CHEM 460 **Spring, 2015**

MWF 10:00–10:50 AM
LaTourette Hall (FW) 201

Lecturer: T. M. Gilbert
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Text: G. L. Miessler, P. J. Fischer, D. A. Tarr, "Inorganic Chemistry", 5th Ed, Pearson, 2014.

	Week	Chapter	Topic
1	1/12–1/16	6	Acid–Base and Donor–Acceptor Chemistry
		9	Coordination Chemistry I: Structures and Isomers
2	1/19		**No Lecture; Martin Luther King Jr Day**
	1/21–1/23	9	Coordination Chemistry I: Structures and Isomers
3	1/26–1/30	4	Symmetry and Group Theory
4	2/2–2/6	4	Symmetry and Group Theory
5	2/9–2/11	10	Coordination Chemistry II: Bonding
	2/13		**Optional Exam I**
6	2/16–2/20	10	Coordination Chemistry II: Bonding
7	2/23–2/27	11	Coordination Chemistry III: Electronic Spectra
8	3/2–3/6	11	Coordination Chemistry III: Electronic Spectra
		12	Coordination Chemistry IV: Reactions and Mechanisms
	3/9–3/13		**No Lectures; Spring Break**
9	3/16–3/18	12	Coordination Chemistry IV: Reactions and Mechanisms
	3/20		**Optional Exam II**
10	3/23–3/27	12	Coordination Chemistry IV: Reactions and Mechanisms
		13	Organometallic Chemistry
11	3/30–4/3	13	Organometallic Chemistry
12	4/6–4/10	13	Organometallic Chemistry
		14	Organometallic Reactions and Catalysis
13	4/13–4/15	14	Organometallic Reactions and Catalysis
	4/17		**Optional Exam III**
14	4/20–4/24	14	Organometallic Reactions and Catalysis
			Bioinorganic Transition Metal Chemistry
15	4/27–4/29		Bioinorganic Transition Metal Chemistry
	5/1		**No Lecture; Reading Day**
16	**Monday, 5/4, 10:00–11:50 am**		**Required Comprehensive Final Exam**

**You can obtain a copy of this syllabus and other class documents at the class BlackBoard site.

INFORMATION and POLICIES

Learning Objectives of Chem 460

– To apply physical chemistry concepts to the behavior of transition metal complexes.
– To correctly name coordination complexes from given formulae and vice-versa, recognizing isomers when present
– To use structure/formula information to determine conceptual parameters like oxidation state, *d* electron count, and acidity/basicity characteristics.
– To correctly assign point groups to given molecules, to write reducible representations of desired characteristics of molecules within the point group, To decompose reducible representations to irreducible representations, and to use the irreducible representations to isolate or image the desired characteristics.
– To understand the relationships between *d*-electron count and orbital splitting patterns to make predictions and rationalizations regarding bonding, spectroscopic issues, and magnetic issues.
– To distinguish types of mechanisms applicable to transition metal chemistry, and to understand the circumstances under which different types apply. To apply knowledge of structure, *d*-electron count, and orbital splitting patterns in distinguishing between labile and inert complexes, especially as applied to electron transfer reactions.
– To recognize transition metal organometallic compounds, and the differences between organometallic and classical transition metal chemistry. To understand and apply the 18 electron rule in considering thermodynamic stability and reactivity of complexes, particularly in catalytic processes.
– To recognize the roles that transition metals play in biochemical processes such as respiration, enzyme catalysis, and photoenergy, and as pharmaceuticals.

Attendance: Students are expected to comply with the attendance terms described in the Undergraduate Catalog: Academic Regulations: Attendance section.

Office Hours: I will hold office hours Mondays and Fridays from 1:00–1:50 PM. You are welcome to come to my office without an appointment for class assistance during these times. If you can't make it then, you may make an appointment for another time. However, since I have other responsibilities, appointments will be limited. You can contact me by e–mail to ask short, concise questions or to make appointments; however, the turnaround time will probably not be instantaneous.

Assistance with the Course Material: In addition to taking advantage of my office hours, you may ask the lab TAs for assistance with the lecture material. However, they are NOT obligated to assist you; they do so at their own prerogative. I strongly recommend you create study groups; teaching each other is often the best way to learn the material.

