Syllabus: Chemistry 16:160:575:01 and 475:01
Spring 2021
Monday, Wednesday 10:55 AM - 12:15 PM
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2220 CCB 848-445-5232
Office Hours: Tues, Thurs. 3:00 - 4:15 pm;
(or by appt.)

Organometallic Chemistry: A survey of organotransition-metal and related chemistry with an emphasis on structure, reactivity, mechanisms and relevance to catalysis.

Required Text:

Crabtree, Robert H., The Organometallic Chemistry of the Transition Metals; John Wiley & Sons, (6th Ed.; earlier editions have generally same material, but different page numbers)

Suggested additional reading:

For more depth: Hartwig, Organotransition Metal Chemistry; University Science Books:
For background: Yamamoto, Akio; Organotransition Metal Chem; Wiley Interscience (esp. pp 1-40) or most advanced undergraduate inorganic textbook (e.g. Shriver Atkins)

The course will be organized to follow (approximately) along the lines of the text by Crabtree. After each chapter is covered in class, you are expected to read the following chapter before the corresponding class.

There will be a quiz, midterm and a final.
In addition, you will be present an organometallic chemistry paper from the literature. The paper should be from 2020 or 2021. You will be expected to present an in-depth summary of the paper *demonstrating a full in-depth understanding of the paper*. It can be a communication or full paper but long papers are discouraged. Papers must be *relevant to material covered in class* and should generally be from *JACS*, *ACS Catalysis* or *Organometallics*, but exceptions will certainly be considered. All papers must be pre-approved. The instructor will ask questions testing your understanding of the paper. Presentation time should be 30 minutes; additional time, up to another 30 minutes, should be allocated for questions. Attendance of these presentations by other students in the class is encouraged but optional.

Tests:	**TENTATIVE** Date	**Aprox. % of final grade**
Quiz #1 ("electron-counting")	Mon. Feb. 15	10
Mid-term	Thurs. March 11	25
Final	TBD	40
Paper presentation	TBD	25

Attendance is required.
Participation in class will affect your grade (only upwards!)

Homework may be assigned and collected. For your own benefit you are encouraged to do problems such as those found at the end of Crabtree's chapters.

Tests are based on lectures and handouts (not directly on the text reading, which is intended to help you to understand and to supplement the lectures).

You are responsible for reading the corresponding chapter in "Crabtree" before each class meeting.

Tentative Course Outline - Chemistry 475/575

(Each "lecture" may require more or less than one class meeting.)

Lecture		Chapter in Crabtree Text*
1,2	Fundamentals of Coordination Chemistry, 18-electron rule	1,2
3,4	Metal Alkyls and Metal Hydrides	3
5	Bond Dissociation Enthalpies	-
6	Metal Carbonyls, Cyanides, Nitrosyls, etc.	4
7	Phosphine Complexes and Substitution	4
8	Metal Olefin Complexes	5
9	Conjugated π -ligand Complexes	5
10	Oxidative Addition	6
11	Insertion Reactions	7
12	Nucleophilic, Electrophilic, Radical Attack	8
13	Homogeneous Catalysis - Hydrogenation	9
14,15	Homogeneous Catalysis - (Misc.)	9
16,17	Metal Carbenes; Polymerization	11
18-20	Spectroscopy and Characterization	10
21,22	Activation of Small Molecules - Alkanes, CO, CO_2, N_2	12

Note: Some "Lectures" may require more than one class-meeting; hence 22 lectures but 28 class meetings.

*Additional readings will be assigned occasionally.

Academic honesty You are being graded on the work you perform. Use of other graded course material from other students (past or present) is expressly forbidden. Both the lender and the borrower are subject to severe penalties. If you are confused, please ask for help. Academic honesty also applies to all exams, papers and other submitted materials in this course.

The Rutgers honor pledge will be included on all (major) assessments for you to sign: **On my honor, I have neither received nor given any unauthorized assistance on this examination/quiz/ assignment.**

(continued)

Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy. As per the policy, all suspected violations will be reported to the Office of Student

Conduct. Academic dishonesty includes (but is not limited to):

· Cheating

· Plagiarism

· Aiding others in committing a violation or allowing others to use your work

· Failure to cite sources correctly

· Fabrication

· Using another person's ideas or words without attribution–re-using a previous assignment

· Unauthorized collaboration

· Sabotaging another student's work. When in doubt, please consult the instructor

Use of external website resources such as Chegg.com or others to obtain solutions to assignments, quizzes, or exams is cheating and a violation of the University Academic Integrity policy. Cheating in the course may result in grade penalties, disciplinary sanctions or educational sanctions.

Posting assignments, quizzes or exams, to external sites without the instructor's permission may be a violation of copyright and may constitute the facilitation of dishonesty, which may result in the same penalties as plain cheating.