
SEMESTER IV

I. MAJOR COURSE- MJ 6:

ECOLOGY AND ENVIRONMENTAL STUDIES

Marks: 25 (5 Attd. + 20 SIE: 1Hr) + 75 (ESE: 3Hrs) = 100	Pass Marks: Th (SIE + ESE) = 40
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(Credits: Theory-04) **60 Hours**

Course Objectives:

1. This course aims to introduce the students to the concepts and principles of ecology, biological diversity, conservation, sustainable development, population, community and ecosystem structure and function, application of these concepts to solve environmental problems.
2. To make them understand complex community patterns, processes, and ecosystem functioning.

Course Learning Outcomes:

1. It will acquaint the students with complex interrelationship between organisms and environment; make them understand methods to studying vegetation, community patterns and processes, ecosystem functions, and principles of phytogeography. What are the limiting factors controlling distribution and growth of organisms?
2. What are the characteristics of organisms as population, community and ecosystems? What are the intra- and inter-specific interactions? What are the ecosystem functions? What are applications of ecological knowledge for the benefit of anthropogenic society?

Course Content:

Unit 1: Introduction Basic concepts of ecology and environmental biology. (2 lectures)

Unit 2: Abiotic interactions

Soil: Importance and Soil profile. Water: Importance and Hydrological Cycle. Light and temperature. (6 lectures)

Unit 5: Biotic interactions

Trophic organization, basic source of energy, autotrophy, heterotrophy; symbiosis, commensalism, parasitism; food chains and webs; ecological pyramids; biomass, standing crop. (6 lectures)

Unit 6: Population ecology

Characteristics and Dynamics. Ecological Speciation (4 lectures)

Unit 7: Plant communities

Concept of ecological amplitude; Habitat and niche; Characters: analytical and synthetic; Ecotone and edge effect; Dynamics: succession (Hydrosere and Xerosere). (6 lectures)

Unit 8: Ecosystems Structure and function; Trophic organization; Food chains and Food webs; Ecological pyramids. Pond ecosystem, grassland ecosystem and forest ecosystem, Biogeochemical cycles (Carbon, Nitrogen and Phosphorus cycle), Energy flow and productivity. (9 lectures)

Unit 10: Phytogeography

Phytogeographical regions of India; Local Vegetation and Endemism; hotspots. (5 lectures)

Unit 11: Pollution and Climate change

Introduction to pollutants, pollution, causes, control and impact of air, water, soil, noise. Role of Biotechnology in pollution control. Major global environmental issues: Climate change, ozone depletion, global warming, acid rain, carbon emission; Objectives of United Nations Framework Convention on Climate Change (UNFCCC). (12 lectures)

Unit 13: Biodiversity and Conservation Biodiversity: Definition, threats and importance, natural resources: renewable and non-renewable, conservation- in-situ and ex-situ methods. IUCN conservation category: Endangered, threatened, vulnerable, Biodiversity management committees, people's biodiversity register; Red Data Book, sustainable development goals: Biofuel and Green hydrogen. Convention on Biological Diversity,