

Syllabus for Entrance Test of M.Sc. Environmental Science 2026-27

Unit 1: Environmental Chemistry

Fundamentals of Solutes and solvents; mole concept, molarity and normality, solubility products; quantitative volumetric analysis.

Atmospheric chemistry: Composition of atmosphere; ions, radicals, water, gases and particles in atmosphere and their chemistry. Ozone layer; importance of ozone layer; ozone layer depletion and causes;; effects of ozone depletion; mitigation measures and international protocols. Smog – formation and types

Water and soil chemistry: Chemical and physical properties of water; alkalinity and acidity of water, hardness of water Soil composition; relation between organic carbon and organic matter, inorganic and organic components in soil;

Unit 2: Principles of Earth Sciences

Concepts of environmental system and geological time: Linked environmental systems and their significance in the study of environment. Feedback links among earth systems. Growth of the Antarctic Ice Sheet. Time, space and earth process The rock cycle and types of rocks.

Lithosphere: Materials of the lithosphere- their evolution and distribution. Effect of external forces on the lithosphere- effect of weather, wind and glacier. Soil formation and processes involved, soil profile and types of soils.

Hydrosphere: Cycling of surface water among atmosphere, biosphere and hydrosphere. Drainage basins and streams. Development of drainage system and drainage patterns. Groundwater sources, aquifers and its types.

Unit 3: Ecology, Biodiversity and Conservation

Ecology: Ecosystem energetics and efficiency. Community structure and species interactions. Population Distribution and Dynamics. Decomposers and nutrient cycling.

Biodiversity: Ecosystem to Genetic Biodiversity. Terrestrial and aquatic Biodiversity of India. Global Biodiversity Data & Information System. Biodiversity assessment: sampling and analysis techniques. Diversity indices computation and assessment. Conservation and Management:.

Unit 4: Environmental Biotechnology and Microbiology

Introduction to Biotechnology: Extraction and Purification of nucleic acids, Detection and Quantitation of biomolecules such as Nucleic acids , Proteins, Enzymes

Introduction to Microbiology: Different groups of micro-organisms, characterization and classification. Types of microbial habitats ,Ecological groups based on requirement of oxygen, carbon, temperature and nutrition. Microbes of the extreme environment (Extremophiles).

Unit 5 Environmental Pollution

Air pollution: Sources and classification of air pollution; Types of air pollutants. Effects on human health, animals and plants. Greenhouse effect, ozone hole, El Nino phenomenon, acid rain, smog. Ambient Air Quality and Standards Air pollution control Methods

Noise and light pollution,Thermal and Radioactive pollution

Water pollution: Water quality parameters and standards, Water pollutants:. Types of water pollution – groundwater and surface water pollution, Water pollution control Methodologies

Soil pollution: Composition of the lithosphere, inorganic and organic components in soil, micro and macro nutrients. Causes and types of soil pollution and consequences of soil pollution..

Solid waste classification and disposal, Management of Soil pollution

Land degradation and desertification: Processes of land degradation, Drivers of land degradation. Impact of land degradation on climate,

Solid and Hazardous waste: Types, sources and quantities of solid waste Physical, chemical & biological characteristics of domestic and industrial solid wastes & sewage. Types & sources of hazardous waste, E- waste & Bio-Medical Waste, Municipal and industrial solid waste.

Management of hazardous waste

Unit 6: Sustainable Development and Climate Change

Millennium Development Goals: Transition from MDGs to SDGs

Climate Change and Its Impacts:– Climatic shift on Global Scale. Impacts of Climate change; Mitigation strategies for climate change: Conventions related to climate change

Unit 7: Analytical techniques,

Analytical Techniques: Chromatography – Principles, of HPLC, GC, Ion-exchange, and Gel chromatography. Principles of Electrophoresis Centrifugation and Microscopy Spectrometry- UV/visible/ Spectrophotometry, Flame Photometer, Atomic absorption spectrometer,

Unit 8: Environmental legislation

Introduction to Environmental Law: Concept of Law & Policy. Environment and Governance. Sustainable Development and Environment. UNEP and international protocols. Environment Protection Act, 1986. Law and Policy Frameworks related to Forest and Wildlife

National laws for pollution control and policies for industries: The Air (Prevention and Control of Pollution) Act, 1981. The Water (Prevention and Control of Pollution) Act, 1974. Solid hazardous waste. Regulatory authorities and boards -Understanding of MoEFCC, CPCB, PCB's and NBB.

Rules with respect to Municipal solid waste (Management and Handling); Hazardous waste (management and transboundary movement); Biomedical waste management ; Fly ash management; Batteries (management and handling).

Unit 9: Demography and Natural Resource Management

Demography: Sources of demographic data and census statistic. Demographic attributes, demographic transition, growth, distribution, density, movement, events responsible for population change. Concepts of optimum population, over-population, under-population

Natural Resource Management: Concepts of resource and waste. Classification and status of natural resources. Concept of sustainable natural resource management. Integrated water resource development and management, Sustainable land and agriculture management, Integrated Pest Management.
