

Dr. Edward Rajaseelan
Ext. 7395
Caputo 213
Office Hours: M & W: 8-8:50 & 11-11:50 am; T: 8-8:50 am

CHEM 452
Advanced Inorganic Chemistry

FALL 2025

Text: Inorganic Chemistry, Miessler, Fischer & Tarr (5th edition Pearson, 2014)

Chapter Topic

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| 1 | Introduction |
| 2 | Atomic Structure: Schrodinger Equation, Periodic Properties of Atoms. |
| 3 | Simple Bonding Theory: Lewis Structures, VSEPR <i>(Review CHEM 111)</i> |
| 4 | Symmetry and Group Theory: Symmetry Elements and Operations, Point Groups, Properties of Groups, Applications of Symmetry. |

EXAM 1 Chapters 1-4

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| 5 | Molecular Orbitals: Formation of M.O. from Atomic Orbitals, Homonuclear and Heteronuclear Diatomics, M.O for Larger Molecules, Photo Electron Spectroscopy |
| 6 | Acid-Base and Donor-Acceptor Chemistry <i>(Review CHEM 251)</i> |
| 7 | The Crystalline Solid State and Ionic Lattices <i>(Review CHEM 251)</i> |
| 8 | The Chemistry of the Main Group Elements <i>(Review CHEM 112 & 251)</i> |

EXAM 2 Chapters 5-8

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| 9 | Coordination Chemistry: Structures and Isomers |
| 10 | Coordination Chemistry: Bonding, Crystal Field Theory, Ligand Field Theory, The Jahn-Teller Effect. |
| 11 | Coordination Chemistry: Electronic Spectra, Selection Rules, Correlation Diagrams, Tanabe-Sugano Diagrams, Jahn-Teller Distortions, Charge-Transfer Spectra. |

EXAM 3 Chap. 9-11

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| 12 | Coordination Chemistry: Reactions and Mechanisms, Substitution in Octahedral and Square planar Complexes, Trans-Effect. |
| 13 | Organometallic Chemistry: Ligands, Nomenclature, EAN Rule, Synergistic Bonding, Spectral Analysis and Characterization. |
| 14 | Organometallic-Reactions and Catalysis: Types of Reactions, Homogeneous Catalysts, Heterogeneous Catalysts. |

EXAM 4 Chapters 12-14

COMPREHENSIVE FINAL EXAM: Thursday, Dec. 11th , 8-9:50 am(ACS)

Problem Sets:

2: 15-17, 22-24, 27-30, 38, 39, 43-45
 3: 2, 3, 5, 6, 8-12, 16, 17, 20, 39, 42, 45
 4: 1-5, 13, 20, 21, 23
 5: 2-5, 7-9, 31-35
 6: 3, 4, 25, 30, 32, 34, 39
 7: 5, 7, 18, 19, 21
 8: 2, 9, 13, 16, 22, 34, 35, 42, 45, 48
 9: 2-12
 10: 1-3, 5, 6, 18, 19, 21, 22, 23
 11: 1-3, 6-9, 11, 17, 20, 22, 27
 12: 1-4, 15, 16
 13: 1-7, 12-15, 35, 37, 39, 41-43, 48, 50
 14: 1-3, 13, 14, 22, 23

Grading:

Four Unit Exams (100 pts. each)	400
Final Exam	200
Quiz (average)	<u>200</u>
TOTAL POINTS	800

Guaranteed Letter Grades:

A	90-100%	C	70 - 74%
A-	87 - 90%	C-	67 - 70%
B+	84 - 87%	D+	64 - 67%
B	80 - 84%	D	60 - 64%
B-	77 - 80%	D-	57 - 60%
C+	74 - 77%	F	BELOW 57%

Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project.

Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred, to the person designated in the University [Protection of Minors policy](#).

Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: www.millersville.edu/titleix