SYLLABUS FOR ENVIRONMENTAL STUDIES FOR UNDERGRADUATES OF ALL BRANCHES OF HIGHER EDUCATION IN MANIPUR

The Core Module Syllabus for Environmental Studies, which aims at imparting knowledge on and attitude towards environment to the undergraduate students, is divided into six units which will be covered in 45 lecture hours based on pass room teaching.

Full marks: 100
Pass marks: 35

Unit I: INTRODUCTION AND NATURAL RESOURCES

20 marks
(8 lecture hours)

Introduction

- Multidisciplinary nature of environmental studies.
- Man and Earth Resources.

Natural Resources

- Natural Resources and associated problems
  a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
  b) Water Resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
  c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
  d) Food Resources: World food problems, change; caused by agriculture and over-grazing, effects of modern agriculture, fertilize pesticide problems, water logging, salinity, case studies.
  e) Energy Resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies.
  f) Land Resources: Land as a resource, land degragation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.

Unit II: Ecosystems

15 marks
(7 lecture hours)

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem: water cycle, carbon cycle, oxygen cycle, nitrogen cycle, energy cycle and integration of cycles in nature
- Ecological succession
- Food chains, food webs and ecological pyramids
- Characteristics features, structure and function of:
  a) Forest ecosystem
  b) Grassland ecosystem
  c) Desert ecosystem
  d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries

Unit III: Biodiversity

20 marks
(8 lecture hours)

- Introduction:
  a) Definition
  b) Genetic, Species and Ecosystem diversities
- Bio-Geographical Classification of India
- Value of Biodiversity:
  a) Consumptive, productive, social, ethical, aesthetic and option values
- Biodiversity at global, national and local levels
- India as a mega-diversity nation
- Hot-sports of biodiversity
- Threats to biodiversity
  a) Habitat loss
  b) Poaching of wildlife, man-wildlife conflicts
- Endangered and endemic species of India:
  a) Common plants and animal species
- Conservation of biodiversity:
  a) In-situ and Ex-situ conservation of biodiversity

UnitIV: Environmental Pollution

15 marks
(8 lecture hours)

- Definition
- Cause, effects and control measures of:

a) Air pollution
b) Water pollution
c) Soil pollution
d) Marine pollution
e) Noise pollution
f) Thermal pollution
g) Nuclear hazards

- Solid waste management: Causes, effects and control measures of urban and industrial wastes
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

Unit V: Social Issues and the Environment — 15 marks (7 lecture hours)

- From sustainable to unsustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people: problems and concerns with case studies
- Environmental ethics: issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust with case studies
- Environment Protection Acts
- Public awareness

Unit VI: Human Population and the Environment — 15 marks (7 lecture hours)

- Population growth variation among nations
- Population explosion
- Environment and human health: environmental health, climate and health, infectious diseases, water related diseases risk due to chemicals in food
- Value education
- HIV/AIDS
- Role of information technology in environmental and human health

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Suggested Readings:

Agarwal,K.C.2001, *Environmental Biology*, Nidi Publ.Ltd.Bikaner.

Anjaneyalu,Y.2004, *Introduction to Environmental Science*.BS Publications, Hyderabad,A.P. India.

Erach Bharucha, 2005, *Text Book of Environmental Studies for Undergraduate Courses*, University Grants Commission, New Delhi.

Gupta, P.K.2004, *Methods in Environmental Analysis -Water, Soil and Air*, Agrobios(India), Jodhpur.

Hawkins R.E., *Encyclopedia of Indian Natural History, Bombay Natural History Society*, Bombay (R).

Mckinney, M.L. & School, R.M. 1996. *Environmental Science Systems & Solutions*, Web enhanced edition. 639p.

Mhaskar A.... *Matter Hazardous, Techno-Science Publication (TB) Miller T.G. Jr. Environmental Science*, Wadsworth Publishing Co.

Rao MN & Datta, A.K., 1987, *Waste Water Treatment*, Oxford & IBH Publ. Co. Pvt. Ltd. 345p.

Sharma B.K. 2001, *Environmental Chemistry*, Geol Publ.House. Meerut.

Trivedi R.K., *Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards*, Vol. I and II, Enviro Media(R).

Trivedi R.K. and P.K. Goel. *Introduction to Air Pollution, Techno-Science* Publication(TB)

Vidyasagar S and Prabhu Prasadini 2008. *Objective Questions and Glossary in Environmental Science*, BS Publications. Hyderabad.