Western Science

Department of Chemistry

Chem 2281G
Inorganic Chemistry of the Main Group Elements
Course Outline

Course Description
Comparison of the structure and solution chemistry of the main group elements and their oxides, halides and hydrides; examples of these compounds in the world around us, with a discussion of the chemical principles involved; Molecular Orbital Theory of polyatomic molecules; metallic bonding and semiconductors.

List of Prerequisites
- Chemistry 2271A *or*
- Chemistry 2211A/B with a minimum mark of 80%

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.

Instructor: Dr. Andrew Henry
Office: CHB 310
Ahenry48@uwo.ca (only send email from your UWO account)

Laboratory TAs: Megan Hoffer
Jan Lamberink
Nils Vogeler

Office hours: Mondays 1:30-2:20 (If this time does not work for you email me and we can schedule a time to meet)

Course Webpage: OWL (https://owl.uwo.ca/portal)

Course schedule: Lectures: 3 hours per week; M W F 12:30 – 1:20
Location: NCB-117

Lab schedule: 8 x 3 hours laboratory sessions during one of the following timeslots:

Tuesday:	9:30-12:30	or	2:30-5:30	or	6:00-9:30
Wednesday:	2:30-5:30	or	6:00-9:00		
Thursday:	9:30-12:30	or	2:30-5:30		

Course-Based Learning Outcomes:
Upon completion of Chem 2281G, students will be able to:

(i) Understand and identify the symmetry elements and operations to be able to assign the correct point group of molecules
(ii) Apply the understanding of symmetry elements in molecules and operators for the construction of molecular orbitals
(iii) Interpret and predict the chemical properties of main group elements/molecules in of the bonding theories typically used to describe them.
(iv) Conduct laboratory experiments safely and evaluate the potential impact of main group chemistry
(v) Prepare logical, organized, and concise written reports describing their experimental results in the areas of the preparation and characterization of main group complexes

Important Dates

Classes begin: January 9, 2023
Reading Week: February 18 – 26, 2023
Classes end: April 10, 2023
Exam period: April 13 – 30, 2023

Methods of Evaluation

The overall course grade will be calculated as follows:

Assignments (5)	5%
Laboratories (8)	25%
Midterm Test 1 (in class – February 1)	15%
Midterm Test 2 (in class – March 1)	15%
Final Exam	40%

Conditions required to pass the course
The labs, assignments, and exams are essential components of the course. You must obtain a grade of at least 50% for the laboratory component of the course. You must submit at least 6 of the 8 labs reports, at least 3 of the 5 assignments, and write the Final Exam. Students who fail to meet any of these requirements without academic accommodation for the missed work will receive a course grade of not greater than 40%, even if the calculated grade is higher. A student who is unable to submit the required minimum number of lab reports and assignments for medical or compassionate reasons, and who wishes to complete the missed work, will need to apply for Incomplete Standing (a grade of INC) by submitting a written request to the Dean of the Faculty of Registration. If Incomplete Standing is granted, the student will be able to complete the missed items the next time the course is offered. A student who is unable to write the Final Exam must apply for permission to write a Special Final Examination (SPC Exam)

Required Text – Inorganic Chemistry, 5th Edition (Miessler, Fischer and Tarr)

This textbook was used in Chem 2271 and will be your textbook for Chem 2281. If you require a copy, this book is available for purchase at the UWO Campus Bookstore. Second hand copies are also generally available and don't forget to check the library!

Laboratory Manual – "Chem 2281G Main Group Chemistry", Laboratory Manual, Winter 2023

Laboratory Notebook (for in person labs) – **A hard covered and bound laboratory notebook** is needed for recording all data and observations in the laboratory. A partially filled one from another course will be fine. Be sure to clearly indicate where the Chem 2281 experiments begin. **Do not use a notebook for a course you are taking concurrently with 2281**.

Molecular model kit – strongly recommended.

Safety glasses and Lab coat – Are required at all times when working in the laboratory. Students who normally wear prescription glasses must wear safety glasses or goggles over their regular glasses. Full details are in your laboratory manual.

Students are responsible for checking the course OWL site (http://owl.uwo.ca) 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: http://owl.uwo.ca.

