

GU-ART ENVIRONMENTAL SCIENCE SYLLABUS

Part A

A Natural Endowments: Status, Issues, concerns and responses

Unit 1: The Multi-Disciplinary Nature of Environmental Studies

Definition, Scope and Importance; need for public awareness.

Unit 2: Natural Resources:

- Renewable and Non-Renewable resources: natural resources and associated problems
 - a) Forest Resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
 - b) Water Resources: use and over-exploitation of surface and ground water; floods, droughts, conflicts over water, dams-benefits and problems.
 - c) Mineral Resources: use and exploitation, environmental effects of extracting and using mineral resources; case studies related to mining and its effect on siltation and loss of biodiversity.
 - d) Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity; case studies.
 - e) Energy Resources: growing energy needs, renewable and non-renewable energy sources, use of alternative energy sources, case studies
 - f) Land Resources: land as a resource, land degradation, man-induced landslides, coastal erosion, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit 3: Ecosystems

Concept of an ecosystem, structure and functions of ecosystems; producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids.

Introduction, types, features, structure and functions of the following ecosystems: forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystem (ponds, streams, lakes, rivers, oceans, coastal zone, estuaries).

Unit 4: Biodiversity and its Conservation

Introduction, definition, genetic, species and ecosystem diversity; bio-geographical classification of India; value of biodiversity - consumptive use, productive use, social, ethical, aesthetic and option values; biodiversity at global, national, regional and local levels; India as a mega-diversity nation; hotspots of biodiversity; threats to biodiversity - habitat loss, poaching of wildlife, man-wildlife conflicts, bio-invasion, and over exploitation; endangered and endemic species of India (at least 5 examples of animals and plants each); conservation of biodiversity- in-situ and ex-situ conservation, role of biotechnology in conservation of biodiversity.

Unit 5: Field visit to different ecosystems/Landscapes and to learn biodiversity

Visit to a local area to document environmental assets - river/ forest/ grassland/ hill/ mountain; study of common plants, insects, birds; study of simple ecosystems-pond/ river/ hill slopes, etc. A report of field visit(s) to be maintained.

SECTION – B Socio-economic dimensions of Environment

Unit 6: Environmental Pollution

Definition, causes, effects and measures to control air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards; waste – types, causes, effects; waste management –solid, sewage and effluents; measures to control industrial and urban wastes; role of an individual in prevention of pollution; pollution case studies (Bhopal gas tragedy and mining); disaster mitigation and management-floods, droughts, earthquakes, landslides, cyclones, Tsunami.

Unit 7: Social issues and the Environment

From unsustainable to sustainable development; urban problems related to energy; water conservation, rainwater harvesting, watershed management; resettlement and rehabilitation of people - problems and concerns, case studies; environmental ethics - issues and concerns; climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies; wasteland reclamation; consumerism and associated waste products; Objectives and scope of Environment (Protection) Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Forest Conservation Act, Wildlife Protection Act, Forest Rights Act and Biodiversity Act; Issues involved in enforcement of environmental legislation; public awareness.

Unit 8: Human Population and the Environment

Population growth, variation among nations; 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 9: Tourism and Environment

Definition and typology of tourism; mass tourism and environment - aspects of degradation and exploitation, physical and social impacts; examples at local, regional, national and international levels. Sustainable tourism.

Unit 10: Field visit local polluted / waste treatment site(s)

Visit to a local polluted site - urban/rural/ industrial/ agricultural and waste treatment plant(s)/sustainable tourism site(s). A report of field visit to be maintained.

Recommended Readings

1. Agarwal K.C. (2001): Environmental Biology, Bikaner, Nidi
2. Bharucha E.: The Biodiversity of India, Ahmedabad, Mapin
3. Bharucha E.: Textbook of Environmental Studies. Orient BlackSwan
4. Brunner R.C. (1989): Hazardous Waste Incineration, New York, McGraw-Hill
5. Chatwal G.R. & Sharma H. (2005): A Textbook of Environmental Studies, Mumbai, Himalaya
6. Clark R.S.: Marine Pollution, Oxford, Clanderson
7. Cunningham W.P., Cooper T.H., Gorani E. & Hepworth M.T. (2001): Environmental Encyclopaedia, Mumbai, Jaico.
8. De A.K.: Environmental Chemistry, Wiley

9. Desai R.J. (2003): Environmental Studies, Mumbai, Vipul

10. Gleick H.P. (1993): Water in Crisis, Stockholm Env't. Institute, OUP
11. Hawkins R.E.: Encyclopaedia of Indian Natural History, Mumbai, BNHS
12. Heywood V.H. & Watson R.T. (1995): Environment Protection and Laws, Mumbai, Himalaya
13. Jadhav H. & Bhosale V.M. (1995): Environment Protection and Laws, Mumbai, Himalaya
14. McKiney M.L. & Schoel R.M. (1996): Environment Science, Systems and Solutions, Web Enhanced Edition.
15. Mhaskar A.K.: Matter Hazardous, Techno-Science Publications
16. Miller T.G. Jr.: Environmental Science, Wadsworth
17. Odum E.P. (1971): Fundamentals of Ecology, Philadelphia, W.B. Saunders
18. Rao M.N. & Datta A.K. (1986): Waste Water Treatment, Oxford & IBH
19. Santra S.C. (2004): Environmental Science, Kolkata, Central Book Agency
20. Sharma B.K. (2001): Environmental Chemistry, Meerut, Goel Publishing House
21. Townsend C., Harper J. & Begon M.: Essentials of Ecology, Blackwell Science
22. Trivedi R.K.: Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol.1 & 2, Enviro Media.
23. Trivedi R.K. & P.K. Goel: Introduction to Air Pollution, Techno-Science Publications
24. Wagner K.D. (1998) Environmental Management, Philadelphia, W.B. Saunders

Magazines

Down to Earth, Centre for Science & Environment
Survey of the Environment published by The Hindu

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<http://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf>

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