

CAPILANO UNIVERSITY COURSE OUTLINE	
Term: SPRING 2016	Course No. CHEM 206
Course: INTRODUCTION TO ANALYTICAL CHEMISTRY	Credits: 4.0 Section:
Office: Tel:	email:

COURSE FORMAT: Six hours of studio lab time, divided between lecture and lab for a 15 week semester, which includes two weeks for final exams.

PRE-REQUISITES: CHEM 111 with a minimum "C" grade; use of TI-83 or TI-84 calculator.
Note: This is an approved Quantitative/Analytical course for baccalaureate degrees.

COURSE OBJECTIVES:

General: To provide a rigorous background in those chemical principles of particular importance to analytical chemistry, and to prepare students for further courses in chemistry or related fields.

A study of the chemistry of aqueous solutions, statistics and error analysis, evaluation of analytical data, gravimetric and titrimetric methods of analysis.

An introduction to spectroscopic methods, which includes infrared, ultraviolet-visible and atomic spectroscopy. Separation of compounds by various chromatographic methods will be examined and if time permits, a brief look at electrochemistry.

**Student Learning
Outcomes:**

Upon successfully completing the course, the student should be able to demonstrate an understanding of the basic principles of analytical chemistry, and show competence in various laboratory techniques.

REQUIRED COURSE MATERIALS:

Textbook: Skoog, D.A., D. M. West, F.J. Holler, and S.R. Crouch. Analytical Chemistry. 7th ed. Saunders Publishing, 2000. Capilano University Chemistry 206 Laboratory Manual.

Additional material: Answers to Skoog – Analytical Chemistry (on Moodle site).

COURSE CONTENT:

Topic	Weeks (approx)
Fundamentals, Statistics and Error Analysis The role of analytical chemistry, steps in a quantitative analysis, units of measurement - ppm, molarity, molality, and stoichiometric calculations. A look at errors in chemical analysis; standard deviation, variance, confidence limits, and calibration plots.	1-2
Gravimetric and Volumetric Analysis A look at properties of precipitates, mechanism of precipitate formation, colloids, co-precipitation, drying and ignition of precipitates and volatilization methods. A brief look at volumetric titrimetry, equivalence points, primary versus secondary standards, titration curves, buffers, polyfunctional acids and bases.	3-5
Neutralization Reactions A look at the applications of neutralization reactions, elemental analysis, complex-formation titrations with emphasis on the use of EDTA. An introduction to electrochemistry, oxidation-reduction reactions, electrochemical cells, activities, formal potentials, redox titration curves.	6-9
Spectroscopy The electromagnetic spectrum, radiation sources and radiation detectors. A study of the theory and applications of ultraviolet and visible spectroscopy, infrared spectroscopy, and atomic absorption spectroscopy. This will include numerous experiments as well as the text material. Also, an in-depth look at Beers Law and its limitations, spectrophotometric titrations, instrumental deviations, errors.	10-13
Chromatography A look at analytical separations by extraction or ion exchange, ion-exchange resins, column and gas chromatography.	13
Final Exam Period	14,15

EVALUATION PROFILE:

Final grades for the course will be computed based on the following schedule:

Term Tests (2)	30%
Labs	30%
Final Examination	35%
Performance Evaluation	5%
TOTAL	100%

A pass grade of 50% or above is required on each of the laboratory and lecture portions of the course for the student to pass the course.

PERFORMANCE EVALUATION:

In the absence of exceptional circumstances, which are at the instructor's discretion, the performance evaluation component of the final grade will be prorated to the rest of the grade. For example, a 10% performance evaluation component would be determined by dividing the remaining mark out of 90 by 9. The most common circumstance justifying an increased performance evaluation mark is a student's improved performance in the final examination relative to the midterm exam(s), which the instructor feels justifies an elevated letter grade.

GRADING PROFILE:

Letter grades will be assigned according to the following guidelines:

A+ 90 - 100%	B+ 77 - 79%	C+ 67 - 69%	D 50 - 59%
A 85 - 89%	B 73 - 76%	C 63 - 66%	F 0 - 49%
A- 80 - 84%	B- 70 - 72%	C- 60 - 62%	

Students should refer to the University Calendar for the effect of the above grades on grade point average.

OPERATIONAL DETAILS:***University Policies:***

Capilano University has policies on Academic Appeals (including appeal of final grade), Student Conduct, Cheating and Plagiarism, Academic Probation and other education issues. These and other policies are available on the University website.

Attendance:

The student is responsible for all information given in the lectures and laboratories, including times of examinations and assignment deadlines.

Missed Exams and Labs:

Normally, a score of zero will be given for a missed exam, test, quiz, lab, etc. In some exceptional situations, the student will be permitted to write a make-up test, defer the lab to a later date or to replace the score by other marks.

The situations in which a score of zero may be avoided are those for which the student meets **all** of the following conditions:

1. Circumstances are beyond the control of the student which resulted in the exam, test, quiz, lab, etc. to be missed. Such circumstances include serious illness or injury, or death of close family member. They do **NOT** include forgetting about the test, lack of preparation for the test, work-related or social obligations.
2. The student has notified the instructor (or the Pure and Applied Science office staff, if the instructor is not available)

about the missed exam, test, quiz, lab, etc. Such notification **MUST** occur in advance, if possible, or at the latest, on the day of the exam, test, quiz, lab, etc.

3. Proof of the circumstances must be provided. Proof of illness or injury requires a note from a doctor, who may also be consulted.
4. The student has been fully participating in the course up until the circumstances that prevented the writing of the exam, test, quiz, lab, etc. **Fully participating means attending almost all classes and turning in almost all assignments in the course.**

The options offered to the student who meets the four conditions are decided by the instructor. They will not necessarily meet the convenience of the student.

Final Exam Period:

Students should note that the final exam period is from **April xx to April xx** (*includes Saturday, April xx*), and that they can expect to write exams at any time during this period. Individual exam times will not normally be rescheduled because of holidays, work, or other commitments. While efforts are made to spread exams throughout the exam period, an individual's particular course combination may result in exams being scheduled close together, or spread widely through the entire exam period.

Cheating/Plagiarism:

Students caught cheating on a test will normally receive a grade of "F" on the course and may be expelled from the University. Plagiarism (including the copying of any part of assignments, laboratory reports, and essays) is a serious offence and is a form of cheating.

Incomplete Grades:

Incomplete grades ("I") are given only when special arrangements have been agreed upon with the instructor prior to the end of the semester. Since "I" grades are granted only in exceptional circumstances (usually health problems), their occurrence is rare. A student receiving an "I" grade should see the instructor.

English Usage:

Students are expected to use correct standard English in their written and oral assignments, exams, presentations and discussions. Failure to do so may result in reduced grades in any part of the Evaluation Profile. Please refer to the guidelines provided in the Capilano Guide to Writing Assignments (available from the University bookstore).

Emergency Procedures:

Please read the emergency procedures posted on the wall of the classroom.