

Drexel University University
Inorganic Chemistry I
CHEM 421
Fall 2013 Syllabus

Instructor: Dr. Molly A. O'Connor
Email: mao23@drexel.edu

Office: Stratton 410
Phone: (215) 895-2666

CLASS SCHEDULE

Lecture:	M W F 10:00 –10:50 am	CAT 76
Office Hours:	T 3:00 – 4:00 pm W 3:00 – 4:00 pm Also available by appointment	Stratton 410 Stratton 410

COURSE OBJECTIVES

- To understand how structure and bonding influence the physical properties and reactivity of inorganic molecules.
- To be able to recognize symmetry elements in molecules and assign molecules to the appropriate point group.
- To learn several theories of bonding, the advantages and disadvantages of each theory, and which theory is most useful for each type of inorganic molecule.
- To learn how structures are determined for inorganic molecules and to learn about the thermodynamics of crystal lattice formation.
- To gain an appreciation for how inorganic chemistry influences your everyday life.

Note – CHEM 421 is the pre-requisite for CHEM 420. Junior chemistry majors follow CHEM 421 with CHEM 420 in the winter term (either the same year or the next year), with CHEM 422 and CHEM 425 taken in the spring of your Senior year.

COURSE MATERIALS

Required:

- Housecroft, C. E.; Sharpe, A. G. *Inorganic Chemistry 4th ed.*; Pearson, 2012. ISBN: 978-0-273-74275-3.
- Any molecular model kit that can build linear, trigonal planar, tetrahedral, trigonal bipyramid, and octahedral structures.

Optional:

- Housecroft and Sharpe solutions manual

Other Useful Texts:

- Vincent, A. *Molecular Symmetry & Group Theory 2nd ed.*; Wiley, 2001.
 - available as a 2-hour loan *via* Hagerty Reserves
- Atkins, et al. *Shriver & Atkins Inorganic Chemistry 5th ed.*; Freeman, 2010.
 - available as a 4-hour loan *via* Hagerty Reserves
- Lawrence, G. A. *Introduction to Coordination Chemistry*, Wiley, 2010.
 - available as a hardcopy and as an electronic resource *via* Hagerty Library
- Miessler, G. L.; Tarr, D. A. *Inorganic Chemistry 3rd ed.*; Pearson, 2004.
 - available as an overnight loan *via* Hagerty Reserves

Web: The “Drexel Learn” course website will be used extensively throughout the course. Lecture notes, course announcements, homework assignments and solutions, and exam information will be regularly posted. Emails will also be sent to your Drexel email account. Students are responsible for checking the course website and email on a regular basis.

COURSE EXPECTATIONS

Lecture: Lecture will primarily be conducted through PowerPoint lectures as well as through worked examples on the board, in-class demonstrations, and in-class activities. Lecture notes will normally be posted on the course website prior to class. Students are encouraged to print off the materials and bring them to lecture. Though lecture is the major portion of the course, students must still read the textbook. Relevant readings are listed in the syllabus.

Attendance: Although an attendance grade will not be given in this course, you are expected to attend all lectures. If you do miss class, be sure to go over the corresponding PowerPoint slides and consult a fellow classmate for any additional notes given in class. You are also expected to arrive on time and remain to the end of class. Arriving late or leaving early puts the student at a disadvantage as well as interrupts the rest of the class. If you must arrive late or leave early, please notify me beforehand.

Homework Problem Sets: Five homework sets will be assigned throughout the term. Regular work on problems is ESSENTIAL to your mastery of the topics presented in CHEM 421. You are encouraged to discuss these problems with me at our mutual convenience, as well as with your classmates, though final work turned in for grading must be your own. Due-dates for homework assignments are included in the syllabus. **Late homework assignments will not be accepted!** Assignments will be posted on the course website at least one week prior to the due date. Problem sets will be graded mostly on effort, but the instructor reserves the right to choose a few questions at random for grading based on performance. Answer keys will be posted on the course website once the assignment has been returned. Be sure to go over the key so that you learn from your mistakes prior to an exam!

Exams: There will be two one-hour exams during the semester and a 2-hour comprehensive final exam. The exam dates for the in-class exams can be found on the class schedule at the end of the syllabus. The date, time, and place of the final exam will be announced later in the term so **do not make any travel arrangements until you know your final exam schedule**. All exams, including the final, will be closed book. If you miss an in-class exam, a make-up exam will be given at the end of the term (date, time, and place of the make-up exam are TBA). You do not need an excuse to take the

make-up if you miss an in-class exam, but you *MUST* attend the make-up or receive a score of zero. You may make-up only one exam, and only because of an absence. NO MAKE-UP EXAMS WILL BE GIVEN FOR THE FINAL EXAM!

