



REVISED COURSE OUTLINE FOR REMOTE LEARNING

To account for the necessary transition to remote learning from March 13 onward, adjustments have been made to assessment deadlines and requirements so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff). If you are unable to meet the deadlines or requirements specified, please connect with your course instructor to work out alternative dates/assessments.

1. **Course:** CHEM 433, Inorganic Chemistry: Transition Metals - Winter 2020

Lecture 01: MWF 11:00 - 11:50 - Remote Learning (check with your instructor or coordinator for details)

Instructor	Email	Phone	Office	Hours
Dr Warren Piers	wpiers@ucalgary.ca	220-5746	EEEL 548	By Appointment or MWF 11:00-11:50 via Zoom

Start date of Labs/ Tutorials: Week of January 15, 2018

Course Site:

D2L: CHEM 433 L01-(Winter 2020)-Inorganic Chemistry: Transition Metals

Note: Students must use their U of C account for all course correspondence.

2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

Prerequisite(s):

Chemistry 201 or 211, and 203 or 213, and 331 or 431. Also known as: (formerly Chemistry 333)

3. **Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Component(s)	Weighting %	Date
Laboratory experiments	25	
Midterm I	25	Friday, February 7, In class
Midterm II	25	Monday, March 23, Remote
Final Assignment	25	by email Mar 27 - April 17

Students will have 24 hours to return the Midterm II assignment.

The Final Assignment is not closed book and it is not an exam.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	85 %	80 %	75%	70%	65 %	60 %	55%	50%	45 %	40 %

Notes:

Students will be expected to understand at every stage the material covered in all components of the course. In order to satisfy the prerequisite requirements (i.e., C-) for further Chemistry courses, a student must meet the following requirements: (1) achieve a minimum 50% in the laboratory grading, *and* (2) achieve *either* a minimum 50% on the Final examination, *or* a minimum 50% weighted average on the examinations (Term Tests and Final).

This means that if a student scores below 50% in either the laboratory component or the examinations, then the

maximum course letter grade they can obtain in CHEM 333 is a D+.

The Midterm Tests will be held in class, Friday, February 7th and Monday March 23rd, 2020. The latter will be written at home and emailed to the instructor. There are no deferred term tests. The weight of a legitimately missed term test will be handled as discussed in section 4 below. All exams are cumulative. The marks for all of the course components will be recorded as numerical scores and combined to arrive at a final numerical score, which will be converted to the letter grade that is reported to the Registrar according to the grading scale.

4. Missed Components Of Term Work:

The University has suspended requirements for students to provide evidence for reasons for absences so please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations. Please let your instructor know immediately if you are ill and cannot meet the deadlines specified.

There are no deferred Midterm/ term test examinations. In the event that a student misses the midterm or any course work due to illness then an official medical note will be required. Absences must be reported **within 48 hrs**. If a student misses the midterm for other reasons, then analogous documentation will be required. The course coordinator will need to see the original documentation (not electronic copy) for review / decision and keep it (or a copy) for his record. The documentation must be provided to the course coordinator **within 15 days** of the date of the midterm in order for an excused absence to be considered. If an excused absence is approved, then the percentage weight of a legitimately missed midterm examination *will be pro-rated among the remaining examination components of the course* (see [Section E.3](#) of the University Calendar).

If a student missed an experiment or a make-up lab for non-legitimate reasons (e.g. vacation, incomplete or insufficient score in pre-lab assignment), and did not perform the experiment, the contribution of that experiment in the final course grade will be zero. This does not apply to labs cancelled due to the COVID-19 situation.

5. Scheduled Out-of-Class Activities:

There are no scheduled out of class activities for this course.

Not applicable.

6. Course Materials:

- Recommended Textbook: Miessler, G. L.; Fischer, P. J., and Tarr, D. A., "Inorganic Chemistry", 5th Ed., Pearson, 2014 (available in the Bookstore)
- Lab coat & safety glasses (required)
- A non-programmable calculator

7. Examination Policy:

All exams will be cumulative and in closed book format. Students should read the Calendar [Section G](#), on Examinations.

Students should also read the Calendar, [Section G](#), on Examinations.

8. Approved Mandatory And Optional Course Supplemental Fees:

Due to the mid-semester transition to online learning, laboratory checkout is not required this semester. No fees will be assessed for either breakage or failure-to-checkout.

