



## CHEM-201 – Organic Chemistry 1

University Arts and Science

**Effective Term & Year:** Fall 2022

**Course Outline Review Date:** 2024-03-01

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**Program Area:** Math and Sciences

**Description:**

CHEM 201 is an introductory course in organic chemistry including the structure and reactions of aliphatic and aromatic hydrocarbons and their derivatives. The laboratory stresses the techniques of preparation, purification and identification of organic compounds.

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**Program Information:**

CHEM 201 and CHEM 202 can be used as components of 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 could also be suitable as an elective course for General Interest or Arts students who have previously completed CHEM 101 and CHEM 102.

**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          | 60  |
| Practicum/Field Experience |     |
| Co-op/Work Experience      |     |
| Other                      |     |
| Total                      | 105 |

**Course Requisites:**

- Completed the following:
  - CHEM101 – Fundamentals of Chemistry 1 (3)
  - CHEM102 – Fundamentals of Chemistry 2 (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:

1. McMurry. *Organic Chemistry*. 7TH ed. Brooks/Cole.

*Laboratory Experiments and Worksheets for Chemistry 201*. COTR

*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.

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### Learning Outcomes:

This course places heavy emphasis on the application and integration of chemical knowledge, which should assist you in developing effective problem solving skills for application in other science courses and in your future career.

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

- illustrate the application of modern theories of chemical bonding and the various theories of acids and bases to the prediction of stabilities and behavior of organic molecules, ions and radicals;
- name structural, geometric and stereoisomers of a wide variety of organic compounds;
- utilize the mechanisms of nucleophilic substitution, elimination and free radical reactions to evaluate reaction feasibility and to predict product identities;
- describe and predict the chemical and physical properties of alkanes, alkenes, alkynes, alkyl halides, alcohols, ethers and organometallics, and apply the predictions to problems of chemical identification and synthesis;
- discuss the basis of IR and UV spectroscopy and the phenomenon of color and apply this knowledge to problems of structural determination;
- perform complex problem solving involving a large number of interconnected steps;
- visualize chemical reactions occurring in 3 dimensions;
- work with potentially hazardous chemicals in a safe and prudent manner;
- recognize and efficiently utilize typical organic chemistry laboratory equipment without instructor assistance;
- operate delicate and expensive equipment in a confident and careful manner; and
- assemble and organize information obtained through experimentation so that the information may be utilized in the future by yourself or others.

This course should help you:

- 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 judgement;
- 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;
- search for information in the professional literature;
- 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;
- draw reasonable conclusions from observations;
- visualize abstract concepts; and
- perform mental manipulations in 3 dimensions.

### Course Topics:

- Bonding, Acidity/Basicity, Molecular Geometry, Molecular Orbitals, Functional Groups
- Alkanes, Isomers and Nomenclature
- Stereochemistry of Alkenes and Cycloalkanes, Geometric Isomers and Chirality
- Alkyl Halides, Substitution and Elimination Reaction Mechanisms
- Free Radical Reactions
- Alcohols and Organometallic Reagents in Syntheses
- Ethers and Epoxides
- IR and UV-Vis Spectroscopy
- Alkenes and Alkynes

See instructor's 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       | 30%              |
| Laboratory Reports      | 17%              |
| Laboratory Test         | 5%               |
| Quizzes and 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.

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### **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

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### **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.