

ENS-222 FUNDAMENTALS OF ECOLOGY 3(3+0)

COURSE CODE: ENS-222
COURSE NAME: Fundamentals of Ecology
CREDIT HOURS: Theory = 03 Practical = 0 Total = 03
CONTACT HOURS: Theory = 48 Practical = 0 Total = 48
PREREQUISITE: None

MODE OF TEACHING: 3 hours of Lecture per week (100%)

COURSE DESCRIPTION:

Ecology is a core discipline in environmental sciences that explores the relationships between organisms and their environment. It provides the scientific basis for understanding and addressing global issues such as biodiversity loss, and ecosystem degradation. This course equips students with essential ecological concepts and applied skills aligned with international standards. It supports the development of informed professionals capable of contributing to sustainable environmental management and policy.

COURSE LEARNING OUTCOMES:

By the end of this course, students will be able to:

- a) Understand basic concepts and principles of ecology.
- b) Describe the structure and function of ecosystems.
- c) Analyze ecological relationships and interactions in natural environments.

TOPICS COVERED:

Theory:

Week	Topics to be covered
1	Introduction to Ecology: scope of ecology, Levels of biological organization, branches of ecology.
2-3	Ecosystem Basics: Components (biotic/abiotic), types of ecosystems, trophic structure, food chains & webs, energy flow
4-5	Biogeochemical Cycles: Water, carbon, nitrogen cycles
6-7	Population Ecology: Population growth, limiting factors, basic models
8	Community Ecology: Species interactions (competition, predation, mutualism), succession
9	Mid Semester Exam
10-11	Ecological production: primary and secondary productivity, productivity of different ecosystems.
12-13	Biomes of the world: Tundra, taiga, rainforest, savanna, grasslands, deserts
14-15	Ecological Zones of Pakistan
16	Human Impact on Ecosystems: Pollution, habitat destruction, biodiversity loss
17	Climate Change & Ecology: Effects of global warming, ecosystem resilience
18	End Semester Exam

TEXT AND MATERIAL:**Textbooks:**

1. Michael Begon, Robert W. Howarth, Colin R. Townsend. Essentials of Ecology. Latest edition. Publisher Wiley
2. Jennifer Heath. Principles of Ecology. Latest edition. Publisher Salem Press.

Reference Books:

1. Eugene Pleasants Odum, Gary W. Barrett. Fundamentals of ecology. Latest edition. Publisher Thomson Brooks/Cole
2. Joseph Travis, Thomas E. Miller, 2022. Foundations of Ecology II Classic Papers with Commentaries, University of Chicago Press
3. Reinhard Mechler, Swenja Surminski, Laurens Bouwer, Joanne Linnerooth-Bayer 2018.
Loss and Damage from Climate Change Concepts, Methods and Policy Options, Springer International Publishing

ASSESSMENT SYSTEM:

Theoretical/ Instruction		
Assessment Category	Marks Distribution (%)	
	Without Project	With Project
Quiz	15	10-15
Assignment	10	5-10
MSE	25	25
Project	-	5-10
ESE	50	45-50