

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

Course Objectives:

The main learning goals students will all accomplish by the end of the semester are

- To gain an understanding of the broad biological significance of ecological theory.
- To make understanding of solid foundation of the fundamental ecology topics.
- To gain an understanding of the questions that ecologists study, the methods they use, and the questions that remain unanswered.

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. Understand and apply the basic concepts of Ecology
2. Acquire theoretical knowledge for rehabilitation of destroyed ecosystems and habitats in the environment.
3. Solve the ecological Problems and their management through scientific approach

Course Contents:

1. **Origin of Solar System and Earth:** Climate variations; Origin of Atmosphere; Origin of Oceans, Life in water: History, Hydrologic cycle; Fresh Water Ecology, Marine Ecology, Estuarine Ecology, Life on land; Terrestrial Ecology, Energy in Ecological System; Food Chain, Food Web, Trophic Levels, Trophic Structure and Ecological Pyramids, Ecosystems (Ecosystem Ecology, Characteristics of an Ecosystem, Kinds of Ecosystem, Structure of Ecosystem). Interaction in Ecosystem (Competition; Exploitation; predation, Herbivory and parasitism, Mutualism).

2. **Concept of Primary Production:** Aquatic primary production, Terrestrial primary production; Consumer influence
3. **Biogeochemical Cycles:** Nitrogen, Phosphorus, Sulphur, Water, Carbon, Nutrient cycles
4. **Population Ecology:** Population dynamics, Population Dispersal
5. **Community Ecology:** Community change during succession, Ecosystem change during succession; Mechanism of succession; Community and ecosystem stability

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

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

Assessments and Examination

Sessional Work:	25 marks
Midterm Exam:	35 marks
Final term Exam:	40 marks

Books Recommended:

1. M.L. McKinney. 2019. **Environmental Science: System and Solution**. 6th Edition. Jones and Bartlett Publication, Boston, USA
2. G. Tyler Miller, Jr. 2016. **Living in the Environment. Principles, Connections and Solutions**. Book/Cole Thomson Learning, USA 9th Ed.
3. Peter Stilling, 2002. **Ecology**. 4th Edition. Prentice Hall Publication, New Jersey, USA
4. Krebs. 2016. **Ecology: The experimental analysis of distribution and application**. 6th Ed.
5. J.L. Chapman and M.J. Reiss, 1997. **Ecology**. Cambridge University Press, UK.
6. M.C. Molles. 2016. **Ecology: Concepts and applications**. WCB/McGraw Hill, New York 7th Ed.
7. C.E. Mason. 2002. **Biology of Freshwater Pollution**. Longman Publication, UK
8. E.P. Odum. 1996. **Ecology: A Bridge between science and society**.
9. R.K. Singh. 1998. **Human Ecology**.
10. R. Lloyd. 1992. **Pollution and Freshwater**. Fishing News Books
11. Smith, 2001. **Ecology and Field Biology**. National Book Foundation, Islamabad.
12. E. P. Odum. 2005 5th Ed. **Fundamentals of Ecology**. National Book Foundation, Islamabad.

Z-4702 Environmental Biology-I (Lab.)

Cr. (1)

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Practical

1. Methods and analysis of population dynamics; Quadrant method; Determining frequency of different species; Determining density of species in habitat
2. Field Sampling of Aquatic Biota
3. Food Chain studies through analysis of gut content
4. Field visits for study of selected terrestrial habitat and writing notes

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