

SEMESTER - I Compulsory Course (AECC - Environment Studies) BA and BSC Departments**Unit 1 : Introduction to environmental studies**

(2 lectures)

Multidisciplinary nature of environmental studies; Scope and importance; the need for environmental education. Concept of sustainability and sustainable development.

Unit 2 : Ecosystems

(3 Lectures)

What is an ecosystem? Structure: food chains, food webs and function of ecosystem: Energy flow in an ecosystem, nutrient cycle and ecological succession. Ecological Interactions.

Case studies of the following ecosystems:

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

Unit 3 : Biodiversity and Conservation

(4lectures)

- Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: *In-situ and Ex-situ* conservation of biodiversity.
- Nature reserves, tribal populations and rights (Niyamgiri-Vedanta, POSCO), and human wildlife conflicts in Indian context (Sundarban-Human-Tiger encounters).
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit 4 : Environmental Pollution and Global Environmental Issues

(6 lectures)

- Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution.
- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Nuclear hazards and human health risks (Chernobyl, 3 mile Island, Daiichi- Fukushima)
- Solid waste management: Control measures of urban and industrial waste, special referenceto e-waste, Biomedical waste.
- Pollution Tragedies: Love canal, Bhopal Gas, Endosulfan, Minamata and Flint water

TEXT BOOKS :

- Basu, M. and Xavier, S., Fundamentals of Environmental Studies, Cambridge University Press, 2016.
- Mitra, A. K and Chakraborty, R., Introduction to Environmental Studies, Book Syndicate, 2016.
- Enger, E. and Smith, B., Environmental Science: A Study of Interrelationships, Publisher: McGraw-Hill Higher Education; 12th edition, 2010.
- Basu, R.N, Environment, University of Calcutta, 2000.

SUGGESTED READINGS :

- Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
- Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India* Univ. of California Press.
- Odum, E.P., Odum, H.T. & Andrews, J. 1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
- Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. *Environmental and Pollution Science*. Academic Press.
- Agrawal, KM, Sikdar, PK and Deb, SC, A Text book of Environment, Macmillan Publication, 2002.
- Richard T Wright, Environmental Science: Towards a Sustainable Future, Prentice-Hall Inc., 2008.

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SEMESTER - II Compulsory Course (AECC - Environment Studies) BA and BSC Departments**Unit 5: Natural Resources : Renewable and Non-renewable Resources** (6 lectures)

- A. Land resources and land use change; Land degradation, soil erosion and desertification.
- B. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- C. Disaster management : floods, earthquake, cyclones and landslides. Resettlement and rehabilitation of project affected persons; case studies.
Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
- D. Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit 6: Environmental Management: Laws, Policies & Practices (7 lectures)

UN Initiatives and International agreements: Montreal and Kyoto protocols, Paris Climate Summit (2015) and Convention on Biological Diversity (CBD).

Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Green Politics, Earth Hour, Green Option Technologies, ISO standards: ISO 9000 and 14000. Environmental communication and public awareness, Role of National Green Tribunal; EIA Formulations, stages, Merits and demerits: case studies (e.g., CNG vehicles, Bharat IV stage)

Environment Laws: Environment Protection Act (1986); Air (Prevention & Control of Pollution) Act (1981); Forest Conservation Act (1980); Water (Prevention and control of Pollution) Act (1974); Wildlife Protection Act (1972).

Unit 7: Human Population and the Environment (2 lectures)

Human population growth: Impacts on environment, human health and welfare. Family Welfare Programs, Human Rights.

Environmental movements: Chipko, Silent valley, Bishnoi, Narmada Bachao Andolan, Nava Danya.

Role of Information Technology (IT) in environment and Human Health

Unit 8 : Field work (Equal to 5 lectures)

Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.

Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.

Study of common plants, insects, birds and basic principles of identification.

Study of simple ecosystems-pond, river, Delhi Ridge, etc.

Text Books:

1. Basu, M. and Xavier, S., Fundamentals of Environmental Studies, Cambridge University Press, 2016.
2. Mitra, A. K and Chakraborty, R., Introduction to Environmental Studies, Book Syndicate, 2016.
3. Enger, E. and Smith, B., Environmental Science: A Study of Interrelationships, Publisher: McGraw-Hill Higher Education; 12th edition, 2010.
4. Basu, R.N, Environment, University of Calcutta, 2000.

Suggested Readings:

1. Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
2. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
3. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science*, 339: 36-37.
4. McCully, P. 1996. *Rivers no more: the environmental effects of dams* (pp. 29-64). Zed Books.
5. McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
6. Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India*. Tripathi 1992.
7. World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press.
8. Ghosh Roy, MK, Sustainable Development (Environment, Energy and Water Resources), Ane Books Pvt. Ltd., 2011.
9. Karpagam, M and Geetha Jaikumar, Green Management, Theory and Applications, Ane Books Pvt. Ltd., 2010.

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