

**Faculty of Science Course Syllabus Fall 2020** (revised June 2020)**Department of Chemistry**

CHEM 4102

**Advanced Transition Metal Chemistry - 4102**

Fall 2020

**Instructor(s):** Mark Stradiotto [mark.stradiotto@dal.ca](mailto:mark.stradiotto@dal.ca)*please contact by email to arrange a virtual appointment as needed***Lectures:** *All lectures will be available asynchronously***Tutorials:** *Designated class timeslots (MWF) 12:35-1:55pm will be used for tutorial/testing (schedule to be provided at the start of term). Synchronous components will be conducted using the TEAMS software package. The course will otherwise be housed on Brightspace.*

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**Course Description***Various themes of modern transition metal chemistry are examined, including but not restricted to: fundamental structure and bonding; spectroscopic characterization methods; as well as reactivity and reaction mechanisms.***Course Prerequisites**CHEM 3103.03 (grade of C- or better)**Course Objectives/Learning Outcomes***Students, upon completion of the course, should demonstrate working knowledge pertaining to:*

- basic organometallic structure and bonding*
- fundamental reaction classes involving organometallic complexes*
- mechanistic organometallic chemistry and catalysis as per the material covered in the course*

**Course Materials***- Provided by the instructor***Course Assessment**

<b>Component</b>	<b>Weight (% of final grade)</b>	<b>Date <sup>1,2</sup></b>
<b>Quizzes</b>	<b>40% total (2% x 20 quizzes)</b>	<b>due each Thursday after the posted lecture</b>
<b>Tests</b>	<b>60% (15% x 4)</b>	<b>12:35-1:55pm (on October 7, November 6, November 18, and December 7)</b>

## Course Schedule

*Notes:*

**L#** = posted lecture number (recorded for viewing on-line, asynchronously; for each lecture an accompanying quiz will be posted for completion on Brightspace and will be due the **following Thursday, 5:00 pm**).

**'recap'** = 'live' review by Prof. Stradiotto of the previously assigned weekly lectures; answer student questions (synchronous, not recorded).

**Office hours** = 'live' with Prof. Stradiotto. Answering student questions, review problem set or other questions (synchronous, not recorded).

**TEST #** = synchronous test run during the scheduled class time. Note that there will be a specific test preparation office hours session just prior to each test.

Virtual meetings with Prof. Stradiotto are also available on request.

Attendance in the synchronous sections is highly recommended but not mandatory (no grade provided) with the exception of completing the tests in the allotted timeframe (**12:35-1:55pm on October 7, November 6, November 18, December 7**). The tests will be made available on the course website and by email from the instructor at the start of the testing time, and are to be completed during the regularly scheduled class time as indicated below. Students will hand-write answers to their test and then take photos of their hand-written answers and email these to the professor ([mark.stradiotto@dal.ca](mailto:mark.stradiotto@dal.ca)) at the end of the testing window (2:00 pm on the day of the test).

### **September**

*9 Intro discussion of syllabus, style of class, and review class schedule (not recorded)*

*11 L1,2*

*14 recap L1,2 (not recorded)*

*16 office hours (not recorded)*

*18 L3,4*

*21 recap L3,4 (not recorded)*

*23 office hours (not recorded)*

*25 L5,6*

*28 recap L5,6 (not recorded)*

*30 office hours (not recorded)*

### **October**

*2 L7,8*

*5 preparation TEST 1 office hours (not recorded)*

*7 TEST 1, Lectures 1-4*

*9 L9,10*

*12 Thanksgiving Univ Closed*

**October (continued)**

14 recap L7-10 (not recorded); no OA today  
16 L11,12  
19 recap L11,12 (not recorded)  
21 office hours (not recorded)  
23 L13,14  
26 recap L13,14 (not recorded)  
28 office hours (not recorded)  
30 L15,16

**November**

2 recap L15,16 (not recorded)  
4 preparation TEST 2 office hours (not recorded)  
6 TEST 2, Lectures 5-10  
9 Study break  
11 Study break/Remembrance day  
13 Study break  
16 preparation TEST 3 office hours (not recorded)  
18 TEST 3, Lectures 11-15  
20 L17,18  
23 recap L17,18 (not recorded)  
25 office hours (not recorded)  
27 L19,20  
30 recap L19,20 (not recorded)

**December**

2 office hours (not recorded)  
4 preparation TEST 4 office hours (not recorded)  
7 TEST 4, Lectures 16-20  
8 (no schedule, flex class - tuesday but monday schedule applies)

**Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale**

A+ (90-100)	B+ (77-79)	C+ (65-69)	D	(50-54)
A (85-89)	B (73-76)	C (60-64)	F	(<50)
A- (80-84)	B- (70-72)	C- (55-59)		

