

Subject Code: 02CY0352**Subject Name: Advanced Organic Chemistry****B.Sc. Sem - VI****Objectives:**

- To study reactive intermediates, name reactions and rearrangements.
- To make students capable of understanding reagents and its applications.
- To study the introduction, classification and nomenclature of carbohydrates.

Credits Earned: 6 Credits**Course Outcomes:** After completion of this course, student will be able to

- Understand the concepts of reactive intermediates, name reactions and rearrangements.
- Be aware of the basics of reagents and its applications .
- Obtain the information regarding carbohydrates and its chemistry.

Pre-requisite of course: Basics of the organic chemistry, its fundamental and brief knowledge regarding name reaction is required for this course.**Teaching and Examination Scheme**

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA	CSE	Viva (V)	Term Work (TW)	
5	-	2	6	50	30	20	25	25	150

Contents

Unit	Topics	Contact Hours
1	Reactive Intermediates, Name Reactions and Rearrangements Homo and heterolytic fission, carbocations, carbanions, free radicals, Introduction to carbenes, nitrenes, benzyne, ylides and enamines. Ullmann reaction, Meerwein-pondorffvarley reaction, Knorr-pyrole reaction, skraup synthesis, Hantzsch-pyridine synthesis, Neber rearrangement, Stevens rearrangement, pinacol-pinacolone rearrangement.	20
2	Reagents and its applications Aluminium isopropoxide, N-bromosuccinimide, Diazomethane, Lithium aluminium hydride, Manganese dioxide, Wittig reagent, Selenium dioxide.	15
3	Carbohydrates Introduction, classification and nomenclature, general reactions of monosaccharides (with reference to glucose and fructose), conversion of aldose to corresponding ketose, conversion of aldose to next higher ketose (Wolfson method), conversion of aldose to ketose having two more carbon atoms (Sowden method), conversion of ketose to corresponding aldose. Step-up reactions: Kiliani reaction and Swodennitromethane reaction, Step-down reactions: Ruff method, configuration of monosaccharides, ring structure of aldoses, determination of ring size of glucose by methylation method and periodic oxidation method, mutarotation of D(+) glucose.	25
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, New Delhi.
4. Physical Chemistry; Arun Bahl & 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, Prentice Hall 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 Boyd
12. Organic Chemistry (Volume I, II & III); S. M. Mukherji, S. P. Singh, R. P. Kapoor.
13. 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
20%	30%	25%	15%	10%	-

Seperation and Qualitative analysis:

1. Separation and Qualitative analysis of given unknown mixture of organic compound.[Mixture 1]
2. Separation and Qualitative analysis of given unknown mixture of organic compound.[Mixture 2]
3. Separation and Qualitative analysis of given unknown mixture of organic compound.[Mixture 3]
4. Separation and Qualitative analysis of given unknown mixture of organic compound.[Mixture 4]
5. Separation and Qualitative analysis of given unknown mixture of organic compound.[Mixture 5]

Organic Synthesis:

6. Synthesis of Benzoic acid from benzaldehyde and determine the % yield.
7. Synthesis of dibenzalacetone from benzaldehyde.
8. Synthesis of p-chlorotoluene from p-toluidine.

Reference Books

1. An Advanced Course in Practical Chemistry, A. K. Nad, B. Mahapatra and A. Ghoshal, New Central Book Agency (P) Ltd.
2. Practicals in Physical Chemistry, P S Sindhu, Macmillan.
3. Experimental Physical Chemistry: A Laboratory Textbook, Arthur Halpern, George McBane, W. H. Freeman.

Instructional Method:

1. 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.

2. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory
5. Use of hazardous/toxic chemicals should be avoided as far as possible in laboratory.
6. All students in the laboratory must wear safety goggles and lab coats during lab session.

Supplementary Resources:

1. <http://nptel.ac.in/course.php?disciplineId=104>
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
5. <https://www.youtube.com/user/TMPChem>
6. <https://www.youtube.com/playlist?list=PL166048DD75B05C0D>
7. <https://www.youtube.com/channel/UCqk-dmk3AOfikaFDpsZorg>
8. <https://www.youtube.com/user/PradeepKshetrapal>