PGDEM

Course Curriculum for

Post Graduate Diploma in Environment Management

Through Distance Education

(w.e.f. July 2002)

Directorate of Distance Education
Guru Jambheshwar University of Science & Technology
Hisar-125001

DIRECTORATE OF DISTANCE EDUCATION

GURU JAMBHESHWAR UNIVERSITY, HISAR

OFFERS

POST GRADUATE DIPLOMA IN ENVIRONMENTAL MANAGEMENT

Course structure and scheme of examination

Course Code No.	Subject	Maximum Marks	
		External	
PGDEM-01	Fundamentals of Environment	100	
PGDEM-02	Natural Resourse Conservation and Mgt.	100	
PGDEM-03	Environmental Pollution	100	
PGDEM-04	Pollution Control and Management	100	
PGDEM-05	Energy and Disaster Management	100	
PGDEM-06	Environmental Awareness & Legislation	100	

Note :

(i) There will be 8 questions in all covering whole of the syllabus with 2 questions from each unit. The candidate will have to attempt 5 questions in all, selecting atleast one question from each unit.

PGDEM-01 **Fundamentals of Environment**

I. **Environment and its components :-** Biotic and abiotic components ; Atmosphere- its evolution, Composition & stratification; Hydrosphere- Characteristics of lentic and lotic freshwater systems and marine system (a brief account) Lithosphere- Soil characteristics & soil biota, various types of soils.

II. **Ecological Principles :-** Biosphere & its organisational Levels : Population, community & ecosystem; ecosystem structure & function-tropic structure, food-web ; cycling of nutrients-H_2O, C, N, P ; Flow of energy-various models, ecological succession. Natural Vs. man-made environment; ecological balance.

III. **Human Activities and Environmental Degradation :** Impact of Agriculture, overgrazing, mining and industrialization on environment (a brief account).

Land degradation : soil erosion, water-logging and salinization.

Deforestation and its environmental impacts. Eutrophication of lakes ; remedial measures.

IV. **Human Population Growth :**

Human evolution on earth with changing environment (a brief account); population growth trends, characteristics of human population- doubling time, zero growth rate; population explosion, population stabilization.

Environmental problems related to population growth.

REFERENCE BOOKS :

1. Basic Ecology - E.P.Odum.
2. Fundamental of Ecology - E.P.Odum.
3. Living in the Environment - T.J.Miller.
4. Environmental Science - Cunningham Saigo.

PGDEM-2 **Nature Resource Conservation and Management**

I. **Water Resources :** Unique characteristics of water and its use; Types of water resources - ground water and surface water; consumption patterns and demands; water conservation practices.

Management strategies - Watershd management, desalination methods; Rain-water harvesting and cloud-seeding

II. **Mineral Resources :** Minerals and their uses, their reserves and consumption patterns; Bio-beaching of mineral ores; Harvesting minerals from sea. Recycling of minerals.

III. **Wild-life and Biodiversity :** Introduction & significance of biodiversity; Problems of biodiversity loss.

Forest : Types and importance, forest resources of India. Forest Management Practices.

Wild-life, endemic, exotic, rare, threatened, endangered and extinct species, extinction process, IUCN and Red Data Book.

IV. **Wild-life - Conservation & Management :-** Need for wild-life conservation, *In-situ* and *ex-situ* conservation; Biosphere Reserves, National Parks and wild-life sanctuaries; Management and conservation of Wild-life in India-Project Tiger, Project Crocodile.

REFERENCE BOOKS

1. Natural Resource Conservation - Oliver S. Owen and Chiras.

2. Living in the Environment - T.J.Miller.

3. Global Biodiversity - W.R.L.I.U.C.N.

4. Ecology and Environment - P.D.Sharma.

5. Conservation Ecology - G.W.Cox.

PGDEM-03 Environmental Pollution

I. **Water Pollution** - Introduction, Water quality standards, sources of water pollution (domestic, industrial and agricultural), major pollutants-oxygen demanding wastes, pathogenic organisms, nutrients, heavy metals, pesticides and their harmful effects; Marine pollution - oil spills. Self-purification capacity of natural waters.

II. **Air Pollution** - Introduction, National ambient air quality standards, classification of pollutants (primary & secondary pollutants), sources of air pollutants; suspended particulate matter (SPM), oxides of sulphur (SOx), carbon monoxide, oxides of nitrogen (NOx), hydrocarbons, photochemical oxidants, fly-ash. Meteorology and plume dispersion. Automobile pollution; Harmful effects on human health, vegetation and material (metals and buildings).

III. **Noise Pollution** - Definition of sound and noise, audible, infra-sonic and ultra-sonic spectrum of sound, sources of noise pollution, concept of sound pressure levels - decibel scale ; Measurement and monitoring of noise, indices of noise pollution, standards of noise pollution in India.

