

**Course Title: Topics in Inorganic Chemistry**

**Course Code: CH-817**

**Credit Hours: 3-0**

**Prerequisite: Nil**

### **Course Objectives**

Topics in Inorganic Chemistry course is designed to introduce students to the advanced characterization techniques of the crystalline materials and interpretation of the results before they start their research. Further, this course will introduce students to the recent research trends in the Inorganic Chemistry.

### **Course Outcomes**

The students would enable students to understand chemistry of the crystalline materials, X-rays crystallography and surface characterization techniques. Additionally, a selection of the recent topics recommended by the department will be taught.

### **Course Contents**

Properties of x-rays, crystallography, geometry of crystals, crystallographic symmetry, diffraction and experimental methods like powder XRD and applications like crystal size, crystal structure, amorphous materials, precise parameter measurements, phase diagram determination and multiphase quantitative analysis, X-ray photoelectron spectroscopy (XPS) is an advanced surface characterization technique and an important tool in materials chemistry. In this course fundamentals of XPS, role and identification of binding energies, kinetic energies, Auger electrons and their utilization in finding the oxidation states of the surface atoms will be taught. Interpretation of the XPS spectra from the literature.

Three topics from the recent trends in inorganic chemistry will be taught by the instructor after approval of HoD.

### **Recommended Books**

- 1- Principles and Applications of Powder Diffraction, Editor(s):Abraham Clearfield Ph.D., Joseph H. Reibenspies Ph.D., Nattamai Bhuvanesh Ph.D., 2009, ISBN:9781405162227.
- 2- X-Ray Photoelectron Spectroscopy: An Introduction to Principles and Practices Author(s):Paul van der Heide, 2011, ISBN:9781118062531.
- 3- Handbook of x-ray photoelectron spectroscopy : a reference book of standard spectra for identification and interpretation of XPS data, by John F. Moulder ; edited by Jill Chastain, Roger C. King, Jr, 1995, ISBN 9780964812413.
- 4- Recent literature from the journal publications.