



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

COURSE CODE	CATEGORY	COURSE NAME	LEVEL UG/PG	TEACHING & EVALUATION SCHEME					CREDITS
				PRACTICAL					
				END SEM University Exam	Teachers Assessment *	L	T	P	
VOCCH301	Vocational	Lab Techniques in Chemical Analysis	UG	60	40	2	0	4	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):

The course is designed in such a way to provide the students:

1. To familiarize with the safety measures in laboratory and professional ethics
2. To impart knowledge about the basics of chemical analysis and its application
3. To train students to prepare standard solutions and dilutions.
4. To give insight into the principle of qualitative and quantitative analysis
5. To acquaint the students with the practical knowledge of instruments, its operation, and applications
6. To instill the practical skills and groom before undertaking lab courses

Course Outcomes (COs):

CO1: To have awareness of safety measures in lab and professional ethics.

CO2: To have knowledge about the basics of chemical analysis and its application.

CO3: To learn about preparation of standard solutions and standardization.

CO4: To gain insight into the principle of qualitative and quantitative analysis.

CO5: To know about the various commonly used instruments and their operation.

CO6: To instill the practical skills and entrepreneurship attitude

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Syllabus

UNIT I: Basics of chemistry lab

Safety aspects in Chemical laboratory, emergency procedures, Introduction of different lab apparatus, safe handling, and calibration of glassware. Handling of balances, muffle furnaces, assembling of distillation apparatus, and Deans-Stark apparatus. Chemical concentrations – molar mass, mole, molarity, molality, normality, and percent concentration (v/v, w/v, w/w). Preparation of solutions – standard solutions, primary and secondary standards.

UNIT II: Introduction to Chromatographic Techniques

Introduction, principle, classification, and applications of chromatography. Practical demonstration of following of paper, thin layer chromatographic (TLC) and column chromatographic techniques. Principle and applications of pH meter, conductometer and calorimeter.

UNIT III: Purification methods used in Chemistry

Practical demonstration of following sublimation, distillation, crystallization, recrystallization. Applications of these techniques in chemical industries with examples. Comparison of crude and pure samples after purification based on TLC. Separation of organic mixtures (binary and ternary) by solvent extraction.

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UNIT IV: Analysis of Food and Biomolecules

Practical demonstration of food analysis, food flavors, food colors, and food preservatives. Analysis of milk and milk products, jam, pickles, and tomato ketchup. Titratable acidity of different food samples (solids and liquids). Analysis of Biomolecules – Fehling's and Tollen's test, Molish test, Ninhydrin test, Biuret test, Acid value and FFA test. Estimation of Fat and Proteins – food samples.

UNIT V: Analysis of Paints and Pigments

Practical demonstration of paints, varnishes, pigments, composition of paint. Preliminary inspection of sample coated with paint, test on coating with varnish, binder and thinner. Practical applications and examples of paint analysis (industry visit). Analysis of oil-based, and water-soluble paints.

Reference Textbooks

- 1) Vogel's Qualitative Inorganic Analysis, A. I. Vogel, Prentice Hall
- 2) Vogel's textbook of Chemical Quantitative Analysis, Longman Scientific

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3) The golden book of Chemistry Experiments, R. Brent, Golden press, NY

4) Comprehensive Practical Organic Chemistry, V. K. Ahluwalia, and R. Aggarwal, University Press.

5) Lab Manual of Organic Chemistry, R. K. Bansal, New Age Publications

6) Advanced Practical Chemistry, J. Singh et al. Pragati Prakashan publishers

7) Laboratory Techniques in Food analysis, D. Pearson, TATA McGraw Hill

8) Treatise on Analytical Chemistry Vol. I and II, I. M. Kolthoff

9) Aids to the analysis of Foods and Drugs, Nicholls

10) Standard Methods of Chemical analysis Vol I & II (6th Ed.), F. J. Welcher

11) Analysis of Food products, S. N. Mahendru, Swan publishers

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