FIRST SEMESTER

CH H 401: INORGANIC CHEMISTRY

COURSE OUTCOMES:
- Students will learn the basics of ionic and covalent bonding, lattice energy, hydration energy,
- This course enables the students to understand VSEPR theory and MOT theory.
- This course will Enlighten the students to understand Noble gas chemistry, Graphitic compounds, HSAB Concept,
- Theories of redox indicators and sampling techniques.

UNIT- I: **[15 Hours]**

Ionic bond: Properties of ionic substances, coordination number of an ion, structures of crystal lattices- NaCl, CsCl, ZnS and rutile. Lattice energy- Born Lande equation, Born-Haber cycle, Uses of Born-Haber type of calculations. Ionic radii, methods of determining ionic radii, factors affecting ionic radii, radius ratio rule, covalent character in ionic bonds, hydration energy and solubility of ionic solids.
Covalent bond: valence bond theory, resonance, hybridisation, Bent's rules and energetics of hybridization, Deduction of molecular shapes – VSEPR theory.
M.O.theory, application to homo- and hetero-diatomic and -triatomic molecules.

UNIT -II: **[15 Hours]**

Alkali and alkaline earth metal complexes of crown ethers, cryptands and calixarenes and their biological significance.
Halogens and Noble gas chemistry –interhalogens, psuedohalogens, polyhalide ions, oxyhalogen species, xenon oxides and fluorides. Oxy- and peroxy acids of N, P and S. Graphitic compounds, carbides, pure silicon, silica and silicates, zeolites.
HSAB concept. super acids. Reactions in non-aqueous media: Liquid ammonia, anhydrous sulphuric acid, glacial acetic acid, anhydrous HF, bromine trifluoride, liquid sulphur dioxide and dinitrogen tetroxide. Reactions in molten salts.

UNIT- III: **[15 Hours]**

Precipitation phenomena: precipitation from homogeneous solutions, organic precipitants in inorganic analysis. Solvent extraction of metal ions, nature of extractant, distribution law, partition coefficients, types of extractions and applications.
Theories of redox indicators, titration curves, feasibility of redox titrations.
Chelometric titrations- titration curves with EDTA, feasibility of EDTA titrations, indicators for chelometric titrations, selective masking and demasking techniques, industrial applications of masking.
Sampling techniques, preparation of samples for analysis. Nature of errors, statistical treatment of errors, the t- and F-tests, significant figures, rejection of data.