ENVIRONMENTAL SCIENCE AND ENERGY MANAGEMENT

Subject Code : **No. of Credits :** 2 (TH:4,T:0,P:0)

I. RATIONALE:

This course introduces students to environmental science and sustainable energy practices. It emphasizes the importance of maintaining ecological balance, pollution control, and energy conservation to support sustainable development. Students gain knowledge about various environmental issues and legal frameworks, as well as practical energy management and renewable energy solutions to address industrial and domestic energy challenges.

II. INDUSTRY/EMPLOYER EXPECTED OUTCOME:

- Understand the fundamentals of ecosystems and sustainable development.
- Analyze different types of environmental pollution and propose control strategies.
- Evaluate the impact of climate change and social issues related to the environment.
- Apply principles of energy conservation, energy audits, and efficient technologies.
- Understand and identify various renewable energy sources and their applications.

III. COURSE LEVEL LEARNING OUTCOMES (COs):

CO1: Understand ecosystem structures, natural resources, and sustainable development.

CO2: Identify various types of pollution, their sources, effects, and control measures.

CO3: Recognize the role of social issues, legislation, and technologies in environmental protection.

CO4: Apply concepts of energy efficiency and conduct basic energy audits.

CO5: Understand and differentiate between types of renewable energy and their benefits.

IV. THEORY LEARNING OUTCOME AND ALIGNED COURSE CONTENT:

Sr. No	Theory Learning Outcomes (TLOs) aligned to COs	Learning content mapped with Theory Learning Outcomes (TLOs) and COs.	Suggested Learning Pedagogies.	No of Lecture	Relevant COs
1	**TLO 1.1** Define and explain environment and ecosystem	**Unit I: Environment, Ecosystem, and Natural Resources:** Environment definition, scope, ecosystem components & structure, sustainable development, water and forest resources	Lecture, Discussion, Activity	14	CO1
2	**TLO 2.1** Describe pollution types and their effects	**Unit II: Environmental Pollution and Social Issues:** Air, water, soil, marine, noise, thermal pollution, solid waste management, individual roles	Lecture, Case Study, Demo	15	CO2
3	**TLO 3.1** Discuss social issues and environmental laws	**Unit III: Social Issues and Environment:** Rainwater harvesting, global warming, disaster management, green buildings, environmental acts, organic farming	Seminar, Group Work, Debate	14	CO3
4	**TLO 4.1** Explain energy conservation and auditing methods	**Unit IV: Energy Conservation and Audit:** Efficiency in lighting, appliances, motors, audit methodology, BEE schemes	Lecture, Field Survey, Hands-On	14	CO4
5	**TLO 5.1** Identify renewable energy sources	**Unit V: Renewable Energy:** Types of sources, electric vehicles	Lecture, Demo, Presentation	07	CO5

V. SUGGESTED ASSIGNMENT / SELF-LEARNING ACTIVITIES:

S.N.	Title	Description	Skills Developed
1	Pollution Survey	Identify pollution sources in local area and propose mitigation measures	Analytical, environmental awareness
2	Water Harvesting Project	Design a simple rainwater harvesting system	Sustainability practice
3	Energy Audit Report	Conduct an energy usage survey at home or college	Energy management
4	Green Building Case Study	Research on a certified green building	Critical thinking
5	Renewable Tech Research	Presentations on solar, wind, and EVs	Technical awareness

VI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE:

S. N.	Unit	Unit Title	Aligned COs	Learning Hours	Weightage
1	I	Environment, Ecosystem and Natural Resources	CO1	14	20
2	II	Environmental Pollution and Social Issues	CO2	15	25
3	III	Social Issues and Environment	CO3	14	20
4	IV	Energy Conservation and Energy Audit	CO4	14	20
5	V	Renewable Energy	CO5	7	15
Total				**64**	**100**

VII. CO-PO MATRIX FORM:

S.N.	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
1	CO1	3	2	1	2	3	2	2
2	CO2	3	3	2	2	3	1	2
3	CO3	3	3	2	2	3	2	3
4	CO4	3	3	3	3	2	2	3
5	CO5	3	2	2	2	3	1	3
Legend :- High = 3, Medium = 2, Low = 1, No Mapping = -								

VIII. SUGGESTED LEARNING MATERIALS / BOOKS:

S.N.	Author	Title	Publisher
1	D.D. Mishra	Fundamental Concept in Environmental Studies	S. Chand & Co Ltd
2	Deswal & Deswal	Environmental Science	Dhanpat Rai & Sons
3	P.D. Gera	Handbook of Organic Farming	Abhishek Publications
4	Daniel	Environmental Studies	Wiley India
5	M. Ajni Reddy	Textbook of Environmental Science	BS Publication, Hyderabad
6	CII Energy Management Cell	Manuals on Energy Efficiency	Various Case Studies

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