

SWARNIM STARTUP & INNOVATION UNIVERSITY

SWARNIM SCIENCE COLLEGE

VALUE ADDED COURSE (VAC)

Green Chemistry Course -VACGC

Duration: **30 Hours (15 Sessions, 2 Hours Each)**

Session	Topic	Content	Duration
Session 1	Introduction to Green Chemistry	Definition, Principles of Green Chemistry, Importance, and Benefits	2 hours
Session 2	Green Chemistry Metrics	E-Factor, Atom Economy, Carbon Efficiency, Life Cycle Analysis	2 hours
Session 3	Green Solvents and Reagents	Solvent Selection Guides, Water as a Green Solvent, Ionic Liquids, Supercritical CO ₂ , Green Reagents	2 hours
Session 4	Catalysis in Green Chemistry	Types of Catalysts, Homogeneous and Heterogeneous Catalysis, Biocatalysis, Case Studies	2 hours
Session 5	Renewable Feedstocks	Biomass, Renewable Resources, Green Chemistry in Polymer Production, Bio-based Chemicals	2 hours
Session 6	Energy Efficiency in Chemical Processes	Energy Minimization, Alternative Energy Sources, Microwave and Ultrasound Chemistry	2 hours
Session 7	Waste Minimization and Management	Waste Prevention, Recycling and Reuse, Industrial Ecology, Zero Waste Strategies	2 hours
Session 8	Green Synthesis and Sustainable Design	Designing Safer Chemicals, Green Synthesis Pathways, Sustainable Manufacturing Processes	2 hours
Session 9	Analytical Techniques in Green Chemistry	Real-Time Analysis, In-Process Monitoring, Green Analytical Methods	2 hours
Session 10	Green Chemistry in Industry	Industrial Case Studies, Green Engineering Principles, Sustainable Practices in Chemical Industry	2 hours
Session 11	Regulations and Policies	Environmental Regulations, Policy Frameworks, Incentives for Green Chemistry	2 hours
Session 12	Green Chemistry in Education and Outreach	Incorporating Green Chemistry into Curriculum, Public Awareness, Community Engagement	2 hours
Session 13	Challenges and Barriers	Technical and Economic Challenges, Overcoming Barriers, Future Directions	2 hours



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Session 14	Case Studies in Green Chemistry	Detailed Analysis of Successful Case Studies in Pharmaceuticals, Agriculture, and Consumer Products	2 hours
Session 15	Recent Developments and Future Trends	Innovations in Green Chemistry, Emerging Technologies, Future Trends	2 hours

Assessments

- **Participation:** Active involvement in discussions, interactive sessions, and peer reviews.
- This curriculum provides a thorough understanding of green chemistry principles and practices, combining theoretical knowledge with practical skills to help participants contribute to sustainable chemical processes and innovations.




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