



**School of Arts & Science**  
**CHEMISTRY AND GEOSCIENCE DEPARTMENT**  
**CHEM 224-01**  
**Introduction to Analytical Chemistry**  
**2008F**

## COURSE OUTLINE

The Approved Course Description is available on the web @ [camosun.bc.ca](http://camosun.bc.ca)

Ω Please note: this outline will be electronically stored for five (5) years only.  
It is strongly recommended students keep this outline for your records.

### 1. Instructor Information

(a)	Instructor:	Blair Surridge		
(b)	Office Hours:	Tuesday 8:30-10:20 am Wednesday 1:30-4:20 pm Friday 10:30am-12:00 & 1:30-2:20 pm		
(c)	Location:	F350A		
(d)	Phone:	370-3438	Alternative Phone:	
(e)	Email:	<a href="mailto:SurridgeB@camosun.bc.ca">SurridgeB@camosun.bc.ca</a> <a href="mailto:bsurridge@shaw.ca">bsurridge@shaw.ca</a> (home)		

### 2. Intended Learning Outcomes

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

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

At the end of this course, the student will possess an enhanced ability 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

Text	♦ "Quantitative Chemical Analysis" 7th Edition, by Daniel C. Harris (Freeman and Company)
Other	♦ Chem 224 Lab Manual (Safety glasses mandatory & lab coat recommended) ♦ A Small hard backed laboratory notebook (from bookstore)
In Library On Reserve	♦ "Fundamentals of Analytical Chemistry" 8 <sup>th</sup> addition, by Skoog, West, Holler, and Crouch

### 4. Course Content and Schedule

#### Lectures:

Monday	10:30 to 11:20 am in F310
Wednesday	10:30 to 11:20 am in WT203
Thursday	10:30 to 11:20 am in F202

Unit	Topic	Textbook Reference* Followed in class
1	Analytical process, measurement, experimental error, and statistics	Chapter 0, 1, 3, and 4
2	Classical methods (Gravimetric and Titration)	Ch. 27 and 7
3	Methods of Calibration	Ch.5
4	Spectrochemical Methods	Ch. 18, 19, 20, 21, and 22
5	Methods of Separation	Ch. 23, 24, 25, and 26
6	Electrochemical Methods	Ch. 14, 15, 16, and 17
7	QA/QC & Method Validation	Also Ch.5

\*- selected topics only

**Chem. 224 Lab Schedule Monday 2:30-5:20pm in F356**  
**(Subject to Change)**

Week	Lab Date	Experiment No.
I	Sept. 1:	Labour Day, No meeting
II	Sept. 8:	Exp # 1, Introduction & skills assessment
III	Sept. 15:	Exp # 2, Analysis of halide ions using silver nitrate
IV	Sept. 22:	Exp # 3, Calibration of Instruments
V	Sept. 29:	<b>Test #1 (2.5hrs)</b>
VI	Oct. 6:	Exp # 4, UV/Vis Spectroscopy
VII	Oct. 13:	<b>No Lab - Thanksgiving Day!!</b>
VIII	Oct. 20:	Exp # 5, Atomic absorption spectroscopy
IX	Oct. 27:	Exp # 9, Chromatography (Part1)
X	Nov. 3:	<b>Test #2 (2.5hrs)</b>
XI	Nov. 10:	See Handout Provided, Chromatography Part 2 (Analysis of BPA in Water)
XII	Nov. 17:	Exp # 11, Isotopic dilution and separation of mixtures
XIII	Nov. 24:	Exp # 7, Ion selective electrodes
XIV	Dec.1:	Review for Final Exam

**5. Basis of Student Assessment (Weighting)**

Labs	25%
Test I (Units I, 2 & 3*)	15% (Week V Lab Period, 2-hour)*
Test II (Units 3*, 4,& 5*)	15% (Week X Lab Period, 2-hour)*
In class group presentation	10% (Week XIII)
Final Exam (comprehensive)	35% (TBA ~Week XV, 3 hours in Dec)

\*- not all of unit will be included on the test

**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 and individual lab reports completed.
- (2) Immediate contact must be made with instructor for missed labs due to illness or family emergencies for arrangements to be made
- (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 term tests are missed your final exam will then be 65% of the course grade!
- (4) No one is allowed to write late and there will be no exceptions. Early exam is a privilege and not a right; thus, at full discretion of the instructor.

\* Test dates to be confirmed during the first week of classes in Sept.

**6. Grading System**

*(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)*

## 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	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

### 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 E-1.5 at [camosun.ca](http://camosun.ca) for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
<b>I</b>	<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.
<b>IP</b>	<i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. <i>(For these courses a final grade will be assigned to either the 3<sup>rd</sup> course attempt or at the point of course completion.)</i>
<b>CW</b>	<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.

## 7. Important Dates

Week

- VII Oct 13 (Mon): Thanksgiving Day – College Closed
- VI Oct 6 (Mon): Fee Deadline Last Day to Withdraw or Change to Audit...
- XI Nov 11 (Tues): Remembrance Day
- XV Dec 8-16: Exam Period for Winter 2008

**8. Recommended Materials or Services to Assist Students to Succeed Throughout the Course**

**LEARNING SUPPORT AND SERVICES FOR STUDENTS**

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services or the College web site at [camosun.ca](http://camosun.ca).

**STUDENT CONDUCT POLICY**

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services and on the College web site in the Policy Section.

**Prerequisite:** Chem 121 (C grade minimum)