

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART-A: Introduction			
Program: Bachelor in Science (Certificate / Diploma / Degree)		Semester - II/IV/V/VI	Session: 2024-2025
1	Course Code	CHSEC	
2	Course Title	GREEN CHEMISTRY	
3	Course Type	SEC	
4	Pre-requisite(if, any)	As per Program	
5	Course Learning Outcomes(CLO)	➤ Understand needs, goals, and obstacles in green chemistry. ➤ Understand and application of twelve principles of chemistry. ➤ Design green solvents and green reactions. ➤ To interpret and execute case study, survey, and projects on Green Chemistry.	
6	Credit Value	2 Credits (1C + 1C)	Credit = 15 Hours –Theoretical learning and = 30 Hours Laboratory or Field learning/Training
7	Total Marks	Max.Marks:50	Min Passing Marks:20
PART -B: Content of the Course			
Total No.of Teaching–learning Periods: Theory–15 Periods (15 Hrs.) and Lab. or Field learning/Training 30Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Theory Contents	Introduction to Green Chemistry: What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry. Principles of Green Chemistry and Designing a Chemical synthesis: Twelve principles of Green Chemistry with their explanations and examples and special emphasis on the following: • Designing a Green Synthesis using these principles; Prevention of Waste/ by products; maximum incorporation of the materials used in the process into the final products, Atom Economy, addition, substitution, and elimination reactions. • Prevention/ minimization of hazardous/ toxic products reducing toxicity, and risks (hazard × exposure); waste or pollution prevention hierarchy. • Green solvents– supercritical fluids, water as a solvent for organic reactions, ionic liquids, fluoruous biphasic solvent, PEG, solventless processes, immobilized solvents and how to compare greenness of solvents. Future Trends in Green Chemistry: Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; Green chemistry in sustainable development.		15
Lab./Field Training Contents	• Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis). • Microwave assisted reactions in water: Hofmann elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols; microwave assisted reactions in organic solvents Diels-Alder reaction and Decarboxylation reaction. • Right fit pigment: synthetic azo pigments to replace toxic organic and inorganic pigments. • An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.		30

