

**Faculty of Science Course Syllabus**  
**Department of Chemistry**  
*Advanced Transition Metal Chemistry - 4102*  
*Fall 2019*

**Instructor(s):** *Mark Stradiotto*      *mark.stradiotto@dal.ca*      *Chemistry 217*

**Lectures:**      *MWF 9:35am - 10:25am*      *Chemistry 540*

**Office Hours:** *MWF 10:30-11:00 am in Chemistry 217*

**Tutorials:**      *NA*

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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

**Tests** 20% each: Three term tests (in class) on 25 Sept 2019, 21 Oct 2019, 08 Nov 2019

**Final exam** 40% (04 December 2019 – location TBA)

**Assignments** Self-study problem sets can be found in the course material that will be provided throughout the term. It is strongly recommended that students work through these problems, and related material in the suggested texts, in order to assess their progress in learning the course material. However, none of these problem sets will be graded.

### 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

*Missed tests will be made up promptly at a date that is mutually agreeable to the student and the instructor.*

### 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.

## 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](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)

**Missed or Late Academic Requirements due to Student Absence (policy)**

[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)

## 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>