School of Science

M.Sc. (Chemistry) Programme

Subject Code & Name: - MS02CCHE04 & Inorganic Chemistry-II

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				Internal		External	
L	T	P	Total	TH	PWE	TH	PWE
2	-	2	4	25	25	25	25

Programme Name	M.Sc. Chemistry
Semester	II
Course Code	MS02CCHE04
Course Title	Inorganic Chemistry - II
Course Content Type (Th./Pr.)	Theory/Practical
Course Credit	4
Sessions+ Lab. Per Week	4
Total Teaching/Lab. Hours	60 Hours
* 2 Laboratory = 1 Session	

Learning Objectives

1. This course aims to teach students about the concepts of organometallic compounds.
2. The aim of this course is understood the spectroscopy of organometallic compounds.
3. The learners get idea about coupling reactions and bio-inorganic chemistry.

Prerequisites (if any)

Learning Outcomes

On the Completion of this course, students will able to:

1. Understand basic of organometallic compounds, how to calculate eighteen electron rule, structure of metal carbonyls.
2. Get idea about classification of metal carbonyls and which factors can affect the magnitude of stretching frequency and its spectroscopy
3. Understand reactions in metal carbonyls and their mechanisms.
4. Write different c-c coupling reactions and their mechanisms.
5. Have idea about bio-inorganic chemistry.

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Detailed Contents		
UNIT	**TOPIC/SUB-TOPIC**	**TEACHING HOURS**
I	**Organometallic compounds-I:** Introduction of organic compounds, Classification of organometallic compounds, Hapticity, Oxidation state/number, Eighteen electron rule, Structure of metal clusters, Geometry of metal clusters, Isolobal Analogy, Metal Carbonyls, Classification of metal carbonyls, Factors affecting the magnitude of stretching frequency, Bonding modes of CO, Spectroscopy of metal-carbonyl complexes: IR-spectroscopy, ^{1}H NMR, ^{13}C-NMR,	15
II	**Organometallic compounds-II:** Reactions in metal carbonyls, Mechanism in organometallic chemistry(oxidative addition, Reductive elimination, Trans-metallation, β-elimination, Migratory instertion), Organometallic carbene,	15

Text Book(s)

1. Organometallic & Bioinorganic chemistry(2nd-edition), Ajai Kumar, Aaryush education

Reference Books

1. Inorganic Chemistry(3rd edition), D.F. Shriver and P.W. Atikns
2. Basic organometallic chemistry(1st edition), B.D. Gupta and A.J.Elias
3. The organometallic chemistry of the transition metals(4th edition), Robert H. Carbtree

Web Resources

1. www.nptel.ac.in
2. www.swayam.gov.in
3. www.epgp.inflibnet.ac.in (e-PG pathshala)
4. www.ndl.iitkgp.ac.in (National Digital Library)

Required Software(s) (if any)

Practical(s) (if any)

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INORGANIC CHEMISTRY

Sr. No.	(Inorganic-I)-Quantitative Analysis:
1.	Direct Titration (Cu^{+2}, Ni^{+2}, Ca^{+2}, Mg^{+2} and Fe^{+3})
2.	Indirect Titration of Calcium
3.	By Back Titration and Replacement titration
4.	Determination of composition of complex and interference study.
5.	Water Analysis

References Books:

1. Advanced Practical Inorganic Chemistry – Gurdeep Raj Goel Publishing House, Meerut.
2. Qualitative Inorganic Analysis. – A. I. Vogel, 6th Edition revised by G. Svehla ELBS – London
3. Textbook of Chemistry Analysis – A. I. Vogel
4. Qualitative Chemistry semi micro analysis – edited by P. K. Agasyan CBS PublisherDelhi.
5. Water Quality-An Introduction Second edition ISBN: 978-3-319-17445-7 (Print) 978-3-319-17446-4 (Online) Authors: Claude E. Boyd
6. Chemistry: Inorganic Qualitative Analysis in the Laboratory, Clyde Metz, Elsevier, 2012, ISBN: 978032316104

L:: Lecture, **T::** Tutorial , **P::**Practical

CCE:: Continuous and Comprehensive Evaluation

(CCE Theory includes Mid Semester Examination, Assignment, MCQ quizzes, Seminar, Reflective notes, class participation, case analysis and presentation, slip tests (announced/ surprised), attendance etc. or any combination of these)

PWE:: Practical Work Examination

(PWE includes Laboratory practical work, project work, viva simulation exercise work etc.)

SEE:: Semester End Evaluation