DEPARTMENT OF CHEMISTRY
ATTENDANCE REGISTER
M.Sc CHEMISTRY (2022-2024)
2023-2024 AY

Sl No.	**Candidate code**	**Name of the student**	01/11/23	16/11/23	07/12/23	08/12/23	08/01/24	08/01/24	16/01/24	20/01/24	20/01/24	20/01/24
1.	**63522142001**	ADITHYA J	p	p	p	p	p	p	p	p	p	p
2.	**63522142002**	ANISHA A	p	p	p	p	p	p	p	p	p	p
3.	**63522142003**	ARCHA T M	p	p	p	p	p	p	p	p	p	p
4.	**63522142004**	ARYA RAJEEV	p	p	p	p	p	p	p	p	p	p
5.	**63522142005**	ASWANI ACHUTHAN	p	p	p	p	p	p	p	p	p	p
6.	**63522142006**	FABA SAJEED	p	p	p	p	p	p	p	A	A	A
7.	**63522142007**	FATHIMA SHAMEER	p	p	p	p	p	A	A	A	A	A
8.	**63522142008**	GEETHU J S	p	p	p	p	p	p	p	p	p	p
9.	**63522142009**	HANANA S	p	p	p	p	p	p	p	p	p	p
10.	**63522142010**	LEKSHMI S	p	p	p	p	p	p	p	p	p	p
11.	**63522142011**	MEGHA RAJESH	p	p	p	p	p	p	p	p	p	p
12.	**63522142012**	NAJMA H	p	p	p	p	p	p	p	p	p	p
13.	**63522142013**	PRIYANKA S	p	p	p	p	p	p	p	p	p	p
14.	**63522142014**	SAFA A	p	p	p	p	p	p	p	p	p	p
15.	**63522142015**	SHEHNA S	p	p	p	p	A	A	A	A	A	A

Sl No.	Candidate code	Name of the student	03/02/24	03/02/24	03/02/24	03/02/24	17/02/24	17/02/24	17/02/24	17/02/24	28/02/24	01/03/24
1.	**63522142001**	ADITHYA J	p	p	p	p	p	p	p	p	p	p
2.	**63522142002**	ANISHA A	p	p	p	p	p	p	p	p	p	p
3.	**63522142003**	ARCHA T M	p	p	p	p	A	A	A	A	p	p
4.	**63522142004**	ARYA RAJEEV	p	p	p	p	p	p	p	p	p	p
5.	**63522142005**	ASWANI ACHUTHAN	A	p	p	p	p	p	p	p	p	p
6.	**63522142006**	FABA SAJEED	p	p	p	p	p	p	p	A	A	A
7.	**63522142007**	FATHIMA SHAMEER	A	A	A	A	A	A	A	A	A	
8.	**63522142008**	GEETHU J S	p	p	p	p	p	p	p	p	p	p
9.	**63522142009**	HANANA S	p	p	p	p	p	p	p	p	p	p
10.	**63522142010**	LEKSHMI S	p	p	p	p	p	p	p	p	p	p
11.	**63522142011**	MEGHA RAJESH	p	p	p	p	p	p	p	p	p	p
12.	**63522142012**	NAJMA H	p	p	p	p	p	p	p	p	p	p
13.	**63522142013**	PRIYANKA S	p	p	p	p	p	p	p	p	p	p
14.	**63522142014**	SAFA A	p	p	p	p	p	p	p	p	p	p
15.	**63522142015**	SHEHNA S	p	p	p	p	p	p	p	p	p	p

