



CHOICE BASED CREDIT SYSTEM COURSES

FOR

AECC - 1 & 2

UNDER BODOLAND UNIVERSITY

Unit 1:

Introduction to environmental studies

- (a) Multidisciplinary nature of studies;
- (b) Scope and importance; concept of sustainability and sustainable development. (2 lectures)

Unit 2: Ecosystems

• What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and 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) (4 lectures)

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

- (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) 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. (4 lectures)

Unit 4: Biodiversity and Conservation

- (a) Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- (b) India as a mega-biodiversity nation; Endangered and endemic species of India
- (c) Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- (d) Ecosystem biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value. (4 lectures)

Unit 5: Environmental Pollution

- (a) Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution
- (b) Nuclear hazards and human health risks

- (c) Solid waste management: Control measures of urban and industrial waste.
- (d) Pollution case studies. (4 lectures)

Unit 6: Environmental Policies & Practices

- (a) Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- (b) Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- (c) Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

(4 lectures)

Unit 7: Human Communities and the Environment

- (a) Human population growth: Impacts on environment, human health and welfare.
- (b) Resettlement and rehabilitation of project affected persons; case studies.
- (c) Disaster management: floods, earthquake, cyclones and landslides.
- (d) Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
- (e) Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- (f) Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

(6 lectures)

Unit 8: Field work

- (a) Visit to an area to document environmental assets: river/forest/flora/fauna, etc.
- (b) Visit to a local polluted site---Urban/Rural/Industrial/Agricultural.
- (c) Study of common plants, insects, birds and basic principles of identification.
- (d) • Study of simple ecosystems---pond, river, Delhi Ridge, etc. (Equal to 4 lectures)

Suggested Readings:

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ .of California Press.
3. Gleeson, B. And Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
4. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev.,Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. *Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R.Edward,and Pandit, M.K. 2013.Threats from India’s Himalaya dams. *Science*, 339: 36-37.

7. McCully, P. 1996. *Rivers no more: the environmental effects of dams* (pp. 29--64). Zed Books.
8. McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. *Environmental and Pollution Science*. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. *Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India. Tripathi 1992*.
14. Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
18. Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E. O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.
20. World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press.

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