Chemistry 307

Inorganic Chemistry

Spring 2015

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Lecture: M, W and F 12:35 p.m. - 1:25 p.m.; Discussion: F, 1:40 p.m. – 2:30 pm; DU 117

Office Hours: W, 10:30 a.m. – 11:30 a.m., FH 125; other times by appointment.

Required Textbook:

Inorganic Chemistry, 6th Edition, D. Shriver, M. Weller, T. Overton, J. Rourke and F. Armstrong, ISBN-13: 978-1-4292-9906-0, W. Freeman, 2014

Recommended:

Solutions Manual to Accompany Inorganic Chemistry, 6th Edition, A.Hadzovic, ISBN-13: 978-1-4641-2438-9, W. Freeman, 2014.

Molecular Model Kit, ISBN-09648837-0-8 (2001), by Stephen Darling (see www.molecularvisions.com or www.darlingmodels.com)

Learning Outcomes: Master basic concepts in inorganic chemistry, such as structure and bonding, transition metal chemistry and organometallics, as well as obtain an appreciation for the role of metal ions in biological systems.

Course/Instructor Evaluation (IDEA): Loyola has recently switched to IDEA for instructor and course evaluations. After the withdrawal deadline (Monday, March 24th) and up to the last day of classes, students will be given the opportunity to evaluate both the instructor and the course by using an online survey. The essential IDEA objective for this course is building a sizeable knowledge base of inorganic compounds. The important IDEA objectives are: 1) learning the fundamental principles and theories that relate to inorganic compounds; and 2) learning to apply what you know from the course to solving problems.

By the end of the first week of classes, students who need special testing accommodations should give the instructor documentation that has been approved by the Services for Students with Disabilities (SSWD).

The Tutoring Center offers free small group tutoring and lab (drop-in) tutoring for Loyola students. The groups meet once a week through the end of the semester and are led by a student who has successfully completed study in the course material. To learn more or request tutoring services, visit the Tutoring Center online at www.luc.edu/tutoring

Sakai and Lecture Notes: The Instructor plans to use Sakai to distribute lecture notes and slides. The web address for this site is found at Loyola's homepage. Go to "Loyola links" and then click on "Sakai." Sakai will ask for your universal ID and password and once these have been correctly entered, Sakai will list all of those courses for which you are enrolled and for which a Sakai course exists. Chemistry 307 should be one of those courses. I will make every effort to have the materials posted on the site at least a day before the lecture so that you can print them and bring them to class. A word of foreknowledge is that the PowerPoint presentations can be quite large (on the order of megabytes) and hence, if one does not have a high-speed internet connection at home, one should consider using Loyola's computer resources to download the materials.

Grading Policy: 100 points for each of the two 50-min exams, 25 points for each of the four 15-min quizzes, and 200 points for the final exam for a grand total of 500 points. The exams will be made up of multiple-choice and short-answer questions, but only multiple-choice questions for the quizzes. The final exam will be comprehensive with 60% covering material since Exam II and the remaining 40% on the material from Exams I and II. No makeup exams or quizzes will be given. For missed exams, a **written** doctor's or judge's excuse, or a letter from a funeral director, or documentation supporting an officially-approved activity or a Medical School interview is required. The score of a missed exam or quiz will be assigned based on the average of the other exams or quizzes.

Class grades will be calculated by two separate methods. The method that generates the highest letter grade will be used.

Method 1: The mean of the total raw scores for the class will be calculated and designated as the C+/B- cutoff. One-third of the standard deviation will be added or subtracted from the mean to arrive at the remaining grades. For example, a student must be one standard deviation above the mean to obtain a grade of A-.

