25PEEM03 ECOLOGY AND ENVIRONMENT (3-1-0)

MODULE-I: (10 HOURS)

Basics of Environment

Physical, biological and chemical environment, structure and composition of atmosphere, hydrosphere, lithosphere and bio Noise Pollution And Control

sphere, Meteorological elements of environment - Pressure, temperature, precipitation, Humidity, radiation and wind, Mass and energy transfer across the various interface material balance, first and second law of thermodynamics, Heat transfer process

MODULE-II: (10 HOURS)

Fundamentals of Ecology

Organizational level of ecological systems, components of ecosystem, Ecosystem structure, Flow of energy and material cycling, Trophic pyramids and food webs, Productivity of ecosystem, Ecological efficiencies, biogeochemical cycles, Ecological succession, Population characteristics, Malthusian growth, species interactions, qualitative and quantitative

characteristics of communities.

MODULE-III: (10 HOURS)

Biodiversity and Environment

Introduction to Biodiversity, Types of biodiversity, Species richness and evenness, Megadiversity zones and Hot spots, IUCN threat categories, Red data book, importance of biodiversity, Ecosystem services, Threats to biodiversity, In situ and ex-situ conservation, Protected areas and functions.

Human population and Environment

Human population demographics, Effects of overpopulation on agriculture, urbanization, environmental degradation and public health. Global challenges associated with climate change and growing pollution. Concept of cleaner production and sustainable development, SDGs.

MODULE-IV: (10 HOURS)

Application of Ecological principles

Landscape ecology, Ecosystem response to environmental contamination (de- oxygenation, eutrophication, pesticides, metals). Principles of Biomagnification and Biotransformation, Biomonitoring – a tool for environmental monitoring, Ecological restoration – from theory to practice, Phytoremediation and bioremediation of environmental contaminants. Microbial Catabolism of Organic Pollutant, Bio adsorbents.

TEXT BOOK


1. Fundamentals of Ecology (3rd ed.) - Eugene P. Odum. WB Sunders Company, Philadelphia, 1971.(T1)
2. Ecology and environment – P. D. Sharma (T2)
3. Fundamentals of Ecology- MC Dash, Tata - McGraw Hill, New Delhi, 1996. (T3)
4. Introduction to Environmental Engg. - GM Masters, Prentice Hall of India, 1991. (T4)
5. Biodiversity and Conservation - P. C. Joshi (T5)
6. A Text book of Environmental Science -Prabhat Patnaik 6. A Textbook of Environmental Sciences-Purohit (T6)


REFERENCE BOOK


1. Microbiology for Environmental Scientists and Engineers – AF Gaudy (R1)
2. Enzymatic Transformation of Metals - Strains for Enhanced Biodegradation - Improved Biodegradation by Protein. T Gaudy, McGraw-Hill, New York, 1980. (R2)
3. Elements of Ecology (6th edition) – Thomas M. Smith and Robert Leo Smith, Pearson Education, 2007. (R3)
4. Biodiversity and Conservation - M. P. Singh and Aravind Kumar (R4)
5. Kangas, P.C. and Kangas, P., Ecological Engineering: Principles and Practice, Lewis Publishers, New York, 2003.
6. Etnier, C. and Guterstam, B., Ecological Engineering for Wastewater Treatment, Lewis Publishers, New York, 1997