

**DEPARTMENT OF ENVIRONMENTAL STUDIES  
UNIVERSITY OF DELHI**

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**Environmental Studies\***  
(Six-months Compulsory Core Module for Undergraduate Programmes)

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**Unit 1 : Introduction to environmental studies**

- Multidisciplinary nature of environmental studies
- Scope and importance
- Need for public awareness.

(2 lectures)

**Unit 2 : Ecosystems**

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Energy flow in an ecosystem: food chains, food webs and ecological pyramids.
- Ecological succession.
- Case studies of the following ecosystems :
  - a) Forest ecosystem
  - b) Grassland ecosystem
  - c) Desert ecosystem
  - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lectures)

**Unit 3 : Natural Resources : Renewable and Non-renewable Resources**

- Land resources and land use change : Land as a resource, land degradation, landslides (natural & man-induced), soil erosion and desertification.
- Forests & forest resources : Use and over-exploitation, deforestation, case studies.
- Impacts of deforestation, mining, dam building on environment, forests, biodiversity and tribal populations.
- Resettlement and rehabilitation of project affected persons; problems and concerns, case studies
- Water resources: Use and over-exploitation of surface and ground water, floods, drought, conflicts over water (international & inter-state).
- 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: Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

(8 lectures)

**Unit 4 : Biodiversity and Conservation**

- Levels of biological diversity : genetic, species and ecosystem diversity.
- Biogeographic zones of India
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational values
- 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.

(8 lectures)

**Unit 5 : Environmental Pollution**

- What is environmental pollution and its types?
- Causes, effects and control measures of :
  - a) Air pollution

- b) Water pollution – freshwater and marine
- c) Soil pollution
- d) Noise pollution
- e) Thermal pollution
- Nuclear hazards and human health risks
- Solid waste management : Control measures of urban and industrial waste.
- Role of an individual in prevention of pollution.
- Pollution case studies.

(8 lectures)

#### **Unit 6 : Environmental Policies & Practices**

- Concept of sustainability and sustainable development.
- Water conservation & watershed management.
- Climate change, global warming, acid rain, ozone layer depletion.
- Disaster management : floods, earthquake, cyclones and landslides.
- Wasteland reclamation.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Environment: rights and duties.

(7 lectures)

#### **Unit 7 : Human Population and the Environment**

- Population growth, demographic variation among nations.
- Environment, human health and welfare; infectious and lifestyle diseases in contemporary world.
- Value Education: Environmental ethics.
- Environmental communication and public awareness, case studies.

(6 lectures)

#### **Unit 8 : Field work**

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

(Equal to 5 lectures)

#### **Suggested Further Readings:**

- 1 Brunner RC, 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480pgs.
- 2 Carson, Rachel. 1962. Silent Spring (Boston: Houghton Mifflin, 1962), Mariner Books, 2002
- 3 Cheney, J. 1989. Postmodern environmental ethics. *Environmental Ethics* 11: 117-134.
- 4 Economy, Elizabeth. 2010. The River Runs Black: The Environmental Challenge to China's Future.
- 5 Gadgil, M. & Ramachandra, G. 1993. *This fissured land: an ecological history of India*. Univ of California Press.
- 6 Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
- 7 Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Development.
- 8 Environment and Security. Stockholm Environmental Institute, Oxford University Press.
- 8 Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of conservation biology.

Sunderland: Sinauer Associates, 2006.

- 9 Grumbine, R. Edward, and Pandit, M.K. Threats from India's Himalaya dams. *Science* 339.6115 (2013): 36-37.
- 10 Heywood V.H. & Watson, R.T. 1995. *Global Biodiversity Assessment*. Cambridge University Press.
- 11 McCully, P. 1996. *Silenced rivers: the ecology and politics of large dams*. Zed Books.
- 12 McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
- 13 Norton, B. G. 1984. Environmental ethics and weak anthropocentrism. *Environmental Ethics* 6: 131-148.
- 14 Odum, E.P., Odum, H.T. & Andrews, J. 1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
- 15 Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. *Environmental and Pollution Science*. Academic press, 2011.
- 16 Philander, S. George (Ed.). (2012). *Encyclopedia of global warming & climate change*. (2nd ed., Vols. 1-3). Thousand Oaks, CA: SAGE Publications, Inc.
- 17 Rao MN and Datta AK, 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
- 18 Raven, P.H., David M. H., & Linda R. B. *Environment*. De Boeck, 2009.
- 19 Reaka-Kudla, Marjorie L., Don E. Wilson, and Edward O. Wilson, eds. 1996. *Biodiversity II: understanding and protecting our biological resources*. Joseph Henry Press.
- 20 Ricklefs, R. E., & Miller, G.L. 2000. *Ecology*. W. H. Freeman, New York.
- 21 Robbins, P. 2012. *Political ecology: A critical introduction*. John Wiley & Sons.
- 22 Rosencranz, A., Divan, S. & Noble, M.L.. *Environmental law and policy in India*. 2001. Tripathi 1992.
- 23 Rothmun, H.K. 1998. *The Greening of a Nation? Environmentalism in the United States since 1945*.
- 24 Sengupta, R. 2003. *Ecology and economics (OUP): An approach to sustainable development.*" *OUP Catalogue*.
- 25 Singh, J.S., Singh, S.P. and Gupta, S.R. 2006. *Ecology, Environment and Resource Ecology, Environment and Resource Conservation*. Anamaya Publishers.
- 26 Sodhi, N.S., Gibson, L. & Raven, P.HG. (eds). 2013. *Conservation biology: voices from the Tropics*. John Wiley & Sons.
- 27 Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
- 28 Van Leeuwen, C. J., & Vermeire, T. G. 2007. *Risk assessment of chemicals*.
- 29 Warren, C.E. 1971. *Biology and water pollution control*.
- 30 Wilson, E. O. 2006. *The creation: An appeal to save life on earth*. New York: Norton.
- 31 World Commission on Environment and Development. 1987. *Our Common Future*. Oxford: Oxford University Press.

**\*Note:** The course is uploaded as sent by the Department concerned. The scheme of marks and number of periods/lectures will be determined by the University and will be corrected in the syllabus according to Academic Council and Executive Council Minutes (dated 19<sup>th</sup> July 2014) and guidelines framed by the Course Implementation Committee, University of Delhi. Editing, typographical changes and formatting will be undertaken further.

Undergraduate Programme Secretariat