Syllabus for Master of Science

Organic/Analytical Chemistry

Subject Code: 02CY0502

Subject Name: Essential of Physical and Inorganic Chemistry

M.Sc. Sem - III

Objectives:

- To understand the role of catalyst and different types of catalyst with their synthesis.
- To understand the key features of organometallic compounds, includingthe variety of structures, oxidation numbers, electronic configurationsand stability of complexes.
- To know about the macromolecular chemistry.
- To know about Photochemistry

Credits Earned: 6 Credits

Course Outcomes:

After the successful completion of the course, students will be able to understand,

- Role of different types of catalyst.
- Polymerization
- Explain the fundamental concepts in organometallic chemistry of transition metals.
- Study about Photochemistry

Pre-requisite of course: NA.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Internal (I)	Viva (V)	Term work (TW)	
4	0	3	6	50	30	20	25	25	150

Contents:

Unit	Topics	Contact Hours
1	**Organometallic Chemistry** Introduction, ionic organometallic compounds, organometallic compounds of various group, Classification of ligands in organometallic compound, Eighteen electron rule, EAN, metal carbonyl, metal nitrosyl, nomenclature of organometallic compounds, metal cluster,	20
2	**Catalysis** Introduction of Catalyst, types of catalyst and its commercial applications, Ziegler–Natta catalyst, Wilkinson catalyst, Fischer–Tropsch, Zeolites as catalyst for organic transformations	10
3	**Macro molecular chemistry** Introduction, Classification of polymer, Chain polymerization &Polycondensation in detail, Molecular weight determination, Polymer processing techniques: Calendaring, diecasting, rotational casting, film casting, compression molding, injectionmolding, blow molding, extrusion molding, thermo forming and foaming.	20
4	**Patents and IPR** Patents and IPR in drug discovery and development, Selected topics of chemo and bio informatics tools and their applications, Agreements, confidential, nondisclosure agreements. **Combinatorial Chemistry** Fundamentals methods, preparation study of targeted or focused libraries.	10
Total Hours		**60**

References:

1. A Textbook of Physical Chemistry;K. L. Kapoor
2. An Introduction to Chemical Thermodynamics; R. P. Rastogi, R. R. Misra, 6th Edition, Vikas Pub. Pvt. Ltd.
3. Physical Chemistry; G. W. Castellan, 3rd Edition,Narosa Publishing House, NewDelhi.
4. Physical Chemistry; ArunBahl& J. D. Tuli, S. Chand Publishing.
5. Organic Reactions and their Mechanisms; P. S. Kalsi, New Age International Publishers.
6. Organic Chemistry; R. T. Morrison and R. N. Boyd, 6th Edition, PrenticeHall of India.
8. Concise Inorganic Chemistry; J. D. Lee, 5th Edition, Blackwell Science, London.
9. Basic Inorganic Chemistry; F. A. Cotton, G. Wilkinson
10. Principles of Inorganic Chemistry; B. R. Puri, L. R. Sharma, K. C. Kalia,Vallabh Publications, Delhi
11. Organic Chemistry; Morrison and Boydnic Chemistry (Volume I, II & III); S. M. Mukherji, S. P. Singh, R. P. Kapoor.
12. Principles of physical chemistry; B.R. Puri, L.R. Sharma, M.S. Pathania.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
30%	25%	15%	15%	10%	5%

Suggested List of Experiments:(Any six)

1. Synthesis of polystyrene by free radical polymerization.
2. Synthesis of phenol-formaldehyde resin.
3. To determine intrinsic viscosity and average molecular mass of a given polymer-solvent system.
4. Paper Chromatography-circular and ascending of metal.
5. Ore and Alloy Analysis
6. Synthesis of metal complexes and its characterization.

Reference Books:

1. Vogel's Textbook of Quantitative Chemical Analysis 6th edition, Pearsons Education.
2.Practical clinical Biochemistry, Harold Varley (4th Edition), CBS publishers and Distributors. New Delhi -110002.
3. RIkan;natural products.
4. Peach and Tracy; Methods of Plant analysis Vol- VII.
5. Pavia and others; Orgaic Laboratory Techniques, (Second Edition, 1995), Sannders Series (Harcofst Brace).

Instructional Method:

a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

e. Use of hazardous/toxic chemicals should be avoided as far as possible in laboratory.

f. All students in the laboratory must wear safety goggles and lab coats during lab session.

Supplementary Resources:

1. http://www.nptel.ac.in/courses/104103069/#
2. http://ocw.mit.edu/courses/chemistry/
3. http://vlab.amrita.edu/index.php?sub=2
4. http://www.vlab.co.in/ba_labs_all.php?id=9