

Curriculum Plan

(Odd Semester 2024-25)

Teacher Name: **Dr. Rajesh Kumar Meena**

Course: B.Sc. (H) Chemistry, Sem V

Paper Name: Inorganic Chemistry-IV: Organometallic Chemistry

UPC: 32171601

S.No.	Contents	Allocation of Lectures	Month wise schedule to be followed	Assignments/ Presentations etc
1.	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.	8 Lect.	3 rd week of July -1st week of August	-Syllabus Overview -Reference Books -Problem solving
2.	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.	8 Lect.	2 nd week of August- 1 st week of September	-Problem solving - Home Register Overview
3.	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.	12 Lect.	2 nd week of September - 1 st week of October	- Related Problems - Assignment - Home Register Overview - Student's difficulties
4.	Catalysis by Organometallic Compounds: General principles of catalysis, properties of catalysts, homogeneous and heterogeneous catalysis (catalytic steps, examples and industrial applications).	4 Lect.	2 nd week of October- 4 th week of October	- Revision session prior to home - Student's difficulties
5.	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	10	1 st week of November - 3 rd week of November	- Revision session prior to home - Student's difficulties