



Department of Chemistry and Chemical Sciences
CENTRAL UNIVERSITY OF JAMMU
 Rahya-Suchani (Bagla), District-Samba,
 Jammu-181143, (J&K) India

Five-year Integrated M.Sc. Chemistry
Teaching Plan (Feb 2021-May 2021)

Semester: X
 Course: Organometallic Chemistry-Elective-III (ICCHM10E003T)
 Course Teacher: Dr. Sujata Kundan

Week	Lecture No./Day	Topic to be Taught	No. of Hours	Suggested Readings
1 st Week	1,2	UNIT – I Structure and bonding in organometallic: Organometallic: Definition and classification with appropriate examples based on nature of metal-carbon bond (ionic, s, p and multicenter bonds)	2	2, 5, 6
2 nd Week	3,4	16 and 18 electron rule and its limitations, Classification of organometallic compounds by bond type, Nomenclature	2	2, 5, 6
3 rd Week	5,6	Ziese's salt, EAN rule as applied to carbonyl	2	2, 5, 6
4 th Week	7,8	Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d-metal ions	2	3, 5, 6
5 th Week	9,10	Contd... Synergic effects (VB approach)	2	2, 5, 6
6 th Week	11,12	MO diagram of CO can be referred for synergic effect to IR frequencies	2	2, 5, 6
7 th Week	13,14	UNIT – II Chemistry of organometallic compounds: Synthesis and reactions of organomagnesium (Grignard reagent), Organotin, Organomanganese,	2	2, 5, 6,7, 8,9
8 th Week	15,16	Synthesis and reactions of Organoaluminium, Organozinc, Organolithium (n-BuLi, PhLi) reagents	2	2, 5, 6,7, 8,9
9 th Week	17,18	Revision and Class test for Unit-I Cyclopentadienyl metal complexes: Metallocenes- Electronic structure and bonding in Ferrocene- Synthesis, Physical and spectroscopic properties of metallocenes	2	2, 3, 6, 7
10 th Week	19,20	Contd... Transition metal- π complexes with unsaturated organic molecules like alkenes, Alkynes, Allyls, Diene and arene complexes, Preparation, Properties, Chemical reactions, Nature of bonding and structural properties	2	2, 3, 6, 7
11 th Week	21,22	Contd...	2	2, 3, 6, 7
12 th Week	23,24	Contd...	2	4, 5, 6, 11, 12,1 3
13 th Week	25,26	UNIT – III Compounds of transition metal-carbon multiple	2	4, 5, 6, 11, 12,1 3



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		bonds: Alkylidenes, Alkylidyne: Synthesis, Nature of bond, Structural characteristics,		
14 th Week	27,28	Nucleophilic and electrophilic reactions of the ligands and applications. N-heterocyclic carbenes Low valent (Fischer) and high valent (Schrock) carbenes and carbines, Carbynes, Isolobal analogy, Metal-metal bond, Transition metal clusters	2	
15 th Week	29,30	Revision and Class test for Units II Group Discussion on class test question papers of unit-I	2	
16 th Week	31,32	Revision and Class Test for Units III Group Discussion on class test question papers of unit-II and Unit-III	2	

References

1. R. H. Crabtree, The Organometallic Chemistry of the Transition Metals, 7th Ed., Wiley, 2019.
2. P. Powell, Principles of Organometallic Chemistry, 2nd Ed., ELBS, 1991.
3. F. A. Cotton, G. Wilkinson, Inorganic Chemistry, 5th Ed., Wiley, 1988.
4. A. J. Pearson, Transition Metal-Stabilized Carbocations in Organic Synthesis, Wiley, 2010.
5. M. Bochmann, Organometallics and Catalysis: An Introduction, OUP Oxford; UK Ed., 2014.
6. R. C. Mehrotra, Organometallic Chemistry: A Unified Approach, 2nd Ed., New Age International, New Delhi, 2007.
7. B. D. Gupta and A. J. Elias, Basic Organometallic Chemistry, Concepts, Synthesis and Applications, 2nd Ed., Basic. Pubs: University Press, 2013.
8. H. Wren, A. C. Cumming, The Organometallic Compounds of Zinc and Magnesium. , Leopold Classic Library, 2017.
9. F. C. Whitmore, Organic Chemistry, Volume Two: Part III: Aromatic Compounds Part IV: Heterocyclic Compounds Part V: Organophosphorus and Organometallic Compounds, 2nd Ed., Dover Publications, 2011).
10. P. Perez, Advances in Organometallic Chemistry, 1st Ed., Academic Press 2018.
11. C. Elschenbroich and A. Salzer, Organometallic Chemistry, 2nd Ed., Weinheim, 1992.
12. R. Whyman, Applied Organometallic Chemistry and Catalysis., Oxford University Press, 2004.
13. B. C. Chapman all, Heterogeneous Catalysis, 2nd Ed., 1987.
14. G. W. Parshall and S. D. Ittel, Homogenous Catalysis: the Applications and Chemistry of Catalysis by Soluble Transition Metal Complexes, 2nd Ed., Wiley, 1992.