

Subject Code: 02CY0302
Subject Name: Organic Chemistry
B.Sc. Sem - V
Objectives:

- To study the concept stereochemistry.
- To make students capable of understanding the basics of conformation and configuration.
- To study the introduction, properties, occurrence of alkaloids and terpenoids.
- To know more about Drugs and Dyes.

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

- Understand the basics of stereochemistry.
- Be aware of the basics of conformations and configuration.
- Obtain the information regarding alkaloids and terpenoids.
- Understand the basic of drugs and dyes.

Pre-requisite of course: Fundamental knowledge of general chemistry is required.

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	Stereochemistry Stereochemistry, Isomersim, stereoisomerism, plane polarized light, polarimeter, specific rotation, enantiomers, diastereomers, metamerism, chiral molecules and chiral centre, molecules with one chiral centre and more than one chiral centre, prostereoisomerism, resolution, racemisation, optical purity, absolute configuration, R & S sequence rule.	20
2	Conformation and configuration Conformation and free rotation, conformational analysis of ethane, n-butane, cyclohexane and cyclopentane, Baeyer's strain theory, Sache-Mohr theory, conformation of cyclohexane, mono substituted cyclohexane and disubstituted cyclohexane.	15
3	Alkaloids and Terpenoids Introduction, occurrence, classification, isolation, general methods of proving structure of alkaloids, constitution, properties and synthesis of conine, nicotine and papavarine. Introduction, occurrence, isolation, general properties of terpenoids, isoprene rule, synthesis of citral.	15
4	Drugs and Dyes Drugs: Introduction to drugs, classification of drugs, synthesis and application of ibuprofen, atenolol and adrenaline. Dyes: Introduction, classification by structure and methods of application, synthesis and uses of methyl orange, congo red, malachite green, alizarin and indigo.	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, 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%	-

Separation 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. Preparation of aspirin (acetyl salicylic acid) from salicylic acid and determine its % yield.
7. Synthesis of p-nitroacetanilide from acetanilide and determine its % yield.
8. Preparation of Methyl orange/Methyl red.

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>