Syllabus
M.Sc. (Chemistry) Programme
(SEMESTER – II)

Inorganic Chemistry – II
Programme Code- (MSCCH -21)
Course Code – (MSCCH -506)

Block I: Reaction Mechanism
Unit 1: Reaction Mechanism of Transition Metal Complexes - I

Energy profile of a reaction, reativity of metal complexes, inert and labile complexes, A, D and I mechanisms for metal complexes, kinetics of octahedral substitution, acid hydrolysis, factors affecting acid hydrolysis, base hydrolysis, conjugate base mechanism, direct and indirect evidences in favour of conjugate mechanism, anation reactions, reactions without metal ligand bond cleavage.

Unit 2: Reaction Mechanism of Transition Metal Complexes - II

Substitution reactions in square planar complexes, the trans effect, mechanism of the substitution reactions. Redox reaction, electron transfer reactions, mechanism of one electron transfer reactions, outer sphere type reactions, cross reactions and Marcus-Hush theory, inner sphere type reactions.

Block II Electronic Spectra
Unit 3: Metal-Ligand Bonding

Limitation of crystal field theory, molecular orbital theory, octahedral, tetrahedral and square planar complexes, Jahn Teller effect, pi-bonding and molecular orbital theory, spectrochemical series, low spin and high spin complexes, crystal field stabilization energy, spectrochemical series, weak and strong field complexes, thermodynamic and related aspects of crystal fields, ionic radii, heats of ligation, lattice energies, site preference energies.

Unit 4: Electronic Spectra of Transition Metal Complexes

Spectroscopic ground states, correlation. Orgel and Tanabe-Sugano diagrams for transition metal complexes (d^1-d^9 states), calculations of Racah parameters, charge transfer spectra, spectroscopic

method of assignment of absolute configuration in optically active metal chelates and their stereochemical information, Inter-valence, Charge- transfer spectra, R-S coupling of d^n system.

Unit 5: Magnetic Properties of Transition Metals

Origin of magnetic moment, Spin contribution, Orbital Contribution, Derivation of Van Vleck equation, Methods for magnetic susceptibility measurements, Ferromagnetism and Antiferromagnetism, mechanism of anti-ferromagnetic interaction, spin cross over and anomalous magnetic moments. Applications of magnetic measurement for structural elucidation.