

# Chemistry 4471A – Course Outline

## 1. Course Information

Lectures:

Prerequisite(s): Chemistry 3371F

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

, she/her

E-mail correspondence can only be considered if it is sent from your @uwo.ca address. Please also include Chem 4471A 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.

## 3. Course Syllabus, Schedule, Delivery Mode

### Course Description

This course will introduce mechanisms and applications of transition-metal catalysts. Fundamental background in structure and bonding of transition metals will lead into the properties of different ligand classes. Common reaction pathways will be covered, including their relationships to structural properties of the metal complex. Knowledge of individual reaction

steps will provide the basis to understand and postulate catalytic cycles. Common catalytic transformations and applications will be discussed.

### General Course Outline

Chemistry 4471A is composed of three main components, that are all related to transition-metal complexes: (1) Structure and Bonding; (2) Reactivity; and (3) Catalysis.

### Course-Based Learning Outcomes

*Upon completion of Chem 4471A, students will be able to....*

- Identify and explain different ligands and bonding types found in organometallic complexes that are relevant to catalysis.
- Sketch and label individual reaction steps that comprise well-known catalytic cycles.
- Justify observed catalytic performance based on known structure and bonding properties of the catalyst intermediates.

**Mode of Delivery:** This course will be delivered in-person.

### Important Dates:

Sept 5<sup>th</sup> – First Day of Class  
Sept 22<sup>nd</sup> – Assignment #1 Due  
Sept 26<sup>th</sup> – In Class Activity  
Oct 1<sup>st</sup> – Test #1 (in class)  
Oct 20<sup>th</sup>-21<sup>st</sup> – Assignment #2, Oral (Schedule TBD)  
Oct 24<sup>th</sup> – In Class Activity  
Oct 29<sup>th</sup> – Test #2 (In class)  
Nov 3<sup>rd</sup>– 7<sup>th</sup> – Reading Week  
Nov 19<sup>th</sup> & 21<sup>st</sup> – Presentations  
Nov 26<sup>th</sup> – Assignment #3 Due  
Nov 28<sup>th</sup> – In Class Activity  
Dec 8<sup>th</sup> – Last Day of Class  
Dec 11<sup>th</sup>-22<sup>nd</sup> (Exact date TBA by Registrar) – Final Exam

### 4. Course Materials

- An incomplete version of the notes will be posted on Brightspace prior to class, attendance in class is required to fill in additional information.
- There is no required text for this course.
- Many general inorganic textbooks cover aspects of transition-metal chemistry, including:
  - *Inorganic Chemistry: Principles of Structure and Reactivity*, Huheey, Keiter, Keiter, Harper Collins.
  - *Inorganic Chemistry, 4<sup>th</sup> Ed.* Housecroft and Sharpe
  - *Inorganic Chemistry* Shriver and Atkins, Freeman.
- The notes will rely heavily on books specific to transition metals and catalysis, including
  - *The Organometallic Chemistry of the Transition Metals*, Crabtree, Wiley.

- *Organotransition Metal Chemistry: From Bonding to Catalysis*, Hartwig, University Science Books.

**Course Brightspace Site** Students are responsible for checking the course site (<http://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 Brightspace: <http://westernu.brightspace.com/>

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.

### 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 at 15% each)	30%
<i>Assignments:</i> (three at 7% each)	21%
<i>Presentation</i>	7%
<i>Participation</i>	7%
<i>Final Exam</i> (Cumulative, date and time to be announced by Registrar)	35%

### Term Test Dates

Term test will occur *during normal class time (11:30 am - 12:20 pm) in the normal lecture location (ChB 115)* on the specified dates below.

Oct 1<sup>st</sup> – Test #1

Oct 29<sup>th</sup> – Test #2

### Use of Generative AI Tools

The use of generative AI tools (e.g. ChatGPT, Copilot, Gemini) are prohibited during activities, tests, and exams. Using such tools for content generation, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a scholastic offence.

### 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](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/](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 normally 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:

- Exams 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.

If the student misses the **Presentation** without academic consideration a grade of 0 (zero) on the presentation will be assigned. In addition, 1% of the participation grade will be automatically deducted. Thus, a total of 8% of the final grade will be lost if the presentation is not delivered.

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.

- 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:

#### **Deadline with a No-Late-Penalty Period**

**Assignments.** Students are expected to submit each of the 3 assignments by the deadline listed. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to 72 hours past the deadline without a late penalty. Should students submit their assessment beyond 72 hours past the deadline, a late penalty of 20% per day will be applied. Academic Consideration requests may be granted only for extenuating circumstances that started before the deadline and lasted longer than the No-Late-Penalty Period (48 or 72 hours).

### **Absences from Final Examinations**

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).

## **6. Additional Statements**

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

### **Academic Policies**

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 (formally 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)

### **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.

### **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, presentations, tests, and final examinations.

Using such tools for content generation, 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.

**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](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](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. 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)

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.