**Course Policies**

*Normally there would be no make-up opportunity for missed quizzes. Student Declaration of Absence forms should be used for missed tests. Missed tests will be made up promptly at a date that is mutually agreeable to the student and the instructor. Sick notes are not required.*

*It is expected that you complete all of the testing components (quizzes and tests) independently and not collaboratively.*

### Course Content

*The impact of organometallic transition metal chemistry on the evolution of modern synthetic chemistry practices has been profound in recent years, as evidenced by the awarding of the Nobel Prize for Chemistry in 2001, 2005, and 2010 on this topic. This advanced class seeks to develop a fundamental understanding of such chemistry, as well as to highlight fundamental and applied aspects of organometallic reactivity. As such, this advanced class in organometallic chemistry will address a range of topics including structure and bonding models, reactivity and mechanism, and applications in synthetic chemistry. Students are responsible for all material covered in the lectures, including any handouts, as well as the assigned readings. While there is no formal textbook for the course, students are encouraged to consult advanced texts covering the topics of inquiry, as well as to address the self-study problems that will be provided. Students are encouraged to review in detail the material covered in the past inorganic chemistry courses.*

***Assumed Background for this course includes ALL material covered in Chemistry 2101 and 3103, for example: polyhedral geometries and isomerism; basic molecular orbital theory; symmetry; and the basics of d-block coordination chemistry. Students should also have the main group and transition elements of the periodic table memorized (you will need it for exams, etc.).***

### Suggested Texts (especially for background reading):

“The Organometallic Chemistry of the Transition Metals” by R. H. Crabtree.

“Inorganic Chemistry (Third Edition)” by G. L. Miessler and D. A. Tarr.

**Faculty of Science Course Syllabus (Section B)**  
**Fall 2020**  
*CHEM 4102*

**University Policies and Statements**

**This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate**

**Missed or Late Academic Requirements due to Student Absence**

As per Senate decision instructors may not require medical notes of students who must miss an academic requirement, **including the final exam**, for courses offered during fall or winter 2020-21 (until April 30, 2021). Information on regular policy, including the use of the Student Declaration of Absence can be found here: [https://www.dal.ca/dept/university\\_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html](https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html).

**Academic Integrity**

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. **Information:** [https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)

**Accessibility**

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia). **Information:** [https://www.dal.ca/campus\\_life/academic-support/accessibility.html](https://www.dal.ca/campus_life/academic-support/accessibility.html)

**Student Code of Conduct**

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. **Code:** [https://www.dal.ca/dept/university\\_secretariat/policies/student-life/code-of-student-conduct.html](https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html)

**Diversity and Inclusion – Culture of Respect**

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness. **Statement:** <http://www.dal.ca/cultureofrespect.html>

**Recognition of Mi'kmaq Territory**

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) ([elders@dal.ca](mailto:elders@dal.ca)). **Information:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Important Dates** in the Academic Year (including add/drop dates)  
[https://www.dal.ca/academics/important\\_dates.html](https://www.dal.ca/academics/important_dates.html)

**University Grading Practices**

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/grading-practices-policy.html](https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html)

**Student Resources and Support****Advising**

**General Advising** [https://www.dal.ca/campus\\_life/academic-support/advising.html](https://www.dal.ca/campus_life/academic-support/advising.html)

**Science Program Advisors:** <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

**Indigenous Student Centre:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Black Students Advising Centre:** [https://www.dal.ca/campus\\_life/communities/black-student-advising.html](https://www.dal.ca/campus_life/communities/black-student-advising.html)

**International Centre:** [https://www.dal.ca/campus\\_life/international-centre/current-students.html](https://www.dal.ca/campus_life/international-centre/current-students.html)

**Academic supports**

**Library:** <https://libraries.dal.ca/>

**Writing Centre:** [https://www.dal.ca/campus\\_life/academic-support/writing-and-study-skills.html](https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html)

**Studying for Success:** [https://www.dal.ca/campus\\_life/academic-support/study-skills-and-tutoring.html](https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html)

**Copyright Office:** <https://libraries.dal.ca/services/copyright-office.html>

**Fair Dealing Guidelines** <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

**Other supports and services**

**Student Health & Wellness Centre:** [https://www.dal.ca/campus\\_life/health-and-wellness/services-support/student-health-and-wellness.html](https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html)

**Student Advocacy:** <https://dsu.ca/dsas>

**Ombudsperson:** [https://www.dal.ca/campus\\_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html](https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html)

**Safety**

**Biosafety:** <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

**Chemical Safety:** <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

**Radiation Safety:** <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

**Scent-Free Program:** <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>