

Semester	3
Programme	CHEMISTRY
Course	SKILL ENHANCEMENT (ORGANIC CHEMISTRY 3)
Paper Code	S2CH230311P
Credits	3 (PRACTICAL: 3)
Hours/week	3 (PRACTICAL: 3)
Category: Core/MDC/SEC/VEC	SEC
Theory/Practical/Composite	PRACTICAL
Number of Modules	4
Syllabus	Qualitative Analysis of Single Solid Organic Compounds A. Detection of special elements (N, S, Cl, Br) by Lassaigne's test B. Solubility and classification (solvents: H₂O, 5% HCl, 5% NaOH and 5% NaHCO₃) C. Melting point of the given compound. D. Detection of the following functional groups by systematic chemical tests: Nitrogenous functional groups: Aromatic amino (-NH₂), Aromatic nitro (-NO₂), Amido (-CONH₂, including imide), Anilido (-CO-NH-Ar). Non-nitrogenous functional groups: Carboxylic acid (-COOH), Phenolic -OH, Carbonyl (-CHO and >C=O); Ethylenic unsaturation (C=C). E. Preparation of derivative of the given compound. Core Course-Skill practical-II (I) Chromatographic separation of mixture of organic compounds A. TLC separation of a mixture containing 2/3 amino acids B. TLC separation of a mixture of dyes (fluorescein and methylene blue) C. Column chromatographic separation of leaf pigments from spinach leaves D. Column chromatographic separation of mixture of dyes E. Paper chromatographic separation of a mixture containing 2/3 amino acids F. Paper chromatographic separation of a mixture containing 2/3 sugars (II) Isolation of some natural products A. Isolation of caffeine from tea. B. Isolation of cinnamaldehyde from cinnamon. C. Isolation of curcumin from turmeric. And other similar isolations.
Course Overview	Skill-I: To develop skills on the quantitative estimations of compounds Skill-II: To develop skill on the separation techniques and isolation of natural products

Course Outcomes	Upon successful completion of this course, students will be able to: CO1: Perform Lassaigne's test to detect special elements and classify unknown solid organic compounds based on their solubility profiles in different media. CO2: Identify nitrogenous and non-nitrogenous functional groups through a systematic series of chemical tests and confirm the identity by preparing suitable derivatives. CO3: Apply chromatographic techniques (TLC, Paper, and Column) to separate complex mixtures of amino acids, sugars, dyes, and plant pigments. CO4: Execute the isolation of natural products from common sources using extraction and purification protocols. CO5: Demonstrate precision in determining physical constants (melting points) and document laboratory findings in accordance with scientific standards.
Program Outcomes	PO1: Fundamental Knowledge: Demonstrate a comprehensive understanding of core concepts in chemistry, including organic, inorganic, physical, analytical, and biochemistry. PO2: Laboratory Skills: Acquire hands-on experience in laboratory techniques and instrumentation, applying safety protocols and proper methodologies to conduct experiments and analyse results. PO3: Problem Solving: Develop critical thinking and problem-solving skills by applying chemical principles to real-world scenarios, including the ability to design experiments and interpret data. PO4: Research Competency: Engage in independent and collaborative research projects, employing scientific methods to formulate hypotheses, conduct experiments, and communicate findings effectively. PO5: Interdisciplinary Applications: Understand the interdisciplinary nature of chemistry, exploring its applications in fields such as medicine, environmental science, materials science, and nanotechnology. PO6: Communication Skills: Effectively communicate scientific information, both verbally and in written form, to diverse audiences, demonstrating the ability to present complex ideas clearly and concisely. PO7: Ethics and Sustainability: Recognize the ethical implications and responsibilities of scientific research and practice in chemistry, emphasizing the importance of sustainability and environmental stewardship in chemical practices.

CO #	Course Outcome Summary	Bloom’s Taxonomy (K-Level)	Mapped POs
CO1	Element Detection & Classification	K3 (Apply), K4 (Analyze)	PO1, PO2, PO3
CO2	Functional Group & Derivative Prep	K4 (Analyze)	PO1, PO3
CO3	Chromatographic Separations	K3 (Apply), K4 (Analyze)	PO2, PO3, PO5
CO4	Natural Product Isolation	K3 (Apply)	PO2, PO5
CO5	Physical Constants & Reporting	K2 (Understand), K3 (Apply)	PO2, PO6
Reading/Reference Lists		1. Arthur, I. V. Quantitative Organic Analysis, Pearson 2. University Hand Book of Undergraduate Chemistry Experiments, edited by Mukherjee, G. N., University of Calcutta 3. Nad, Mahapatra, Ghosal-Practical Chemistry 4. Sarker, S. D,. Nahar, L. Natural Products Isolation, Springer, 2012	
Evaluation		Practical: 100 CA: Viva: ; Attendance: 5	
Paper Structure for Theory Semester Exam			