Syllabus for
M. Sc (Environment Science) Entrance Test

Unit-I Ecology & Ecosystem Dynamics

Basic concepts of ecology; Ecological hierarchy; ecosystem stability, resistance and resilience; major terrestrial biomes; ecological niche; adaptation in plants and animals; population characterstics, community structure and organization: keystone species, ecotone and edge-effect; species interactions; primary and secondary successions,
Terrestrial and Aquatic ecosystems; Ecological energetics and energy flow–food chain, food web, trophic structure; concept of productivity–primary, secondary, gross and net; energy, pyramids of number, biomass, and energy. Biogeochemical cycles and nutrient cycling, biological invasions. Concept of Sustainable Development

Unit-II Biodiversity & its Conservation

Biodiversity gradient: latitudinal and altitudinal trends of biodiversity; Levels of Biodiversity; alpha, beta and gamma diversity; Concept of hotspots of biodiversity. Biodiversity of mangroves, wetlands and coral reefs. Biodiversity uses and ecosystem services; threats to biodiversity Importance of biodiversity patterns in conservation; In-situ conservation; Ex-situ conservation; Role of local communities and traditional knowledge in conservation; Red Data book; ecological restoration; afforestation; social forestry; agroforestry; joint forest management; the role of remote sensing in management of natural resources. National and international efforts for biodiversity conservation.

Unit-III Environmental Chemistry

Composition of atmosphere, photochemical reactions in atmosphere; thermal inversion, particles in atmosphere, acid rain, chemistry of ozone layer depletion, greenhouse gases and global warming; chemistry of water bodies- lakes, streams, rivers, estuaries and wetlands, solubility of gases in water, Enthalpy and First law of thermodynamics, entropy and second law of thermodynamics, Carnot's cycle, Gibbs force energy, third law of thermodynamics

Unit-IV Environmental biotechnology

Basic concepts of genetic engineering- steps of preparation, toolkit of enzymes for manipulation of DNA: restriction enzymes, polymerases genomic and cDNA libraries, Biodegradation of xenobiotic compounds, Bioremediation-in situ and ex situ methods, Phytotechnology, Wastewater treatment: anaerobic, aerobic process, Solid waste treatment sources and management, use of bioreactors for bioremediation; microbial insecticides, biofertilizers, bio-control of plant pathogen, Integrated pest management; development of stress tolerant plants, biofuel

Unit-V Natural Resource Management

Natural resources and associated problems; Use, exploitation and conservation measures of Land resources, Forest resources, Water Resources, Mineral Resources, Food Resources, Renewable and Non-Renewable Energy Resources; Use of alternate energy resources

Unit-VI Environmental Methods and Analytical Techniques

Titrimetry; Spectrophotometry; Flame photometry; Atomic absorption spectrophotometry; Basic Chromatography; methods of vegetation analysis

Statistical analysis of Environmental data: Mean, Median, Mode, Standard Deviation

Unit-VII Global and National Environmental Issues and Legislation

Acid rain, Smog and Ozone depletion, Climate change, Human population growth and environment, Desertification, Deforestation, Global Pandemics

Wildlife Protection Act-1972, Water Act-1974, Air Act-1981, Environment Protection Act-1986, Forest Conservation Act-1980, Noise Pollution Rules-2000

Unit-VIII Environmental Pollution

Air Pollution- sources and types of air pollutants and effects, smog formation and its types, Biochemical aspects of CO, O3, PAN, Benzene and heavy metals; effects of different pollutants on human health (NOx, SOx, PM, CO, CO2, hydrocarbons and VOCs) and their control measures, Air quality standards; Water pollution: Sources of surface and ground water pollution; water quality standards, Marine pollution, thermal pollution sources and effects on ecosystem ; Soil pollution: Causes of soil pollution and degradation; effect of soil pollution on environment, vegetation and other life forms; control strategies, Noise Pollution-sources, effects and control measures