



CAMOSUN COLLEGE
School of Arts & Science
Department of Chemistry & Geoscience

CHEM-224-D01
Analytical Chemistry
Fall 2020

COURSE OUTLINE

The course description is online @ <http://camosun.ca/learn/calendar/current/web/chem.html>

Ω Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1. Instructor Information

(a) Instructor	Blair Surridge http://camosun.ca/learn/school/arts-science/bios/surridge-chem-bio.html
(b) Office hours	Tues 10:00 – 11:00am, Tuesday and Friday
(c) Location	Office #: F348C Fisher Building Lansdowne Campus
(d) Phone	250-370-3201 Alternative: 250-661-6701
(e) E-mail	SurridgeB@camosun.bc.ca
(f) Website	See D2L

2. Intended Learning Outcomes

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

1. Define and calculate the mean, median, mode, variance and standard deviation for a series of replicate analyses. Estimate the population mean from analysis of a small number of trials. Test for the rejection or retention of suspect data. Explain and use the least squares procedure to graph experimental data.
2. Describe and explain the procedures for gravimetric and titrimetric analyses: obtain data that falls within the established margins of error for the methods.
3. Derive and apply the Beer-Lambert law and use internal and external standards to ensure the validity of the analysis. Distinguish between absorption, emission, fluorescence and phosphorescence. Obtain absorption and emission spectra from various sources and perform a complete quantitative analysis on the samples provided. Explain and use light scattering techniques to estimate the turbidity of solutions.
4. Distinguish between the major modes of radioactive decay and between the activity of the sample and the dose received by the absorber. Estimate the age of fossils and artifacts via carbon and argon dating techniques and the concentrations of trace materials using neutron activation and isotope dilution techniques.
5. Identify and describe the mode of operation for the four major types of electrode. Distinguish between constant current and constant potential coulometry and use them to estimate the concentrations of particular ions in solution. Distinguish between normal and pulsed polarography and analyze polarograms obtained from mixtures of metal ions.
6. Describe, explain and apply the techniques of solvent extraction, distillation, sublimation, and the major forms of chromatography to the separation of a mixture.
7. Discuss the basis for improvements in the signal to noise ratio of a measurement. Distinguish between the Fourier transform and continuous wave methods of recording data. Explain the process of analogue to digital conversion.
8. Construct a null point hypothesis; use one or two tailed significance tests to reject or retain the hypothesis. Use a paired t test to compare two different methods of analysis for the same sample.

3. Required Materials (Access Available Online from Lansdowne Campus Bookstore)

Coursebook and Online Resources	<ul style="list-style-type: none"> ◆ SaplingPlus includes the eText and Sapling Homework Assignments eText “Quantitative Chemical Analysis” 10th Edition, by Daniel C. Harris, Charles A. Lucy)
Lab Manual (printed*)	<ul style="list-style-type: none"> ◆ Chem 224 Lab Manual
Lecture Notes (printed*)	<ul style="list-style-type: none"> ◆ Chem 224 Course Lecture Notes

*printed items will be purchased online from the campus bookstore and picked up by appointment or mailed directly to students

4. Course Content and Online Lecture Schedule:

Tuesday	8:30 to 9:50 pm, online
Thursday	8:30 to 9:50 pm, online

Unit	Topic	Textbook Reference* (Select topics only)
1	Analytical process, measurement, experimental error, and statistics	Ch. 0, 1, 3, and 4
2	Classical methods (Gravimetric and Titration) & Quality Assurance	Ch. 5 & 27
3	Electrochemical Methods	Ch. 14 and 15
4	Spectrochemical Methods	Ch. 18, 19, 20, and 21
5	Methods of Separation	Ch. 23, 24, and 25 (parts of 22)
6	Methods of Calibration and Quality Assurance	Ch.5 Covered in the Lab #2 and throughout the course

* note we will not be covering the sections given in the text in completely. (Specifics are given in the class lecture notes)

Chem. 224 Lab Schedule Wednesday 9:30 to 12:20pm Online Format

You will receive a minimum of one video to watch before the lab regarding the main technique as background. You will then join an online stream for each experiment (using black board collaborate) at the scheduled date and time where you will observe the experiment being carried out by your instructor. Here you will be given chance to ask questions and discuss the lab as it is being carried out. Data will be provided to you for the purposes of the report.

