

Chemistry 307

Inorganic Chemistry

Spring 2014

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Lecture: M, W and F 9:20 a.m. - 10:10 a.m., FH 105

Discussion: W, 11:30 a.m. – 12:20 pm; FH 105

Office Hours: W, 10:20 a.m. – 11:20 a.m., FH 125; other times by appointment.

Required Textbook:

Basic Inorganic Chemistry, 3rd Edition, F.A. Cotton, G. Wilkinson and P.L. Gaus, ISBN 0-471-50532-3, John Wiley & Sons, Inc., 1995

Recommended: Any Molecular Model Kit, e.g., Framework Molecular Model Student Kit, Brumlik, ISBN-13: 978-0-13-330076-5, Prentice Hall. or Darling Models, Kit #1A (see www.molecularvisions.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 to bioinorganic systems.

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 that are to be 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 50-min exam, 100 points for a paper, 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. The final exam will be comprehensive with 60% covering material since Exam II and the remaining 40% will test the concepts from Exams I and II. No makeup exams or extensions for paper submissions will be given. The score for a legitimately missed assignment will be based on the prorated performance during the entire semester.

The paper will be due on the last day of classes (Friday, April 25, 2014) and should be on a bioinorganic topic of your own choosing. Good reference sources include *J. Biol. Inorg. Chem.*, *J. Inorg. Biochem.*, *Biometals*, *Biochemistry*, *Inorg. Chem.* The paper cannot exceed five pages of double-spaced text with single-column format. Use an Arial, Helvetica, Palatino Linotype, or Georgia typeface, and a font size of 12 points or larger. (A Symbol font may be used to insert Greek letters or special characters; the font size requirement still applies.) For all pages, use at least one-inch margins (top, bottom, left, and right), headers that indicate your name, and footers for page numbers. For text, use black font color but colored figures are allowed.

For missed 50-min exams or for non-submission of the paper, a **written** doctor's or judge's excuse, a letter from a funeral director, documentation supporting an officially-approved activity or a Medical School interview will be required. Otherwise, a grade of zero will be assessed for that assignment.

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...

Class grades will be calculated according to 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: The following scale of 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

<u>Lecture #</u>	<u>Date</u>	<u>Topic</u>	<u>Reading</u>
1	1/13	Syllabus, Review	Ch. 1
2	1/15	Electronic Structure	Ch. 2
3	1/17	Electronic Structure	Ch. 2
4	1/22	Electronic Structure	Ch. 2
5	1/24	Lewis Structures and Hybridization	Ch. 3
6	1/27	VSEPR and Symmetry Elements	Ch. 3/Appendix I
7	1/29	Point Groups	Appendix I
8	1/31	VB and MO models of Diatomics	Ch. 3
9	02/3	MO models of Polyatomics	Ch. 3
10	02/5	Solid State Structure	Ch. 4
11	02/7	Solid State Structure	Ch. 4
12	2/10	Review	
13	2/12	EXAM I (Lectures 1 – 11)	
14	2/14	Acids and Bases	Ch. 7
15	2/17	Acids and Bases	Ch. 7
16	2/19	Coordination Numbers and Geometries	Ch. 6

Lecture #	Date	Topic	Reading
17	2/21	Naming Coordination Compounds	Ch. 6.
18	2/24	Isomerism in Coordination Compounds	Ch. 6
19	2/26	Substitution Reactions in O _h Complexes	Ch. 6
20	2/28	Substitution Reactions in D _{4h} Complexes	Ch. 6
21	3/10	Electron Transfer Reactions	Ch. 6
22	3/12	Crystal Field Theory	Ch. 23
23	3/14	M.O. Theory of Coordination Compounds	Ch. 23
24	3/17	Magnetochemistry	Ch. 23
25	3/19	Review	
26	3/21	EXAM II (Lectures 14 – 24)	
27	3/24	Electronic Spectra	Ch. 23
28	3/26	Electronic Spectra	Ch. 23
29	3/28	Ionic Radii and the Jahn-Teller Effect	Ch. 23
30	3/31	Ligand Field Stabilization Energy	Ch. 23
31	04/2	Carbonyl complexes and analogs	Ch. 28
32	04/4	The 18-electron rule	Ch. 28
33	04/7	π -donor complexes	Ch. 29
34	04/9	Homo- and Heterogeneous Catalysis	Ch. 30
35	4/11	Bioinorganic Chemistry	Ch. 31
36	4/14	Bioinorganic Chemistry	Ch. 31
37	4/16	Bioinorganic Chemistry	Ch. 31
38	4/23	Bioinorganic Chemistry	Ch. 31
39	4/25	Review	

The final examination will be on Sat, 5/3, 1:00 p.m. - 3:00 p.m., FH 105 (60% on Lectures 27-38; 20% on Lectures 1-11, and 20% on Lectures 14-24).

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.