I will occasionally suggest homework problems, both from the text and from handouts, especially for the Symmetry and Group Theory material. These problems will not be collected or graded; you are under no obligation to do them. However, I guarantee that questions on the exams will probe your knowledge of the same concepts that the homework problems address. You should understand that the best practice for the exams is to solve **all** of the problems at the end of each chapter, even those not suggested as homework.

Academic Integrity and Dishonesty: Students are expected to comply with the academic integrity terms described in the Undergraduate Catalog: Academic Regulations: Academic Integrity section. As applied particularly to CHEM 110, academic dishonesty includes, but is not limited to, looking at or copying work from another student's exam during a testing session, allowing another student to copy work, and using unauthorized materials (e.g., lecture notes, crib sheets, textbooks, prohibited electronic devices including pagers, cell phones, headphones, or programmable calculators containing stored equations, formulas, or text) during exams. **CHEATING IN ANY FORM WILL NOT BE TOLERATED.** Violation of any of these terms will result, at minimum, in awarding a score of zero for the assignment in question. Students responsible for, or assisting others in, either cheating or plagiarism on an assignment, quiz, or examination may receive a grade of F for the course involved and may be suspended or dismissed from the university.

NIU provides an online tutorial on academic integrity. Students are encouraged to take the tutorial, at http://www.niu.edu/ai/students/.

Exams and Grades: There will be three optional examinations (100 points each) during the semester. There will also be a required comprehensive final examination (200 points). The exams will consist of variable combinations of short answer questions and problems to be solved.

There will be no makeup exams or extra credit. If you miss an exam, you change the category to which you belong in the table below. I will deal with any issues that affect your ability to take exams (such as medical problems or snow closures) on a case–by–case basis. My decision is final.

Keys for the exams will be posted on Blackboard. Requests for regrades must be made directly to me by the end of lecture one week after the scored exam is returned to you. When I regrade, I regrade the entire exam, not merely the problem in question. Therefore you may lose more points than you gain.

Overall course grades will be determined only **at the end of the semester, not before**. Your grade will be determined by the percentage of points you earn on whichever exams you take. The grading scales are:

	A	**B**	**C**	**D**	**F**
If you take only the required final:	≥ 90%	80–89.9%	70–79.9%	60–69.9%	< 60%
If you take the final + 1 exam:	≥ 87%	77–86.9%	67–76.9%	57–66.9%	< 57%
If you take the final + 2 exams:	≥ 84%	74–83.9%	64–73.9%	54–63.9%	< 54%
If you take the final + 3 exams:	≥ 80%	70–79.9%	60–69.9%	50–59.9%	< 50%

The scales may be revised very slightly downward (≤ 1%); **there will not be a curve**. In addition, the following holds: Any student scoring less than 60 out of 200 (30%) on the comprehensive final exam will receive a grade of F for the course, *regardless of that student's performance on the in–semester exams*.

Accommodations for Students with Disabilities: NIU abides by Section 504 of the Rehabilitation Act of 1973, which mandates that reasonable accommodations be provided for qualified students with disabilities. A student who believes that reasonable accommodations with respect to course work or other academic requirements may be appropriate in consideration of a disability must (1) provide the required verification of the disability to the Disabilities Resource Center, (2) meet with the DRC to determine appropriate accommodations, and (3) inform the faculty member in charge of the academic activity of the need for accommodation. Students are encouraged to inform faculty of their requests for accommodations as early as possible in the semester, but must make the requests in a timely enough manner for accommodations to be appropriately considered and reviewed by the university. If contacted by the faculty member, the staff of the DRC will provide advice about accommodations that may be indicated in the particular case. Students who make requests for reasonable accommodations are expected to follow the policies and procedures of the DRC in this process.

Students with disabilities can obtain a wide range of services, including housing, transportation, adaptation of printed materials, and advocacy with faculty and staff. Students with disabilities who need such services or want more information should contact the Disabilities Resource Center (4th floor of the University Health Services building) at 815-753-1303.