

Syllabus for Undergraduates

Unit 1: Environmental Science and Ecosystem08

a. Definition of Environmental Science, multidisciplinary nature, Objective, scope and importance.

b. Concept of an ecosystem, structure and function, energy flow, ecological succession, food chains, food webs, ecological pyramids.

c. Introduction, types, characteristic features, structure and function of the following ecosystem:

- Forest ecosystem
- Grassland ecosystem
- Desert ecosystem
- Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 2: Natural Resources and Biodiversity

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a. Renewable and non-renewable resources.

b. Natural resources and associated problems:

- **Forest resources:** Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.
- **Water Resources:** Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems, water conservation, rainwater harvesting, watershed management.
- **Mineral Resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- **Food Resources:** World food problems, Changes in land use by agriculture and grazing, Effects of modern agriculture, Fertilizer/ pesticide problems, Water logging and salinity
- **Energy Resources:** Increasing energy needs, Renewable/ non-renewable, Use of Alternate energy sources, urban problems related to energy, Case studies
- **Land resources:** Land as a resource, land degradation, man-induced land-slides, soil erosion and desertification, wasteland reclamation

c. Role of an individual in conservation of natural resources, equitable use of resources for sustainable lifestyles.

- d. Definition of biodiversity, levels of biodiversity, value of biodiversity, threats to biodiversity (habitat loss, poaching of wildlife, man-wildlife conflicts).
- e. Biodiversity at global, national and local levels, India as a biodiversity nation, biogeographical classification of India, hotspots of biodiversity.
- f. Endangered and endemic species of India.
- g. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Unit 3: Environmental Pollution

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- a. Definition, causes, effects and control measures of Air Pollution, water pollution, soil pollution, marine pollution noise pollution, thermal pollution, nuclear hazards.
- b. Solid waste Management: causes, effects and control measures of urban and industrial wastes
- c. Role of an individual in prevention of pollution, pollution case studies, pollution case studies

Unit 4: Important Environmental and Social Issues, Management and Legislation¹⁴

- a. Climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocaust. Case studies.
- b. Sustainable development, Resettlement and rehabilitation of people (its problems and concerns, case studies), Environmental ethics (issues and possible solutions), consumerism and waste products.
- c. Disaster management: floods, earthquake, cyclone and landslides.
- d. Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act,
- e. Issues involved in enforcement of environmental legislation, Public Awareness
- f. Population growth (variation among nation), Population explosion (family welfare programme), Environment and human health, human rights, value education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health, case studies.

Unit 5: Field work

- a. Visit to a local area to document environmental assets-river/ forest/ grasslands/ hill /mountain.
- b. Visit to a local polluted site- Urban/ Rural/ Industrial/ Agricultural
- c. Study of common plants, insects, birds
- d. Study of simple ecosystems- pond, river, hill slopes, etc.

References

1. Joseph K. & Nagendran R.: Essentials of Environmental studies; Pearson Edition
2. Santra S. C., Environmental Science; Central Book Agency.
3. Dhameja, S. K.: Environmental Studies; Katson books.
4. Srivastava Smriti: Environmental Studies; Katson books.
5. Deswal, S. & Deswal A.: A Basic Course In Environmental Studies; Dhanpat Rai & Co.