

University of Arkansas – Fort Smith
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General Syllabus

CHEM 4704 Inorganic Chemistry

Credit Hours: 4

Lecture Hours: 3

Laboratory Hours: 3

Prerequisite or corequisite: CHEM 3604 Analytical Chemistry

Effective: 2018~2019

I. Course Information

A. Catalog Description

Explores group theory and symmetry, molecular structure and bonding, inorganic crystals, and mechanisms. Course is offered every other year; consult your faculty advisor.

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

Upon completion of this course, the student will be able to:

1. Assess and describe the internal structure of the atom.
2. Assess and determine molecular symmetry and vibrational modes through group theory.
3. Analyze and describe the structure and bonding in ionic solids and inorganic crystals.
4. Describe the structure bonding in molecules using valence bond theory, molecular orbital theory, and VSEPR theory.
5. Use the principles of crystal field theory to describe isomerism, reaction mechanisms and reaction kinetics of coordination compounds.

B. University Learning Outcomes

Inorganic Chemistry enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills: Students will identify a problem or issue and will research, evaluate, and compare information from varying sources in order to evaluate authority, accuracy, recency, and bias relevant to the problems/issues. Students will generate solutions/analysis of problems/issues evaluated and will assess and justify the solutions and/or analysis.

Communication Skills (written and oral)

Students will communicate proficiently. Students will compose coherent documents appropriate to the intended audience and effectively communicate orally in a public setting.

Ethical Decision Making

Students will model ethical decision-making processes. Students will identify ethical dilemmas and affected parties and will apply ethical frameworks to resolve a variety of ethical dilemmas.

Global & Cultural Perspectives

Students will reflect upon cultural differences and their implications for interacting with people from cultures other than their own. Students will demonstrate understanding or application of their discipline in a global environment and will demonstrate how their discipline impacts or is impacted by different cultures.

III. Major Course Topics

- A. Structure of the Atom
- B. Symmetry and Group Theory
- C. Ionic Bonding/Lattice Energy
- D. Covalent Bonding - Valence Bond Theory and Molecular Orbital Theory
- E. Molecular Structure
- F. Crystal Field Theory
- G. Isomerism, Chelate Effect
- H. Coordination Compound Reactions, Kinetics, and Mechanisms