Illinois State University
Department of Chemistry
CHE 350
Advanced Inorganic Chemistry
3 credit hours

Catalog Description:
Advanced inorganic chemistry including modern bonding theories, spectroscopy, structures and reactivity of coordination, maingroup and transition-metal compounds; selected special topics. Formerly INORGANIC CHEMISTRY. Prerequisites: MAT 146; PHY 109 or 111; grade of C or better in CHE 232 and 250 required for Chemistry and Biochemistry majors.

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Materials:

Required: Access to the ReggieNet Website

Required: Shriver and Atkins, *Inorganic Chemistry* (5th edition). ISBN-13: 978-1429218207. ISBN-10: 1429218207.

Required Technology: Ability to open .pptx files (audio included); Ability to scan/photograph and upload assignments; Ability to access ReggieNet and other assigned websites

Contact Hours:
This course is a structured, self-paced course available online for 8 *(summer term)* or 16 *(fall/spring term)* weeks from the start date of the course. The course is designed for flexibility in that you can work ahead; however, there are still deadlines for assignments.

Accommodations:
Any student needing to arrange a reasonable accommodation for a documented disability should contact Student Access and Accommodation Services at 350 Fell Hall, 438-5853 (voice), 438-8620 (TTY).

Coursework Overview:

Overall, the coursework will consist of the following four components and are outlined in more detail below:

1. Post Lecture Quizzes (100 points)
2. Activities (80 points)
3. Exams (300 points)
4. Final Exam (150 points)

1. Post Lecture Quizzes

There is a short lecture quiz for each of the 31 scheduled lectures. The content of the quiz should help you evaluate your understanding of the lecture material. The quizzes are meant to be formative in nature, and as such, you will have two attempts for each quiz. The highest score for each quiz will be kept. You will be expected to work individually on the quizzes. The quizzes vary slightly in length, but are generally close to 10 questions each. Each quiz will be graded out of 10 points, with the total quiz component scaled to 100 points at the end of the course. Lecture quizzes are due in groups every two weeks, but we encourage you to work on them consistently over that time. The deadlines for the quizzes are noted below and are also posted in the ReggieNet schedule.

2. Activities

Activities are designed to allow you to explore key course topics more in-depth. There are 10 activities, with each activity worth 10 points each. Your two lowest activity scores will be dropped from the final grade. You will be able to work either individually or in pairs on the activities. Instructions for each activity are posted in the Activities section of ReggieNet, in the same location that you will submit the activity. We anticipate that each activity will take approximately 2 hours to complete. Each activity is to be printed out, completed, and either scanned or photographed and then uploaded to ReggieNet. If you work in pairs, please be sure to write your partner's name on your submission! The deadlines for the activities follow the same two week schedule as the quizzes. The deadlines for activities are noted below and are also posted in the ReggieNet schedule.

3. Exams

There will be three exams worth 100 points each over the course of the semester. Each exam covers material contained within the lectures, suggested problems, quizzes, and activities. Exams are to be done individually. The submission deadlines for exams and the material covered are noted below. Deadlines are also posted in the ReggieNet schedule.

4. Final Exam

The final exam is cumulative and is worth 150 points. The final is to be done individually. The submission deadline is noted below and is also posted in the ReggieNet schedule.

Grading Scale

The point breakdown for the course is as follows:

Post Lecture Quizzes	100 points
Activities	80 points
Exams	300 points
Final Exam	150 points
Total Points:	630 points

Letter Grades
90% or higher = A
80% to 89% = B
70% to 79% = C
60% to 69% = D
59% or lower = F

CHE 350 Online Spring 2017 - Lecture Schedule & Corresponding Textbook Readings
Textbook: Shriver & Atkins Inorganic Chemistry, 5th Edition

Date Due	#	Lecture Topic	Corresponding Textbook Chapters	Assessment(s)	Useful Printouts	Optional Suggested Text Practice Problems
Week 2 Sunday 1/29/17 11:59 pm	1	Introduction, Quantum Numbers, Orbitals, Nuclear Chemistry	Chapter 1, Section 1.1-1.5	Post Lecture 1 Quiz	Periodic Table	Pg. 32 Exercises 1.1, 1.4, 1.14, ~~1~~.9 Problems 1.7, 1.9, 1.10
	2	Orbitals, Wave Functions, Nodes	Chapter 1, Section 1.5- 1.7, 1.9	Post Lecture 2 Quiz		Pg. 32 Exercises 1.13, 1.17, 1.19
	3	Periodic Trends	Chapter 1, Section 1.9	Post Lecture 3 Quiz		Pg. 31 Exercises 1.21
	4	Lewis Structures	Chapter 2, Section 2.1	Post Lecture 4 Quiz		None – see practice problems for lecture 5 connected to this section.
	5	VSEPR Theory	Chapter 2, Section 2.3	Post Lecture 5 Quiz Activity 1: Cambridge Structural Database – VSEPR	VSEPR Chart	Pg. 62 Exercises 2.1 – 2.5
Week 4 Sunday 2/12/17 11:59 pm	6	Transition Metal Complexes	Chapter 7, Section 7.1, 7.2	Post Lecture 6 Quiz	Spectrochemical Series	Pg. 62 Exercises 7.1-7.3
	7	Transition Metal Complex Reactions	Chapter 7, Sections 7.3-7.6	Post Lecture 7 Quiz		None
	8	Transition Metal Electron Counting	Refer to: http://www.lifesci.sussex.ac.uk/research/fluorine/p5qsp3l/Teaching/chem_533/Electron_Counting_2000.pdf	Post Lecture 8 Quiz Activity 2: CC Web Search	Electron Counting Chart	None
	9	Bonding Theories in Coordination Chemistry: Valence Bond Theory	Chapter 2, Section 2.4 Chapter 6, Section 6.1 (Character Tables) Chapter 20, Section 2.1-2.8	Post Lecture 9 Quiz		Pg. 505 Exercise 20.1
Week 6 Sunday 2/26/17 11:59 pm	10	Bonding Theories in Coordination Chemistry: Crystal Field Theory	Chapter 20, Section 2.1-2.8	Post Lecture 10 Quiz		Pg. 505 Exercise 20.5
	11	Electronic Spectra of Atoms & Molecules	Chapter 20, Section 2.1-2.8	Post Lecture 11 Quiz Activity 3: Crystal Field Theory Part 1: TM Complexes	Color Wheel	Pg. 505 Exercise 20.4
	12	Term Symbols	Chapter 20, Section 20.3	Post Lecture 12 Quiz		Pg. 505 Exercises 20.10, 20.11, 2.12
	13	Coordination Chemistry Reactions & Mechanisms	Chapter 21 Section 21.1-21.15 Chapter 22 Section 22.22, 22.24	Post Lecture 13 Quiz Activity 4: Crystal Field Theory Part 2		Pg. 532 Exercises 21.14, 21.15
Week 7 Wed. 3/1/17	**EXAM 1 – Submit by Week 7 Wed March 1 at 11:59 pm**			Exam 1		

