

Prof. Daniel N. Huh

Mon/Wed/Fri 8:00am – 8:50am

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Office Hours: Wed/Thurs 11am-12pm

(or by appointment)

#### Course Syllabus

**Textbook:** *Inorganic Chemistry* 5<sup>th</sup> or 4<sup>th</sup> Edition G. L. Miessler, P. J. Fischer and D. A. Tarr

**Slack:** This course will utilize Slack to communicate class material and to ask questions. If you have not yet been added to the channel, please contact the instructor.

**(course material may be subject to change during the semester)**

#### Topics:

##### Section I

#### Chapter 2 Atomic Structure

- 2.1 Periodic Properties of Atoms

#### Chapter 3 Simple Bonding Theory

- 3.1 Lewis Electron-Dot Diagrams
- 3.2 Valence Shell Electron-Pair Repulsion Theory

#### Chapter 4 Symmetry and Group Theory

- 4.1 Symmetry Elements and Operations
- 4.2 Point Groups
- 4.3 Point Group Representations and Character Tables
- 4.4 Molecular Vibrations

##### Section II

#### Chapter 5 Molecular Orbitals

- 5.1 *s*, *p*, and *d* orbitals
- Homonuclear Diatomics
- Heteronuclear Diatomics
- Triatomics

#### Chapter 6 Acid-Base/Donor-Acceptor

- Hard-Soft Acid-Base Theory

#### Chapter 9 Coordination Chemistry

- Nomenclature
- Coordination Number (C.N.)

##### Section III

#### Chapter 10-11 Coordination Chemistry & Electronic Spectra

- Crystal Field Theory
- Ligand Field Theory
- Angular Overlap:  $\sigma$ - and  $\pi$ -bonding
- Electronic Spectra: absorption, spin-orbit coupling, selection rules

#### Chapter 12 Reactions and Mechanisms

- Dissociative, Associative, and Interchange Mechanisms
- Substitution, Oxidative Addition, Reductive Elimination

#### Chapter 13-15 Organometallic Chemistry

- Electron Counting and the Covalent Bonding Classification
- CO and Multiple Bonding

**Presentations:**

Groups will select 1 topic (TBA) and provide a 20-minute lecture. The presentation will either be presented in class or recorded and posted to the Slack channel #presentations. The instructor and all students will ask questions.

**Grading:**

Exam 1	100
Exam 2	100
Presentation	100
Final Exam	200
Problem Sets	100
In-Class Activities	75
TOTAL	675

Your score (%) on your Final Exam will replace your lowest Exam score only if this improves your overall grade. Late problem sets will not be accepted.

**Academic Honesty**

Students are expected to be honest in all academic work. A student's name on any written work, quiz or exam shall be regarded as assurance that the work is the result of the student's own independent thought and study. Work should be stated in the student's own words, properly attributed to its source. Students have an obligation to know how to quote, paraphrase, summarize, cite and reference the work of others with integrity. The following are examples of academic dishonesty.

- Using material, directly or paraphrasing, from published sources (print or electronic) without appropriate citation
- Claiming disproportionate credit for work not done independently
- Unauthorized possession or access to exams
- Unauthorized communication during exams
- Unauthorized use of another's work or preparing work for another student
- Taking an exam for another student
- Altering or attempting to alter grades
- The use of notes or electronic devices to gain an unauthorized advantage during exams
- Fabricating or falsifying facts, data or references
- Facilitating or aiding another's academic dishonesty
- Submitting the same paper for more than one course without prior approval from the instructors.

Any student with a documented disability is welcome to contact me as early in the semester as possible so that we may arrange reasonable accommodations. As part of this process, please be in touch with Disability Services for Students Office at 330 Memorial Union, 401-874-2098 (<http://www.uri.edu/disability/dss/>)

## Tentative Schedule Fall 2023

Sept 6, Wed	Introductions/Syllabus
Sept 8, Fri	Atomic Structure
Sept 11, Mon	Periodic Trends and Lewis Electron-Dot Diagrams
Sept 13, Wed	Valence Shell Electron-Pair Repulsion Theory (VSEPR)
Sept 15, Fri	Symmetry Elements and Operations
Sept 18, Mon	
Sept 20, Wed	Point Groups (in-class activity Sept 20)
Sept 22, Fri	(Assign Problem Set 1 Sept 22)
Sept 25, Mon	<i>(no class)</i>
Sept 27, Wed	Point Group Representations and Character Tables
Sept 29, Fri	
Oct 2, Mon	Molecular Vibrations (Problem Set 1 Due on Oct 2)
Oct 4, Wed	
Oct 6, Fri	Exam I
Oct 9, Mon	Columbus Day <i>(no class)</i>
Oct 11, Wed	<i>s, p, and d orbitals</i>
Oct 13, Fri	
Oct 16, Mon	Homonuclear Diatomics (in-class activity Oct 18)
Oct 18, Wed	
Oct 20, Fri	Heteronuclear Diatomics (assign Problem Set 2 on Oct 20)
Oct 23, Mon	
Oct 25, Wed	Triatomics <i>(mid semester)</i>
Oct 27, Fri	Hard-Soft Acid-Base Theory (Problem Set 2 Due on Oct 30)
Oct 30, Mon	
Nov 1, Wed	Coordination Chemistry Nomenclature
Nov 3, Fri	Exam II
Nov 6, Mon	Coordination Number (C.N.)
Nov 8, Wed	Crystal Field Theory (CFT)
Nov 10, Fri	Veteran's Day <i>(no class)</i>
Nov 13, Mon	Ligand Field Theory (LFT)
Nov 15, Wed	
Nov 17, Fri	Electronic Spectra: absorption, spin-orbit coupling, selection rules (in-class activity Nov 20)
Nov 20, Mon	
Nov 22, Wed	
Nov 23-26, Thurs-Sun	Thanksgiving Recess <i>(no class)</i>
Nov 27, Mon	Mechanisms: Dissociative, Associative, and Interchange, Substitution, Oxidative Addition, Reductive Elimination
Nov 29, Wed	Electron Counting and Covalent Bond Classification
Dec 1, Fri	
Dec 4, Mon	Catalysis
Dec 6, Wed	
Dec 8, Fri	Presentations <i>(no class – recorded presentations – see above syllabus)</i>
Dec 11, Mon	Review
Dec 13, Wed	Reading Day
Dec 20, Wed	Final Exam 8am-10am