



SC/CHEM 2030 (3 credits) Basic Inorganic Chemistry

Term

Fall 2024

Time and Location

Lectures	MWF	CLH-D	09:30-10:30
Tutorial	W	DB 0016	13:30-14:30

Prerequisite

Both SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00.

Course Instructor

Dr. Thomas Baumgartner

E-mail: tbaumgar@yorku.ca

Office: LSB431B

Office hours: by appointment

Land Acknowledgement

York University recognizes that many Indigenous Nations have longstanding relationships with the territories upon which York University campuses are located that precede the establishment of York University. York University acknowledges its presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, and the Huron-Wendat. It is now home to many First Nation, Inuit, and Métis communities. We acknowledge the current treaty holders, the Mississaugas of the Credit First Nation. This territory is subject of the Dish with One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.

Course Description

An overview of the Periodic Table, with a focus on trends in properties of the elements and their compounds; principles of ionic and covalent bonding; molecular orbital theory of simple molecules; solution and solid-state chemistry of the main group elements compounds, with examples relevant to everyday life.

Purpose and Objectives of the Course

The purpose of the course is to introduce important aspects, specific to inorganic chemistry, and build upon knowledge gained in previous general chemistry courses. Particular attention will be paid to the understanding of the Periodic Table, as well as structure and bonding in main group compounds. To this end, we will discuss molecular orbital theory of simple diatomic molecules, and structures and bonding in common solids, as well as the chemistry of select main group elements.

At the end of the course, students should be able to:

1. Communicate effectively with chemists in the field using proper terminologies.
2. Describe the underlying principles that led to the organization of the common periodic table and use the periodic table to rationalize trends in atomic properties.
3. Describe the scientific principles governing the structure, bonding and reactivity of molecules derived from select main group elements.
4. Have a solid understanding of the various models used to describe bonding in molecules and materials.

Textbooks

Required: Missler, G. L.; Fischer, P. J., and Tarr, D. A., "Inorganic Chemistry", 5th Ed., Pearson, 2014
(this book is available through the Bookstore as an eBook)

Recommended: C. E. Housecroft & A.G. Sharpe, "Inorganic Chemistry", 5th Ed., Pearson, 2018
(available on reserve at the Steacie library)

References for further reading will be provided throughout the term via eClass

Organization of the Course

The lectures will be delivered by the Course Instructor but will require active participation of the students in the form of discussions, particularly for the Tutorial. Content slides will be posted ahead of the class on eClass. It is the student's responsibility to sign up for an account. See <https://eclass.yorku.ca> for details.

Course Contents

1. Origin of the Elements

2. Electronic Structure of the Atom

Basics

Atomic Orbitals

Periodic Trends

3. Bonding Models: Discrete Structures

Lewis Structures
VSEPR Theory
Valence Bond Theory

4. Bonding Models: Molecular Symmetry

Symmetry Operations and Symmetry Elements
Point Groups and Group Theory
Molecular Orbital Theory: Diatomic Molecules

5. Bonding Models: Extended Structures

Solid-State Structures & the Unit Cell
Packing of Spheres (Metallic Lattices)
Binary Compounds (Ionic Lattices)

6. Main Group Elements: General Trends & Principles

Electronegativity
Valence
Oxidation State
Coordination Number
Donor-Acceptor Chemistry (including Acid-Base Models)

7. Chemistry of Select Main Group Elements

Evaluation

The level of proficiency in the material will be assessed through the elements listed below. The final grade for the course will be based on the following items weighted as indicated.

<i>Assignments (3):</i>	5% each
<i>Midterm exams (2):</i>	20% each
<i>Tutorial Participation:</i>	5%
<i>Final Exam (2h):</i>	40% (date and time to be scheduled by Registrar)

No make-up midterm exam will be available. The missed marks will be distributed equally among the other tests/exams only if a valid reason is provided to the Course Instructor. If the Course Instructor deems the reason not valid, the student who did not write the test will receive a zero for that missed test. A deferred final exam, if needed, will be held after the fall term. All students should be familiar with the "Missed Exam Policy" document available on the Registrar's website:

<https://myacademicrecord.students.yorku.ca/deferred-standing>

Assignments will involve course-specific questions roughly every month, on topics practiced in the Tutorial, to be submitted on eClass. The due dates for the assignments will be announced in the Tutorial and on eClass.

Grading Scheme, Assignment Submissions, Lateness Penalties, Academic Integrity

The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.). Assignments and Mid-term exams will bear a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 89, B+ = 75 to 79, etc.)

