

## Environmental Science & Ecosystem Management

**1. Introduction to Environmental Studies.** Definition, scope and importance. Need for public awareness on relationship between environment and public health. Role of IT in environmental management. Sustainable development - policy and practices.

**2. Biodiversity: Economic Valuation & Conservation.** Introduction; Definition: genetics, species and ecosystem diversity; Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values; Biodiversity hotspots; Threats to biodiversity: habitat loss, poaching, man-wildlife conflicts; Conservation of biodiversity: in-situ and ex-situ conservation; Bioprospecting. (Field visit to a protected area).

**3. Fundamentals of Ecosystem Ecology.** Structure and function of an ecosystem; Energy flow in ecosystems; geochemical, biogeochemical and hydrological cycles; Ecological succession; Food chains, food webs and ecological pyramids; Ecosystem dynamics and functioning; Role of biodiversity in patterns and processes of communities and ecosystems - stability, disturbance and resilience.

**4. Environmental Pollution & Health.** Definition, causes, effects and control measures of air (including noise) pollution, water (including marine) pollution and soil pollution. Effects and control of urban and industrial wastes. Vector-borne diseases. Housing standards, hospital environment and working conditions in the context of health and disease; Climate change - health impacts, adaptation and mitigation strategies.

**5. Ecosystem & Environmental Management.** Collection and processing of environmental data including social and cultural parameters; Environmental Management System; Environmental Risk & Impact Assessment; Natural Resource Use Optimization; Fundamentals of Ecosystem Modeling - Types of models: Mechanistic, economic, simulation etc; Eutrophication model, habitat suitability index models and modeling of air and water pollution; Remote Sensing: definition, principles and its application for ecosystem management (in urban sprawl analysis, land use land cover change and disaster management).

### Suggested Readings:

1. *Fundamental Concepts in Environmental Studies*, D.D. Mishra, (S Chand & Co Ltd.), 2014.
2. *Environmental Management for Sustainable Development*, Chris Barrow, (Routledge Environmental Management Series), 2<sup>nd</sup> Ed., 2006.
3. *Essentials of Environmental Management*, Paul Hyde and Paul Reeve, (IOSH Services Ltd. UK.), 2004.
4. *Environmental Impact Assessment Methodologies*, Y. Anjaneyulu, Valli Manicka, (CRC Press), 2011.
5. *Fundamentals of Ecological Modelling*, S.E. Jorgensen and G. Bendorrichio (Elsevier), 3<sup>rd</sup> Ed., 2001.
6. *Introduction to Environmental Economics*, Nick Hanley, Jason F. Shogren and Ben White, (Oxford University Press), 2001.