

Branch Name:	M.Sc. Chemistry
Program Code:	SC203
Course Name:	Chemistry of Metal Complexes-II
Course Code:	2SC2030201
Pre-requisite Course:	Basics inorganic chemistry up to B.Sc.

Course Objectives:

- The objective of the course is to appraise the students about the role of metal complexes in chemistry.
- To explain the chemistry of coordination compound and basic knowledge of reaction mechanism..
- To study and compare between the various theories of coordination.
- To study about kinetics and thermodynamics aspects possible in Metal Complexes chemistry.

Teaching and Examination Scheme:

Teaching Scheme(Hours per week)					Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit		Theory(Marks)		Practical(Marks)		Total (Marks)
			T	P	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
4	-	-	4	-	50	50	-	-	100

Subject Contents:

Unit	Contents	Lecture	Weightage
1	Introduction of Metal complexes Introduction, Classification, Nomenclature, 18 e- rule, EAN rule for complexes, Electronic interpretation of co-ordination compounds, factors affecting the formation of complex ions, Isomerism, Chelation, factor influencing the stability of metal chelates, importance of complexation and chelates.	12	25%
2	Bonding Theories : Metal Complexes Valence bond theory (VBT), Limitations of VBT, Molecular orbital theory (MOT), Crystal field theory (CFT), Ligand field theories (LFT), Magnetic properties of complexes, Ligand field stabilization energy (LFSE), Thermodynamic effects: Stability of complexes, Kinetic effects: Liability of complexes.	12	25%
3	Reaction Mechanism of Coordination Compounds Possible mechanism reactions, Substitution reaction of square planar complexes, Substitution reaction in octahedral complexes, Reaction of Platinum II complexes, the trans effect, theories of trans effect, use of synthesis in trans effect and analysis, Ligand displacement reaction in octahedral complexes, acid hydrolysis, Base hydrolysis, Electron transfer reaction, mechanism of redox reaction.	12	25%

4	Metal-Ligand Equilibrium solution Stepwise and overall formation constants and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin, determination of binary formation constants by pH-metry and spectrophotometry.	12	25%
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Text Books:

1. Text Book of Coordination Chemistry - R. K. Sharma.

Reference Books:

1. Advanced in inorganic chemistry by Puri, Sharma and Kaliya, 2019
2. Coordination chemistry by D. Banerjee.
3. Coordination by Ajai Kumar, 7th addition, 2020.
4. A Logical approach to Modern Organic Chemistry by Jagdamba singh & S. Anandvardhan, A Pragati prakashan

List of Open Source Software/learning website:

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=13G8VouhmrFfuhs6rkiyTA==>
2. <https://youtu.be/Yr9p8JS01tl?si=EPmOyN6qS4KZnQLv>
3. <https://www.dalalinstitute.com/wp-content/uploads/sites/2/Books/A-Textbook-of-Inorganic-Chemistry-Volume-1/ATOICV1-7-0-Metal-Ligand-Bonding.pdf>

Course Learning Outcomes(CLO):On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To understand basic term and factors affecting the formation of complexes.	1. Remembering 2. Understanding
CLO2	To understand deep knowledge about Chelation and its importance in complexes.	2. Understanding
CLO3	To understand basic principles and uses of different Bonding theories regarding complexes.	2. Understanding 4. Analyzing
CLO4	To understand different types of Mechanism for reactions Coordination Compounds	2. Understanding
CLO5	Understand formation constants and factors affecting the stability of complexes.	2. Understanding

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)																PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2
CLO1	1				1	1											1	2
CLO2						1											1	2
CLO3	1					1				1							2	2
CLO4	1				1	2				1							2	3
CLO5					1												1	2

3:High, 2:Medium, 1:Low