course through FA  Yes  No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

**Transfer Credit:** For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer>.

Students should also contact an academic advisor at the institution where they want transfer credit.

**Prior Course Number:** N/A

## Textbooks and Required 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*. 10<sup>th</sup> 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 <http://go.cotr.bc.ca/tuition/tCalc.asp> for a complete list of the currently required textbooks.

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## 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 ASSESSMENT:

Assignments		% Of Total Grade
Lecture	- Assignments	5%
	- Midterm Tests	40%
	- Final Examination	32%
Laboratory	- Laboratory Reports	13%
	- Laboratory Test	7%
	- Quizzes & Assignments	<u>3%</u>
Total		100%

*Please see the instructor syllabus for specific classroom policies related to this course, such as details of evaluation, penalties for late assignments, and use of electronic aids.*

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 POLICY:**

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of "0" for the exam.

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**COURSE GRADE:**

Course grades are assigned as follows:

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Mark (Percent)	≥ 90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	< 50

A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

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**ACADEMIC POLICIES:**

See [www.cotr.bc.ca/policies](http://www.cotr.bc.ca/policies) for general college policies related to course activities, including grade appeals, cheating and plagiarism.

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**COURSE CHANGES:**

Information contained in course outlines is correct at the time of publication. Content of the courses is revised on an ongoing basis to ensure relevance to changing educational, employment and marketing needs. The instructor will endeavour to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.