

Drexel University
CHEM 421 – Inorganic Chemistry I
Fall 2015 Syllabus

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CLASS SCHEDULE

Lecture:	M W F 10:00 –10:50 am	Stratton 101
Office Hours:	Tues 1:30 – 3:30 pm	Stratton 410
	Wed 1:30 – 3:30 pm	Stratton 410
	Also available by appointment	

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.
- An online homework system called *Sapling Learning* will be used throughout the course. Each student is REQUIRED to have his or her own access code to the system. All homework assignments must be submitted through Sapling Learning! The access code will cost \$40, and can be purchase at <http://saplinglearning.com>. Please see the homework section below for further information.

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 should still read any relevant readings from the textbook.

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:

Eight problem sets will be assigned and completed through the Sapling Learning website throughout the term. Regular work on problems is *ESSENTIAL* to your mastery of the topics presented in Chem 421. The assigned problems will be posted through the Sapling Learning website. Due-dates for homework assignments are included in the syllabus. **Late homework assignments will receive a deduction of 5% per day!** Each student will have the lowest homework score dropped.

Here are the instructions for gaining access to the Sapling Learning website for our course:

1. Go to <http://saplinglearning.com> and click on your country at the top right.
- 2a. If you already have a Sapling Learning account, log in and skip to step 3.
- 2b. If you have a Facebook account, you can use it to quickly create a Sapling Learning account. Click "Create an Account", then "Create my account through Facebook". You will be prompted to log into Facebook if you aren't already. Choose a username and password, then click "Link Account". You can then skip to step 3.
- 2c. Otherwise, click "Create an Account". Supply the requested information and click "Create My Account". Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
3. Find your course in the list (you may need to expand the subject and term categories) and click the link.
4. Select a payment option and following the remaining instructions.

Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments. During sign up or throughout the term, if you have any technical problems or grading issues, send an email to support@saplinglearning.com explaining the issue. The Sapling Learning support team is almost always faster and better able to resolve issues than your instructor.

Exams:

There will be two one-hour exams during the term 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. 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!**

Americans with Disabilities Act:

Students requesting accommodations due to a disability at Drexel University need to present a current Accommodation Verification Letter (AVL) to faculty before accommodations can be made. AVL's are issued by the Office of Disability Resources (ODR). For additional information, visit the ODR website at <http://www.drexel.edu/oed/disabilityResources>, or contact the Office for more information: [215-895-1401](tel:215-895-1401) (V), or disability@drexel.edu

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.

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	15%
In-class Exams	50%
Final Exam	35%

Academic Honesty:

Drexel University is committed to a learning environment that embraces academic honesty. In order to protect members of our community from results of dishonest conduct, the University has adopted policies to deal with cases of academic dishonesty. Please read, understand, and follow the academic policies on Academic Dishonesty located at

http://www.drexel.edu/provost/policies/academic_dishonesty.asp.

Add, Drop And Withdrawal Policies:

- You can **add** this course until the end of week 2
See http://www.drexel.edu/provost/policies/course_add.asp
- If you add this course after the start of the term, you are responsible for completing ALL work that you may have missed.
- You can **drop** this course until the end of week 2; the course will then be removed from your transcript – See http://www.drexel.edu/provost/policies/course_drop.asp
- The course **withdrawal** deadline is November 6th. You will have received some graded work prior to this deadline. If you have any questions about your progress at any time of the term, please contact me. If you choose to Withdraw, a “W” will be recorded in your transcript
See http://www.drexel.edu/provost/policies/pdf/course_withdrawal.pdf

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 9/21 W 9/23	<ul style="list-style-type: none">• Electron configuration of atoms, main group ions, and transition metal cations• Electronegativity & determining oxidation state	1.6 – 1.9, 19.2, 1.10, 2.5	No Class 9/25
2	W 9/30 F 10/2	<ul style="list-style-type: none">• Term and state description of metal cations• Lewis dot structures• VSEPR Theory	20.6 2.1, 2.4, 2.8	No Class 9/28 <i>HW 1 due F 10/2</i>
3	M 10/5 W 10/7 F 10/19	<ul style="list-style-type: none">• Valence Bond Theory• 18 electron rule• Electronegativity and the nature of elements and their binary compounds	2.2, 5.1 – 5.3, 24.3 2.5 – 2.6	<i>HW 2 due F 10/9</i>
4	W 10/14 F 10/16	<ul style="list-style-type: none">• Molecular dipole moments• Extended lattices• Symmetry operations & elements in molecules	2.6, 3.1 – 3.6	No Class 10/12 <i>HW 3 due F 10/16</i>
5	M 10/19 W 10/21 F 10/23	<ul style="list-style-type: none">• Assignment of molecules to point groups• Exam 1 Review		<i>HW 4 due W 10/21</i> Exam 1 F 10/23
6	M 10/26 W 10/28 F 10/30	<ul style="list-style-type: none">• X-ray diffraction• Coordination number	4.11 Chap. 6	
7	M 11/2 W 11/4 F 11/6	<ul style="list-style-type: none">• Solid state structure• Ionic lattices – Born-Landé model, Born-Haber cycle, Kapustinskii model• Introduction to molecular orbital theory	Chap. 6	<i>HW 5 due F 11/6</i>
8	M 11/9 W 11/11 F 11/13	<ul style="list-style-type: none">• Molecular orbital theory – continued• Metals, electronic (semi)conductors, and band theory	2.3, 2.7 5.4 – 5.7 6.9	<i>HW 6 due F 11/13</i>
9	M 11/16 W 11/18 F 11/20	<ul style="list-style-type: none">• Exam 2 Review		<i>HW 7 due W 11/18</i> Exam 2 F 11/20
10	M 11/23 T 11/24	<ul style="list-style-type: none">• Lewis acids and bases and coordination compounds• Inorganic nomenclature	Chap. 7 Chap. 19	No Class 10/25 & 10/27
11	M 11/30 W 12/2 F 12/4	<ul style="list-style-type: none">• Effects of coordination• Metal ions in solution – coordination geometries, simple isomerism, chelate effect, macrocyclic ligands, hard-soft acids and bases	Chap. 7 Chap. 19	
12	M 12/7	<ul style="list-style-type: none">• Final Exam Review• FINAL EXAM: Date, Time, and location TBA		<i>HW 8 due M 12/7</i>