

## CHN – 704 (A) Organometallic Chemistry

### Organotransition Metal Chemistry

60 Hrs (2 Hrs/week)

#### I Alkyls and Aryls of Transition Metals

5 Hrs

Types, routes of synthesis, stability and decomposition pathways, organocopper in organic synthesis

#### II Compounds of Transition Metal-Carbon Multiple Bonds

12 Hrs

Alkylidenes, alkylidynes, low valent carbenes and carbynes- synthesis, nature of bond, structural characteristics, nucleophilic and electrophilic reactions on the ligands, role in organic synthesis

#### III Transition Metal $\pi$ -Complexes

18 Hrs

Transition metal  $\pi$ -complexes with unsaturated organic molecules, alkenes, alkynes, allyl, diene, dienyl, arene and trienyl complexes, preparations, properties, nature of bonding and structural features. Important reactions relating to nucleophilic and electrophilic attack on ligands and to organic synthesis

#### IV Transition Metal Compounds with Bonds to Hydrogen

3 Hrs

Transition metal compounds with bonds to hydrogen.

#### V Homogeneous Catalysis

14 Hrs

Stoichiometric reactions for catalysis, homogeneous catalytic hydrogenation, Zeigler-Natta polymerization of olefins, catalytic reactions involving carbon monoxide such as hydrocarbonylation of olefins (oxo reaction), oxopalladation reactions, activation of C-H bond.

#### VI Fluxional Organometallic Compounds

8 Hrs

Fluxionality and dynamic equilibria in compounds such as  $\eta^2$ -olefin,  $\eta^3$ -allyl and dienyl complexes

### Books Suggested

- 1 Principles and Application of Organotransition Metal Chemistry, J.P. Collman, L.S. Hegsdus, J.R. Norton and R.G. Finke, University Science Books.
- 2 The Organometallic Chemistry of the Transition Metals, R.H. Crabtree, John Wiley
- 3 Metallo-organic Chemistry, A.J. Pearson, Wiley.
- 4 Organometallic Chemistry, R.C. Mehrotra and A. Singh, New Age International