

Chemistry 425

Fall 2013

Instructor: Dr. Craig M. Jensen, 309B Bilger Hall

Office hours W, Th 3:00 – 5:00 PM or by appointment.

Text: *Inorganic Chemistry*, Fifth Edition, Gary L. Miessler, Paul J. Fischer, and Donald A. Tarr

Problem Sets: 10 sets worth 10 points each (100 points)

Examinations: Midterm Exam I, September 16 (100 points)

Midterm Exam II, October 9 (100 points)

Midterm Exam III, October 30 (100 points)

Final Exam, 12:00 noon, December 20 (200 points)

<u>Date</u>	<u>Lecture Topic(s)</u>	<u>Reading</u>
August	26 Symmetry	4.1
	28 Point Groups	4.2
	30 Representations of Groups	4.3.1, 4.3.2
September	2 Character Tables	4.3.3, 4.4.1
	4 Reducing Representations to Irreducible Representations	4.3.3
	6 Infrared and Raman Spectroscopy	handout
	9 Normal Mode Analysis of Molecular Vibration	4.4.2
	11 Characterization of Inorganic Compounds by Infrared Spectroscopy	13.8.1
	13 Review	
	16 Midterm I	
	18 Molecular Orbital Theory: Diatomic Molecules	5.1, 5.2, 5.3
20 Molecular Orbital Theory: Triatomic Molecules	5.4	
23 Three Center Bonding	8.5	
25 Boron Hydrides and “Hypervalent” Compounds	8.5, 15.4	
27 Group Theoretical Treatments of Molecular Orbitals I	5.4.2, 5.4.3	
30 Group Theoretical Treatments of Molecular Orbitals II	5.4.4, 5.4.6	
October	2 Group Theoretical Treatments of Molecular Orbitals III	8.5.1
	4 Group Theoretical Treatments of Molecular Orbitals IV	
	7 Review	
	9 Midterm II	
	11 Characterization of Inorganic Compounds by NMR Spectroscopy	handout
	13 ^{31}P , ^{11}B , and ^{195}Pt NMR Spectroscopy	handout

<u>Date</u>	<u>Lecture Topic(s)</u>	<u>Reading</u>
October 15	Second Order Spectra	handout
18	Rate dependent phenomena I	handout
21	Rate dependent phenomena II	handout
23	Relaxation phenomena	handout
26	Solid State NMR	handout
28	Review	
30	Midterm III	
November 2	Crystal Lattices	7.1.1
4	Ionic Solids, Lattice Energy	7.1.2, 7.2
7	Order and Disorder	handout
9	X-ray Diffraction: Bragg's Law	handout
11	Crystallography I	handout
14	Holiday	
16	Crystallography II	handout
18	Neutron Diffraction	handout
21	One and Two Dimensional Network Solids	8.6.1
23	Three Dimensional Network Solids	8.6.1, 8.6.2
25	Defects	handout
27	Ionic Conductors/Batteries	handout
30	Holiday	
December 2	Metals and Alloys	7.3
4	Band Theory	7.3
6	Semiconductors	7.3
9	Photovoltaics	handout
11	Review	