302002 – ADVANCED INORGANIC CHEMISTRY II

CREDITS: 04 (four) – 60 hours/class

CONTENT:

Synthesis of Organometallic Complexes. Experimental Techniques in Organometallic Chemistry. Fundamental Processes in Organometallic Reactions. Applications of Organometallic in Catalysis.

SYLLABUS:

1. Synthesis of organometallic complexes:
   - Preparation of metal alkyls.
   - Preparation of olefinic and related compounds containing M-C bond.
   - Preparation of metallocenes.
   - Preparation of metal carbonyls.
2. Experimental techniques in organometallic chemistry:
   - Manipulation of air-sensitive compounds using Schlenk glassware.
   - Characterization of organometallics: vibrational spectroscopies (FTIRand Raman), electron spectroscopy, X-ray and neutron diffraction, magnetic susceptibility and Epr spectroscopy.
   - RMN spectroscopy: study of metallic alkyls, effect trans, π-complexes and fluxionalmolecules.
3. Fundamental processes in organometallic reactions:
   - Dissociation and coordination of ligands.
   - Oxidative addition and reductive elimination.
   - Insertion and elimination.
   - Coordinated ligand reactions.
4. Applications of organometallic catalysis:
   - Characteristics of catalytic complexes.
   - Polymerization and oligomerization of olefins and dienes (Ziegler-Natta catalysts).
   - Synthesis with CO: hydroformylationof olefins and carboxylation of olefins.

BIBLIOGRAPHY:

1. YAMAMOTO, Akio. Organotransition Metal Chemistry: fundamental concepts and applications. Wiley, 1991.