

DSE-12 Ecology, Environment and Elementary Paleobotany

MM : 100
Time : 3 hrs
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Sessional : 30
ESE : 70
Pass Marks : 40

Total Hours: 60

Learning objective:

- To understand the importance of natural resources like soil, water and air.
- To acquire knowledge of various ecosystems components and their functioning.
- To acquire an overall knowledge on ecological factors and plant communities.

Learning outcomes:

At the end of course student will be able to:

- Understand the importance of the natural resource and functioning for sustainable development.
- The student will be able to structural and functional ecological web.
- Identify key points for biogeochemical cycling, complex interrelationship between organisms and environment.
- Understand methods for studying vegetation, community patterns and processes, ecosystem functions, and principles of phytogeography.
- Understand the strategies for sustainable natural resource management and biodiversity conservation.
- Take the decisions for carrier point of views in research, industries and academia.

UNIT – I**(16 Lectures)**

Natural Resources and Sustainable Utilization: Land Utilization, Soil degradation and management strategies; Restoration of degraded lands. Water , Wetlands; Threats and management strategies, Ramsar sites, Forests: Major and minor forest products; Depletion, Biological Invasion, Energy: Renewable and non-renewable sources of energy, Contemporary practices in resource management : EIA, GIS, Participatory Resource Appraisal, Ecological Footprint and carbon footprint.

UNIT – II**(14 Lectures)**

Ecology & Ecosystem: Definition of Ecology, Ecological Factors, Positive and negative interactions. Ecosystem – Concept of an ecosystem-structure and function of an ecosystem. Abiotic and biotic factors- Energy flow in an ecosystem. Ecological Succession- definition & types. hydrosere and xerosere. Food chains and food webs, Ecological pyramids, production and productivity; And components. Types of ecosystems: Forest Ecosystem, Grass land, Crop land, aquatic Ecosystems Ecological Adaptations – Hydrophytes, Xerophytes, Halophytes, Epiphytes and Parasites.

UNIT – III**(14 Lectures)**

Biodiversity and its Conservation: Definition -genetic, species, and ecosystem diversity. Value of biodiversity: hot spots of Biodiversity & threats to biodiversity, Biotic communities and populations, their characteristics and dynamics. Endemic and endangered species of plants in India. Ecological niche, ecotypes, ecological indicators. *Conservation of Biodiversity:* Ex-situ and in-situ conservation, Red data book, botanical gardens, National park, Sanctuaries, hot spots and Bioreserves. Role of Seed Bank and Gene Bank Valuing plant resources, ecotourism, Role of NBPGR, FAO, BSI.

UNIT – IV**(08 Lectures)**

Soil Formation, Properties & Conservation: Soil: Origin, Formation, composition, Soil types, Soil Profile, Soil Microorganisms, soil processes, Soil Erosion, Biogeochemical cycles, Soil Conservation: Biological– Contour farming, Mulching, Strip cropping, Terracing and Crop rotation.

UNIT – V**(08 Lectures)**

Elementary Palaeobotany: An elementary knowledge of Palaeobotany, Fossils: Types of fossils and process of fossilization. A general idea about Geological era. Living fossils.

Suggested Reading

1. Chapman and Riss. Ecology: Principles and Applications, Latest Ed., Cambridge University Press
2. Shukla, R.S. & Chandel, P.S. Plant Ecology, Latest Ed., S. Chandel and Co.
3. Begon, M., Herper, J.L. and Townsend, C.R. Ecology- Individuals, Populations and Communities (3rd ed.), Oxford Blackwell Science
4. Verma, P.S. & Agarwal, U.K. Concept of Ecology, Latest Ed., S. Chand & Company
5. Odum, F.P. Fundamentals of Ecology, Latest Ed., Saunders

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DSE 12 SEMESTER VIII / BBO-E853 (LAB COURSE CC-12)

The Practicals based on BBO E803 will be performed.

1. Analysis of herbaceous vegetation - by using quadrat / line transects method to find out frequency, density, abundance.
2. Estimation of dissolved oxygen content in the given water sample.
3. Estimation microbial load in water samples.
4. Morphological adaptations of hydrophytes and xerophytes.
5. Study of anatomical adaptations of hydrophytes and xerophytes and correlate to their particular habitat.
Hydrophytes: *Nymphaea*, *Hydrilla* Xerophytes: *Nerium*, *Casuarina*.
6. Morphological adaptations of Halophytes-Vivipary and Pneumatophore.
7. Study of native and invasive species and their impacts on environments.
8. A study of plant distribution maps - endemic distribution and continental drift.
9. Vegetation map and types of India.
10. Study of some fossil slides / photographs as per theory.

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