EnvSci.

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ENVIRONMENTAL SCIENCE
M.SC. PART – I
PAPER I – ENVIRONMENTAL BIOLOGY & MICROBIOLOGY

A. ENVIRONMENTAL BIOLOGY

I. Animal diversity in terrestrial and aquatic environments

II. Aquaculture
- Freshwater aquaculture
- Brackish aquaculture-Prawn culture
- Mariculture
  - Molluscan culture
  - Crustacean culture
  - Seaweed culture
- -Adverse impact on aquaculture on the environment

III. Environment and Human health
Effect of Fluoride, Aluminium, Arsenic, Sillica, Asbestos, Coal dust etc

IV. Environmental Impact Assessment with emphasis on depleting biodiversity in different ecosystems.

V. Wildlife of India.
-Biogeographic zones and distribution of wildlife populations.
-Endangered and threatned species.
-Caused of wildlife depletion.
-Conservation and management of Protected area- National Park, Sanctuaries and Biosphere Reserves.

B. ENVIRONMENTAL MICROBIOLOGY

I.a. History and scope of microbiology

b. Microbiological techniques : sterilization, staining, microscopic observation, preparation of glass wares and media for microbiological work, Isolation, cultivation and preservation techniques for microorganisms.

2. a Basic microbial cell anatomy.

b Microbial growth and reproduction

c. Genreal aspects of bacterial genetics

3.a. Characteristics and classification of microorganism. Vis. Bacterial, Fungal, Virus, Actinomycetes.

b Microbes in human life

c. Microbes and disease.

ENVIRONMENTAL SCIENCE
M.SC. PART – I
PAPER II – ECOLOGY & IMPACT ASSESSMENT

1. Broad outline of classification : algae to angiosperms. Utilization of plants of food, timber, fiber, medicine and industrial values plants as a source of renewable energy , centres of origin and gene diversity, genetic resources and their conservation, stragegies, cryopreservation.

2. Growth and development of plants – dormancy, germination, growth indices and growth correlations etc . Mineral nutrition and plant growth hormones; plant repsonses to water, light and temperature.

3. Concept of ecosystem, components and types of ecosystem; dynamics of ecosystem, energy flow in the ecosystem; characters of plant community; ecological indicators; biogeochemical cycles.

4. Remote sensing and mapping of landscape and land-use-Case studies on some ecological problems relevant to India : deforestation and soil erosion, water logging, soil salinization.

5. Environment Impact Analysis · Needs, essential component, full disclsoure and public comment, assessment methodologies, quantification attempts for intangibles, project assessors, cost benefit ratios, monitoring, mitigation methods, selection of alternatives. EIA statements, drafting and policy. Prediction and assessment of impacts on air, water, noise and biological environment – a few studies.

M.Sc. PART II

PAPER III

Environmental Chemistry and Monitoring

1. General Chemistry :

pH and pH concepts, Design of Chemical Buffers, Dissociation constants, conductivity and ionization, oxidation - reduction processes, First and second law of Thermodynamics, Gibbs Energy, Chemical Potential, Chemical Kinetics - first order, half life, colloids, physiorption and chemisorption.

2. Water :

Hydrosphere : structure and properties of water and their environmental significance, source of contamination and pollution of water. Effect of water pollution on aquatic life, bioaccumulation , biomagnification and its importnace, marine chemistry. Water quality standards, physio-chemical, biological and bacteriological analysis - pH, color, temparature, acidity - alcalinity, Hardness, turbidity, DO , COD, BOD, TDS, chlorine demand, sulphates, nitrates, chloride, phosphates, fluorides, organic matters and toxic metals.

3. Chemistry of Air Pollution :

Atmosphere and its fractions, behaviour of the pollutants in Atmosphere, natural and anthropogenic sources of atmoshpheric pollutants, distribution, transport and dispersion of air pollutants - effect of metrological and topographical factors, air quality standards, emission standards, Indian, WHO and EPA standards, Global Climatic effect, Major pollutants like SPM, SO_2 , CO , NOX, oxidants, Hydrocarbon etc.

4. Soil Pollution :

Physical and Chemical properties of soil composition of soil organic matter, sources of soil pollution, Biodegradation and soil erosion.

5. Environmental Geology :

Man and Earth, Earth processes that effect man , earthquakes, volcanoes, Man's alterations on biological environment.

M.Sc. PART I

PAPER IV

Pollution Control (Air, Water and Noise)

Air Pollution Control

1. The philosophy of air pollution control - strategy and tactics - The Air pollution system.
   Episode control, Air Quality Management Control strategies, Economic Consideration.

2. Sources of Air Pollution - Combustion, stationary and mobile sources, Emission Inventory. Air pollution from major industries - petrochemicals, power plants.

3. Measurement and Monitoring of Air Pollution.- Types of Atmospheric Chemical Transformation scavenging and Removal from Atmosphere.
   Air pollution control equipment - particulate matter control, setting chambei cyclones, tilter, EPA scrubbers

4. Air pollution Monitoring and Surveillance
   Stationary Monitoring Networks
   Mobile Monitoring surveillance
   Remote Sensing, Quality Assurance.

5. Meteriology - Micro meterological measurements wind speed, direction, temperature, Air Pollutant Diffusion Theories, Statistical Theory.

6. The Engineering Control Concepts.

Water Pollution Control

1. Riverine, Estauarine, coastal and subsurface pollution, dilution and dispersion, natural purification, Effluent and Environmental standards, Surveillance programmes.

2. General operation and process of Water and Waste - Water Treatments.
   Principle involved in treatment, screening, sedimentation, coagulation, floculation, filtration, ion exchange, disinfactions, water softening, corrosion and its control, Removal of colour, odour, taste, micro-organism and aquatic weeds by different methods. Effluent

standards (Waste - Water treatments like stabilization ponds, created lagons oxidations ditch and control system). Recycling and renovation of Waste Water for industrial , domestic and agricultural use. Remote sensing in Water quality monitoring water quality models.

3. Pollution Indicators - Biological Indicators of pollution

4. Control of Microbes and Nanobes : Disinfection and Sterilization mechanism and practices, application to Industrial Problems.

Noise Pollution and its Control

1. Noise and its source, noise and health, Types of noise, Noise measurements. Environment and Noise measurements.

2. Control of noise at source , control of noise by enclosure, control of noise by sound absorbing.