Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NCYC525	Organometallic Chemistry	3	1	0	4

Course Objective
• With this course students will learn the concepts involved in the syntheses, structure, physical and chemical properties of organometallic compounds along with their application in catalysis.
Learning Outcomes
• General synthetic procedures and characterization of organometallic compounds. • Structure, binding and reactivity. • Application in organic synthesis and industrial catalysis.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Fundamental concept of organometallic chemistry, 18-electron rule, Study of structure, bonding and synthesis of organometallic compounds of ligands commonly encountered in organometallic chemistry like: carbonyls, alkyls, phosphines, carbenes, carbynes, hydrides, Agostic interaction	12L + 4T	Students will understand fundamentals of organometallic chemistry, nature of bonding, and chemical properties of commonly encountered organometallic compounds.
2	π-complexes of mono- and polyenes: alkenes, alkynes, π-allyl, polyenyl, arene etc. Metallocenes and sandwich complexes,	8L+2T	
3	Introduction to catalysis, Reactions that occur at the Metal: ligand substitution, oxidative addition, reductive elimination, Reactions involving modification of ligand: insertion reaction, nucleophilic reactions, electrophilic reactions	8L+4T	Students will understand the Chemical behavior of organometallic compounds like metal-centered reactions and ligand-modification reactions
4	Homogeneous & Heterogeneous Catalysis: hydroformylation, Hydrogenation, Wilkinson's catalyst, Synthesis gas, Monsanto process, and Wacker process, Ziegler-Natta catalyst	8L+2T	Students will learn about the various industrial applications of organometallic catalysis
5	Applications of Organometallic Chemistry to Organic Synthesis: C-H activation and functionalization of alkanes and arenes, Carbon–Carbon Bond Formation. Biological applications of Organometallic compound	6L+2T	Students will learn about the applications of organometallic compounds in organic synthesis as well as the bio-aspect of organometallic chemistry
Total		**42L+14T**	

Text Books:

1. Basic Organometallic Chemistry: Concepts, Syntheses and Applications, Dr. B.D. Gupta, Dr. Anil J. Elias, 2nd Edition, University Press, 2013.
2. Organotransition Metal Chemistry: From Bonding to Catalysis, John F. Hartwig, University Science Books, 2010
3. Organometallic Chemistry, Gary O. Spessard and Gary L. Miessler, OXFORD UNIVERSITY PRESS, 2nd edition, 2010.

Reference Books:

1. Inorganic Chemistry Principles of structure and reactivity, J. E. Huheey, E. A. Keiter, R. L. Keiter and O. K. Medhi, 4th Edition, Pearson, 2013.
2. The Organometallic Chemistry Of The Transition Metals, Robert H. Crabtree, John Wiley & Sons, Inc., Hoboken, New Jersey, 6th Edition, 2014
3. Organometallics and catalysis: An Introduction, Manfred Bochmann, Oxford University Press, 2015