9. Writing Across The Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

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10. Human Studies Statement:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request

a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

12. Other Important Information For Students:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (svsa@ucalgary.ca) or phone at [403-220-2208](tel:403-220-2208).
- d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples.**
- e. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- f. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).

Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Chemistry, Dr. Farideh Jalilehvand by email ahugchem@ucalgary.ca or phone 403-220-5353. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.

- g. **Safewalk:** Campus Security will escort individuals day or night (See the [Campus Safewalk](#) website). Call [403-220-5333](tel:403-220-5333) for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

- h. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- i. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](#) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](#) Email: sciencerep@su.ucalgary.ca. [Student Ombudsman](#), Email: ombuds@ucalgary.ca.
- j. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.
- k. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- l. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.
13. **Laboratory Information:** Laboratory activities will begin on **January 13th, 2020; the first week is for check-in and the experiments will start from January 20rd, 2020**. It is mandatory that students wear a lab coat and safety glasses at all times when working in the lab. Students wearing inappropriate laboratory attire will not be permitted to conduct experiments for safety reasons. The manual can be found online (course D2L site). You must consult the online laboratory manual prior to attending any of your scheduled lab periods and printout the required portion of the manual that outlines the procedures you will be doing.

Students repeating the course within the last two years can be exempted from the Laboratory Component of the Course if a grade of 75% or higher was obtained. The lab grade achieved on the previous attempt will be carried forward. Such students must contact the Chemistry Undergraduate Program Administrator in the Chemistry Main Office, SA 229 **before the drop date**.

Course Outcomes:

- By completing this course, students will be able to:
- 1) write name, formula and charge of coordination compounds; recognize common ligands, their donor atoms and denticity; determine the oxidation state of the metal and its electronic configuration; perform conductivity test in the lab to identify the number of ions constituting a coordination compound (when dissolved in water), making a distinction between inner-sphere and outer-sphere coordination; recognize symmetry elements and operations in a coordination compound, and determine its Point Group.
- 2) distinguish between different types of isomers for coordination compounds; prepare geometrical isomers of an octahedral complex in the lab, recognizing differences in their colors and UV-vis absorption spectra; learn in the lab how to separate two optical isomers (enantiomers) in a racemic solution, and determine the optical purity of the isolated enantiomer by measuring its optical activity using a polarimeter.
- 3) use 18-electron rule, crystal field theory and MO theory to explain bonding in octahedral, tetrahedral, square planar complexes and organometallic compounds, and calculate their crystal field stabilization energies; predict a ligand's field strength (weak vs. strong) and its position in the spectrochemical series based on its ability to be sigma-donor, pi-donor or pi-acceptor, leading to high-spin vs. low-spin electronic state in a complex; generate MO energy level diagrams for different ligand field strengths in an octahedral field; recognize metal ions that gain further stability through tetragonal distortion (Jahn-Teller effect); synthesize metal complexes in the lab, explaining their colors based on the color wheel and absorption bands in their visible spectra, justifying those electronic transitions according to crystal field splitting of d-orbitals, recognizing their spin-state by measuring their magnetic susceptibilities, identifying the nature of isomers formed using IR spectroscopy; explain nature of bonding and orbital overlaps in complexes with metal-metal bonds (delta bonding); describe sigma-donation and pi-back-bonding in metal-carbonyl complexes, preparing such complexes in the lab, using IR spectroscopy to determine their structures.

- 4) recognize thermodynamic stability of a metal complex in solution; distinguish between metal ions that form kinetically inert or labile complexes; describe the mechanisms (Associative, Dissociative, Intermediate) of ligand substitution reactions for octahedral and square planar complexes, and interpret the corresponding rate laws; discuss the electronic and steric factors that influence the reactivity of square planar complexes (such as Trans effect); recognize the mechanism of electron transfer (inner-sphere vs. outer-sphere) in a redox reaction for metal complexes based on supporting evidence (rate constants, presence of bridging ligands, use of radioisotopes, etc), and discuss factors contributing in the “self-exchange” and “cross-exchange” outer-sphere redox reactions.
- 5) use their knowledge about structure, bonding and reactivity of transition metal complexes to describe the mechanism of some fundamental catalytic processes, and the role of transition metal ions and their complexes in selected biological systems.

Electronically Approved - Mar 26 2020 08:48

Department Approval

Electronically Approved - Mar 26 2020 11:07

Associate Dean's Approval for alternate final examination arrangements or remote learning