

Chemistry 2271A – Course Outline

1. Course Information

Chemistry 2271A – Structure and Bonding in Inorganic Chemistry (Fall 2023)

Lectures: [REDACTED]

Tutorials: 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 session (A or B) to which you are assigned.* Tutorial sections will be held during the following timeslots and locations:

[REDACTED]

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.

Prerequisite(s): Chemistry 1301A/B and Chemistry 1302A/B with a minimum mark of 60% in each, *or* Chemistry 1301A/B and Integrated Science 1001X with a minimum mark of 60% in each.

Antirequisite(s): Chemistry 2211A/B.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may 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.

2. Instructor Information

Instructor: [REDACTED]

Office: [REDACTED]
[REDACTED] [REDACTED]

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.

Office Hours: Tuesday 11:30 am -12:30 pm, BGS 2022. If you have a course that conflicts with this time, alternate arrangements can be made.

3. Course Syllabus, Schedule, Delivery Mode

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 the s, p and d-block compounds, with examples relevant to biology and everyday life.

General Course Outline

Chemistry 2271A will be composed of three main components: (1) Brief review of simple bonding models, atomic structure and wave theory, and periodic trends; (2) Structure and bonding using molecular orbital theory; and (3) application of the above concepts to understand Donor-Acceptor Compounds, Transition Metal Structures, and Solid-State Structures.

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 s, d and p-block 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 s, d and p-block elements.
- Work in small groups to evaluate and solve problems in a tutorial setting.

Mode of Delivery: This course (lecture and tutorials) will be delivered in-person.

Important Dates:

Sept 6th – First Day of Class
Sept 12th – First day of Tutorials
Oct 9th – Test #1
Oct 14 – 18th – Fall Break
Nov 13th – Test #2

Week of Nov 28th – Last Week of Tutorials
Dec 6th – Last Day of Class
Dec 9-22 (Exact date TBA by Registrar) – Final Exam

Tutorial: 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 (subject to minor changes)

1. Lewis Structures, VSEPR, Periodic Trends and Valence Bond Theory
 - a. Weeks 1 (Sept 12) and 2 (Sept 19)
2. MO Theory of Homo- and Hetero-Diatomics (Weeks 3-5)
 - a. Week 3 (Sept 26), Week 4 (Oct 3), Week 5 (Oct 10)
3. Donor-Acceptor Compounds (Week 6-7)
 - a. Week 6 (Oct 24) and Week 7 (Oct 31)
4. d-Block Chemistry (Week 8)
 - a. Week 8 (Nov 7)
5. d-Block Chemistry and Solid-State Structures (Weeks 9 and 10)
 - a. Week 9 (Nov 21) and Week 10 (Nov 28)

Tutorial Quiz Dates

1. Week 2, Sept 19th
2. Week 4, Oct 3rd
3. Week 7, Oct 31st
4. Week 9, Nov 21st
5. Week 10, Nov 28th

4. Course Materials

Strongly Recommended Text

Inorganic Chemistry, 5th Ed. Miessler, Fischer and Tarr
This book is available through the Bookstore as an eBook.

NOTE: This text will also be the strongly recommended text 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)

Course OWL Site Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

All course material will be posted to OWL: <https://westernu.brightspace.com/>

If students need assistance with the course OWL site, they can seek support on the OWL BrightspaceHelp page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Technical Requirements

In the event that this course must switch to remote delivery, the following technical requirements will be needed: a stable internet connection and a computer with working microphone and webcam. Affected course content will be delivered entirely online in a synchronous mode (i.e., at the times indicated in the timetable). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

5. Methods of Evaluation

Evaluation

<i>Term Tests</i> , two (highest 20%, lowest 15%)	35%
<i>Tutorial</i> , including participation and quizzes:	15%
<i>Final Exam</i> (Cumulative, date and time to be announced by Registrar)	50%

Term Test Dates

Term test will occur *during normal class time* ([REDACTED]) in the normal lecture location ([REDACTED]) on the specified dates below.

Oct 9th – Test #1

Nov 13th – Test #2

Course Conditions:

To be eligible to pass Chemistry 2271A it is necessary to:

- Obtain a passing grade on the combined marks from the term tests and final examination.
- Attend and complete the assignments of at least 70% of tutorial sessions (7/10). This includes completion of at least 3/5 of the tutorial quizzes.
- The tutorials and quizzes are essential components of this course. You must attend and complete at least 3 out of the 5 tutorial quizzes, write at least one of the two midterm tests, and write the final exam. Students who fail to meet any of these requirements, whether excused or not, will receive a final grade of not greater than 40%, even if the calculated grade is higher. Exception: Students who, for medical or compassionate reasons, have been granted Incomplete Standing (INC grade) by the Dean's Office will be required to complete the missed work the next time the course is offered

General Information about Missed Coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request

without supporting documentation in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Examinations scheduled during official examination periods

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

Evaluation Scheme for Missed Assessments

Midterm tests are essential assessments. At least one of the two midterm tests must be written. Students who write only one midterm and are granted academic consideration will have the weight of the missed test transferred to the final exam. A student who misses both midterms, whether excused or not, will have to apply for a grade of incomplete (INC) at the Dean's Office and write the missed tests the next time the course is offered. Students who miss both midterms and do not have an INC will receive a course grade of not greater than 40%, even if the calculated grade is higher.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under [Special Examinations](#)), especially for those who miss multiple final exams within one examination period.

Essential Learning Requirements

Even when Academic Considerations are granted for missed coursework, the following are deemed essential to earn a passing grade.

- at least 7 (of 10) attended and completed tutorials or a minimum grade on the laboratory component to ensure that students demonstrate sufficient mastery of those technical skills to progress,
- Obtain a passing grade on the combined marks from the term tests and final examination.

Coursework with Assessment Flexibility

By policy, instructors may deny Academic Consideration requests for the following assessments with built-in flexibility:

Flexible Completion

Quizzes. This course has 5 quizzes (conducted during tutorial times), and the 4 quizzes with the highest marks are counted towards your final grade. Should extenuating circumstances arise, students do not need to request Academic Consideration for the first (1) missed quiz. Academic consideration requests will be denied for the first (1) missed quiz. Academic Consideration requests may be granted when students miss 2 or 3 quizzes, and these

additional (2nd and 3rd) missed quizzes will be reweighted to the other completed quizzes.
NOTE: completion of 2 or fewer quizzes means the student is not eligible to pass the course.

7. Additional Statements

Religious Accommodation

When conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence to the Academic Advising office in the Faculty of Science. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the test).

Please visit the Diversity Calendars posted on our university's EDID website for recognized religious holidays:

<https://www.edi.uwo.ca>

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

Electronic Devices

As a courtesy to your fellow classmates, please switch mobile devices to silent mode before lectures/term tests/tutorials/exams begin. We will draw several diagrams and chemical structures so note taking on paper or tablet is recommended. But, 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.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

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

Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<https://learning.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.