

Course Code	Course Name	Credits
26ZY012	PRINCIPLES OF ECOLOGY	04

Course Objectives

- To understand the fundamental concepts and principles related to animal biology.
- To explain the structure, function, and organization of different biological systems.
- To develop knowledge on physiology, ecology, and evolutionary adaptations in animals.
- To analyze the importance of biodiversity and environmental conservation.
- To enhance observation, analytical thinking, and practical skills in zoological studies.

Learning Outcomes

- Explain the basic concepts and principles associated with the course.
- Differentiate structural and functional characteristics among organisms.
- Examine physiological and ecological adaptations in animals.
- Analyze the significance of biodiversity and conservation practices.
- Apply scientific knowledge and analytical skills in zoological research and studies.

Unit 1 – The Environment (12 Hrs.)

Levels of organization- individual, population, community, ecosystem, biosphere; Abiotic and biotic ecological factors, Ecological adaptations, biotic and abiotic interactions. Habitat and Niche: Concept of habitat and niche; niche width and overlap; fundamental and realized niche; resource partitioning; character displacement.

Unit 2 – Population Ecology (12 Hrs.)

Characteristics of a population; population growth curves; Species Interactions: Types of interactions, interspecific competition, herbivory, carnivory, pollination, symbiosis. Population dynamics- Age structure, sex ratio, life history strategies (r-selected vs. K-selected); Metapopulations, Habitat fragmentation, and extinction risk.

Unit 3 - Community Ecology (12 Hrs.)

Community structure - Food webs, trophic levels, keystone species; Species interactions - Competition, predation, mutualism, parasitism; Succession- Primary and secondary succession, mechanisms; changes involved in succession; concept of climax. Nature of communities; community structure and attributes; edges and ecotones.

Unit 4 – Ecosystem Ecology (12 Hrs.)

Ecosystem structure; ecosystem function; energy flow and Biogeochemical cycles (C, N, P); primary production and decomposition; structure and function of some Indian ecosystems: terrestrial (forest, grassland) and aquatic (fresh water, marine, estuarine). Major terrestrial biomes; biogeographical zones of India.

Unit 5 - Applied Ecology (12 Hrs.)

Environmental pollution; global environmental change. Biodiversity and its importance; Threats to biodiversity; IUCN categories of threat, biodiversity management approaches. Conservation Principles and management of Indian wild life – rare and endangered species - Project Tiger, Wild life sanctuaries, National parks and Biosphere reserves in India. Red data book.

Reference Books:

1. Odum, E.P. (1983). Basic Ecology, Saunders Publishing, New York.
2. Berwer. A. (1988). The Science of Ecology. Saunders College Publishing.
3. Bandopadhyay, J. (1985) India's Environment Crisis and response – Natraj Publishers, Dehra Dun.
4. Smith, R. L. (1986). Elements of Ecology, Harper and Row Publishers, New York.
5. Soli, J. Archeivala – 1988 – Wastewater treatment for pollution control – second Ed. Tata McGraw hill Publication Company Ltd., New Delhi – ISBN – 0-07-463002 – 4.

Websites and eLearning Sources:

<https://openstax.org/details/books/biology-2e>
<https://www.biologydiscussion.com/ecology>
<https://www.easybiologyclass.com/category/ecology/>