Sl No.	**Candidate code**	**Name of the student**	16/03/24	16/03/24	16/03/24	23/03/24	23/03/24	23/03/24	23/03/24	13/03/24	20/07/24	20/07/24
1.	**63522142001**	ADITHYA J	p	p	p	p	p	p	p	p	p	p
2.	**63522142002**	ANISHA A	p	p	p	p	p	p	p	p	p	p
3.	**63522142003**	ARCHA T M	p	p	p	p	A	A	A	A	p	p
4.	**63522142004**	ARYA RAJEEV	p	p	p	p	p	p	p	p	p	p
5.	**63522142005**	ASWANI ACHUTHAN	A	p	p	p	p	p	p	p	p	p
6.	**63522142006**	FABA SAJEED	p	p	p	p	p	p	p	A	A	A
7.	**63522142007**	FATHIMA SHAMEER	A	A	A	A	A	A	A	A	A	A
8.	**63522142008**	GEETHU J S	p	p	p	p	p	p	p	p	p	p
9.	**63522142009**	HANANA S	p	p	p	p	p	p	p	p	p	p
10.	**63522142010**	LEKSHMI S	p	p	p	p	p	p	p	p	p	p
11.	**63522142011**	MEGHA RAJESH	p	p	p	p	p	p	p	p	p	p
12.	**63522142012**	NAJMA H	p	p	p	p	p	p	p	p	p	p
13.	**63522142013**	PRIYANKA S	p	p	p	p	p	p	p	p	p	p
14.	**63522142014**	SAFA A	p	p	p	p	p	p	p	p	p	p
15.	**63522142015**	SHEHNA S	p	p	p	p	p	p	p	p	p	p

Department of Chemistry

Organometallic Reagents in Organic synthesis
Year of Admission: 2022
Year of Enrolment: 2023

The Department of Chemistry conducted an additional Chemistry course "Organometallic Reagents in Organic Synthesis" in the academic year 2023-24

This program focused on providing an in-depth knowledge of the various synthetic strategies using organometallic reagents. Both classical and advanced reagents have been discussed emphasizing on the mechanistic details. Along with the reagents in organic synthesis this course provided a broad overview of the generic concepts of design research and design research methodology.

Upon completion of the course the students were equipped to describe different methods for organic synthesis and transformation of the most common functional groups and applications of several useful organometallic reagents and reactions in organic synthesis. Students learned the processes relevant organic-chemical reactions and were able to discuss the mechanism of these reactions. Also gained an awareness to plan and carry out fundamental organic transformations in organic synthesis. The course discussed stereochemical problems related to chemical transformations. The students also were equipped in conducting a literature review for a scholarly educational study and familiar with the steps involved in identifying and selecting a proper instruments to use in a study.

The course commenced on 1st of November , 2023.

The number of participants in the academic year 2023-24 included 15. The course was imparted to the second year MSc Chemistry students.

The students were evaluated, after each activity, through a verbal feedback system.

Assessment Structure:

1. **Assignments and Problem Sets** – 30%
2. **Examination** – 30%
3. **Final Examination** – 30%
4. **Seminar/Project on Recent Advances** –10%

The course had duration of 30 hours. The students were submitted assignments based on lectures given, taken two in-semester written examinations and a research proposal was submitted and presented before the group and an end semester final examination were conducted

Grades were awarded on the following basis:

80% and above : A Grade

70 - 79%	:	B Grade
60 -69%	:	C Grade

Out of the 15 students who enrolled in the course, 6 students secured A Grade , 7 students secured B grade and 1 student was secured C grade

Classes were engaged by the following faculty members of the Department of Chemistry:

1. Dr. Simimole H., Assistant Professor
2. Dr. Sumalekshmy, S., Assistant Professor

Organometallic Reagents in Organic Synthesis

Course	**Details**
Code	
Title	**Organometallic Reagents in Organic Synthesis**
Degree	MSc.
Branch	Chemistry
Year/Semester	S3/S4
Type	Extracurricular/Additional course

Credits	Hrs/week	1 h min	Total hours	30 h

Aim and Expected Course Outcome

- Understand the fundamental principles of organometallic chemistry.
- Explore the synthesis, reactivity, and applications of organometallic reagents in organic synthesis.
- Develop problem-solving skills through reaction mechanisms and practical applications.
- Highlight modern advances and industrial relevance.

- Discuss stereochemical problems related to chemical transformations
- Understand a general definition of research design.

- To carry out simpler risk assessment, in-session laboratory documentation and oral/written presentation of the contents and results of laboratory sessions
- Conducting a literature review for a scholarly educational study:

- Familiar with the steps involved in identifying and selecting a good instrument to use in a study.

