UNIVERSITY GRANTS COMMISSION

Ability Enhancement Compulsory Course (AECC) – Environmental Studies

Unit 1: Introduction to environmental studies (3 lectures)

- Multidisciplinary nature of environmental studies
- Scope and importance
- Environmental communication and public awareness
- Concept of sustainability and sustainable development

Unit 2: Ecosystems (7 lectures)

- Concepts of ecosystem, Structure and function of ecosystem; elementary idea about structure of atmosphere, Energy flow in an ecosystem: food chains, Food webs, Detritus pathway of energy flow, Biogeochemical cycles: Water cycle, Carbon cycle, Nitrogen cycle, Sulphur cycle, Phosphorous cycle, Ecological succession, Ecological niche
- Introduction of the following ecosystems
  a) Forest ecosystem
  b) Grassland ecosystem
  c) Desert ecosystem
  d) Aquatic ecosystems (Fresh water & marine water ecosystem)
    - Importance of Wetland, Mangroves, Coral reef

Unit 3: Natural Resources: Renewable and Non-Renewable (8 lectures)

- **Land** resources: land use changes, Land degradation: Soil erosion (types & remedies), desertification
- **Forest** Resources: Importance, deforestation, Afforestation
- **Water** Resources: Use and over---exploitation of surface and ground water, floods, droughts, advantages and disadvantages of dams, water conservation: Rain water harvesting, conflicts over water (international & inter---state),
- **Mineral** Resources: Mine safety, harmful impacts of mining on environment and human health
    - **Energy** Resources: Renewable and non-renewable energy sources, Elementary idea of Solar energy, Wind energy, Biofuels, Biogas, Tidal energy, Geothermal energy
- Growing energy needs and energy conservation, case studies

Unit 4: Biodiversity and Conservation (8 lectures)

- Levels of biological diversity: genetic, species and ecosystem diversity
- Biogeographic zones of India
- Hot spots of biodiversity, biodiversity hot spots of world, Biodiversity hot spots of India
- Mega- biodiversity nations, India as a mega---biodiversity nation
- IUCN, 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
- Ecosystem and Biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value

Unit 5: Environmental Pollution (9 lectures)

- Environmental pollution: causes, effects and controls of Air, Water, Soil and Noise pollution
- Acid rain and impacts on human communities and agriculture
- Elementary idea about Ozone layer, Ozone layer depletion and its harmful effects
- Biomagnifications, Eutrophication
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste, 3R policy
- Pollution case studies

Unit 6: Environmental Policies & Practices (8 lectures)

- Climate change, global warming
- Environment Laws: Environment Protection Act, 1986; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act
- International agreements: Montreal protocol, Kyoto protocol, Convention on Biological Diversity (CBD)
- Tribal populations and rights (forest dwellers act of 2006), human wildlife conflicts in Indian context

Unit 7: Human Communities and the Environment (7 lectures)

- Human population growth: cause, effect and solution of overpopulation
- Impacts of overpopulation on environment, human health and welfare
- HIV AIDS
- Disaster management: floods, earthquake, Tsunami, cyclones and landslides
- Resettlement and rehabilitation of project affected persons; case studies
- Environmental movements: Chipko movement, Silent valley, Bishnois of Rajasthan
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation

Suggested Readings:

1. Handbook of Environment Studies: St. Xavier college: available in both Hindi & English
2. A text book of Environmental Studies- E. Bharucha (English / Hindi)
3. Fundamental Concepts in Environmental sciences DD Mishra- Sultan Chand publication
4. Fundamental of ecology; by MC Dash
5. A textbook of environmental studies; C. Rajgopalan
6. Environmental studies; Nagender
7. Comprehensive environmental studies- Laxmi publication
8. Environmental studies: Asthana
9. A text book of environmental studies: SVS Rana
10. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia
11. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP
12. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi
13. World Commission on Environment and Development. 1987. Our Common Future. Oxford University Press.
14. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent
15. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press