Course name: B. Pharmacy

Semester: 7th

Subject: Fundamentals of Green Chemistry

Subject code: VAC08

	Fundamentals of Green Chemistry VAC08	L	T	P	S	C	CH
Version 2024		2	0	0	0	2	30
Pre-requisites/Exposure	NA						
Co-requisites	NA						
Semester	7						

COURSE OBJECTIVES

This course will provide knowledge to sustainable chemistry, an approach to chemistry that attempts to prevent of reduce pollution. It will also improve the efficiency of chemical products by changing how chemicals are designed, manufactured, and used. The concept of greening chemistry developed in the business and regulatory communities *as a natural evolution of pollution prevention initiatives*.

COURSE OUTCOMES

1	To apply a range of advanced research skills, principles, methodologies and approaches for research
2	To undertake cutting-edge research, either laboratory or non-laboratory based, in the area of green and sustainable chemistry and allied sectors.
3	To learn various techniques to clean up environmental contaminants
4	To reduce pollution and its source by minimizing or eliminating the hazards of chemical reagents, solvents, feedstocks and product

COURSE CONTENT

Unit 1: Introduction to Green Chemistry 10 contact hours

Detailed study of Green Chemistry, Need for Green Chemistry, Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry. Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; co crystal controlled solid state synthesis, green chemistry in sustainable.

Unit 2: Green Synthesis/ Reactions and some real-world cases 10 contact Hours

Healthier Fats and oil by Green Chemistry: Enzymatic Inter esterification for production of no Trans-Fats and Oils. An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn. Designing of Environmentally safe marine antifoulant. Surfactants for carbon dioxide – replacing smog producing and ozone depleting solvents with CO2 for precision cleaning and dry cleaning of garments. Ultrasound assisted reactions: sonochemical Simmons-Smith Reaction (Ultrasonic alternative to Iodine)

Unit 3: Principles of Green Chemistry and Designing a Chemical synthesis

10 Contact Hours

Energy requirements for reactions – alternative sources of energy: use of microwaves and ultrasonic energy, Selection of starting materials; avoidance of unnecessary derivatization, careful use of blocking/protecting groups, Designing a Green Synthesis using these principles; Prevention of Waste/ byproducts; maximum incorporation of the materials used in the process into the final products , Atom Economy, calculation of atom economy of the rearrangement, addition, substitution and elimination reactions

TEXTBOOKS

T-1: Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010.

T-2: Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001)

T-3: Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).

REFERENCE BOOK

R-1: Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).

R-2: Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).

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