ENVIRONMENTAL BIOTECHNOLOGY

(Professional Elective-IV)

Course Code: 15CH1134

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Course Outcomes :

At the end of the Course, the Student will be able to:

CO 1 Understand the importance of environmental biotechnology and explain the role of microbes and their metabolic activates.

CO 2 Explain the importance of extremophiles and thermophiles in environmental biotechnology.

CO 3 Understand the environmental pollution and their controlling mechanism.

CO 4 Understand the various effluent treatment equipment.

CO 5 Understanding the nature of biowaste and its reduction techniques.

UNIT-I **(10 Lectures)**

Introduction to biotechnology, Role of environmental biotechnology, use of environmental biotechnology, role of microbes and metabolism in biotechnology, metabolic pathways relevant to environmental biotechnology- TCA cycle and glycolsis cycles.

UNIT-II **(10 Lectures)**

Fundamentals of biological intervention- Extremophiles, Thermophiles, Xenobiotics and other problematic chemicals, Mobility of DNA.

UNIT-III **(10 Lectures)**

Pollution and pollution control – Classifying pollution, the pollution environment, pollution control strategies, practical toxicity issues,

use of Bio filters, Bio trickling filters and bio scrubbers in pollution control. Clean technology to reduce pollution.

UNIT-IV (10 Lectures)

Aerobes and Effluents – sewage treatment, septic tank, Nitrogeneous waste,

Aeration-Diffused sir systems, mechanical aeration systems,

Trickling filters, activated sludge systems, process disruption due to toxicity, Deep shaft process, pure oxygen system, Rotating biological contactor, Membrane Bioreactors, Cellulose ion-exchange media, sludge disposal.

UNIT-V (10 Lectures)

Biotechnology and waste; Nature of Biowaste, Composition of biowaste, Landfill, biological waste treatment, composting, composting process, Applying composting to waste management, process parameters affecting composting. Anaerobic digestion, the digestion process, applying anaerobic digestion to waste management, process parameters affecting anaerobic digestion, other biotechnologies like annelidic conversion, entrophic fermentation.

TEXT BOOK:

G M Evans & J C Furlong, "Environmental Biotechnology - Theory and Application,", John Wiley, 2003

REFERENCE :

Bruce E. Rittmann & Perry L. McCarty, "Environmental Biotechnology: Principles and Applications", McGraw-Hill, 2001.