

**Topics in Organic Chemistry – Organometallic Chemistry – 2756**  
**CHEM 3703 Section 1**  
**Spring Quarter, 2019**



**Instructor:** Asst. Professor Brian W. Michel

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**Office:** Seeley G. Mudd 232

**Lecture:** MWF 10:00 – 10:50 am

**Office Hours:** By appointment, stop by

**Required Text:** *Organotransition Metal Chemistry* by John F. Hartwig

**Course Objective:** In this course we will learn about important modern organometallic chemistry. While an emphasis will be placed on applications relevant to organic synthesis, we will also cover topics that are more inorganic in nature and general aspects of catalysis. This should be a very interactive class, with lots of discussions and working problems at the board.

**Problem Sets:** 100 points

**Exams:** There will be two exams worth 300 points each (one midterm and one final).

**Projects:** Each student will present a 25 minute talk (+ 5 min questions) on a topic from the recent literature regarding a new transition metal catalyzed reaction or application of an interesting reaction in a complex molecule synthesis. A minimum of 2 papers should be referenced but more is better. The background for why this is an interesting method or application should be presented based on other literature. Why is this transformation challenging? Unique? Does this application of a new method remove many steps from a previous synthesis? A proposed mechanism should be presented with experimental evidence to support it. Where might this method go from here? Critiques?

An initial topic proposal is due to me by May 15<sup>th</sup>. Please have papers and a talk outline prepared by this time so I can give you suggestions and guidance.

An *excellent* job on the project will increase your grade by a half step (i.e. B+ to A-); a *poor* job will decrease your grade by a half step (B+ to B).

**Final Grade:** Your final grade will be determined out of the 700 available points on exams and problem sets and adjusted based on your project. Additionally, everyone in the class is expected to participate in board sessions, failure to participate could negatively influence your grade. **There will be no makeup exams. If you miss an exam for any reason, that exam will be dropped and the final will count for 600 points. The final exam is not optional. I would not recommend having your entire grade determined by a single exam.**

#### **Cell Phone and Electronic Device Policy:**

While I understand that mobile devices have become integral to our lives, they are disruptive to the learning environment. Therefore, I request that all electronic devices be turned off (not muted) during class (i.e.; please don't text/facebook during class). If an emergency arises, and you need to contact the outside world during our lecture or recitation time, I request that you quietly leave the room and conduct your conversation outside. Additionally, most all of our lectures will require far too much structural drawing for effective notes to be taken on a laptop so please leave these devices off during lecture.

#### **Lecture and Testing Accommodations:**

I will make every effort to accommodate students diagnosed with a learning disability. I will do this in complete confidence. I do, however, request that any student requiring these accommodations inform me the first week of class. For further information, please see the University Disability Services' website at <http://www.du.edu/disability/dsp/index.html>.

#### **Academic Integrity:**

While I advocate collaborative learning and teamwork, I also firmly believe that each individual should maintain the highest ethical standards. As such, I support and will strictly enforce the Honor Code of the University of Denver. [www.du.edu/honorcode](http://www.du.edu/honorcode).

**Honor Code Statement.**

All members of the University of Denver are expected to uphold the values of *Integrity*, *Respect*, and *Responsibility*. These values embody the standards of conduct for students, staff, faculty, and administrators as members of the University community. These values are defined as:

*Integrity*: acting in an honest and ethical manner;

*Respect*: honoring differences in people, ideas, and opinions;

*Responsibility*: accepting ownership for one's own conduct.

**Pioneer Pledge.**

As a University of Denver Pioneer I pledge...

- to act with INTEGRITY and pursue academic excellence;
  - to RESPECT differences in people, ideas, and opinions and;
  - to accept my RESPONSIBILITY as a local and global citizen;
- Because I take pride in the University of Denver I will uphold the *Honor Code* and encourage others to follow my example.

**Topics to be covered:** Preliminary Course Schedule – Subject to Change

<b>Date</b>	<b>Topic</b>
4/1/19	No Class - ACS
4/3/19	Ligands, electron counting
4/5/19	Ligands Continued, Reaction Mechanisms
4/8/19	Reaction Mechanisms and intro to Cross Coupling
4/10/19	Board Day
4/12/19	Intro to Cross Coupling, Oxidative Addition
4/15/19	Reductive Elimination, Transmetallation
4/17/19	Cross Coupling
4/19/19	Cross Coupling
4/22/19	Migratory Insertion, Heck Reactions
4/24/19	Olefin Metathesis
4/26/19	Carbon Monoxide, Hydroformylation
4/29/19	Cycloadditions
5/1/19	Cycloadditions
5/3/19	Open day/Additional Topics
5/6/19	<b>Midterm Exam</b>
5/8/19	Exam review
5/10/19	Wacker Reactions
5/13/19	Wacker Reactions
5/15/19	Wacker Reactions – Initial proposals due
5/17/19	Gold Catalysis
5/20/19	$\pi$ -allyl chemistry
5/22/19	$\pi$ -allyl chemistry
5/24/19	Oxidative Chemistry, C-H activation
5/27/19	Memorial Day: No Class – work on projects
5/29/19	Oxidative Chemistry, C-H activation
5/31/19	Oxidative Chemistry, C-H activation
6/3/19	Memorial Day: No Class – work on projects
6/5/19	Talks
6/7/19	Talks
6/10/19	<b>Final Examination</b>

**Canvas and Class Notes:**

Slides from class and homework assignments will be posted on Canvas.