Date Due	Lecture	Topic	Corresponding Textbook Chapters	Assessment(s)	Useful Printouts	Optional Suggested Text Practice Problems
Week 8 Sunday 3/5/17 11:59 pm	14	Symmetry & Operations	Chapter 6, Resource Sections 4 & 5	Post Lecture 14 Quiz		Pg. 197 Exercises 6.1-6.5
	15	Point Groups	Chapter 6	Post Lecture 15 Quiz Activity 5: Symmetry and Point Groups	Point Group Flow Chart	Pg. 197 Exercises 6.7 Problems 6.1-6.3
	16	Character Tables	Chapter 6	Post Lecture 16 Quiz	Character Tables References	None
	17	Spectroscopy, Reducible and Irreducible Representations	Chapter 6	Post Lecture 17 Quiz		Pg. 197 Exercises 6.9-6.12
Week 10 Sunday 3/26/17 11:59 pm	18	Molecular Orbital Theory	Chapter 2	Post Lecture 18 Quiz		Pg. 63 Exercises 2.17, 2.18, 2.20
	19	Molecular Orbital Theory	Chapter 2, Chapter 6 Section 6.6	Post Lecture 19 Quiz Activity 6: Literature Analysis – Uranyl Compounds		None – see practice problems from lecture 18.
	20	Acids and Bases	Chapter 4	Post Lecture 20 Quiz		Pg. 144 Exercises 4.1-4.6, 4.14
	21	Acids and Bases	Chapter 4	Post Lecture 21 Quiz Activity 7: Introduction to Equilibrium and Aqueous Acids		Pg. 144 Exercises 4.9, 4.16, 4.22, 4.25, 4.27
Week 11 Wed. 3/29/17 11:59 pm	**EXAM 2 – Submit by Week 11 Wed March 29, 2017 at 11:59 pm**			Exam 2		

Date Due	Lecture	Topic	Corresponding Textbook Chapters	Assessment(s)	Useful Printouts	Optional Suggested Text Practice Problems
Week 12 Sunday 4/9/17 11:59 pm	22	Solid State Chemistry – Unit Cells	Chapter 3	Post Lecture 22 Quiz		Pg. 108 Exercises 3.1, 3.2, 3.8 Problems 3.1, 3.2
	23	Solid State Chemistry – Close Packing	Chapter 3, Section 3.2	Post Lecture 23 Quiz		Pg. 108 Exercise 3.3
	24	Solid State Chemistry	Chapter 3, Section 3.3-3.10	Post Lecture 24 Quiz		Pg. 108 Exercise 3.4, 3.5
	25	Solid State Chemistry	Chapter 3	Post Lecture 25 Quiz		Pg. 108 Problems 3.4, 3.5
	26	Solid State Chemistry	Chapter 3	Post Lecture 26 Quiz Activity 8: Solid State Stoichiometry		Pg. 108 Exercises 3.26, 3.27
Week 14 Sunday 4/23/17 11:59 pm	27	Oxidation Reduction	Chapter 5	Post Lecture 27 Quiz	Table of Standard Reduction Potentials	Pg. 176 Exercises 5.1, 5.2, 5.3
	28	Oxidation Reduction	Chapter 5	Post Lecture 28 Quiz		Pg. 176 Exercise 5.7
	29	Oxidation Reduction	Chapter 5	Post Lecture 29 Quiz Activity 9: Nernst Equation and Pourbaix Diagrams		Pg. 177 Exercises 5.18, 5.19
	30	Descriptive Chemistry	Chapter 15, Section 15.4 - 15.6 Chapter 11, Section 11.5	Post Lecture 30 Quiz		Pg. 396 Exercise 15.3
	31	Physical Techniques in Inorganic Chemistry	Chapter 8	Post Lecture 31 Quiz Activity 10: Literature Analysis – Solar Cells		Pg. 252 Exercise 8.1
Week 15 Wed. 5/3/17 11:59 pm	**EXAM 3 - Submit by Week 15 Wednesday May 3, 2017 11:59 pm**			Exam 3		

Final Exam – Submit by Thursday May 11, 2017 at 11:59 pm