FOREST ECOLOGY & ENVIRONMENT MANAGEMENT

1. Fundamentals of Ecology

Introduction: Definition; evolutionary/historical background; principle and scope; aquatic and terrestrial ecology; community concept, succession process, competition and Coexistence; natural ecosystems; concept of species & individual; concept of carrying capacity.

Autecology: Introduction to Autecology; Population definition & characteristics; population parameters- growth, fluctuation, regulation and dynamics, r and k selection, species interaction and intra and inter specific competition, evolutionary consequences of competition, allelopathy, biotic potential

Synecology: Introduction to Synecology; community dynamics; community characteristics; community coefficients; cluster analysis; association analysis; gradient analysis; vegetation mapping; community classification concept.

Ecosystem: Ecosystem components and structure; abiotic and biotic factors, trophic relation, functional aspect of ecosystem, ecological succession, concept of climax.

Vegetation sampling: Purpose of studying plant communities, sampling units, size and shape of sampling unit, methods of sampling.

2. Ecosystem Analysis

Major ecosystems: Concept of Biosphere and ecosystem; evaluation of ecosystem; major biomes & biogeographic regions of India and world..

Biodiversity, *Ecosystem stability and Management*: Biodiversity: concept and levels; speciation and extinction; terrestrial biodiversity hot spots etc.; Biodiversity status in India; Ecology of plant invasion; concept of ecosystem resistance and resilience.

Functional aspects of ecosystem: Ecosystem components; functional aspect of ecosystem analysis; biomass production & methods; litter production & decomposition in different ecosystem and biogeochemical cycles.

3. Forest Ecology

Forest types of India; structure and biota; mycorrrhizae and forests; forests and forestry in India; sacred groves; social forestry and agro-forestry, human impacts on forests; management and conservation of tropical forests.

4. **Conservation Ecology**

Introduction: Definition of conservation, postulates of conservation biology; the origin and evolution of living organisms, ecological niches, adaptive radiation, genetic plasticity.

Ecosystem instability: Species of biological importance; Ecosystem fragmentation and edge effects; Red and Green data books, World Conservation Strategy; methods of biological conservation.

Conservation of resources: Energy sources - conservation and management of non-renewable fossil fuel resources, conservation and management of forest & water resources; conservation of biological resources.

5. **Restoration Ecology**

Introduction: Definition, aims and objectives of restoration, principles, concepts and strategies, role of ecological principles in restoration, holistic approach in restoration.

Restoration of natural and degraded resources: Restoration of degraded lands/waste lands, range land, forest, river corridor, water resources; methods of soil and water conservation for reclamation of degraded land; concept of sustainable development.

Microbial management: Role of microbes, biofertilizers and biotechnology for restoration of degraded lands.

People's participation in restoration: Role of people's participation, government agencies, NGOs and environmental education in conservation and restoration.

Soils and mineralization: Soils - characters, formation, classification and major soil types of the world; soil quality assessment and factors affecting soil quality; mineralization, litter dynamics and biological management of soil fertility.

6. **Pollution and Climatic Change**

Air, water, soil and noise pollution; bioremediation; Environment Impact Assessment; global warming and climatic change.