

No. - 97

# SYLLABUS

FOR

M. Sc. in ENVIRONMENT

Part - I & Part - II



VIDYASAGAR UNIVERSITY  
MIDNAPORE - 721 102  
WEST BENGAL

## **M. Sc. in Environment**

### **Paper 1 :**

Introduction to environmental studies :

Basic concepts of environmental studies. Orientation of environmental studies, Man-Environment-Nature nexus, Quality of life, living vis-a-vis environment components of environment, Air, land and water, Non-anthropogenic and anthropogenic changes in environment. Global environmental issues, Environmental hazards and signs, Environment and development.

### **Paper 2 :**

Nature and Natural processes :

Components of the Earth : Lithosphere, Hydrosphere, Atmosphere and Biosphere.

Natural processes and its environmental impacts.

Environmental impacts on engineering construction and mining,

Natural Cycles :

Geological, Chemical and Biological cycles.

Climate of the Earth – oceanic and continental effects on climate.

Natural and man-made disasters and disaster management.

Resources, its type, utilisation and conservation.

Land use for various purpose : Agriculture, forestry, housing, building, forms of cities, roadways, mining etc.

Water : Types of water, global and natural situation, saving water.

Coastal Zone environment :

Role of Geologists and Geographics in rural and urban environmental planning.

**Paper 3:**

Population and Environment :

Limits to population growth, population distribution in the world, population dynamics with particular reference to developing countries.

Natural resources and population growth, Environment, economic and sustainable development in third world countries. Impact of economic development on environment particularly in India.

**Paper 4 :**

Environmental Chemistry :

Components of air : Carbon, Oxygen and N Cycle.

Sources and nature of air pollutants, Type of air pollution.

Sampling methods for air pollutants.

"Green House Gases", "Ozone hole", "Global warming".

Pollution effects of air on flora, fauna and human beings.

Smell and fragrance, flavouring agents in food, drinks, medicine, odorous pollutants, abatement method.

Nature and characteristics of water pollution and their sources.

Treatment of raw and waste water in factories, municipalities, removal of toxic elements and desalinisation.

**Paper 5 :**

Environmental Physics :

Atmosphere : Constituents, thermal structure and stratification, Energy budget.

Meteorological parameters (Temperature, Pressure, Density, Moisture content and velocity).

General Atmospheric feature : Thunderstorm connection, structure at life cycle of cell.

Characteristics of Indian Monsoon, Depression and low pressure .

Air – Sea interaction seasonal anomalies of the ocean-atmosphere system.

Long term variations in ocean-atmosphere system.

Mechanisms of climate change.

**Paper 6 :**

Society and Environment :

Origin of environmental problems :

Historical growth of civilisation, Industrialisation, population growth and consumerism.

Changes in social environment and its effect in natural environment particularly with technology for quality of life.

Impact of colonialism (power politics) in changing social and natural environment of the developing countries.

Factors effecting socio-cultural environments : Ethics, moral, and practical concerns, Resource mobilization, equality of opportunity, equality of distributing and their impact on socio-economic environment.

Environment and regional conflict (Political, Geographical and economic etc.)

PRA technique.

**Paper 7 :**

Environmental Bio-Sciences :

Definition of life, characteristics of living matter, biomolecules, structural organisation of living system Biogeochemical cycles and their significance, Life support system in favourable and unfavourable environmental system.

Ecology and concept of ecosystem, biomass, biotic and abiotic

components of ecosystem.

Land-based marine, aquatic and wet land ecosystems.

Flora, fauna and environment : Interactions and interrelations.

Natural balance in ecosystem – vegetation as a major balancing factor.

Forest ecology, importance of forestry, management of natural and man-made forests, conservation of forests.

Problems of sustainability of stable ecosystem.

### **Paper 8 :**

Environmental economics :

Basic concepts of economic theory and natural resource economics.

The general framework of economy-environment interaction.

Application of economic principle to environmental problems.

Pollution externality, pollution damage and costs.

Environmental management : Cost benefit analysis and project appraisal input-output model.

Economics of Environmental policies, different criteria for evaluating impact of environmental policy, the choice of instrument for implementing environmental policy (a) pricing and (b) tax subsidy.

Environmental problems of India and economic viability for solution of the same.

### **Paper 9 :**

Environment and public health :

Public health issues as related to environmental pollution.

General symptoms, allergic reaction and common health disorders.

Major water, food and air-borne diseases of man vectors of disease– transmission by flies, mosquitoes, rodents and pet animals.

Life cycle of malarial parasites.

Environmental, biological, chemical and biotechnological control of mosquitoes, flies and other domestic pets.

Control of chemical health hazards in agricultural pest control, integrated pest management in agriculture, biological control, biotechnological approach.

Heavy metal and organic pollutant toxicity – nature and abatement.

Non-point pollution from inorganic fertilizers.

### **Paper 10 :**

Pollution control, waste management and resource conservations,

Energy relations :

Removal of pollutants from water.

Prevention of undue change in local air components, reduction of release of toxic gases from different sources.

Persistent organic pollutants (POPs) and their interaction, measures, prevention of biomagnification.

Soil and noise pollution.

Waste disposal.

Recycling and resource conservation.

Economics of waste recycling.

Conventional and non-conventional energy sources. Nuclear energy– problems and prospects, Waste management in energy production.

Waste recycling and energy conservation.

### **Paper 11 :**

Environmental policies :

History of environmental institution

Environmental awareness generations, role of government and public institutions, role of NGO's.

Environment policies at national and state levels.

Regulatory system, incentive based system.

Women and Environment.

Human rights, women related to environment, National eminent movements – Chipko, Silent valley, Narmada, Tehri-Garhwal, Sardar Sarovar Project.

Problems of Environmental refugees.

Legal issues in environmental risk – assessment and management.

Basic tenets of the National environment protection Act, "Green Bench".

Environmental Ethics : The need to develop a shared vision of a sustainable earth.

Changes in Environmental perception through ages.

Environmental information system.

### **Practicals :**

#### **Paper 1 :**

A visit to an envirolab for developing familiarity with :

Air pollution monitoring equipments e.g. High volume samplers etc.

Air pollution sampling method devices.

Decibelmeter and its calibration.

GLC, HPLC, pH meter, Flame photometer, UV/IR detection.

Normal lab equipments.

Report.

#### **Paper 2 :**

Determination of pH of water.

Dissolved Oxygen (Winkler method), of water

Biological Oxygen Demand,

Chemical Oxygen Demand,

TSS. Transparency of water.

Total Coli and Faecal Coli.

Practical note book.

Project Report.

**Part I :** 400 + 100

Papers 1, 3, 8, 9.

Practical : Paper 1.

**Part II :** 400 + 100

Paper 11 and any three papers from papers 2, 4, 5, 6, 7 & 10.

Practical : Paper 2.

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