School of Chemistry

Aims and Objectives: Session 2023-2024, Semester 1

Module CH1401: Introductory Inorganic and Physical Chemistry

Course Title: Shapes and Properties of Molecules / Chemistry of the Elements

Duration: 12 hours

Lecturer: Dr P. Kilian

Aims: To gain understanding how electronic structure of atoms affects the physical properties and reactivity of elements and simple compounds. To appreciate the differences in chemistries of main group elements from various Groups of the Periodic Table.

Objectives:

1. To understand how periodic trends in electronegativity and ionization energy determine nature of the bonding (metallic, covalent) in the solid state.
2. To understand how periodic trends in electronegativity and ionization energy determine nature (ionic, covalent) of binary compounds.
3. To understand and be able to determine oxidation numbers in compounds. To understand the concept of oxidation and reduction.
4. To know common oxidation states across the s- and p-block. To be able to predict which hydrides, oxides and halides exist.
5. To understand and know limitations of the octet rule. To know and understand how size of the central atom determines maximum coordination number in simple molecules.
6. To draw Lewis structures for simple covalent molecules and ions, and to understand and apply the VSEPR method for the prediction of molecular shape.
7. To know some main group descriptive chemistry of alkali metals, halides, oxides and hydrides. To know chemical transformations and processes involved in the manufacture of selected industrially important inorganic compounds.