CURRICULUM PLAN OF Dr. Rajesh Kumar Meena

(Even SEMESTER 2010-21)

B.Sc. (H), III Year

Semester – VI

Name of Paper & Code:- Organometallic Chemistry & Bio-inorganic Chemistry, 4 Periods per week

Contents	Allocation of Lecture	Month wise schedule to be followed	Tutorials/Assignment/Presentation etc.
Organometallic Compounds Definition and classification of organometallic compounds on the basis of bond type. Concept of hapticity of organic ligands. Metal carbonyls: 18 electron rule, electron count of mononuclear, polynuclear and substituted metal carbonyls of 3d series. General methods of preparation (direct combination, reductive carbonylation, thermal and photochemical decomposition) of mono and binuclear carbonyls of 3d series. Structures of mononuclear and binuclear carbonyls of Cr, Mn, Fe, Co and Ni using VBT. π-acceptor behaviour of CO (MO diagram of CO to be discussed), synergic effect and use of IR data to explain extent of back bonding.	20 Lectures	January – 1st week February	-Syllabus Overview -Reference Books -Problem solving
Zeise's salt: Preparation and structure, evidences of synergic effect and comparison of synergic effect with that in carbonyls. **Metal Alkyls:** Important structural features of methyl lithium (tetramer) and trialkyl aluminium (dimer), concept of multicentre bonding in these compounds. **Ferrocene:** Preparation, physical properties and reactions (acetylation, alkylation, metallation, Mannich Condensation). Structure and aromaticity. Comparison of aromaticity and reactivity with that of benzene.	8 Lectures	2nd week of February – 3rd week of February	- Related Problems - Assignment - Home Register Overview - Student's difficulties
Bioinorganic Chemistry: Metal ions present in biological systems, classification of elements according to their action in biological system. Geochemical effect on the distribution of metals. Sodium / K-pump, carbonic anhydrase and carboxypeptidase. Excess and deficiency of some trace metals. Toxicity of metal ions (Hg, Pb, Cd and As), reasons for toxicity, Use of chelating agents in medicine, Cisplatin as an anti-cancer drug. Iron and its application in bio-systems, Haemoglobin, Myoglobin; Storage and transfer of iron.	12 Lectures	4th week of February – Mid March	- Related Problems -Home Register checking - Class test - Previous Year Question Papers discussion
Catalysis by Organometallic Compounds: General principles of catalysis, properties of catalysts, homogeneous and heterogeneous catalysis (catalytic steps, examples and industrial applications), deactivation and regeneration of catalysts, catalytic poison, promoter. Study of the following industrial processes and their mechanism: 1. Alkene hydrogenation (Wilkinson's Catalyst) 2. Synthetic gasoline (Fischer Tropsch reaction) 3. Polymerisation of ethene using Ziegler-Natta catalyst	9 Lectures	Mid March - 3rd week of March	- Revision session prior to home - Student's difficulties
Theoretical Principles in Qualitative Analysis (H_2S Scheme): Basic principles involved in analysis of cations and anions. Solubility products, common ioneffect. Principles involved in separation of cations into groups and choice of group reagents. Interfering anions (fluoride, borate, oxalate and phosphate), need to remove them after Group II and methods of removal. Analysis of insoluble substances.	4 Lectures	1st & 2nd week of April	- Related Problems - Home Register Overview - Revision session prior to home - Previous Year Question Papers discussion