Week	Lab Date	Lab No. / Experiment
I	Sept 9 th	Lab #1: Introduction and skills assessment:
II	Sept 16 th	Lab #2: External Standard Calibration and Isotopic Dilution
III	Sept 23 th	Lab #3: Analysis of Halide Ions Using Silver Nitrate:
IV	Sept 30 th	Statistics Tutorial
V	Oct 7 th	Lab #4: Part B Ion Selective Electrodes
VI	Oct 14 th	Lab #5: UV/Vis Spectroscopy:
VII	Oct 21 st	Lab #6: Flame Atomic Absorption Spectroscopy
VIII	Oct 28 th	Online Midterm
IX	Nov 4 th	GC Tutorial
X	Nov 11 th	Remembrance Day (College Closed)
XI	Nov 18 th	Lab #7: Chromatography Part 1
XII	Nov 25 th	HPLC Tutorial
XIII	Dec 2 nd	Lab #7: Chromatography Part 2
XIV	Dec 9 th	Lecture Wrap-up plus Final Exam Review (Room TBA)

5. Basis of Student Assessment (Weighting)

Attendance	5%
Labs	15%
Sapling Homework ¹	20%
Quizzes	15%
Midterm ² (Units 1, 2, & 3)	15% (Week VIII, Online)
Final Exam (comprehensive)	30% (Week XV, Online)

1. This online homework software will provide practice questions, which are interactive and are not meant to replace the more traditional end of chapter homework questions. Marks are given for correctness and completing each assignment. Sapling Learning comes with the ebook can be purchased from Camosun College bookstore online. See D2L for more instructions. Due dates for

- each assignment will be provided by your instructor and can be found on the Sapling Learning website.
2. Expected to cover units 1-3; note an outline will be provided ahead of time for the midterm and the final exam.

Additional Notes:

- (1) Student must pass the lab and lecture component of the course to obtain credit for Chem 224. All labs are to be attended, individual lab reports completed following your instructors guidelines, and the report format provided in the lab manual.
- (2) Immediate contact must be made with instructor for missed labs due to illness or family emergencies for arrangements to be made. This should be done by email. For more information see lab manual.
- (3) A test score that is not as high as that of the December final exam will be dropped automatically and its weight redistributed to the final exam. For example, if a low score is obtained on your midterm then your final exam will then be 45% of the course grade!
- (4) This will be written in one of the classes. No one is allowed to write exams late and there will be no exceptions. Early exam is a privilege and not a right; thus, at full discretion of the instructor. In the event that the midterm is missed the marks will be weighted to the final exam as per point 3) above.

Important:

Students may not use recording devices in the classroom without the prior permission of the instructor. However, the instructor's permission is not required when the use of a recording device is sanctioned by the College's Resource Centre for Students with Disabilities in order to accommodate a student's disability and when the instructor has been provided with an instructor notification letter which specifies the use of a recording device. Recordings made in the classroom are for the student's personal use only, and distribution of recorded material is prohibited. Cell phones should be turned off while in class.

6. Grading System

- Standard Grading System (GPA)
- Competency Based Grading System

7. Recommended Materials to Assist Students to Succeed Throughout the Course

IMPORTANT DATES

Week

- III Sept. 21: Fee deadline
- VI Oct.12: Thanksgiving Monday-College Closed
- XI Nov. 11: Remembrance Day – College Closed
- XIV Exam Period for Fall 2020 begins

Use this link to check out scholarships and bursaries

<http://camosun.ca/learn/calendar/current/pdf/financial-assistance.pdf>

8. College Supports, Services and Policies



Immediate, Urgent, or Emergency Support

If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ <http://camosun.ca/about/mental-health/emergency.html> or <http://camosun.ca/services/sexual-violence/get-support.html#urgent>

College Services

Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at <http://camosun.ca/>

College Policies

Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at <http://camosun.ca/about/policies/>. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

A. GRADING SYSTEMS <http://camosun.ca/about/policies/index.html>

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at <http://camosun.ca/about/policies/index.html> for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.