

Chemistry 2271A – Structure and Bonding in Inorganic Chemistry (Fall 2021)
Western University
Department of Chemistry

Instructor: Prof. Johanna Blacquiere (BLAA-key-air), she/her

Office: BGS 2022

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E-mail correspondence can only be considered if it is sent from your @uwo.ca address. Please also include Chem 2271A in your e-mail subject line. I would prefer to discuss chemistry face to face (see office hours below) and would ask that you contact me by e-mail only for administrative reasons.

Lectures: M-W-F 9:30-10:30; BGS 0153

Land Acknowledgement: We acknowledge the Anishinaabek, Haudensaunee, Lūnaapéewak and Attawandaron peoples, whose land we will gather upon for the duration of this course.

Course Webpage: Students should check OWL (<http://owl.uwo.ca>) on a regular basis for news and updates or have notifications set to receive all updates. This is the primary method by which information will be disseminated to all students in the class. Missing critical information due to your failure to check OWL cannot be used as a basis for appeal.

NOTE: You will need to be registered in the course and have a UWO account to access this site.

Office Hours: Th 10:30-11:30 am, BGS 2022. If you have a course that conflicts with this time, alternate arrangements can be made.

Important Dates:

Sept 8th – First Day of Class
Week of Sept 20th – First week of Tutorials
Oct 8th – Test #1
Nov 1-5th – Fall Break
Nov 12th – Test #2
Week of Nov 29th – Last Week of Tutorials
Dec 8th – Last Day of Class
Dec 10-21 (Exact date TBA by Registrar) – Final Exam

Tutorial: All tutorials will be held in the rooms identified below. Please attend the section for which you have registered. *The sections are listed as 3 h time slots, but these will be divided into two 1.5 h sessions (A and B). You will be informed which section (A or B) that you are assigned to.* Tutorial sections will be held during the following timeslots and locations:

Wed 6 - 9 pm, PAB-150

Th 9:30 am - 12:30 pm, TC-343

Th 2:30 - 5:30 pm; UCC-59

Tutorials will take place on a weekly basis for a total of **10 sessions**. The topics covered are designed to build upon the principles discussed in the lectures.

The names of the Tutorial TAs for Chem 2271A will be provided to you at the beginning of term. Specific questions regarding the tutorial content are to be directed to your specific TA (contact details will be provided during first week). If you have general problems or issues with the tutorials, please direct your queries to Prof. Blacquiere.

Tutorial Topics

1. Lewis Structures/VSEPR (Weeks 1 and 2)
2. Periodic Trends and Valence Bond Theory (Week 3)
3. Valence Bond Theory (Week 4)
4. MO Theory of Homo- and Hetero-Diatomics (Weeks 5-7)
5. Donor-Acceptor Compounds (Week 8)
6. Solid-State Structures (Week 9)
7. Solid-State Structures and s-Block Chemistry (Week 10)

Details on Student Accessibility

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 519-661-2111 (ext 82147) for any specific question regarding an accommodation.

Electronic Devices

As a courtesy to your fellow classmates, please leave mobile devices at home or switch them to silent mode before lectures begin. If you use a laptop to take notes, please sit near the back of the classroom in order to minimize disruption to other students. The use of electronic devices (aside from a basic scientific calculator) is prohibited during quizzes, tests, and exams.

Course Attendance

Information missed during unexcused lecture absences will not be the grounds for academic appeal.

Students must attend and complete the assignments of at least 80% of tutorial sessions (8/10) to be eligible to pass the course. If acceptable accommodation is received, attendance during a different tutorial time in a given week may be considered.

Course Description

An overview of the Periodic Table, stressing 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 Group 1 and 2 compounds, with examples relevant to biology and everyday life.

General Course Outline

Chemistry 2271A will be composed of three main components: (1) Understanding the Periodic Table; (2) Structure and bonding in main group compounds as well as molecular orbital theory of simple diatomics, and structures and bonding in common solids; and (3) Chemistry of selected main group elements.

Course-Based Learning Outcomes

Upon completion of Chem 2271A, students will be able to....

- 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 based on its current form.
- Describe the scientific principles governing the structure and bonding of molecules derived from group 1, 2, and 13 elements.
- Have a solid understanding of the various models used to describe bonding in molecules and materials.
- Apply foundational knowledge to solve more complex structure and bonding questions relating to molecules derived from group 1, 2, and 13 elements.
- Work in small groups to evaluate and solve problems in a tutorial setting that are related to the potential impact chemistry may have on society, health, and the environment.