For a full description of York grading system see the York University Undergraduate Calendar: <https://calendars.students.yorku.ca/2024-2025/grades-and-grading-schemes>

Proper academic performance depends on students doing their work not only well, but on time. Accordingly, the assignments must be received on the due date specified for the assignment, which are to be emailed to the Course Instructor. **Assignments received later than the specified time on the due date will result in no credit (0%).** Exceptions to the lateness penalty will be entertained by the Course Instructor only when supported (see above). The grading scheme will be adjusted accordingly.

Important Dates

September 4:	Classes start
October 7:	First Midterm Exam (in-class)
October 12 – 18:	Reading Week (no classes)
November 6:	Second Midterm Exam (in-class)
December 2:	Last class
December 5-20:	Final Exam Period

Academic Honesty and Integrity

Academic misconduct undermines the values of honesty, trust, respect, fairness, and responsibility that we expect in this class. York University provides supports such as academic integrity workshops to ensure that all students understand the norms and standards of academic integrity that we expect you to uphold.

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards. Please review and familiarize yourself with the policy.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve your research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website:

Examples of actions that do not adhere to York's Academic Integrity Policy include:

- Plagiarism (passing off someone else's work as your own)
- Accessing unauthorized sites for assignments or tests
- Unauthorized collaboration on assignment and exams
- Uploading work to third party repository sites (e.g., Course Hero, One Class, etc.)
- Scanning, sharing, uploading, or publishing exams, tests, or scholarly work

For more information on what academic integrity is and why it is important see:

<https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/>. Information on the process of investigations into breaches of academic honesty: <https://spark.library.yorku.ca/academic-integrity-breach-of-policy-on-academic-honesty/>

Important Note from the FSc Committee on Examinations & Academic Standards (CEAS): Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g., Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. Whenever a student submits work obtained through an external site (e.g., Course Hero, Chegg), the **submitting student will be charged with plagiarism** and the **uploading student will be charged with aiding and abetting**. To avoid this risk, students are urged not to upload their work to these sites.

Assistance for Students (Academic and Well-Being)

Academic Advising*: <https://www.yorku.ca/science/academic-advising/> * Departments also offer program-specific advising. Check with your Department's Undergraduate Office.

Centre for Human Rights, Equity, and Inclusion: <https://rights.info.yorku.ca>

Centre for Indigenous Students Services: <https://aboriginal.info.yorku.ca/>

Food Access, Funding, & Supports/Resources: <https://students.yorku.ca/food>

Good2Talk 24-hour Ontario Student Helpline: 1-866-925-5454 /Text: GOOD2TALKON to 686868

Keep.meSAFE: <https://myssp.app/keepmesafe/ca/home>

Learning Commons (general academic learning supports including library research, time management, study skills, career planning, etc.): <https://learningcommons.yorku.ca/>

Peer Assisted Study Sessions (PASS): <https://www.yorku.ca/colleges/bethune/get-help/pass/>

Peer Tutoring: <https://www.yorku.ca/colleges/bethune/get-help/peer-tutoring/>

Sexual Violence Response and Support: <https://thecentre.yorku.ca>

Student Counselling, Health & Well-being: <https://counselling.students.yorku.ca/>

Support Services for International Students: <https://yorkinternational.yorku.ca/international-student-support/>

Writing Services: <https://www.yorku.ca/colleges/bethune/get-help/writing/>

York University Student Services: <https://family.yorku.ca/student-services/#SCD>

York University Student Well-being Resources: <https://www.yorku.ca/well-being/resources/students/>

Accessibility

York University is committed to principles of respect, inclusion, and equality of all persons with accessibility needs across campus. The University provides services for students with accessibility needs (including physical, medical, learning, and psychiatric needs) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

If you are in need of these services, please register with accessibility services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with accessibility services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Student Accessibility Services: <https://accessibility.students.yorku.ca>

York Accessibility Hub: <https://www.yorku.ca/accessibilityhub/>

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course Director immediately. To arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete and submit an accommodation request form at least 3 weeks *before the exam period begins*. <https://secure.students.yorku.ca/pdf/religious-accommodation-agreement-final-examinations.pdf>

Student and Instructor Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at <http://secretariat-policies.info.yorku.ca/policies/disruptive-and-or-harassing-behaviour-in-academic-situations-senate-policy/>.

Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference. The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does academic accommodation undermine or compromise the learning objectives that are established by the academic authorities of the University.

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

<https://calendars.students.yorku.ca/policies-and-regulations>

E-mail Communications

All course-related questions and issues will be addressed during class or during office hours. Any administrative questions and issues will likely be best addressed by the Undergraduate Program Assistants in the Chemistry Building (CB 124). E-mail communications should have "CHEM 2030" as subject line. All messages received without this tag may be ignored and deleted. Messages will be replied to within 24-48 hours, except during weekends or holidays.