



Introduction to Chemical Analysis – CHEM 215 University Studies Program

Course Outline

COURSE IMPLEMENTATION DATE: January 2022
OUTLINE EFFECTIVE DATE: January 2022
COURSE OUTLINE REVIEW DATE: September 2027

GENERAL COURSE 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: 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	
Other Contact Hours	
Total	90

Practicum Hours (if applicable):

Type of Practicum	Duration
On-the-Job Experience	
Formal Work Experience	
Other	
Total	

Course Outline Author or Contact:

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Signature

APPROVAL SIGNATURES:

Department Head
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Department Head Signature

Dean Signature

EDCO

Valid from: January 2022 – September 2027

Education Council Approval Date

COURSE PREREQUISITES AND TRANSFER CREDIT:

Prerequisites: CHEM 102 or equivalent

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>.

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

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:

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

<http://go.cotr.bc.ca/tuition/tCalc.asp> 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 ASSESSMENT Face-to-Face Delivery:

Assignments	% of Total Grade
Lecture	
Assignments	5%
Term Tests	40%
Final Exam	32%
Laboratory	
Quizzes and Assignments	3%
Laboratory Reports	13%
Laboratory Test	<u>7%</u>
Total:	100%

Note: 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.

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

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 schedule exam.

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

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.

ACADEMIC POLICIES:

See www.cotr.bc.ca/policies for general college policies related to course activities, including grade appeals, cheating and plagiarism.

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 endeavours to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.