

BS Chemistry Semester-V					
Programme	BS Chemistry	Course Code	CHEM-391	Credit Hours	2
Course Title	Introduction to Green Solvents		Course Type	Major Elective	
Course Introduction					
This course is aimed to make students learn about green solvents essential for any of the chemical reaction to make it environmentally benign. It explores the principles, applications and environmental impacts of green solvents in chemical processes. Introduction to green solvents, traditional solvents and their impact, traditional vs green solvents, solvent selection and evaluation, types of green solvents, water, supercritical fluids, ionic liquids & deep eutectic mixtures, physiochemical properties of green solvents, nomenclature of ionic liquids, synthesis of ionic liquids, applications of green solvents in organic synthesis and industrial processes. Challenges and future directions					
Learning Outcomes					
On the completion of the course, the students will be able to: 1. Understand the principles of green chemistry and solvent selection 2. Explore various types of green solvents and their applications 3. Evaluate the environment and economic impact of traditional vs green solvents 4. Explore the applications of green solvents in various lab scale processes					
Course Content			Assignments/Readings		
Week 1	Introduction to green solvents		Related reading		
Week 2	Traditional solvents and their impact		Related reading		
Week 3	Traditional vs. green solvents		Related reading		
Week 4	Solvent selection and evaluation		Related reading		
Week 5	Types of green solvents		Related reading		
Week 6	Water and supercritical fluids as green solvents		Related reading		
Week 7	Ionic liquids and deep eutectic mixtures as green solvents		Related reading		
Week 8	Mid-term Examination				
Week 9	Physiochemical properties of green solvents		Related reading		
Week 10	Types and nomenclature of ionic liquids		Related reading		
Week 11	Synthesis of ionic liquids		Related reading		
Week 12	Task specific ionic liquids and their significance		Related reading		
Week 13	Applications of green solvents in organic synthesis		Related reading		
Week 14	Applications of green solvents in industrial processes		Related reading		
Week 15	Challenges and future directions		Related reading		
Week 16	Final term Examination				

Textbooks and Reading Material	
1. J. H. Clark, A. Hunt, C. Topi, G. Paggiola and J. Sherwood, (2017), <i>Sustainable Solvents: Perspectives from Research, Business and International Policy (Green Chemistry Series)</i> , RSC Publishers. 2. A. Lapkin and D. Constable, (2008), <i>Green Chemistry Metrics: Measuring and Monitoring Sustainable Processes</i> , Wiley Publishers. 3. Douglas, R. Macfarlane, Mega Kar, and Jennifer M. Pringle, (2017), <i>Fundamentals of Ionic Liquids, from Chemistry to Applications</i> , Wiley VCH publishers. 4. Micheal Freementle, (2010), <i>An Introduction to Ionic Liquids</i> , RSC Publishers. 5. Jason P. Hallett. (2010), <i>An Introduction to Ionic Liquids</i> , RSC Publishers. 6. Suojian Zhang, Xinmei Lu, Sucai Li. (2009), <i>Ionic Liquids: Physicochemical Properties</i> , Elsevier Publishers 7. P. Anastas and P. Trevorow, (2013), <i>Handbook of Green Chemistry, Green Processes, Designing Safer Chemicals</i> , Wiley Publishers	
Teaching Learning Strategies	
Class lecture method, which includes seminars, discussions, assignments and projects. Audio-visual tools will be used where necessary	
Assignments: Types and Number with Calendar	
1. Written Task 2. Presentation 3. Tutorials 4. Solving related exercises	