

Lecture Plan							
Name of the college: Government College of Arts, Science and Commerce, Sanquelim- Goa							
Name of Faculty: Ms Dipika Gosavi				Subject: Chemistry			
Paper code: CHC-303				Program: T Y BSc		Division: A	
Academic year: 2025 - 2026				Semester: V		Total Lectures: 30	
Course Objectives: : To develop a strong foundation in green chemistry techniques by understanding fundamental concepts, applying mathematical models, and performing related problem-solving and experimental analysis.							
Expected Course Outcome: 1. To understand solvent-free and safer solvent organic reactions. 2. 2. To demonstrate the role of green catalysis in organic reactions. 3. 3. To acquire knowledge on modern green techniques..							
Student Learning Outcome: 1.							
Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	20/06/2025	28/06/2025	1	Solvent free reaction: Grinding techniques – Aldol condensation between 3,4-dimethoxybenzaldehyde and	Assignment: Write a brief note on mechanogrinding as a green chemistry	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.

				1-indanone, procedure, advantages and drawbacks	method and explain why it reduces solvent hazards.		
July	30/06/2025	05/07/2025	2	Ball milling technique – principle, instrumentation, working, advantages, disadvantages, one application	Assignment: Write a brief note on mechanogrinding as a green chemistry method and explain why it reduces solvent hazards.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
July	07/07/2025	12/07/2025	2	Water as green solvent – with example of Diels–Alder reaction, theory on how water works as solvent, advantages and disadvantages	Assignment: Write a brief note on mechanogrinding as a green chemistry method and explain why it reduces solvent hazards.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
July	14/07/2025	19/07/2025	2	Supercritical liquids – procedure for extraction of D-limonene from orange peels, advantages of using supercritical CO ₂	Assignment: Explain how water promotes the Diels–Alder reaction. Mention two advantages and one drawback of using water as a solvent.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
July	21/07/2025	26/07/2025	2	Ionic liquids as designer solvent – reasons, preparation of [Bmim]BF ₄ , green preparation of 1-acetyl ferrocene	Assignment: Outline the steps involved in extracting D-limonene from orange peels using supercritical CO ₂ and explain its advantage over conventional extraction.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
July/ August	28/07/2025	02/08/2025	2	Deep eutectic solvents – properties and one application with example of choline chloride and urea	Assignment: Explain why ionic liquids are called “designer solvents” and describe the preparation of [Bmim]BF ₄ .	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
August	04/08/2025	09/08/2025	2	Catalysis – definition and content of catalysis, types of	Assignment: Write about the properties of deep	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.

				catalysis, homogeneous and heterogeneous	eutectic solvents and explain one application of choline chloride–urea mixture.		
August	11/08/2025	16/08/2025	2	Types of green catalysis – solid supported reagents, advantages and disadvantages, examples: NaBH ₄ –alumina and PCC–silica with one application of each	Assignment: Define catalysis and differentiate between homogeneous and heterogeneous catalysis with suitable examples.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
August	18/08/2025	23/08/2025	2	Biocatalysts or natural catalysts – thiamine hydrochloride in benzoin condensation and L-proline in enantioselective aldol reaction, advantages of both	Assignment: Discuss the advantages and disadvantages of solid-supported reagents and describe one application of NaBH ₄ –alumina.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
August	25/08/2025	30/08/2025	CHATURTHI BREAK				
September	01/09/2025	06/09/2025	2	Phase transfer catalysis – definition, phase transfer catalyst, mechanism, advantages, application using 18-crown-6 ether or ammonium salt	Assignment: Explain the role of thiamine hydrochloride in benzoin condensation and L-proline in enantioselective aldol reaction.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
September	08/09/2025	13/09/2025		Microwave heating technique – principle (convection, dipolar ionisation), working, advantages, limitations, green synthesis of metallophthalocyanine complexes	Assignment: Explain the mechanism of phase transfer catalysis and give one application using 18-crown-6 ether.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.

September	15/09/2025	20/09/2025	2	Ultrasonication technique – principle (acoustic cavitation with diagram), working, advantages, limitations, preparation of Grignard reagent	Assignment: Describe the principle of microwave heating and outline the green synthesis of metallophthalocyanine complexes.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
September	22/09/2025	27/09/2025	2	Ultrasonication technique – principle (acoustic cavitation with diagram), working, advantages, limitations, preparation of Grignard reagent	Assignment: Explain acoustic cavitation in ultrasonication and describe how Grignard reagents can be prepared using this technique.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
September/ October	29/09/2025	04/10/2025	2	Photochemistry – principle of photochemical reactions, organic photochemical reactions with two examples, advantages and drawbacks as a green technique	Assignment: State the principle of photochemical reactions and write two examples of organic photochemical reactions.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
October	06/10/2025	11/10/2025	2	Photochemistry – principle of photochemical reactions, organic photochemical reactions with two examples, advantages and drawbacks as a green technique	Assignment: Explain the role of thiamine hydrochloride in benzoin condensation and L-proline in enantioselective aldol reaction.	Power point presentation/ Smart board	Puri, Sharma and Kalia, Principles of Inorganic Chemistry, 33rd Edition, Vishal Publishing Co. (2018).

October	13/10/2025	18/10/2025	2	Electrochemistry and Flow Chemistry – principles, electrochemical set up diagram, one application, advantages and limitations, flow chemistry principle, one application, advantages over batch process	Assignment: Draw a labeled electrochemical setup and describe one application of electrochemistry. Compare flow chemistry with batch process, mentioning one advantage.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.
October	21/10/2024	21/10/2024	2	Solvent free reaction: Grinding techniques – Aldol condensation between 3,4-dimethoxybenzaldehyde and 1-indanone, procedure, advantages and drawbacks	Assignment: Draw a labeled electrochemical setup and describe one application of electrochemistry. Compare flow chemistry with batch process, mentioning one advantage.	Power point presentation/ Smart board	Ahluwalia, V. K., Green Chemistry: Environmentally Benign Reactions, Anne Books India, New Delhi, 2006.

Assessment Rubrics

Component	Max Marks
ISA 1	7.5
ISA 2	7.5
Practical	-
Project	-
Semester End Exam	45