Course Name: ENVIRONMENTAL STUDIES

Course Code:

Course Objectives: Understand core concepts and methods from ecological and physical sciences and their application in environmental problem-solving. ... Appreciate that one can apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.

Module I: Introduction to Environmental Studies

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

Module II: 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:
  - Forest ecosystem
  - Grassland ecosystem
  - Desert ecosystem
  - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Module III: 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.

Module IV: 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 hotspots
- 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

Module V:: Environmental Pollution

- What is environmental pollution and its types?
- Causes, effects and control measures of:
  - Air pollution
  - Water pollution – freshwater and marine
  - Soil pollution
  - Noise pollution
  - 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

Module VI: 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, earthquakes, 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

Module VII: Human Population and the Environment

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

- ***Reference Books:***

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