

Syllabus  
Of  
Environmental Science  
For  
B.Sc. Three-Year Degree Course

Jiwaji University, Gwalior

YEAR 2011- 13

B.Sc. I Year

I Semester

Principles of environmental science and ecology

II Semester

Environmental Pollution

B.Sc. II Year

III semester

Natural Resources and Biodiversity conservation

IV Semester

Human Population and Environmental Impact Assessment

B.Sc. III Year

V Semester

Waste and Disaster management; Remote sensing

VI Semester

Environmental law and Biostatistics

## B.Sc. I YEAR ENVIRONMENTAL SCIENCE

### I SEMESTER

#### Principles of Environmental Science and Ecology

##### UNIT I

History and scope of environmental science, importance of Environmental science, Global Environmental problems, (Global warming, ozone depletion and acid rain) Environmental priorities in India, Environmental ethics.

##### UNIT II

Environmental education: Background, Goals, Objectives, Guided principles

Strategies for EE Development: authorization; curriculum renewal, teachers training renewal, teaching methods

**Unit III:** General idea about: Natural Resources , current status and types of resources ;

Environmental Pollution : general idea about air pollution, water pollution, noise pollution ;

General idea about Environmental laws

##### Unit IV

Principles of ecology, ecosystem concept: Biotic and abiotic components of ecosystem, ecological pyramids, food chain, food web, and trophic levels, ecological niches, flow of energy in an ecosystem

##### Unit V

General idea about forest ecosystem, grassland ecosystem, wetland ecosystems and aquatic ecosystem. Biogeochemical Cycling : Oxygen cycle, Carbon cycle, Nitrogen cycle, Phosphorus cycle, Sulphur cycle and water cycle.

#### **Practical**

Study of functioning and operations of important instruments and equipments.

Frequency, density, IVI, leaf area estimation.

Identification of different types of ecosystems.

Estimation of biomass in different ecosystems.

## B.Sc. II semester

### ENVIRONMENTAL POLLUTION

#### **UNIT-I**

Environmental Components: Structure and composition of the, Atmosphere, hydrosphere, biosphere and Lithosphere

#### **UNIT-II**

Water pollution: Sources, its effect and control; Sampling and measurement of water quality and their analysis, water quality standards, Eutrophication and restoration of lakes.

#### **UNIT-III**

Air Pollution: Types and sources of air pollution, Effects of air pollution; Sampling and measurement of air quality; Air pollution standards.

#### **UNIT-IV**

Sources, types, effects and control of: Land pollution, Marine pollution, Thermal Pollution and Radioactive pollution.

#### **UNIT-V**

Noise Pollution: sources effect and control: Measurement of noise; Noise pollution (Regulation and control) Rules 2000; Pollution from Road Vehicles.

#### **Practical**

Estimation of SPM, SO<sub>x</sub>, NO<sub>x</sub>

Estimation of smoke from diesel vehicles

Water analysis; Physical, Chemical and Biological parameters

## B.Sc. II YEAR ENVIRONMENTAL SCIENCE

### B.Sc. III semester

## Natural Resources and Biodiversity conservation

### Unit I

Natural Resources: concept of resources, types of resources, water resources, land resources, biological resources, mineral resources.

### Unit II

Energy resources, resources from oceans, human resources, conservation of natural resources, environmental impact of degradation of resources.

### Unit III

Biodiversity: Concept, origin, values, measurement and loss of biodiversity ; needs for conservation of biodiversity ; Hot spots of biodiversity and Key stone species.

### Unit IV

Wildlife Management: Concept of wild life management and conservation, Diversity and distribution of wildlife in India ; wildlife values, wildlife biology, protected area concept

### Unit V

Forest Mensuration, Forest Protection and Regeneration of Forest. Agro forestry, Social Forestry. Joint forestry management

### Practical

1. Planning a census for wildlife.
2. To recognize population trends from the indirect evidence of dung.
3. Methodologies for preparation of pug marks of animals

## IV Semester

### Human Population and Environmental Impact Assessment (EIA)

#### Unit I

Population dynamics , Age structure and significance, survivorship curves, demographic transition, population growth rate, population regulation.

#### Unit II

Human Population and environmental impact , Population and resources, Malthus theory of population, Relation between population poverty and pollution. Measures for controlling population

#### UNIT III

EIA: Introduction, Legislative frame work, Elements of EIA, EIA Methodologies, Guidelines for conducting EIA. Draw backs of EIA.

#### Unit IV

Environmental Audit (EA): Introduction, definition, benefits and objective of Environmental Audit. Procedure and guidelines for EA.

#### Unit V

Sitting of Industries : Introduction, Environmental site clearance, classification of Industries. and guidelines for Industries.

#### Case Studies /Field Practical.

1. Environmental Impact Assessment (EIA).
2. Environmental Impact statement (EIS).
3. Environmental Management system (EMS)
4. Environmental Audit (EA)

## B.Sc. III Year

### V Semester

#### Waste and Disaster management & Remote sensing

##### Unit 1.

Solid waste characteristics, collection and transportation ; Waste separation, storage and disposal ; Waste Reduction, Recycling and Recovery of materials.

##### Unit II

Biomedical waste management, wealth from waste, integrated solid waste management, Guidelines for owner/operator/transporter of hazardous waste, storage, treatment and disposal.

##### Unit III

Natural Disasters: Hazards in the environment, Dimension of Disaster, Tectonic hazards, Atmospheric hazards, Hydrological hazards.

##### Unit IV

Types of maps , survey of India maps, Toposheets , map reading, Symbols signs used in maps. Primary division and Classification of Surveying.

##### Unit V

Introduction to aerial photography, Basic information and specifications of aerial photography. Stereoscopy and aerial mosaics, Principals of photo interpretation.

#### Practical

1. Identification of features from single vertical aerial photograph.
2. Study of Topography through stereographs and aerial photographs.
3. Preparation of land use map.
4. Visual Interpretation of stereo-pair for environmental studies.

## B.Sc. III Year

### VI Semester

#### Environmental law and Biostatistics

##### Unit I

The Air (Prevention and Control of Pollution) Act, 1981 as Amended by Amendment Act, 1987; The water (Prevention and Control of Pollution) Act, 1974 as Amended up to 1988 ; Motor Vehicle Act, 1988 pertaining to pollution.

##### Unit II

The Environment Protection Act, 1986 Amendments 1991 and Rules 1986 ; Wildlife Protection Act, 1972 Amendment 1993 and 2002 ; Forest Conservation Act, 1980 – Amended up to 1988.

##### Unit III

Introduction, Collection, Tabulation and classification of data, Measure of Central values, mean, mode and median.

##### Unit IV

Geometric mean and Harmonic mean, Measure of dispersion – Standard deviation.

##### Unit V

Chi Square test, Small sample test, ANOVA – 1 way classification.

#### Practical

##### Case studies:

1. M.C. Mehta V. Union of India, AIR 1992 SC 852.
2. M/S Narula Dyeing and Printing works V. Union of India, AIR 1995 Guj 185.
3. Rural Legis lation and entitlement Kendra-Dehradun V/S State of atter Prdesh (1987) Supp. Sec 487.
4. The Bhopal Gas Disaster case.
5. Ganga water Pollution N.C. Mehta V/S Union of India Sec 47, April 1988 SC 115. Date of Decision 22.09.1987