Chemistry 427
Spring 2021

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. Meisler, Paul Fischer and Donald A. Tarr

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

Examinations: Midterm Exam I, February 8 (100 points)
Midterm Exam II, March 12 (100 points)
Midterm III, April 14 (100 points)
Final Exam, 12 noon, May 14 (200 points)

Date	Lecture Topic(s)	Reading
January		
11		
13	Symmetry Elements, Point Groups	4.1, 4.2
15	Transformation Matrices, Character Tables	4.3.3
18	Holiday	
20	Group Representations	4.3.1, 4.3.2
22	Problem Set I Review, Molecular Vibrations	
25	Normal Mode Analysis of Molecular Vibrations	4.4.2
27	Stretches Only Normal Mode Analysis	4.4.2
29	Problem Set II Review	
February		
01	Infrared Spectroscopy	4.4.2
03	Raman Spectroscopy	4.4.2
05	Problem Set III Review	
08	Midterm I	
10	Midterm I Review	
12	Molecular Orbitals in Homodiatomic Molecules	5.1
15	Holiday	
17	Molecular Orbital in Hetrodiatomic Molecules	5.2, 5.3
19	Molecular Orbital in Triatomic Molecules	5.4.1
22	Problem Set IV Review	
24	Molecular Orbital Treatment of Boron Hydrides and Other Group 13 Compounds, 3-Center Bonding	8.5, 15.4

Date	Lecture Topic(s)	Reading
26	Molecular Orbital Treatment of "Hypervalent" Molecules	handout
March		
01	Molecular Orbitals in Extended Systems	handout
03	Problem Set V Reivew	
05	Group Theoretical Treatment of Molecular Orbitals I	5.4.2
08	Group Theoretical Treatments of Molecular Orbitals II	5.4.6
10	Problem Set VI Review	
12	Midterm II	
15-19	Spring Break	
22	Midterm II Review	
24	Crystal Lattices	7.1.1
26	Holiday	
29	Ionic Solids, Lattice Energy	7.1.2
31	X-ray Diffraction	handout
April		
02	Miller Indices, Powder X-ray Diffraction	handout
05	Crystal Indexing	handout
07	Single Crystal X-ray Diffraction/ Fourier Analysis	handout
09	Neutron Diffraction	handout
12	Review Problem Sets VII and VIII	
14	Midterm III	
16	Discussion Midterm III	
19	One and Two Dimensional Network Solids	8.6.1
21	Three Dimensional Network Solids	8.6.1, 8.6.17
23	Defects	handout
25	Ionic Conductors	handout
27	Metals and Alloys	7.3
29	Band Theory	7.3
30	Semiconductors	7.3
May		
02	Photovoltaics	handout
05	Problem Sets IX and X Review	