DISCIPLINE SPECIFIC ELECTIVES (DSES)

B.ScVth Semester-Chemistry

Course No: CH516DA *Max. Marks: 80*
Course Weightage: 04 Credits *End Term Exam: 60*
No. of Contact Hours: 60 *Continuous Assessment: 10*
Attendance: 10

OPTION-I

GREEN CHEMISTRY

Unit-I: Green Chemistry-Theory **(15 hours)**

Introduction: Need for Green Chemistry and the role of chemists.Tools of Green Chemistry:- Selection of starting materials, Catalysts, Alternative Solvents, Appropriate reagents, Percentage atom utilization, Microwaves and Sonication. Twelve principles of Green Chemistry with their explanations and examples.

Unit-II: Designing a chemical synthesis **(15 hours)**

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); prevention/ minimization of hazardous/ toxic products; designing safer chemicals – different basic approaches to do so; selection of appropriate auxiliary substances (solvents, separation agents), green solvents, solvent less processes, immobilized solvents and ionic liquids; energy requirements for reactions - use of microwaves, ultrasonic energy

Unit-III: Green Chemistry-Practice **(15 hours)**

Microwave assisted reactions in water: Hofmann Elimination, Hydrolysis (of benzyl chloride, benzamide, n-phenyl benzamide, methylbenzoate to benzole acid), Oxidation (of toluene, alcohols).

Microwave assisted reactions in organic solvents: Esterification, Fries rearrangement, Orthoester Claisen Rearrangement, Diels-Alder Reaction, Decarboxylation.

Alkylations, oxidation, reduction, coupling reaction, Cannizaro reaction, Strecker synthesis, Reformatsky reaction.

Unit IV Trends in Green Chemistry **(15 hours)**

Microwave assisted solid state reactions: Deacetylation, Deprotection, Saponification of esters.

Ultrasound assisted reactions: Esterification, saponification, substitution reactions.

Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; oncovalent derivatization; Green chemistry in sustainable development

Books recommended

1. Green Chemistry- Environment Friendly Alternatives; Rashmi Sanghi & M. M Srivastava; Narosa; 2007.
2. Green Chemistry- An Introductory Text; IInd Edn.: Mike Lancaster; RSC; 2010.
3. Green Chemistry- Theory and Practice; P. T. Anastas and J. C. Warner; oxford; 2000.
4. Green Cheistry-Environmentally Benign Reactions, V. K .Ahluwalia. Ane books Pvt. Limited.
5. Green Chemistry. Mohit Books International. New Delhi-110002.