CHM 432H: Organometallic Chemistry and Catalysis
Course Syllabus: Fall 2020

I   CONTACTS

INSTRUCTOR
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Online student hours: Mondays at 10:30–11:30 AM via Bb Collaborate

II   COURSE OVERVIEW

COURSE DESCRIPTION:
This course will cover a series of topics on organometallic chemistry and catalysis, including key reactions in organometallic chemistry such as transmetalation, oxidative addition, reductive elimination, insertion, elimination, and metathesis, as well as their applications in catalytic transformations. Typical bonding modes, structures, and reactivity patterns of various types of organometallic compounds will be discussed, including compounds with σ-bound ligands, compounds with π-bound ligands, and carbene complexes.

STUDENT LEARNING OUTCOMES:
By the end of the course, successful students are expected to demonstrate:

- knowledge and understanding of important concepts in catalysis
- knowledge and understanding of the mechanistic details of key organometallic reactions
- knowledge and understanding of the synthesis and structural features of important organometallic compounds
- general knowledge and understanding of physical methods used to study organometallic compounds and reactions
- knowledge and understanding of important catalytic reactions and topical areas in the fields of organometallic chemistry and catalysis

PREREQUISITE COURSE(S):
CHM 338H (Intermediate Inorganic Chemistry)

Textbook:
Required: The Organometallic Chemistry of the Transition Metals, 6th ed., Robert H. Crabtree, John Wiley & Sons, Inc. 2014. The electronic version is available to University of Toronto students free of charge at
http://onlinelibrary.wiley.com.myaccess.library.utoronto.ca/book/10.1002/9781118788301

III   HOW THE COURSE IS ORGANIZED

Two classes each week (T and R at 11:10 am Toronto time) starting on Thursday September 10.

In a fully online course there is no in-person scheduled classroom time. Over the course of each week, you are expected to download the posted notes ahead of time and watch and take notes during the online classes, along with reading the relevant sections of the textbook. You are expected to answer problem sets and submit your answers according to the due dates, prepare your oral presentation ahead of time and present as instructed during the scheduled presentation time, and submit the final assignment according to the due date.

COURSE SCHEDULE & RELEVANT SESSIONAL DATES:

DATES	WEEK	TOPICS
Sept. 10	0	Introduction to CHM 432H and gaining familiarity with Bb Collaborate
Sept. 14 – Sept. 18	1,2	Electron Counting and Concepts in Catalysis Key Reactions in Organometallic Chemistry
Sept. 21, 11:59 pm	**Problem Set 1 Due**	
Sept. 21 – Oct. 2	3,4	Complexes of σ-Bound Ligands
Oct. 5 – Oct. 16	5,6	Complexes of π-Bound Ligands
Oct. 19, 11:59 pm	**Problem Set 2 Due**	
Oct. 19–Oct. 30	7,8	Carbene Complexes
Nov. 2–Nov. 6	9	Student Presentations during class time
Nov. 9–Nov. 13	Reading Week	No Classes
Nov. 16, 11:59 pm	**Problem Set 3 Due**	Student Presentations during class time
Nov. 16–Dec. 4	10–12	
Dec. 11	**Final Assessment Period**	**Final Assignment Due on Dec. 11 at 11:59 pm**

IV   EVALUATION/GRADING SCHEME

Problem Sets (three in total, best two) worth 20% each[1]
Oral Presentation during class time worth 30%[2]
Final Assignment (end of course) worth 30%

[1] Textbooks, journal articles, and lecture notes are the **ONLY** allowed aids. Students are expected to work independently on their own problem sets, i.e., no discussion with others by any means.

[2] The presentation topics can be chosen from a given list on a first-come first-served basis.

MARK BREAKDOWN
Problem sets: 2 × 20 % = 40% of final grade
Oral Presentation: 30 % of final grade
Final Assignment: 30 % of final grade
Total: 100%

Note: if an unexpected technical issue occurs with a university system (e.g., Quercus services, network outage) that affects availability or functionality, it may be necessary to revise the timing or weighting of the assessments.

V COURSE POLICIES

- I will respond to email within 24 hours on weekdays.

- The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

- This course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session. Course videos and materials belong to your instructor, the University, and/or other source depending on the specific facts of each situation, and are protected by copyright. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor. For questions about recording and use of videos in which you appear please contact your instructor.

- Deadlines for problem sets, and final assignment submissions are listed in the table above. Late policy: 10% per day late penalty.

- Submission methods: all problem sets are to be uploaded to Quercus.

- If you believe that an error has been made in the marking of your work please contact Prof. Song.

- If you miss classes, assignments or presentations for medical reasons please inform Prof. Song immediately by email.

VI   TECHNOLOGY REQUIREMENTS

Specific guidance from the U of T Vice-Provost, Students regarding student technology requirements is available here:
https://www.viceprovoststudents.utoronto.ca/covid-19/tech-requirements-online-learning/

Advice for students more broadly regarding online learning is available here:
https://onlinelearning.utoronto.ca/getting-ready-for-online/

This course requires the use of computers, and of course sometimes things can go wrong when using them. You are responsible for ensuring that you maintain regular backup copies of your files, use antivirus software (if using your own computer), and schedule enough time when completing an assignment to allow for delays due to technical difficulties. Computer viruses, crashed hard drives, broken printers, lost or corrupted files, incompatible file formats, and similar mishaps are common issues when using technology, and are not acceptable grounds for a deadline extension.

VII   INSTITUTIONAL POLICIES AND SUPPORT

ACADEMIC INTEGRITY

On Academic Integrity:
Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:
1. Using someone else's ideas or words without appropriate acknowledgement.
2. Submitting your own work in more than one course without the permission of the instructor.
3. Making up sources or facts.
4. Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:
1. Using or possessing unauthorized aids.
2. Looking at someone else's answers during an exam or test.

3. Misrepresenting your identity.

In academic work:
1. Falsifying institutional documents or grades.
2. Falsifying or altering any documentation required by the University.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see https://www.academicintegrity.utoronto.ca/).

Use of Turnitin

Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

COPYRIGHT

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ACCESSIBILITY NEEDS
Students with diverse learning styles and needs are welcome in this course. The University of Toronto is committed to accessibility: if you require accommodations for a disability, or have any other accessibility concerns about the course, please contact Accessibility Services as soon as possible.

ADDITIONAL SERVICES and SUPPORT
The following are some important links to help you with academic and/or technical service and support

- General student services and resources at Student Life
- Full library service through University of Toronto Libraries
- Resources on conducting online research through University Libraries Research
- Resources on academic support from the Academic Success Centre

- Learner support at the [Writing Centre](#)
- Information for [Technical Support/Quercus Support](#)