

CAPILANO UNIVERSITY COURSE OUTLINE	
Term: FALL 2015	Course No. CHEM 205
Course: INTRODUCTION TO BIO- INORGANIC 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.
Note: This is an approved Quantitative/Analytical course for baccalaureate degrees.

COURSE OBJECTIVES:

General:

- To provide students an introduction to the chemical principles associated with inorganic chemistry.
- To expose students to innovative laboratory techniques and modern analytical equipment and to assist them to develop further their written communication skills.
- To prepare students for subsequent courses in inorganic chemistry or in related fields.

**Student Learning
Outcomes:**

Upon successfully completing the course, the student should be able to:

- understand the general principles associated with the chemistry of main group compounds;
- comprehend the general principles involved in the coordination chemistry of the transition metals; and
- synthesize and characterize a variety of inorganic compounds using modern analytical methods and clearly communicate, in writing, the results.

REQUIRED COURSE MATERIALS:

Textbook: Rodgers, G.E. Descriptive Inorganic, Coordination, and Solid-State Chemistry. 3rd ed. Toronto: Thomson Nelson, 2012.
Capilano University Chemistry 205 Laboratory Manual and Student Laboratory Guide.

Supplements: The following are supplementary textbooks, which may be helpful in your studies:

Housecroft, C.E. and A.G. Sharpe. Inorganic Chemistry. 2nd ed. London: Pearson, 2005.

Miessler, G.L. and D.A. Tarr. Inorganic Chemistry. 3rd ed. New Jersey: Pearson, 2004.

COURSE CONTENT:

Topic	Weeks (approx)
Main Group Chemistry A brief introduction to quantum theory, atomic orbitals and many electron atoms. A detailed look at established trends in atomic parameters (i.e., Slater's rules), the <i>Uniqueness Principle</i> , the <i>Diagonal Effect</i> and the <i>Inert Pair Effect</i> , as they apply to Main Group elements and their corresponding compounds.	1-2
Molecular Structure A review of basic bonding models as they apply to Main Group compounds including such ideas as Lewis dot structures, formal charge, resonance, molecular shape and the VSEPR model, hybridization of atomic orbitals (i.e., Valence Bond theory), σ and π bonds. An introduction to Molecular Orbital theory (i.e., homo and heteronuclear diatomic molecules). An introduction to molecular symmetry, symmetry operations, symmetry elements, and point groups.	3-4
Coordination Chemistry An introduction to coordination compounds (i.e., oxidation state and coordination number of metal; types of ligands); nomenclature. The structures of coordination compounds; isomers (stereo vs. constitutional) with an emphasis on octahedral, square planar and tetrahedral coordination spheres. The nature of the metal-ligand bond; Lewis acid-base definition; the use of Crystal Field Theory or Ligand Field Theory to account for the stability of transition metal complexes, their electronic and magnetic characteristics and the variety of colours exhibited by these compounds; Jahn-Teller distortions. Rate and mechanisms of reactions of coordination compounds.	5-11
Bio-inorganic Applications Medicinal inorganic complexes and their effective use for drug therapy, especially for the treatment of neurodegenerative disorders and cancer. The use of heavy metals as imaging agents (i.e. MRI).	12-13
Final Exam Period	14,15

EVALUATION PROFILE:

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

Term test 1	12.5%
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Term test 2	12.5%
Labs	30%
Final Examination	35%
Performance Evaluation	10%
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 **December x to December xx** (*includes Saturday, December x*), 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.