Chemistry 340/441

Fall 2013

Course:	Chemistry 340/441		Instructor: Prof. Jacob Ciszek
Textbook:	Housecroft and Sharpe; Inorganic Chemistry (4th ed.)		Flanner Hall 122 Phone: (773) 508-3107 E-mail: jciszek@luc.edu
Website:	Sakai (sakai.luc.edu)		
Date:	Tuesday Thursday	Tuesday	
Time:	10:00-11:15A	2:30-3:45p	
Location:	Flanner Hall 105	Mundelein 307	

Course Philosophy: The course is designed for well prepared juniors or seniors; a certain basic knowledge is expected. Fundamentals such as VESPER and Bronsted-Lowry acid/base are only covered in a precursory manner, if at all. Basic competence in physical chemistry is assumed. Chemistry 340/441 introduces the class to advanced inorganic structures including solid state systems and coordination complexes, and then develops your preexisting knowledge to allow for prediction and analysis of the spectroscopies of these systems.

We have a limited amount of days allotted to class. Thus, it is very important that the class environment is free of distractions. No laptops or other computers are allowed. Cell phone use including texting is not acceptable.

Office Hours: Office hours consist of one hour during each of the following time slots (3h total):
Tuesday and Wednesday 11:20A-12:20p, except 9/10
Thursday 1:30-2:30p, except 10/10

Academic Honesty & Discipline: Honesty is the foundation of the academic system and hence is of the utmost importance. All exam answers should be exclusively your own work and no outside materials are allowed. In the unfortunate event that a student is caught cheating, 100 points will be deducted from your total grade and you will be brought to the attention of the Department Chair and Dean of the College who will determine if further action should be taken. Full details on Loyola University's academic policy can be found at the following site: http://www.luc.edu/cas/pdfs/CAS_Academic_Integrity_Statement_December_07.pdf

Grading: You have three avenues of learning, which will prepare you for the exams (which constitute the bulk of your grade). The first is the lecture, which is obviously ungraded. The second is discussion, where preparatory problems are demonstrated. After demonstration, roughly half the class period will be spent working through similar problems, and then more challenging problems. These are collected and graded based on completion; a total of 14 discussions (10 pts each) are collected, though the points for this category (120) maxes out at 12 sessions. Thus, you may miss two discussions without impacting your grade. The third method is problem sets which are collected on five Thursdays (see schedule on next page for dates). Each set consists of 5 preparatory problems and are graded on a 0, 1, 2 scale for each problem for a total of 10 points per set. 0 points indicates the problem was not done. 1 point indicates no/incorrect work or an incorrect answer. 2 points is for correct work and a correct answer. Problem sets are posted on Sakai the Thursday before they are due.

Problem sets are good practice for exams; I suggest you treat them as such. If your exam preparation is typically done in small groups, this is acceptable for the problem set; however, I emphasize that you should not miss this opportunity to prepare, so make sure that, by the end,

you can solve these problems on your own. A typical exam will be about 25-40% more difficult than the problem sets. There are three exams, each worth 100 points, and a final (150 pts) which is cumulative.

Exams should not be missed, but in the case of hardship or debilitating illness can be made up. Under such circumstances, evidence of hardship should be presented and you and I can arrange for a makeup. This must be scheduled within one week of the original exam date.

Grading scale:

Problem Sets:	5 × 10 pts	50	A> 87%
Discussion	14 × 10 pts	120 (120 max, 2 can be missed)	B> 77%
Exams	3 × 100 pts	300	C> 67%
Final	150 pts	150	D> 57%
Total		620	

Pluses and minuses are not indicated in the grading scale but will be given. This will be done according to the natural breakdown of the grade distributions. Expect this to be the closest 1-2% to the final A-B, B-C, and C-D divisions.

Schedule (including approximate chapters/page numbers):

Theme : The basics of structure and molecular orbitals			
8/27 - 8/29	TT	Atomic orbitals, valence bond theory	Ch. 1, 2.1, 2.2
9/3 - 9/5	T[T]	Molecular orbital, VESPR	Ch. 2.3, 2.7, 2.8
9/10 - 9/12	TT	Symmetry, point groups	Ch. 3
9/17 - 9/19	T[T]	*(Valence bond)*, MO continued	*(Ch. 5-1-5.3)*, Ch. 5.4-5.7
9/24 - 9/26	**T**T	Review/**exam 1**, coordination chem.	Ch. 7.11, 19.7
Coordination chemistry: nexus of crystal field, molecular orbitals, spectroscopy and ligands			
10/1 - 10/3	TT	Coord. chem., crystal field, MO	Ch. 7.12, 7.13, 2.9, 19.8, 20.1-20.4
10/10	~~T~~[T]	Ligand field, MO, spectroscopy	Ch. 20.5-20.8, 4.7, p98-99&102
10/15 - 10/17	TT	Spectroscopy and magnetism	Ch. 2.6, 20.10, 20.11, 3.7
10/22 - 10/24	**T**T	Review/**exam 2**, ligands	Ch. 24 (except 24.3 to 24.6)
Reaction of coordination compounds: Ligand effects and catalysis			
10/29 - 10/31	TT	Ligands, structure	Ch. 24 (except 24.3 to 24.6), p647
11/5 - 11/7	T[T]	Kinetics primer, Ligand substitution	Handouts, Ch. 26
11/12 - 11/14	**T**T	Catalytic cycles, review/**exam 3**	p940-51, handouts
Solid state, surfaces, materials, and associated spectroscopy			
11/19 - 11/21	T[T]	Heterogenous catalysis, surface intro., solid state	Ch. 25.7, 6.1-6.3
11/26	T~~T~~	Solid state, band theory, conductivity	Ch. 6.4-6.12, p1040 & 1045
12/3 - 12/5	TT	Surfaces (dangling bonds, reactivity, miller indicies), characterization	Handouts, Ch 4.12, p 960, 121-125, 463-470, 966-967
12/10	**T**	Final 1p	

Exam dates are in **underlined bold**, ~~double strikethrough~~ means the university is closed, [boxed] means a problem set is due.

Other:

Calculators are generally not needed on exams and thus are not allowed during the exam session.

Any student with disabilities requiring special accommodations should provide documentation from Services for Students with Disabilities (SSWD) by the end of the first week.

The tutoring center offers free small group tutoring and lab (drop-in) tutoring for Loyola students. To learn more or request tutoring services go to: www.luc.edu/tutoring.