ENVIRONMENTAL SCIENCE AND ENGINEERING 3 0 0 3

OBJECTIVE

To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value; assess the damage caused to the environment and in turn to the human health due to pollution from various sources; sustainable use of natural resources for better current and future lives; and highlight the Involvement of society, government and other agencies for regulated use and conservation of environment.

UNIT – I INTRODUCTION 6

Definition, scope and importance of environment – need for public awareness ,Population growth, exponential growth – variation among nations – population explosion – resource consumption, environment and human health - Global Temperature changes, Ozone depletion, acid rains, Green House effect, Carbon Cycle, Global warming potential – Risk assessment – Hazard Identification – Risk characterization, Human rights – value education.

UNIT – II ECOSYSTEMS AND BIODIVERSITY 11

Ecosystem – structure and function– producers, consumers and decomposers – energy flow– ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems. Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots – threats: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation: In-situ and exsitu.

Field study of common plants, insects, birds Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT – III ENVIRONMENTAL POLLUTION 11

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT – IV NATURAL RESOURCES 10

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 – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets – river / forest /grassland / hill / mountain.

UNIT – V SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of nongovernmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards - role of information technology in environment and human health.

TOTAL: 45

TEXT BOOKS:

1. Gilbert M. Masters and Wendell P. Ela, “Introduction to Environmental Engineering and Science”, 3rd edition, Prentice Hall , 2007.
2. Deeksha Dave and S S Katewa “Environmental Science & Engineering (Anna University)” Cengage Learning India, 2010.

REFERENCES:

1. P.Venugopala Rao, “Principles of Environmental Science and Engineering”, PHI, 2006.
2. Benny Joseph, “Environmental Science and Engineering”, Tata McGraw-Hill,
3. New Delhi, (2006).
4. J. Glynn Henry, J. G. Henry “Environmental Science and Engineering - Second Edition, PHI Learning, 2009.
5. R.K. Trivedi, “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Vol. I and II, Enviro Media.
6. Cunningham, W.P. Cooper, T.H. Gorhani, “Environmental Encyclopedia”, Jaico Publ., House, Mumbai, 2001.
7. Dharmendra S. Sengar, “Environmental law”, Prentice Hall of India PVT LTD, New Delhi, 2007.
8. Rajagopalan, R, “Environmental Studies-From Crisis to Cure”, Oxford University Press (2005)

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