

Sr. No.	Course Code	Course Title	Credit Hours
Theory			
3	ZOOL-4103	Environmental Biology	3

Course Objectives:

The main goal of this course is to:

- ☐ Enable students to develop strong expertise in contemporaneous themes in ecological research
- ☐ Develop critical thinking and to discuss about advanced topics in population, community and ecosystem ecology as well as in biodiversity research.
- ☐ Develop expertise to update their knowledge continuously, and to design their own research in ecology.

Course Learning Outcomes:

Course outlines:

Week 1-4

Energy: laws of thermodynamics, primary and secondary productions, trophic levels and energy variation with increasing trophic levels, energy flow, food chains and food webs. Biogeochemical 75

cycle: nitrogen, phosphorus, sulphur, water, carbon, nutrient. Limiting factors: basic concepts, temperature, soil, water and humidity, light, fire.

Week 5-8

Global ecosystems: (atmosphere, hydrosphere, lithosphere, ecosphere). An overview of ecosystem with special reference to ecological niche: basic concepts and types. Major ecosystem of world: Marine, Estuarine, Freshwater, Wetlands, Tundra, Forest, Grassland, Desert and Agricultural ecosystems.

Population ecology: basic population characters, growth and growth curves, population dynamics and regulations. Community ecology: basic concepts, community analysis, ecotones, inter-population interactions.

Week 9-12

Applied Ecology: resources and their ecological management (mineral, agricultural desalination and weather modification, forest and range management, landscape and land use);

Pollution: (definition, types, cost, origin and management); water (sources, domestic and industrial pollution, heavy metals); air (sulphur dioxide, nitrogen oxide, carbon monoxide, ozone, smog and PAN, MTBE & CFCs); land pollution (pesticides, bacterial toxins, synthetic hormones); noise pollution.

Week 13-16

Radiation ecology: global environmental changes (ozone depletion, acid rain, greenhouse effect and global warming, Koyota protocol, desertification, deforestation, exotic and invasive species, radioactivity leakage, environmental laws).

Recommended Books:

1. Molles, M.C. 2005. Ecology: Concepts and Applications. 6th Ed., McGraw Hill, New York, USA.
2. Cox, C.B., Morre, D. 2000. Biogeography: An Ecological and
3. Evolutionary Approach, 6th Ed., Life Sciences King's College, London, UK.
4. Dondson, S.I., Allen, T.F.N., Carpenter, S.R., Ives, A., Jeanne, R.L.,
5. Kitchell, J.F., Langston, N.E., Turner, M.G. 1998. Ecology. Oxford Univ. Press, UK.
6. Chapman, J.L., Reiss, M.J. 1997. Ecology: Principles and Applications. Cambridge Univ. Press, UK.
7. Odum, E. P. 1994. Fundamentals of Ecology. 3rd Ed. W.B. Saunders. Philadelphia. Newman, I. 1993. Applied Ecology. Black Well Scientific Publications Oxford. UK.
8. Slingsby, D., Cook, C., 1986. Practical Ecology. McMillan Education Ltd. UK.