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

Late Policy for Chem 2281G – All work is subject to a late policy of 10% per day, including weekends. Work more than three days late will not receive any credit. Late policies will be waived provided students have a valid reason that is supported by the academic counsellors from their home faculty.

Lab Reports: Each lab will be given a mark out of 10, except the formal report, which will be graded out of 20. Laboratory notebooks will be evaluated (write as you go!) and a laboratory performance grade assigned by the TAs. Overall, the lab component will be marked out of 100, which will be converted to contribute to your overall mark for Chem 2281G (25% of course total).

Weight of laboratory components:

Lab performance (notebook, fluency, lab safety & responsibility)	10%
Library Lab sheet	2.5%
Symmetry Lab sheet	2.5%
Pre-labs for each experiment (6 x 2.5%)	15%
All lab reports with data sheets (5 x 10%)	50%
Carbon Quantum Dots (formal lab report)	20%
Total	100%

Report Sheets – All but one of the labs will be "written up" in a report sheet style, where the sheets are included as a component of this lab manual. Don't be afraid to fill in some of the answers as you go, if time allows. Work efficiently, don't waste your time. The 2281G lab is supposed to enhance the class, not be a class unto itself.

Pre-lab, report sheet 'write-ups' and formal lab hand in. Pre-lab: All pre-labs will be completed before you attend your lab section for an experiment. Pre-labs should include all the necessary detail as described in the lab manual. If the pre-lab is not completed before a lab, then students will not be allowed to perform the lab and a mark of zero will be assigned for that lab.

Laboratory reports are due one week after completing the experiment at the start of the next lab. For example, if you complete the silicone bouncing putty experiment on Tuesday Feb 7th then your report must be handed in by February 14th. Any document that is handed in after the due date will be subject to the Chem 2281 late penalty. Laboratory reports should generally be marked by the next lab session after you hand them in.

Formal Laboratory Write-up – You are required to write one formal laboratory report, which will be on Carbon Quantum Dots. The report must be prepared using 12 pt, Times Roman font, with 2.54 cm margins around the whole page and 1.5 line spacing. Chemical drawings are to be done using ChemDraw, which is freely available to all Western students. This software is the industry standard for preparing chemical drawings for a formal document. Formatting and document presentation will be assigned 2 of the 20 marks. The report should include all of the same things outlined above in the What to Include in your Laboratory Notebook section, however the procedure must be written out in full, not point form and in your own words.

Laboratory Schedule

Week of	Experiment	Due Week of
Jan. 23	Library Lab (in Kellogg Room of Taylor Library)	Jan. 30
Jan. 30	Symmetry Tutorial	Feb. 6
Feb. 6	Exp. 1	Feb. 13
Feb. 13	Exp. 2	Feb. 27
Reading Week		
Feb. 27	Exp. 3	Mar. 6
Mar. 6	Exp. 4	Mar. 13
Mar. 13	Exp. 5	Mar. 20
Mar. 20	Exp. 6	Mar. 27
Mar. 27	Exp. 6 (cont.)	Apr. 3

Student Absences

Students who are unable to meet their academic responsibilities due to medical or compassionate reasons may submit a request for academic consideration. For each missed piece of work, regardless of its weight in the total course grade, you must apply for such consideration by providing valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration.

Accommodation for students with disabilities
Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. In cases where a student misses a piece of work for reasons related to the disability on file with Accessible Education, the student should request accommodation by contacting Accessible Education instead of the Academic Counselling Office

For further information, please consult the University's medical illness policy at
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

The Student Medical Certificate is available at

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

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.

Specific to Chem 2281
Midterm Tests –If a test is missed for valid reasons (see process for seeking academic consideration above) the weighting will be transferred to the final examination.

Assignments – If an assignment is not handed in for a valid reason (see process for seeking academic consideration above) the weighting will be redistributed equally to the other assignments

Laboratory -If a lab is missed and academic consideration is granted, the weight of the missed lab will be redistributed to the other labs.

Final Exam–If you miss the Final Exam, please contact your faculty's Academic Counselling Office as soon as you are able to do so. 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).

Accommodation and Accessibility

Religious Accommodation
When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

https://multiculturalcalendar.com/ecal/index.php?s=c-univwo.

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.

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.

Additional student-run support services are offered by the USC, https://westernusc.ca/services/.