Method 2: Total raw scores will be used to establish class letter grades:

A = 100-85; A^- = 84-80; B^+ = 79-75; B = 74-70; B^- = 69-65; C^+ = 64-60; C = 59-55;

C^- = 54-50; D^+ = 49-45; D = 44-40; F = Less than 40

Lecture #	Date	Topic	Reading
1	1/12	Atomic Structure	Ch. 1
2	1/14	Shielding	Ch. 1
3	1/16	Atomic Properties	Ch. 1
4	1/21	Molecular shapes and VSEPR	Ch. 2.1 - 2.3
5	1/23	Symmetry Elements	Ch. 6.1
6	1/26	Point Groups	Ch. 6.1
7	1/28	Polarity	Ch. 6.3
8	1/30	Chirality	Ch. 6.4
9	02/2	VB Theory of Diatomics and Polyatomics	Ch. 2.4 – 2.6
10	02/4	MO Theory of Diatomics	Ch. 2.7 – 2.9
11	02/6	MO Theory of Polyatomics	Ch. 2.11
12	2/9	Review	
13	2/11	EXAM I (Lectures 1 – 11)	
14	2/13	Acids and Bases	Ch. 4
15	2/16	Acids and Bases	Ch. 4
16	2/18	Nomenclature of Coordination Compounds	Ch. 7.1, 7.2
17	2/20	Coordination numbers	Ch. 7.3 – 7.6
18	2/23	Isomerism of Coordination Cpds.	Ch. 7.7 – 7.11
19	2/25	Crystal Field Theory	Ch. 20.1
20	2/27	Crystal Field Theory	Ch. 20.1
21	3/9	Ligand Field Theory	Ch. 20.2
22	3/11	Ligand Field Theory	Ch. 20.2
23	3/13	Magnetochemistry	Ch. 20.8, 20.9

Lecture #	Date	Topic	Reading
24	3/16	Review	
25	3/18	EXAM II (Lectures 14 – 23)	
26	3/20	Term Symbols	Ch. 20.3
27	3/23	Electronic Spectra	Ch. 20.4–20.7
28	3/25	Electronic Spectra	Ch. 20.4-20.7
29	3/27	Substitution Reactions in O_h Complexes	Ch. 21.1,21.2,21.5-21.9
30	3/30	Substitution Reactions in D_{4h} Complexes	Ch. 21.3, 21.4
31	04/1	Electron Transfer Reactions	Ch. 21.10 – 21.12
32	04/8	The 18-electron rule	Ch. 22.1-22.4
33	04/10	Carbonyl and π-donor complexes	Ch. 22.5-22.20
34	04/13	Organometallic Rxns & Catalysis	Ch. 22.21-22.26, 25.1-2,25.4
35	4/15	Bioinorganic Chemistry	Ch. 26
36	4/17	Bioinorganic Chemistry	Ch. 26
37	4/20	Bioinorganic Chemistry	Ch. 26
38	4/22	Metals in Medicine	Ch. 27
39	4/24	Review	

The final examination will be on Fri, 5/1, 9:00 a.m. - 11:00 a.m., DH 117 (60% on Lectures 26-38; 20% on Lectures 1-11, and 20% on Lectures 14-23).

Academic Integrity: Refer to the policies on dishonest academic behavior in the Undergraduate Studies Catalogs http://www.luc.edu/media/lucedu/cas/pdfs/academicintegrity.pdf Students are advised to download and read the statement as it will be part of the governance of their efforts in the course. In addition, as pre-professional students at Loyola University Chicago, it should be obvious at this stage of your careers that all answers on examinations must arise from independent, honest efforts. Nothing less is acceptable in the Land of Lincoln. Thus, any student found cheating on any examination will receive an automatic "0" for that examination. His (her) name will be reported to Dr. Mota de Freitas, the Chairperson of the Department of Chemistry and Biochemistry, as well as to the Dean of the College of Arts and Sciences, who will decide whether further disciplinary action is necessary. We remind you that such an incident will

become part of one's personal record and may be transmitted to organizations such as medical schools, dental schools, pharmacy programs, graduate programs, etc...

Appropriate In-class Behavior and Electronic Devices: It is incumbent upon you, as a student, to maintain a professionalism and code of conduct appropriate with the course material and course enrollment. To this end, rude, disruptive behavior (such as talking during class, viewing computer materials not concerning class subjects, etc...) will not be tolerated. It is acceptable to use laptops or comparable devices (tablets, iPads, etc.) for taking notes in class. Voice recording but not visual recording is allowed. Cell phones, pagers, wireless PDAs, etc. must be turned off during class. If your device is activated during class, you must leave the class immediately and cannot return for the duration of that class period.

Error Policy: The instructor reserves the right to amend or correct this syllabus.