



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Science
Name of Program: B.Sc. (Major: Chemistry)
(2022-2025)

Semester V

COURSE CODE	COURSE NAME	CATEGORY	LEVEL UG/PG	TEACHING & EVALUATION SCHEME					
				PRACTICAL		L	T	P	CREDITS
				END SEM University Exam	Teachers Assessment*				
VOCCH501	Green and Applied Chemistry	Vocational	UG	60	40	0	0	8	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit.

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):


This module aims to offer an overview of pharmaceutical chemistry from a holistic perspective and introduces the interdisciplinary idea of sustainable chemistry together with water analysis.

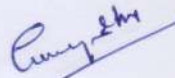
The course has been designed to provide the students with

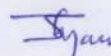
1. To comprehend the fundamentals of Green chemistry's guiding principles and its real-world applications.
2. To acquire knowledge about various types of Biotransformation and to gain practical insight into functional group transformation.
3. To emphasize the significance of managing solid waste and turning it into beneficial products.
4. To understand the functions and applications of the Dean-Stark and Soxhlet apparatus.
5. By offering the students hands-on experience in the analysis of various water samples.

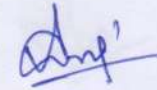
Course Outcomes (COs):

1. Students will obtain the knowledge and practical skills of Green chemistry and synthetic utility.
2. It will give students a deeper sense of responsibility and a readiness to assist in resolving various environmental issues.
3. The capacity to make decisions at every stage of life and choose solutions that will be sustainable, both personally and professionally
4. Students will be able to articulate the fundamental concepts underlying Solid waste management and Biotransformation.
5. They have the ability to anticipate prospective applications of the Soxhlet apparatus, Dean-Stark, Preparative TLC, and its value in helping them emerge into capable researchers.


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Syllabus

Unit-1 Green Chemistry

Merits and synthetic utility of green chemistry, the role of MAOS and UAOS on organic synthesis, significance of solid supported reagents. Solid supported nitration; coupling and oxidation reactions. The significance of Biotransformation in pharma industries and selected experiments with the yeast

Unit-2 Solid waste management


The negative impact of solid waste on the environment, kitchen waste is the source of novel aromatic molecules. Extraction and characterization of aromatic molecules from the kitchen waste. Preparation of compost from the kitchen and agricultural solid waste. Synthesis of Bio-Diesel from different types of waste cooking oil.

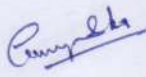
Unit-3 Pharmaceutical chemistry

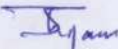
API's and types, different types of pharma industries. Green synthetic modification and characterization of selected API's (Metformin, Levitricetam). Determination of percentage purity and assay of selected API. Preparation of herbal based hand sanitizer.

Unit –4 Water analysis

Importance of water purity and human health, collection of different water samples and estimation of BOD, COD, Dissolved Oxygen (DO) and Total Dissolved Solids (TDS) of water samples. The significance of effluent treatment in chemical industries.


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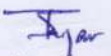
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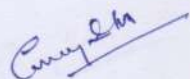
Unit -5 Dean-Stark, Soxhlet apparatus and Prep TLC

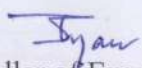
Working principle of Dean-Stark apparatus, determination of moisture content of the sample. Soxhlet apparatus principle, working and applications, extraction of phytochemicals by Soxhlet apparatus. Advantages of preparative TLC and purification of the organic compounds.

References:

1. Furniss, B.S., Hannaford, A.J., Smith, W.G., and Tatchell, A.R. Vogel textbook of Practical Organic Chemistry, Longman Scientific and Technical Publishers Ltd., 5th edition, 2011
2. Faber, K. Bio-transformations in Organic Chemistry, Springer, 10th edition, 2018.
3. Abraham, D.J. Burger's Medicinal Chemistry and Drug Discovery, Wiley, 18th edition, 2021
4. Gonzalo, G. and Maria, P.D. Biocatalysts: An Industrial Perspective, RSC Publishers, 2017
5. Patrick, G. L. An Introduction to Medicinal Chemistry, OUP Oxford, 5th edition, 2013
6. Ahluwalia, V.K. and Kidwai, M. New Trends in Green Chemistry, Anamaya Publishers, New Delhi, 2012.
7. Lancaster, M. Green Chemistry: An Introductory Text, The Royal Society of Chemistry, 3rd edition, 2017.
8. Ahluwalia, V.K. and Dhingra, S. Green Chemistry in 21st Century and Beyond, Manakin Press, 2017.


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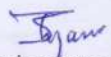
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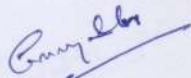
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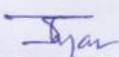
9. Sharma, A. Practical in Pharmaceutical Chemistry-III (Organic Chemistry-I), Shri Sai Prakashan, 3rd edition, 2015.

List of Experiments:

1. Green Chemistry - Solid phase nitration reaction of selected organic molecules
2. Green Chemistry - Solid phase oxidation reaction of selected organic compounds .
3. Solid waste management - Extraction of aromatic molecules from the kitchen waste
4. Solid waste management - Preparation of Compost from the waste (agricultural & kitchen)
5. Solid waste management - Preparation of Biodiesel from the waste cooking oils
6. Structural modification and characterization of selected API's
7. Biotransformation experiment with Baker's Yeast
8. Water analysis - Estimation of BOD and COD
9. Water analysis - Estimation of DO and TDS
10. Assay of API - Determination of the percentage purity of selected medicines
11. Preparation and characterization of Herbal sanitizer
12. Demonstration of Dean-Stark and Soxhlet apparatus
13. Demonstration of Preparative TLC of Chalcone crude compound (purification)
14. Demonstration of Preparative TLC of reaction mixture


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