Prerequisite(s): Chemistry 1301A/B and Chemistry 1302A/B with a minimum average mark of 60%, or the former Chemistry 1100A/B and 1200B with a minimum average mark of 60%, or the former Chemistry 1050 with a minimum mark of 60%.

A Mandatory Notice from the Registrar: Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Antirequisite(s): Chemistry 2211A/B.

Required Text

Inorganic Chemistry, 5th Ed. Miessler, Fischer and Tarr

This book is available through the Bookstore as a physical book or as an eBook. Either are acceptable for this course.

https://bookstore.uwo.ca/textbook-search?campus=UWO&term=W2021A&courses%5B0%5D=001_UW/CHE2271A

NOTE: This text will also be required for Chem 2281G and Chem 3371F, thus you should expect to get substantial use out of it.

Other Reading

There are texts available in the Taylor Library, which can supplement the required text and will help you with your tutorials, bonding theory, and other aspects of the class. I recommend you have a look at these resources.

Inorganic Chemistry 4th Edition, Catherine E. Housecroft and Alan G. Sharpe Pearson, Harlow, Pearson Education Limited, 2012.

Introduction to Coordination, Solid State, and Descriptive Inorganic Chemistry, Glen E. Rodgers, McGraw-Hill Inc.

In the library

Please make every effort to use the library as much as possible. ALL of the answers are there, you just have to find them! The reference section is excellent – some books that you may be interested to look at include:

- 1 – CRC Handbook of chemistry and physics (QD 65.C4)
- 2 – Lange's handbook of chemistry (QD 65.L36)
- 3 – Handbook of inorganic chemicals (QD 155.5.P37)
- 4 – Encyclopedia of inorganic chemistry (QD 148.E53 2005)

Evaluation

Term Tests: two (@ 20% each)	40%
Tutorial	15%
Final Exam (Cumulative, date and time to be announced by Registrar)	45%

NOTE: To pass Chemistry 2271A it is necessary to obtain a passing grade on the tutorial component and the combined marks from the term tests and final examination.

Message from the Dean of Science and the Chair of Chemistry Cheating and Plagiarism

Students must write their essays and assignments in their own words! Whenever a student (or any scientist) takes an idea or passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations.

For all tests and exams, it is the policy of the Department of Chemistry that any electronic devices, i.e., cell phones, tablets, cameras, or iPod are strictly prohibited. These devices **MUST** be left either at home or with the student's bag/jacket at the front of the room and **MUST NOT** be at the test/exam desk or in the individual's pocket. Any student found with one of these prohibited devices will receive a grade of zero on the test or exam. The Department of Chemistry is not responsible for stolen/lost or broken devices.

Plagiarism and cheating is a serious academic offence and will not be tolerated. Any incidents in this regard will be reported immediately to the Department Chair for consideration of disciplinary action as noted in the Western Academic Calendar under "Scholastic Offences".

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com.

Illness and Missing Course Requirements

If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a self-reporting of absence or via the Dean's Office/Academic Counselling unit of your Home Faculty. If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in NCB 280, and can be contacted at scibmsac@uwo.ca. For further information, please consult the university's policy on academic consideration for student absences:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf

If you miss the Final Exam, contact your faculty's Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special Exam (the name given by the

university to a makeup Final Exam). You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation”, see:

http://www.registrar.uwo.ca/examinations/exam_schedule.html

How this applies to Chem 2271A

It is the policy in Chem 2271A that if you have missed an assignment/test due date, it is your responsibility to contact Professor Blacquiere and the science counsellors’ office within 48 hours AFTER the missed date or before the next lecture period where you are in attendance.

...and about the Chem 2271A late policy

Due dates/times for tutorials and quizzes will always be at the end of a tutorial/lecture session. Late tutorials/quizzes will not be accepted.

Support Services

Learning-skills counselors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling. Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help. Additional student-run support services are offered by the USC, <http://westernusc.ca/services>. The website for Registrarial Services is <http://www.registrar.uwo.ca>.

Science Student Donation Fund

This course is supported by the Science Student Donation Fund. If you are a B.Sc. or B.M.Sc. student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students’ Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing paperwork in the Faculty of Science’s Academic Counselling Office. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the chair of the department or email the Science Students’ Council at ssc@uwo.ca.

Social Media

Twitter

For those who are interested, I encourage you to get involved in the Western Chemistry community by joining us on Twitter: @westernuchem, @WorkentinChem, @Lagugne, @GilroyGroup, @RagognaGroup, @CorriganLab, @jmblacquiere, etc.

Facebook

The department also has a Facebook page, please visit the page to keep up to date with things happening in and outside of the department: <https://www.facebook.com/ChemistryatWestern>