IV. **Radioactive, Thermal and Indoor Pollution** - Nature of radiations, sources of radioactivity in environment, fate and movement of radioactivity in environment, biological effects of radiations.

Thermal pollution, its physical, chemical and biological impacts. Indoor pollution, Electromagnetic pollution.

<u>REFERENCE BOOKS</u>

1. Environmental Chemistry - A.K. De.

2. Industrial Environment - S.K. Agarwal

3. Fundamentals of Air Pollution - Boubel, Fox, Turner and Stem.

4. Industrial Noise Control - Bell and Bell.

5. Fundamental Concepts of Environmental Chemistry - G.S. Sodhi.

PGDEM-04 Pollution Control and Management

I. **Water treatment** - Objectives, primary treatment screening, plain sedimentation, chemical coagulation; secondary treatment: Activated sludge process, Trickling filter, Rotating biological reactor; Tertiary treatment, Disinfection.

II. **Industrial Waste water management** - Indian standards for industrial wastes disposal, Methods to control/minimize industrial wastes: reduction of volume, strength, neutralization, equalization of wastes; Process for removal of suspended solids, colloidal solids, dissolved organic and inorganic solids.

III. **Solid waste management** - Quantum and nature of solid wastes, solid waste management: reduction in raw material use, reduction in generation of solid waste quantities, Generation of energy/biogas; Conversion into useful products such as fertilizers, fuel pellets, etc; Reduction in quantity of solid wastes through incineration/pyrolysis; Disposal of soild wastes.

IV. **Noise and air pollution control** - Strategies for noise pollution control, particulate control equipment, electrostatic precipitators, silencers, Fabric filters. Ambient air quality monitoring, prevention and control method of air pollution, Measures to control/minimize vehicular pollution.

REFERENCE BOOKS:

1. Water Supply and Sanitary Engineering - G.S. Birdie and J.S. Birdie.

2. Waste Water Engineering - Metcalf and Eddy.

3. Air Pollution and Control - K.V.S.G. MurliKrishnan.

4. Industrial Noise Control - Bell and Bell.

PGDEM-05 Energy and Disaster Management

I. **Conventional Sources of Energy** - Energy demands and supply of commercial sources, coal, petroleum, natural gas, energy use and its effect on environment. Energy resources of India, India's present energy scenario and planning.

II. **Non-Conventional Energy Sources** - Hydel-power energy, wind energy, tidal energy, geothermal-energy (in brief).

Biomass energy - biomass conversion, biogas technology in India, potential of biogas in India; energy plantation, improved chullah programme.

Hydrogen - as an alternate fuel.

III. **Solar Energy** - Active and passive solar energy collectors, solar photovoltaic system, principle of solar cell, solar energy application in India, solar water heater, solar pump, solar ponds, solar cooker, solar desalination.

Energy conservation strategies, energy management in India.

IV. **Environmental Disasters** - Hazards - Dimensions, perceptions & adjustments.

Natural hazards - earthquakes, valcanoes, landslides, storms & cyclones, floods and droughts.

Recognition and emergence of technological hazards - some case studies. Mitigation measures.

REFERENCE BOOKS

1. Non-conventional Energy Sources - G.D. Rai.

2. Renewable Energy - N.K. Bansal.

3. Renewable Energy - Godfrey Boyle.

4. Non-conventional Energy System - K.M. Mittal.

PGDEM-06 **Environmental Awareness & Legislation**

I. **Global Environmental Issues** - Global environmental problems, ozone layer depletion, greenhouse gases and global warming, desertification, Acid rain. Concept of sustainable development.

II. **Environmental Conventions, treaties & litigations** - Stockholm conference, The Rio Earth Summit, Montreal protocol, Kyoto Conference

Interest Litigation (PIL) Some important PIL's for environmental protection.

III. **Environmental Ethics** - Development Vs environment, human-centred and eco-centred world views, ethical aspects, views of different religions on nature/ environment, role of common man in environmental protection, environmentalism in modern context.

IV. **Environmental Legislation & EIA** - Constitutional guarantees to environmental protection. A brief account of various environment related laws : Forest Conservation Act 1980, The National Forest Policy 1988, Wild Life (Protection) Act 1972, Environmental Protection Act, 1986; Water Pollution (Prevention & Control) Act 1974, Air Pollution (Prevention and Control) Act 1981.

Environmental Impact Assessment (EIA) - Significance and brief methodology.

REFERENCE BOOKS

1. Living in the Environment - T.J. Miller.
2. Environmental Planning, Policies and Programmes in India - K.D. Saxena.
3. Environmental Concerns and Strategies - T.N. Khoshoo.
4. Environmental Awareness and Law - Paras Diwan.
5. Environmental Laws in India - R.B. Singh.
6. Environmental Laws : Indian Prospective - K.C. Agrawal.
7. Environmental impact Assessment - J. Glasson.