Please let me know as soon as possible if you require extended time for exams or have any additional needs. Proper paperwork is required and must be filled out through the Office of Disability Resources. Students with disabilities should see material under the “health and disability services” tab at the following link: http://drexel.edu/studentaffairs/community_standards/studentHandbook/

Electronic Devices: Students may use computers, laptops, and electronic tablets to follow along with the lecture notes. The use of computers, laptops, and electronic tablets for *any other purposes*, as well as the use of cell phones, iPods, mp3 players etc., will be **strictly prohibited** during class! If students are unable to abide by these rules, all electronic devices will be prohibited!

GRADING

Tentative grade cutoffs are shown below. The instructor reserves the right to lower some or all of the grade cutoffs.

Final Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
%	100-93	92-90	89-87	86-83	82-80	79-77	76-73	72-70	69-67	66-65	Below 65

The grading rubric for the course is as follows:

Homework	10%
In-class Exams	50%
Final Exam	40%

Academic Integrity: Discussion of lecture material and homework assignments among class members is encouraged, but all final work turned in for grading must be your own, unless otherwise explicitly stated. Academic dishonesty in any form (plagiarism, cheating, copying homework, or use of unauthorized answer keys) will not be tolerated and will result in an **AUTOMATIC ZERO** on the given assignment. Subsequent incidents of academic dishonesty will result in automatic failure of the course. For more information, see material in “academic dishonesty” under the “academic policies” tab at the following link: http://drexel.edu/studentaffairs/community_standards/studentHandbook/

Course Withdrawal: If you are registered and wish to drop or withdraw from this course, see the following link: http://www.drexel.edu/provost/policies/course_drop.asp. Also, please note the following important dates from the University registrar:

- Last day for drop/add: Friday October 4th
- Last day for withdrawal: Tuesday November 5th

TENTATIVE SCHEDULE

The instructor reserves the right to change the schedule of topics, readings, homework assignments, etc., if necessary. Appropriate advance notice will be given by in-class announcement and on the course website. The dates of in-class exams and the final exam will not change.

Week	Lecture Dates	Lecture Topics	Relevant Readings	Notes
1	M 9/23 W 9/25 F 9/27	• Electron configuration of atoms, main group ions, and transition metal cations • Electronegativity and determining oxidation states • Term and state description of metal cations	1.6 – 1.9, 19.2 1.10, 2.5 20.6	
2	M 9/30 W 10/2 F 10/4	• Lewis dot structures • Valence Bond Theory • VSEPR Theory • 18 electron rule	2.1, 2.2, 2.4, 2.8, 5.1 – 5.3, 24.3	<i>HW 1 due F 10/4</i>
3	M 10/7 W 10/9 F 10/11	• Electronegativity and the nature of elements and their binary compounds • Molecular dipole moments • Symmetry operations and symmetry elements in molecules	2.5 – 2.6 3.1 – 3.3	
4	W 10/16 F 10/18	• Assignment of molecules to point groups	3.4 – 3.6	<i>HW 2 due F 10/18</i> No Class 10/14
5	M 10/21 W 10/23 F 10/25	• Coordination number • Extended lattices	Chapter 6	Exam 1 F 10/25
6	M 10/28 W 10/30 F 11/1	• Extended lattices continued • Solid state structure and X-ray diffraction	Chapter 6 4.11	<i>HW 3 due F 11/1</i>
7	M 11/4 W 11/6 F 11/8	• Solid state structure and X-ray diffraction continued • Introduction to ionic lattices	Chapter 6 4.11	
8	M 11/11 W 11/13 F 11/15	• Ionic lattices continued – Born-Landé model, Born-Haber cycle, Kapustinskii model	Chapter 6	<i>HW 4 due F 11/15</i>
9	M 11/18 W 11/20 F 11/22	• Introduction to molecular orbital theory – homonuclear diatomics, electronic (semi)conductors	2.3, 2.7 5.4 – 5.7 6.9	Exam 2 F 11/22
10	M 11/25	• Lewis acids and bases and coordination compounds • Inorganic nomenclature	Chapter 7 Chapter 19	No Class 10/27 & 10/29
11	M 12/2 W 12/4 F 12/6	• Effects of coordination • Metal ions in solution – coordination geometries, simple isomerism, chelate effect, macrocyclic ligands, hard-soft acids and bases	Chapter 7 Chapter 19	<i>HW 5 due W 12/4</i>
12		FINAL EXAM: Date, Time, and location TBA		