Government Degree College Baramulla

SEMESTER 1st MAJOR/MINOR COURSE
ENVIRONMENTAL SCIENCE
W.e.f. Academic Session 2022

Title: Environment and Ecology
Course Code: BES22C101

Credit: 04 Theory+02 Practical
Contact Hours: 64 (T) +64 (L)

Part-I: Theory (4 Credits)

Course Objectives: *The course shall help the students to gain the ability to demonstrate comprehensive understanding of the environment and its components. It shall also help them to understand population interactions and the different aspects of ecosystems as well as human ecology.*

Learning Outcomes: *This paper is designed to introduce the basic concepts of Environment and Ecology leading to better understanding of inter-connections of Environmental Science as a discipline. At the end of the course the student is expected to be able to:*

1. *Describe the various components of environment and the interrelationships between land, sea, the atmosphere as well as the living things that occupy these environments.*
2. *Explain the basic principles of ecology, including population ecology, community ecology, and ecosystem function.*
3. *Discuss the dynamics of the ecosystem as well as nutrient cycling.*
4. *Discuss and evaluate the dynamics of human population and its projections*

UNIT 1: BASICS OF ENVIRONMENT

Environmental science: Scope and importance, Components of environment: Atmosphere, Lithosphere, Hydrosphere, Biosphere, Brief account of Cryosphere and Anthroposphere (Built Environment).

UNIT 2: POPULATION AND COMMUNITY

Concept of population, Population growth (Density dependent and density independent factors), Survivorship curves and age structure, Biotic potential and carrying capacity (r and k strategists), Population interactions: Mutualism, Commensalism, Competition, Predation, Parasitism, Community: Concept and characteristics, Ecological succession.

UNIT 3: ECOSYSTEMS

Ecosystem: Concept, Organization and significance, Types of ecosystems, Food chains, Food webs and trophic levels, Ecological pyramids, Energy flow in ecosystems, Ecosystem productivity, Decomposition, Biogeochemical cycles: Carbon, Nitrogen, Phosphorus and Sulphur.

UNIT 4: HUMAN ECOLOGY

Global and regional human population growth, Theories of human population growth (Malthusian and neo-malthusian), Drivers of human population change, Growth curves and population projections, Earth's carrying capacity and ecological footprint, Brief account of Anthropocene.

Part 2: LABORATORY COURSE (2 CREDITS)

1. Recording of daily temperature of ambient air for a specified period and plotting of temperature graph
2. Determination of soil texture, soil temperature, soil pH and soil conductivity

3. Determination of pH, temperature, turbidity and Total Suspended Solids of different water samples
4. Identification of dominant vegetation in local area and preparation of herbarium
5. Visit to a Zoological Museum for identification of fauna
6. Study of vegetation of in different ecosystems by using quadrat method
7. Estimation of biomass of herbaceous/aquatic vegetation
8. Field study for understanding of different ecosystems

Books Recommended

1. Basics of Environmental Science: Michael Allaby. 2000 (2nd edition). Routledge.
2. Environmental Science: Botkin, Keller. 2010 (8th Edition). John Wiley & Sons.
3. Environmental Science: Tyler Miller. 2010 Brooks & Cole.
4. Essentials of Geology: Chernicoff, Fox and Venkatakrishnan. 1996. Worth Publishers.
5. Concepts of Ecology: E.J. Kormondy. 2017. Pearson Education.
6. Environment Principles & Applications: Chris Park. 2001. Routledge.
7. Fundamentals of Ecology: E.P. Odum, 2017; Cengage India Private Limited.
8. Population Ecology: P.S. Aaradhana. 1999. South Asia Books.
9. Ecology and Environment: P.D.Sharma. 2011. Rastogi Publications.
10. Ecology, Environment and Resource Conservation: Singh, J.S., Singh, S.P. and Gupta, S.R. 2014; S. Chand Publishing.
11. Environmental Chemistry: A.K. De. 2016. New Age Publisher International Pvt Ltd.