

Syllabus-2020 Spring: Chem 520 B. ADVANCED INORG CHEM

Instructor: Dr. Yong Yan

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Mode of Delivery: Lecture

Class Schedule: Tues. & Thurs. 12:30-1:45 pm, GMCS-327

Office Hours and Location: Tues 1:45-2:45pm, or by appointment on Tues, GMCS-213F

Textbooks:

Optional: Crabtree, Robert H. *The Organometallic Chemistry of the Transition Metals*, 6th Ed., John Wiley & Sons. *If you would like to choose a textbook, this one is suggested.*

Optional: Turro, Nicholas J. *Modern Molecular Photochemistry*. 1991 (not suggested to buy)

Other useful course materials: peer reviewed Journal papers in: *Journal of American Chemical Society*; *Inorganic Chemistry*; *Nature Materials*; *Nature Communications*

Prerequisite

Must pass Chem520A. We will be building upon the concepts from Chem 520A.

Course Description: This course is intended for Chemistry, Materials Science, Physics, and Geology majors, and is designed to prepare students for further research in Inorganic Chemistry, Materials Science, Nanotechnology, Renewable Energy or, more generally, employment in physical or materials sciences fields. The course content will include advanced concepts in structure, bonding, and chemical/physical properties of inorganic compounds, understanding of which is central to the study of all areas of chemistry. The course will rely both on the books and literatures. Not all material in the textbook will be covered and not all material covered will be found in the textbooks. Additional reading from primary literatures and literature presentations will be an integral part of this course. This course cannot be exhaustive in its coverage of organometallic chemistry but it is hoped that it will serve as a rational foundation of self-development in further studies.

Major topics will include:

- 1) Introduction to Current Inorganic Related Topics: Inorganic Materials, Renewable Energy, Catalysis, Nanotechnology, Functional Materials (length: 1 week)
- 2) Coordination Compounds/Organometallics (including Inorganic Synthesis, 18-electron rule, Oxidation state, Catalysis, Fundamental Characterizations, Survey of Various Ligand Types, basic Organometallic Reactions) (length: 7-10 week)
- 3) Solid State Inorganic Chemistry and Materials: Brief introduction of solid state chemistry and semiconductor photophysics and characterization (length: 2-3 week)
- 4) Research Frontiers and Advanced Topics in Inorganics/Organometallics Catalysis (length: 2-4 week)

Expected Outcomes:

Upon completion of Chemistry 520B, students should be able to:

- Apply knowledge obtained in this class towards problem solving and critical thinking in the field of Inorganic Chemistry.
- Master Basic inorganic chemistry concepts.
- Understand the direction of future Inorganic Research topics.
- Utilize knowledge gained from this class to perform logic thinking and utilize concepts and theories to predict the properties of common/general Inorganics/Organometallics.
- Grasp the advanced knowledge to characterize inorganic materials and organometallic molecules by physical and spectroscopic means, including UV-vis, fluorescent, and ultra-fast techniques etc.
- Develop the skill set necessary to continue on to further Inorganic Chemistry graduate Research.

Examinations and Points:

Attendance and class performance: 100 points

Presentations: 200 points

In-class quiz: 200 points

Homework: 200 points

Final Exam: 300 points

Total points: 1000 points (100%)

Grading: A: 90-100%, A-: 85-89%, B⁺: 80-85% B: 75-79% B-: 70-75% C: 60-69%, D: 50-59%, F < 50%

I will teach primarily using the Crabtree text, with occasional use of the other textbook, as well as other texts, literature works, internet videos, etc.

UNIVERSITY POLICIES

Accommodations: If you are a student with a disability and are in need of accommodations for this class, please contact Student Ability Success Center at (619) 594-6473 as soon as possible. Please know accommodations are not retroactive, and I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Ability Success Center.

Student Privacy and Intellectual Property: The [Family Educational Rights and Privacy Act](#) (FERPA) mandates the protection of student information, including contact information, grades, and graded assignments. I will use Blackboard or email to communicate with you, and I will not post grades or leave graded assignments in public places. Students will be notified at the time of an assignment if copies of student work will be retained beyond the end of the semester or used

as examples for future students or the wider public. Students maintain intellectual property rights to work products they create as part of this course unless they are formally notified otherwise.

Religious observances: According to the University Policy File, students should notify the instructors of affected courses of planned absences for religious observances by the end of the second week of classes.