SEMESTER 1st
MAJOR/MINOR COURSE

EVS122M: ENVIRONMENTAL SCIENCE (ENVIRONMENT AND ECOLOGY)

(4+2 CREDITS)

Paper outcome: *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.*

THEORY (4 CREDITS)

UNIT 1: BASICS OF ENVIRONMENT

Environmental science: Scope and importance, Components of environment: Atmosphere, Lithosphere, Hydrosphere, Biosphere (structure and function), 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, Protocooperation, Commensalism, Competition, Herbivory, 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 SulphFAur.

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.

LABORATORY COURSE (2 CREDITS)

1. Study of water flow and discharge from any water body
2. Study of meteorological parameters (temperature, humidity, rainfall)
3. Study of the soil profile in any ecosystem
4. Study of vegetation in a particular ecosystem (lake, forest, agricultural, grassland etc)
5. Study of fauna in a particular ecosystem (lake, forest, agricultural, grassland etc)
6. Study of biomass and carbon stock of herbaceous vegetation in any ecosystem (lake, forest, agricultural, grassland etc)
7. Case study of approaches used by any country or region for human population management
8. Field /Environmental visit to understand various environmental components

BIBLIOGRAPHY

1. Basics of Environmental Science: Michael Allaby
2. Environmental Sciences (system and solutions): Mckinney and Schoch
3. Environmental Science: Botkin, Keller
4. Environmental Science: Tyler Miller
5. Essentials of Geology: Chernicoff, Fox, Venkatakrishnan
6. Concepts of Ecology: E.J. Kormondy
7. Environment Principles & Applications: Chris Park.
8. Fundamentals of Ecology: E.P. Odum
9. Population Ecology: P.S. Aaradhana
10. Ecology and Environment: P.D.Sharma
11. Ecology, Environment and Resource Conservation, Singh, J.S., Singh, S.P. and Gupta, S.R.
12. Environmental Chemistry, De, A.K.