

GREEN TECHNOLOGIES	
CHY 411 (B)	Credits: 3
Instruction: 3 periods & 1 tutorial/week	Sessional marks: 40
End exam: 3 Hours	End exam marks: 60

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	Realise 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 mechanisms 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.

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.

[Code] model paper
IV B.Tech DEGREE EXAMINATIONS
Seventh semester
GREEN TECHNOLOGIES
Common for all branches
(Effective from the admitted batch 2015-16)

Time: Three Hours

Maximum: 60 Marks

Answer **Five** questions, **One** from each **Unit**. Each question carries **Twelve** marks
All parts of a question must be answered at one place; otherwise they will not be valued

UNIT-I

1. a) Discuss the importance of Green Technology. 4M
b) Write a note on Factors affecting the Green Technology. 8M
(OR)
2. a) What is Industrial Ecology? 4 M
b) Explain the role of a government and Institutions In development of Green technology. 8M

UNIT-II

3. a) 2 M
b) Explain with example the microwave assisted synthesis 8 M
(OR)
4. a) i) Define Hot spot? Give example. 2 M
ii) List out endangered and endemic species? 2 M
b) What is biodiversity? Mention the values of biodiversity? 8 M

UNIT-III

5. a) i) Define eutrophication? 2 M
ii) What are the adverse effects of thermal pollution? 2 M
b) Briefly describe the sources, effects, control measures of air pollution? 8 M
(OR)
6. a) i) How Vermi composting can be done? 2 M
ii) What are the sources of e-Waste? 2 M
a) What adverse effects can solid waste cause? How can be solid waste be managed? 8 M

UNIT-IV

7. a) i) What is EIA ? Mention the benefits? 2 M
ii) Discuss the objectives of rain water harvesting. 2 M
b) What do you mean by Sustainable Development? What are the major measures to attain sustainability? 8 M

(OR)

8. a) What meant by population explosion? Discuss the Indian scenario? 4 M
b) What are the major issues and problems related to resettlement and rehabilitation of the displaced people? 8 M

UNIT-V

9. a) Mention the duties and powers of CPCB? 4 M
b) Discuss the salient features of i) Wild life protection Act (4+4) M
ii) Forest conservation Act

(OR)

10. a) Discuss the features of Johannesburg summit. 4 M
b) Write note on i) Stockholm conference (4+4) M
ii) Ralegeon siddhi

