Institute of Zoology,
Faculty of Life Sciences
University of the Punjab, Lahore
Course Outline

Programme	BS Zoology	**Course Code**	**ZOOL-318**	**Credit Hours**	2
Course Title	Ecology				

Course Introduction

Ecology is the study of the interactions between organisms and their environment. This course provides a background in the fundamental principles of ecological science, including concepts of population and community ecology, biodiversity, and sustainability. Students will acquire a thorough understanding of the scientific field of ecology, how ecologists conduct research, and the importance of general ecological knowledge. Moreover, this course will help to develop an understanding of how scientific methods are used to construct ecological knowledge. The course will also explore some of today's major ecological challenges, and the important research that is being done to address these concerns.

Learning Outcomes

1. To gain an understanding and deep insight to basic ecological principles.
2. To make understanding of solid foundation of the fundamental ecology topics.
3. To gain an understanding of the questions that an ecologist study, the methods they use, and the questions that remain unanswered.

	Course Content	**Assignments/Readings**
Week 1	**Unit-1: Introduction to Ecology** 1.1 What is Ecology 1.2 The Scope of Ecology 1.3 The Subdivisions of Ecology	
	Unit-2 Trophic levels of Ecosystems 2.1 Importance of studying trophic level 2.2 Autotrophs 2.3 Herbivores and carnivores	
Week 2	2.4 Omnivores 2.5 Decomposers	
	2.6 Food chains 2.7 Food webs 2.8 Pyramids of number and pyramids of biomass	
Week 3	**Unit-3 Energy Transfer** 3.1 Energy and disorder 3.2 Primary production in aquatic and terrestrial communities	
	3.3 Pyramids of energy	
Week 4	**Unit- 4 Nutrient Cycling** 4.1 Carbon cycle 4.2 Nitrogen cycle	
	4.3 Sulphur cycle 4.4 Phosphorus cycle	
Week 5	**Unit-5 Population Ecology**	

	5.1 Populations and Population Change 5.2 Dispersal of Organisms 5.3Patterns in population dynamics 5.4 Presentation of demographic data	
	5.5 Evolutionary strategies 5.6 Population growth 5.7 Factors regulating population size	
Week 6	**Unit-6 Community Ecology** 6.1 Concept of community 6.2 Structure of communities	
	Unit-7 Succession 7.1 Vegetation changes and their causes 7.2 Primary seres 7.3 Pattern and types of succession	
Week 7	Unit-8 **Habitats and Niches** 8.1 Introduction to habitats and niches 8.2 Gause's competitive exclusion principle 8.3 Species coexistence 8.4 Fundamental and realized niches	
	8.5 Resource partitioning 8.6 Character displacement 8.7 Importance of interspecific competition	
Week 8	**Unit-9 Freshwater Ecology** 9.1 Characteristics of freshwater habitat 9.2 Ecological classification of freshwater organisms and freshwater habitat 9.3 Life in freshwater	
	9.4 Lakes and Ponds 9.5 Lentic versus Lotic habitat	
Week 9	**Unit-10 Marine Ecology** 10.1 Characteristics of marine habitat 10.2 Life in marine habitat	
	10.3 Zonation in sea	
Week 10	**Unit-11 Terrestrial Ecosystem** 11.1 Tropical rain forest 11.2 Tropical seasonal forest	
	11.3 Temperate rain forest 11.4 Temperate deciduous forest	
Week 11	11.5 Boreal forest 11.6 Grassland	
	11.7 Tundra 11.8 Deserts	
Week 12	11.9 Wetland and freshwater biomes 11.10 Coastal and marine biomes	
	Unit-12 Ecological Genetics 12.1 Importance of genetics to ecology 12.2 Patterns of genetic variations	
Week 13	12.3 Genetic variations within an organism	

	Unit-13 Behavioral Ecology 13.1Optimization Theory 13.2 Optimal Foraging	
Week 14	13.3 Parental care 13.4 Alternative strategies	
	13.5 Games theory 13.6 Constrains on adaptation	
Week 15	**Unit-14 Co-evolution** 14.1 Different grades of co-evolution 14.2 Pairwise co evolution	
	14.3 Diffuse co evolution 14.4 Introduced species	
Week 16	**Unit-15 Sociobiology** 15.1 Living in groups 15.2 Optimal group size	
	15.3 Unit of selection and social behaviour 15.4 Advantages and disadvantages of group living	

Textbooks and Reading Material

1. Textbooks.

1. E. P. Odum. 1976. Fundamentals of Ecology National Book Foundation, Islamabad.
2. E.P. Odum. 1996. Ecology: A Bridge between science and society.
3. J.L. Chapman and M.J. Reiss, 1997. Ecology. Cambridge University Press, UK.
4. Krebs. 2000 Ecology: The experimental analysis of distribution and application.
5. M.C. Molles. 1999. Ecology: *Concepts and applications* WCB/McGraw Hill, New York

2. Suggested Readings Books

1. G. Tyler Miller, Jr. 2002. Living in the Environment. Principles, Connections and Solutions. Book/Cole Thomson Learning, USA
2. M.L. McKinney. 2007. Environmental Science: *System and Solution*. 4th Edition. Jones and Bartlett Publication, Boston, USA
3. R. Lloyd.1992. Pollution and Freshwater. Fishing News Books
4. R.K. Singh. 1998. Human Ecology.
5. Smith, 1988. Ecology and Field Biology. National Book Foundation, Islamabad.

Teaching Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos/films will be shown on occasion.

Assignments: Types and Number with Calendar

The sessional work will be a combination of written assignments, class quizzes, projects, presentation,]and class participation/attendance.

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.

3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.