

<b>GREEN TECHNOLOGIES</b>	
<b>CHY 312</b>	<b>Credits: 3</b>
<b>Instruction: 3 periods &amp; 1 tutorial/week</b>	<b>Sessional marks: 40</b>
<b>End exam: 3 Hours</b>	<b>End exam marks: 60</b>

**Target group:** Chemical Engineering, Mechanical Engineering, Electrical and Electronics Engineering, Electronics and Communication Engineering.

### Course Objectives

- To provide basic knowledge on green technology.
- To understand the principles of green chemistry and eco friendly methodologies.
- To create awareness on Cleaner development mechanisms.
- To develop concepts on various energy efficient systems and green buildings.

### Course outcomes

By the end of the course, student will be able to:	
1	Realize the importance of green technologies in sustainable growth of Industry and society.
2	Adopt alternative methods and solvents for green synthesis.
3	Develop cleaner production and treatment mechanism for pollution prevention.
4	Design and implementation of suitable energy efficient processes.
5	Plan and use of selective materials for green buildings.

## SYLLABUS

### Unit-I Introduction to green chemistry and technology

**8 periods**

Twelve principles of green chemistry, Green technology-definition, importance, factors affecting green technology.

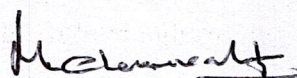
Role of industry, government and institutions; industrial ecology, role of industrial ecology in green technology.

### Unit-II Green synthesis and Solvents

**10 periods**

Green methods of synthesis- microwave assisted synthesis, solvent free techniques- Reaction on solid supports.

Alternative solvents Ionic liquids- general synthesis, applications; super critical fluids- extraction, process and applications.

  
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### **Unit-III Cleaner development technologies**

**10 periods**

Cleaner development mechanisms, role of industry; reuse, reduce and recycle, raw material substitution; wealth from waste; carbon credits, carbon trading, carbon sequestration, eco labelling.

Oxidation technology for waste water treatment- Cavitation, Fenton chemistry, photocatalysis and hybrid processes.

### **Unit-IV Energy efficient systems and processes**

**12 periods**

Energy efficient motors, energy efficient lighting, control and selection of luminaries; bio-fuels, fuel cells- working, selection of fuels,

Green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of sustainable green production systems.

### **Unit-V Green Buildings**

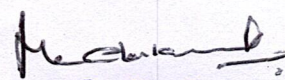
**10 periods**

Definition- Features and benefits, Fundamental planning decisions for energy efficient building- site selection, buildings forms and orientations, building fabrics and insulation, ventilation, passive solar features.

Ecofriendly and cost effective materials, Energy management, roof top solar photovoltaic system and solar tracking system, alternating roofing systems.

### **Prescribed books**

1. Khan B.H, Non conventional energy resources, Tata McGraw-Hill, New Delhi 2006.
2. Rashmi Sanghi and M.M. Srivastava, Green Chemistry-Environment Friendly Alternatives, Narosa Publishing House, New Delhi 2009.
3. Paul L. Bishop, Pollution prevention –Fundamentals and Practices, McGraw-Hill- international 2000.
4. N. Vinutha bai, R. Ravindra, Energy efficient and green technology concepts, International Journal of Research in Engineering and Technology p 253-258, Volume: 03 Special Issue: 06 , 2014, eISSN: 2319-1163 pISSN: 2321-7308.

  
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FED Chemistry  
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