CHEM2400:
INORGANIC CHEMISTRY: Structures & Applications

The University of Manitoba, Faculty of Science, Department of Chemistry
Syllabus for CHEM2400 Inorganic Chemistry (Winter 2020)

1. General Information

Class time:	Mondays, Wednesdays, Fridays:	12:30 p.m. – 1:20 p.m.
Room:		205 Armes Bldg.
Class dates:		Jan. 6th, 2020 – Apr. 6th, 2020
Prerequisites:		CHEM1310 or CHEM1311 (C)

2. Instructor Information

Course Instructor:

Name: Dr. Mario Bieringer **E-mail:** Mario.Bieringer@UManitoba.ca
Office: 520c Parker Building **Phone:** (204) 474 6258

Office hours: Mondays: 10:00 am – 11:00 am
Thursdays: 12:00 pm – 1:00 pm

Laboratory Instructor:

Name: Dr. Gurmeet Singh Bindra **E-mail:** t.b.a.

3. Textbook:

"Inorganic Chemistry", 7th Edition by Weller, Overton, Rourke, Armstrong (Oxford University Press) 2018
The course material is based and referenced with respect to the 7th edition (2018).

4. Additional Resources:

Material in addition to the textbook can be found on the course specific **UMLearn** site.

5. Course Evaluation:

In-class test:	6%
Midterm:	20%
Take home assignments:	2 x 7%
Laboratory:	20%
Final written exam:	40%

The following letter grade conversion will be applied for the final grades:

92.0 -100.0%	= A+	64.0 - 69.9%	= C+
83.0 - 91.9%	= A	58.0 - 63.9%	= C
76.0 - 82.9%	= B+	50.0 - 57.9%	= D
70.0 - 75.9%	= B	0 - 49.9%	= F

A minimum mark of **60% for the laboratory component** is required for passing the course.

There is no make up midterm. If the midterm was missed the final exam percentage will increase accordingly.

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6. IMPORTANT DATES:

In-class test:		Friday **January 31st, 2020**: 12:30 pm – 1:20 pm (location 205 Armes Bldg.)
Assignment #1:	distribution date:	Friday February 14th, 2020
	due date:	Wednesday **February 26th, 2020**
Midterm Exam:		Wednesday **March 4th, 2020**: 6:00 pm – 8:00 pm (location t.b.d.)
Assignment #2:	distribution date:	Friday March 20th, 2020
	due date:	Friday **March 27th, 2020**
Final Exam:		Final Exam Period to be scheduled by the registrars office.

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7. General Course Overview:

Overview of chemical bonding, structure and reactivity across the Periodic Table, illustrated by examples linking Inorganic Chemistry with e.g. materials science and biochemistry. The lab component involves synthesis and analysis of simple inorganic compounds.
Not to be held with CHEM 2380, CHEM 2381 or CHEM 2401. Prerequisite: CHEM 1310 or CHEM 1311 (C). The laboratory is an essential component to this course. A minimum mark of 60% must be obtained in the laboratory portion to receive a passing grade in this course. Dr. Bindra will handle all aspects of the laboratory. Be sure to check the laboratory section of the UMLearn site for CHEM2400 and review the posted information prior to the first lab session.

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8. Course Goals:

This course consists of a lecture component (three 50 minute lectures weekly) and a laboratory component (once 3 hours per week). This introduction to Inorganic Chemistry aims at generating a solid understanding of the periodic table of elements, atomic structure, and the relationship between fundamental elemental properties and periodic trends, chemical properties and some aspects of chemical reactivity. You should gain from this course a foundation of knowledge about chemical bonding, and an understanding of covalent, ionic and dative bonds and the reasons and consequences for using one model for interpreting chemical bonding over another.

9. Using Copyrighted Material:

Please respect copyright. We will use copyrighted content in this course. I have ensured that the content I use is appropriately acknowledged and is copied in accordance with copyright laws and University guidelines. Copyrighted works, including those created by me, are made available for private study and research and must not be distributed in any format without permission. Do not upload copyrighted works to a learning management system (such as UM Learn), or any website, unless an exception to the *Copyright Act* applies or written permission has been confirmed. For more information, see the University's Copyright Office website at http://umanitoba.ca/copyright/.

