

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

The course is designed to enable students to:

1. Relate theories of bonding and structure to the properties of inorganic materials.
2. Perform laboratory work safely and with care and precision.
3. Interpret laboratory results in terms of theoretical material covered in the course, and to understand the relationship between experimental and theoretical science.

METHODS:

Presentation of the course will be interrelated theory classes ("lectures"), discussion periods ("seminars"), and laboratory sessions. Audio visual aids will be used where appropriate, and students will be given instruction in the use of various instrumental techniques, and in the use of an academic library.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR (Please check:) Yes No

METHODS OF OBTAINING PLAR:

Challenge exams, including both theory and lab components

TEXTBOOKS, REFERENCES, MATERIALS:

[Textbook selection varies by instructor. An example of texts for this course might be:]

Inorganic Chemistry, 2nd Ed., Shriver, Atkins and Langford. Publisher: W.H. Freeman, ISBN 0-7167-2079-5

UCFV Laboratory Manual for Chemistry 221.

SUPPLIES / MATERIALS:

Laboratory supplies required.

STUDENT EVALUATION:

[An example of student evaluation for this course might be:]

First in-term test	20%
Second in-term test	20%
Laboratory (reports and technique)	25%
Final examination	35%

COURSE CONTENT:

[Course content varies by instructor. An example of course content might be:]

1. Theories of Atomic Structure. Introduction to wave mechanics.
2. Theories of Bonding. Application of VSEPR theory, molecular orbital theory, valence bond theory to inorganic systems.
3. The Solid State. Metals, ionic solids, covalent solids, silicates and semi-conductors. Radius Ratio rules and calculation of Lattice Energy of an Ionic Compound.
4. Chemical Properties of Main-Group Elements and their Compounds, in Relation to the Periodic Table.
5. Thermodynamic and Kinetic Effects in Main-Group Chemistry.

6. Descriptive Main-Group Chemistry.

Selected topics will concentrate on the chemistry of:

- (a) hydrogen
- (b) Group 14
- (c) Group 16
- (d) Electron-deficient compounds.
- (e) Recent advances in inorganic chemistry.

LABORATORY EXPERIMENTS 8 or 9 labs will be chosen from the following:

- Experiment 1. Preparation and Thermal Decomposition of an Electron-deficient Compound, $[\text{C}_6\text{H}_5)_3\text{P}]_2\text{CuBH}_4$.
- Experiment 2. Preparation of Tin(IV) Iodide and Two Derivatives, $[\text{Et}_4\text{N}]_2[\text{SnI}_4\text{Cl}_2]$ and $\text{SnI}_4(\text{PPh}_3)_2$.
- Experiment 3. Preparation and NMR of Tris(2,4-pentanedionato) silicon hydrogendichloride.
- Experiment 4. Preparation and Spectroscopy of Ph_4Sn and derivatives.
- Experiment 5. Infra-Red Spectroscopy of Deutero-Substituted Compounds.
- Experiment 6. Preparation of $(\text{EtOPh})_2\text{Te}$ and $(\text{EtOPh})_2\text{TeCl}_2$.
- Experiment 7. Spectroscopy (Ir, NMR, and Mass spec) of $(\text{EtOPh})_2\text{Te}$ and $(\text{EtOPh})_2\text{TeCl}_2$.
- Experiment 8. Preparation of Silicone Polymers.
- Experiment 9. Relative Stability of Tin(IV) and Lead(IV). Preparation of Ammonium Hexachlorostannate(IV) and Ammonium Hexachloroplumbate(IV).