

Topics in Organic Chemistry – Organometallic Chemistry – 4380
CHEM 3703 Section 1
Spring Quarter, 2016



Instructor: Asst. Professor Brian W. Michel

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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 develop a set of exam-type questions based on a recent primary literature reference(s) that you find. This reference cannot be contained in the class notes. At a minimum, one question should focus on mechanism (drawing organometallic mechanism, proposing experiments to differentiate possibilities, etc.) and one question should be focused on an example of the synthetic utility of the given transformation(s) (used in a roadmap towards a target, etc.). If you are more interested in a discipline that is not very organic, then this can be an opportunity to relate to areas you are more interested in (disciplines are very interrelated in modern chemistry and will likely continue along this trend). The ultimate goal is for you to spend some time in the literature looking at recent progress in the field. Please provide a copy of both the problems and detailed solutions by May 25th. 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. **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.

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

Date	Topic
3/21/16	Transition metals, Ligand Types, Electron counting
3/23/16	Ligands Continued, Reaction Mechanisms
3/25/16	Reaction Mechanisms and intro to Cross Coupling
3/28/16	Intro to Cross Coupling, Oxidative Addition
3/30/16	Reductive Elimination, Transmetalation
4/1/16	Cross Coupling
4/4/15	Cross Coupling
4/6/15	Migratory Insertion, Heck Reactions
4/8/15	Open day for discussions/Catch up/Review
4/11/15	Olefin Metathesis
4/13/15	Carbon Monoxide, Hydroformylation
4/15/15	Cycloadditions
4/18/15	Cycloadditions
4/20/15	Wacker Reactions
4/22/15	Wacker Reactions
4/25/15	Midterm Exam
4/27/15	Exam review
4/29/15	Gold Catalysis
5/2/15	π -allyl chemistry
5/4/15	π -allyl chemistry
5/6/15	Oxidative Chemistry, C-H activation
5/9/15	Oxidative Chemistry, C-H activation
5/11/15	Oxidative Chemistry, C-H activation
5/13/15	Open day/Additional Topics
5/16/15	Open day/Additional Topics
5/18/15	Memorial Day: No Class – work on projects
5/20/15	Open day/Additional Topics
5/23/15	Open day/Additional Topics
5/25/15	Projects due - Open day/Additional Topics
5/27/15	Open day/Additional Topics
5/28/15	Final Examination

Canvas and Class Notes:

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