Instructor(s):  Mark Stradiotto mark.stradiotto@dal.ca

Lectures:  9:35-10:25 MWF LSC-Common Area C244

Course delivery:  All lectures will be available asynchronously (on-line) and students are expected to review the material on the timeline listed below and complete associated on-line quizzes. The designated in-person lecture class timeslots (MWF, as above) will be used for deeper discussions/in-class problem sets/office hours/testing; this will not be recorded. The course will be hosted on Brightspace.

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 (in the case of students taking CHEM 4102.03)

Course Anti-requisites
CHEM 4102.03 (in the case of students taking CHEM 5102.03)

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 (there is no textbook to purchase)

Course Assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight (% of final grade)</th>
<th>Date</th>
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<tbody>
<tr>
<td>Quizzes</td>
<td>40% total (2% x 20 quizzes)</td>
<td>due each Thursday after the posted lecture</td>
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<tr>
<td>Tests</td>
<td>60% (15% x 4)</td>
<td>in-class (on October 6, November 5, November 17, and December 6)</td>
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Course Schedule

L# = posted lecture number (recorded for viewing on-line, asynchronously). For each posted lecture an accompanying quiz worth 2% of the final grade will be posted on a Friday (see below) at the same time for completion on Brightspace, and will be due the following Thursday, 5:00 pm. Please keep track of these deadlines.

‘Recap’ = face-to-face/in-class (unless otherwise mandated by the university) review/discussion with Prof. Stradiotto of the previously assigned lectures. Can also feature in-class group problem sets to develop a better understanding of the material (e.g., practice reaction mechanism, etc.)

‘Office hours’ = face-to-face/in-class (unless otherwise mandated by the university) with Prof. Stradiotto. No new material, but rather an opportunity to answer student questions. There will be no other out-of-class-time office hours made available for this course.

TEST # = face-to-face/in-class (unless otherwise mandated by the university) test run during the scheduled class time. In-class tests will be held on the following days: October 6, November 5, November 17, December 6). There is no final examination for this course.

**September**
8 Intro discussion of syllabus, style of class and review schedule
10 L1,2; office hours
13 recap L1
15 recap L2
17 L3,4; office hours
20 recap L3
22 recap L4
24 L5,6; office hours
27 recap L5
29 recap L6

**October**
1 L7,8; office hours
4 Office hours in preparation of TEST 1
6 TEST 1, Lectures 1-4
8 L9,10; office hours
11 Thanksgiving Univ Closed
13 recap L7-10
15 L11,12; office hours
18 recap L11
20 recap L12
22 L13,14; office hours
25 recap L13
27 recap L14
29 L15,16; office hours
November
1 recap L15
3 Office hours in preparation of TEST 2
5 TEST 2, Lectures 5-10
8 Study break
10 Study break
12 Study break
15 Office hours in preparation of TEST 3
17 TEST 3, Lectures 11-15
19 L17,18; office hours
22 recap L16-18
24 recap L16-18
26 L19,20 (last lecture assignments); office hours (also S. Rousseaux remote seminar 1:30pm for interested students!)
29 recap L19

December
1 recap L20
3 Office hours in preparation of TEST 4
6 TEST 4, Lectures 16-20
7 LAST CLASS - monday schedule (no scheduled content)

CHEM 4102: 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)

CHEM 5102: Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale (where a grade of at least B- must be obtained):

- **A+** (90-100)
- **B+** (77-79)
- **F** (<70)
- **A** (85-89)
- **B** (73-76)
- **A-** (80-84)
- **B-** (70-72)

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 Crabtree.
“Inorganic Chemistry” by Miessler, Fischer and Tarr.
University Policies and Statements

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

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

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

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.


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).

Information: 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

University Grading Practices
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
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
Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html
International Centre: 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
Studying for Success: 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
Student Advocacy: https://dsu.ca/dsas

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