- **Reagents in Organic Synthesis – Course Overview**

Sl No.	Topic	Hrs
1.	**Module 1: Introduction to Organometallic Chemistry** 1. Definition and historical background. 2. Basic concepts: Metal-carbon bond characteristics, types, and properties. 3. Common metals in organometallic chemistry: Alkali metals, transition metals, and main-group metals.	4
2.	**Classical Organometallic Reagents** 1. **Organolithium and Organomagnesium Reagents (Grignard Reagents):** o Synthesis and handling. o Reactivity and selectivity. o Applications: Carbon-carbon bond formation, alcohol synthesis, and functional group transformations. 2. **Organozinc Reagents:**	5

	o Preparation and characteristics. o Reactions: Negishi coupling, Reformatsky reaction, and Simmons-Smith cyclopropanation. 3. **Organoaluminum and Organoboron Compounds:** o Synthesis and properties. o Hydroboration, Suzuki coupling, and other applications.	
3.	**Transition-Metal Organometallic Reagents** 1. Palladium and Nickel Reagents: o Cross-coupling reactions: Heck, Suzuki, Stille, and Negishi reactions. o Catalytic cycles and mechanisms. 2. Rhodium and Ruthenium Catalysts: o Hydrogenation and hydroformylation reactions. o Olefin metathesis: Grubbs and Schrock catalysts. 3. Gold and Copper Reagents: o Catalysis in organic transformations. o Applications in modern synthetic methodologies.	5
4.	**Main Group Organometallic Compounds** 1. Silicon and Tin Reagents: o Organosilanes: Hiyama coupling and hydrosilylation. o Organotin reagents: Stille coupling and radical reactions. 2. Phosphorus and Sulfur Compounds: o Wittig reaction and related transformations. o Sulfur ylides and their applications.	4
5.	**Organometallics in Industrial Processes:** a. Catalysis in polymerization. b. Pharmaceutical applications	3
6.	Research Methodology of Chemistry: The search of knowledge, purpose of research, scientific methods, role of theory, characteristics of research.	3
7.	Types of research: fundamental, applied, historical and experimental research.	2
8.	Chemical literature: primary, secondary and tertiary sources of literature. Classical and comprehensive reference. Literature databases: ScienceDirect, SciFinder. Chemical Abstract.	2

9.	**Scientific writing**: research reports, thesis, journal articles, books. Types of publications: articles, communications, reviews. Important scientific and Chemistry Journals. Impact factor.	2

Assessment Structure:

5. **Assignments and Problem Sets** – 30%
6. **Examination** – 30%
7. **Final Examination** – 30%
8. **Seminar/Project on Recent Advances** –10%

Suggested Reading Materials:

1. R.O.C. Norman, Principles of Organic Synthesis, Chapman and Hall, London, 2nd 1980.
2. Francis A. Carey, Richard J. Sundberg,Advanced Organic Chemistry-Part B, Reactions and Synthesis,Plenum Press, 3rdEdition,1990.
3. Strategic Applications of Named Reactions in Organic Synthesis: Barbara Czako, Laszlo Kurti, Elsevier, 2005
4. Blessing, L.T.M., Chakrabarti A. and Wallace, K.M. An Overview of Design Studies in Relation to a Design Research Methodology, Designers: the Key to Successful Product Development, Frankenberger & Badke-Schaub (Eds.), Springer-Verlag, 1998.
5. **Organometallics in Synthesis** by Bruce H. Lipshutz.
6. **"The Organometallic Chemistry of the Transition Metals"** by Robert H. Crabtree.
7. **"Organometallic Chemistry"** by Gary O. Spessard and Gary L. Miessler.
8. Recent review articles and research papers from journals like *JACS*, *Angewandte Chemie*, and *Organometallics*.
9. Introduction to Research, Free online Education, Swayam Online, Lectures
10. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th Edition, by John W. Creswell
11. The Craft of Research, Third Edition, by Wayne C. Booth (Author), Gregory G. Colomb (Author), Joseph M. Williams