



CHEM-215 – Introduction to Chemical Analysis

University Arts and Science

Effective Term & Year: Fall 2022
Course Outline Review Date: 2027-09-01

Program Area: Math and Sciences

Description:

This course provides a solid background in the principles of analytical chemistry and their applications in fields such as environmental science. Topics include measurements and their errors, the use of statistics in data analysis and sampling, redox-, complexometric- and acid-base titrations, absorption and emission forms of atomic and molecular spectroscopy, electrochemical methods of analysis and separation techniques. The laboratory exercises emphasize proper experimental techniques, data collection and analysis, safety and technical writing skills.

Program Information:

This course can be used as lab science course 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.

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
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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 the following:
 - 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:

Analytical Chemistry 2.1, D.T. Harvey (2016).

Retrieved from http://dpuadweb.depauw.edu/harvey_web/eTextProject/version_2.1.html

Course Manual for Chemistry 215 (available in COTR Bookstore)

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:

- quantify the uncertainty of a result using a knowledge of errors associated with the analysis and sampling method;
 - apply statistical methods to analytical results;
 - perform a gravimetric analysis and recognize common errors with these analyses;
 - perform calculations associated with redox-, complexometric- and acid-base titrations while accounting for effects of equilibrium and activities;
 - apply a thorough understanding of the details of atomic and molecular spectroscopy towards the analysis of environmental samples;
 - describe the applications of potentiometric and coulometric forms of analysis;
 - apply the theories of the various separation techniques to effectively separate species in a variety of samples and demonstrate a knowledge of the instrumentation associated with these techniques;
 - describe the theory, instrumentation and applications of the techniques of volumetric titrimetry, atomic absorption-, flame emission-, ICP-, UV-Vis-, IR- and fluorescence spectroscopy;
 - precisely record laboratory data, correctly perform associated calculations and present the results in a professional format.
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Course Topics:

- Measurements and Errors
- Statistics in Data Analysis and Sampling
- Volumetric Titrimetry
- Atomic and Molecular Spectroscopy
- Electrochemical Analysis
- Separation Techniques

OPTIONAL COURSE TOPICS:

- Mass Spectrometry

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%
Term Tests	40%
Final Exam	32%
Quizzes and Assignments	3%
Laboratory Reports	13%
Laboratory Test	7%
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.

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.