10. Recording Class Lectures:

Mario Bieringer and the University of Manitoba hold copyright for the course materials, presentations and lectures, which form part of this course, unless otherwise stated. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission from Mario Bieringer. Course materials (both paper and digital) are for the participants' private study and research.

11. Lecture Material:

This course will cover an overview of periodic trends and their relationship to some properties of the elements, aspects of chemical bonding, examples of the reactivity of some inorganic molecules and materials, and examples of applications of inorganic chemistry in a variety of settings.

Specific topics to be covered include (subject to change):

- Atomic structure and properties, periodic trends, and electronic configuration (review only)
- Molecular structure and bonding: VSEPR, Valence Bond Theory, Molecular Orbital Theory
- Molecular symmetry including point groups, character tables and symmetry-property relationships
- Structures of simple solids: Theories of structure and bonding in elements and extended solids including lattices, crystal structures, close-packed solids and thermodynamics of ionic bonding
- Acid/base theory: Bronsted, Lewis and their applications to dative bonding and chemical reactivity
- Aspects of redox chemistry, including concept of oxidation states
- Descriptive properties and chemistry of s- and p-block elements,
- Introduction to transition metal chemistry
- Coordination chemistry: geometries, electron counts, nomenclature, ligands, molecules and materials
- Some aspects of inorganic elements in biology and medicine

12. Laboratory Program:

The lab program involves the synthesis and analysis of simple inorganic compounds. The laboratory experiments start during the week of January 13th, 2020. The laboratory manual can be found on the CHEM2400 UMLearn site. The laboratory and lectures share one common UMLearn site.

13. Class Communication:

The University requires all students to activate an official University email account in order to comply with the Electronic Communication with Students regulations. Please note that all communication between myself and you as a student must comply with the electronic communication with student policy.
You are required to obtain and use your U of M email account for all communication between yourself and the university.

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14. Academic Integrity:

POLICIES:

The following is an excerpt from the online Undergraduate Calendar 2019-2020 of the University of Manitoba. LINK

Academic Integrity

The University of Manitoba takes academic integrity seriously. As a member of the International Centre for Academic Integrity, the University defines academic integrity as a commitment to six fundamental values: honesty, trust, fairness, respect, responsibility and courage. (International Centre for Academic Integrity, 2014)

To help students understand the expectations of the University of Manitoba, definitions for the types of prohibited behaviours are in the Student Academic Misconduct Procedure and provided below.

"Academic Misconduct" means any conduct that has, or might reasonably be seen to have, an adverse effect on the academic integrity of the University, including but not limited to:

(a) Plagiarism – the presentation or use of information, ideas, images, sentences, findings, etc. as one's own without appropriate attribution in a written assignment, test or final examination.

(b) Cheating on Quizzes, Tests, or Final Examinations – the circumventing of fair testing procedures or contravention of exam regulations. Such acts may be premeditated/planned or may be unintentional or opportunistic.

(c) Inappropriate Collaboration – when a student and any other person work together on assignments, projects, tests, labs or other work unless authorized by the course instructor.

(d) Duplicate Submission – cheating where a student submits a paper/assignment/test in full or in part, for more than one course without the permission of the course instructor.

(e) Personation – writing an assignment, lab, test, or examination for another student, or the unauthorized use of another person's signature or identification in order to impersonate someone else. Personation includes both the personator and the person initiating the personation.

(f) Academic Fraud – falsification of data or official documents as well as the falsification of medical or compassionate circumstances/documentation to gain accommodations to complete assignments, tests or examinations.

Note that the above applies to written, visual, and spatial assignments as well as oral presentations.

Over the course of your university studies, you may find yourself in situations that can make the application of these definitions unclear. The University of Manitoba wants to help you be successful, and

this includes providing you with the knowledge and tools to support your decisions to act with integrity. There are a number of people and places on campus that will help you understand the rules and how they apply to your academic work. If you have questions or are uncertain about what is expected of you in your courses, you have several options:

- Ask your professor, instructor, or teaching assistant for assistance or clarification.
- Get support from the Academic Learning Centre or Libraries:
- Visit the Academic Integrity site for information and tools to help you understand academic integrity.
- Make an appointment with the Student Advocacy office. This office assists students to understand their rights and responsibilities and provides support to students who have received an allegation of academic misconduct.