

# Chemistry 4481B Solid-state Inorganic Chemistry and Materials

Winter 2026

## Course Outline

### 1. Course Information

#### Course Information



#### **Prerequisite(s): Chemistry 3371F**

Unless you have either the prerequisites for this course or written special permission from the Department of Chemistry to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record. This decision may not be appealed.

### 2. Instructor Information



Students must use their Western ([@uwo.ca](mailto:@uwo.ca)) email addresses when contacting their instructors. Office hours are in-person.

### 3. Course Syllabus, Schedule, Delivery Mode

**Course Description:** The structures and bonding in inorganic solids as well as of their physical and chemical properties will be discussed. Links to practically important inorganic materials and solid-state devices will be emphasized. The course also covers synthesis methods and characterization techniques.

## Course Topics

- Introduction: why do we study solids?
- Packing and simple crystal structures
- Preparation of solid-state materials
- Characterization
  - powder X-ray diffraction
  - solid-state NMR
  - electron microscopy
  - others
- Porous materials (molecular sieves and metal-organic frameworks)
- Bonding in solids and electronic properties
- Defects and non-stoichiometry

## Learning Outcomes

- Recognize and describe the packing and crystal structures, bonding and electronic properties of inorganic solids.
- Recognize the common synthetic methods of inorganic solids and describe the characterization methods of these inorganic materials.
- Be able to discuss the relationship between the chemical characteristics and physical properties of various inorganic solids.

## 4. Course Materials

**Required Textbook:** This course has no required textbook.

There are lecture handouts

### Reading and References List:

- *Reactions and Characterization of Solid*, by Sandra E. Dann; Wiley-Interscience, 2002. QD478.D36 2002
- *Solid State Chemistry, An introduction*, by Lesley Smart and Elaine Moore, 4<sup>th</sup> edition - QD478.S53 2012 (e-book)
- *Basic solid state chemistry*, by West, Anthony R., John Wiley & Sons, 1999 QD478.W47 1999

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

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

## 5. Methods of Evaluation

## Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

- Two one-hour tests 50% (25% each)
- Handing in four assignments on time 4% (1% each)
- Final examination 46%

Two one-hour tests: Feb 11<sup>th</sup> and Mar 11<sup>th</sup> 7:00 – 8:00 pm (room TBD)

## 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://uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration\\_Sep24.pdf](https://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/](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.

## Evaluation Scheme for Missed Assessments

If you miss in-class tests and final exam due to illness or other serious circumstances and wish to be excused, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University’s medical illness policy at

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf)

The Student Medical Certificate is available at

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf)

**Assignments:** If an assignment is missed, the weighting of the assignment will be automatically transferred to the final examination. Note that you do not need to provide medical documentation or contact the Academic Counselling Office.

**One-hour Tests:** If a test is missed and academic consideration is granted, the weighting of the test will be transferred to the final examination.

**Final Exam:** If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (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” (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

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.

## 6. Additional Statements

### 6.1 Religious Accommodation

When a recognized religious holiday or observance conflicts with an examination, test, or other scheduled academic obligation, students must request accommodation via the University's Student Absence Portal (SAP). This request should identify the conflict and specify which course component(s) (e.g. test, midterm, exam) are affected.

Students are encouraged to submit the SAP request as early as possible, but no later than two weeks before any examination, or one week before any mid-term test or quiz, to allow sufficient time for adjustment.

The SAP request serves as official notification to both the course instructor and the Academic Advising Office, in accordance with University policy:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_religious.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf)

The Faculty of Science considers religious accommodations as scheduling conflicts. Instructors should provide either a make-up exam or an earlier sitting of the same exam to accommodate the student.

For more information on recognized religious holidays, please visit the Diversity Calendar posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca>

### 6.2 Academic 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](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf).

### 6.3 General Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

**Use of @uwo.ca email:** In accordance with policy, [https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](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 email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

**Requests for Relief** (formerly known as "appeals")

Policy on Request for Relief from Academic Decision:

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/requests\\_for\\_relief\\_from\\_academic\\_decisions.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf)

Procedures on Request for Relief from Academic Decision (Undergraduate):

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/undergrad\\_requests\\_for\\_relief\\_procedure.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf)

Procedures on Request for Relief from Academic Decision (Graduate):

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/graduate\\_requests\\_for\\_relief\\_procedure.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_requests_for_relief_procedure.pdf)

## 6.4 Scholastic Offences

Policy on Scholastic Offences:

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_offences.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf)

Procedures on Scholastic Offences (Undergraduate):

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/undergrad\\_scholastic\\_offence\\_procedure.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf)

Procedures on Scholastic Offences (Graduate):

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/graduate\\_scholastic\\_offence\\_procedure.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_scholastic_offence_procedure.pdf)

## Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones. **Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at your desk, on your person, or within reach during an assessment will be treated as a *scholastic offence*, even if the device is not in use.** Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

## Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations. Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**. If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

## 6.5 Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, 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 (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced GBSV (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](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](mailto: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. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at

[http://academicsupport.uwo.ca/accessible\\_education/index.html](http://academicsupport.uwo.ca/accessible_education/index.html)

Learning-skills counsellors at Learning Development and Success (<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/>.