Course Code	Course Name	Credits
26ZY511	ECOLOGY AND CONSERVATION BIOLOGY	04

Course Objectives

- To understand the fundamental concepts and principles of ecology and conservation biology.
- To explain ecosystem structure, ecological interactions, and energy flow in nature.
- To develop knowledge on biodiversity, wildlife conservation, and environmental management.
- To analyze ecological issues, habitat degradation, and conservation strategies.
- To enhance scientific awareness and practical skills related to environmental protection and sustainable resource management.

Learning Outcomes

- Explain the basic concepts and significance of ecology and conservation biology.
- Differentiate various ecosystem components, ecological relationships, and biodiversity patterns.
- Examine the causes and impacts of environmental degradation and biodiversity loss.
- Analyze conservation methods, wildlife management, and sustainable utilization of natural resources.
- Apply ecological principles and conservation strategies in environmental studies and research.

Unit 1 – Principles of Ecology (12 Hrs.)

Definition, principles and scope of Ecology; Ecological species concept. Biomes and their environments, Habitat and Niche. Fresh and Marine water ecosystems: Classification and Characteristics, eutrophication, seasonal changes. Terrestrial ecosystems: Forests – Grass lands – Tundra – Desert, island biogeography.

Unit 2 – Population Ecology (12 Hrs.)

. Population growth models- Mathematical Interpretations, Population fluctuations and Explanatory models (Beverton – Holt, Ricker), Synthesis of population regulation theories. Life history strategies. Meta-population concept, Models of persistence and extinction risks.

Unit 3 - Community Ecology (12 Hrs.)

Community structure. Species coexistence – maintenance of species diversity, Island Biogeography theory, Biodiversity and Ecosystem Function. Interspecific Interactions – Competition, predation, mutualism. Community stability and Functions – Food web models and Network, Disturbance and Implications. Ecological modeling - Predator-prey models, Epidemiological models, Harvest models, Foraging models

Unit 4 – Ecological crises and Management (12 Hrs.)

Measuring global biodiversity and its decline with special reference to mammals, birds, herpetofauna, fish and insects. Local and regional biodiversity-niche assembly theories, Unified Neutral theory. Threats to species diversity: Habitat loss, Habitat fragmentation and species extinction, Endemism and biodiversity, Population bottleneck, Genetic drift, inbreeding depression, Risks to biodiversity extinction, Extinction vortex.

Unit 5 - Pollution (12 Hrs.)

Air Pollution– Greenhouse gases and Green House Effect, Stratospheric ozone, Acid rain. Water and Soil Pollution Criteria and standards in India, health hazards and toxicology. Role of environmental epidemiological studies and health indices in evaluation of environmental health hazards: environmental epidemiological episodes in India and Abroad. Environmental Laws; Environmental Laws in India – legislation and Execution.

Reference Books:

1. Odum, E.P. & Barrett, G.W. (2021). Fundamentals of Ecology (5th Edition). Cengage Learning Publishers.
2. Sharma, P.D. (2020). Ecology and Environment. Rastogi Publications, Meerut.
3. Kormondy, E.J. (2018). Concepts of Ecology (4th Edition). Pearson Education Publishers.
4. Verma, P.S. & Agarwal, V.K. (2019). Environmental Biology: Principles of Ecology. S. Chand & Company Ltd.
5. Barnes, R.S.K. & Hughes, R.N. (2017). An Introduction to Marine Ecology. Wiley-Blackwell Publishers.

Websites and eLearning Sources:

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