

## CHEM 3400 Inorganic Chemistry: Reactivity and Properties

Department of Chemistry, Faculty of Science, University of Manitoba

### General Information

Class time: Tuesday/Thursday 10:00-11:15 (3 credit hours)  
Location: 319 Allen Building  
First class: 5 September 2019  
Last class: 5 December 2019

### Laboratory Information

Times: Tuesday 14:30-17:25  
Location: 442 Parker Building  
First lab: 10 September 2019  
Last lab: 3 December 2019

### Instructor

Prof. Scott Kroeker  
458 Parker Building  
<http://www.sci.umanitoba.ca/chemistry/profiles/scottkroeker>  
Office hours by appointment

Scott.Kroeker@umanitoba.ca  
204-474-9335

### Laboratory Main Teaching Assistant

Mr. Arun Krishnamurthy      krishna6@myumanitoba.ca      455 Parker

### Course Website

[universityofmanitoba.desire2learn.com](http://universityofmanitoba.desire2learn.com)

### Textbook (required)

Inorganic Chemistry (7<sup>th</sup> Ed.), Weller, Overton, Rourke, Armstrong: Oxford University Press, Oxford, U.K. (2018)

### Evaluation

Evaluation will be based on the following components:

- assignments: 2 x 10% = 20%
- midterm exam: 15%
- laboratory: 25%
- final exam: 40%

Assignments will be distributed on October 3 and November 14 and will be due one week later. There will be no make-up assignments. Late assignments will not be accepted for marking without prior permission from instructor; such permission may be granted at the discretion of the instructor at a penalty of 10% per day. Extensions must be arranged well in advance of the due date (e.g., 72 hours).

A two-hour midterm exam will be scheduled for October 22 during the lab period, location TBA. There will be no opportunity to rewrite a missed mid-term test. Upon approval of a written excuse, the marks from a missed midterm exam will be added to the final exam, making it worth 55%.

The laboratory is an essential component of the course. A minimum mark of 60% must be obtained to receive a passing grade in this course. *Note that lab exemptions will be granted for one year only.*

A three-hour final examination to be held during the December examination period will cover all aspects of the course, including material from lectures, assignments, textbook readings and laboratory. The time and location will be set by the Student Records office. It is *your* responsibility to be available for any examination scheduled between 9-20 December 2019, inclusive. Final examination deferrals must be processed by the Faculty of Science office.

Feedback prior to deadline for voluntary withdrawal (18 November 2019) will consist of a mid-term exam and one assignment.

### Grading Scheme

95-100%	A+	75-79%	C+
90-94%	A	70-74%	C
85-89%	B+	60-69%	D
80-84%	B	0-59%	F

### *Academic Integrity*

The University of Manitoba takes academic integrity seriously. There are many supports available to assist you in completing your studies with integrity. Please see the following webpages for resources and more information:

<https://www.sci.umanitoba.ca/undergraduate-students/academic-resources/academic-integrity-2/>

<http://umanitoba.ca/academicintegrity/>

### *Student Accessibility*

Students with disabilities should contact Student Accessibility Services to facilitate the implementation of accommodations. Please contact me if you wish to discuss their recommended accommodations.

### *Course Content*

Prerequisites: Course material from CHEM 2400 is a prerequisite for CHEM 3400.

Overview: This course builds on the material presented in *Inorganic Chemistry: Structure and Applications* with an emphasis on *properties* and *reactivity*. Focusing primarily on coordination compounds involving transition metals, fundamentals such as molecular bonding, electronic spectroscopy and ligand substitution reactions are presented. Standard examples will be augmented by inorganic compounds and materials of interest in biochemistry, materials science and catalysis. The lab component involves the synthesis and characterization of structure and properties in inorganic systems, and has been designed to cultivate scientific writing skills.

General topical outline:

- Molecular symmetry
- Ligand field theory
- Electronic spectroscopy
- Ligand substitution mechanisms
- Electron transfer reactions
- Characterization methods