Entrance Test Syllabus-2025
(NEP 2020 UG Syllabus)
M.Sc. Environmental Science
School of Earth and Environmental Sciences
University of Kashmir, Srinagar

The question paper, containing 60 multiple-answer questions, for the entrance examination for admission to M. Sc. Environmental Science will be broadly based on the topics below, placed under 15 units drawn from different branches of science strongly related to the Environment. The paper will be spread over the whole syllabus, with four questions from each unit and each carrying one mark.

Unit 1: Environment and Ecology

Importance, structure and composition of Atmosphere, Hydrosphere and Hydrological Cycle, Origin of Earth, Origin and evolution of life, Lithosphere, Biosphere, Cryosphere and Anthrosphere, Concept and Structure and function of an ecosystem, Food chain, Food web, Pyramids, Ecological balance in nature, Energy flow, Ecosystem productivity, Succession (Hydrosere and Xerosere).

Unit 2: Natural Resources and Biodiversity Conservation

Natural resources: concept and classification, forest resources, water resources, mineral resources, Energy resources (Renewable and Non-renewable), Biodiversity: Status and importance, Levels of biodiversity, Endemism, Hot spots and cold spots, India as a mega-diversity nation, Threats to biodiversity, IUCN's Red list (Scheme and Status), Geographical classification and zones, Major biomes of the world, Zoogeographic realms of the world, Dispersal: Means, modes and barriers, Migrations, Biodiversity conservation: In-situ and Ex-situ.

Unit 3: Environmental Chemistry

Titrimetry, Volumetry, Colorimetry, Mole concept, molarity, normality, quantitative volumetric analysis, Concept of Acids and Bases, Buffer system, Thermochemical and photochemical reactions in atmosphere (Acid rain, Smog and Ozone depletion), Chemistry of greenhouse gases, Physico-chemical properties of water, Biological oxygen demand and Chemical oxygen demand, Inorganic and Organic Components of Soil, Soil profile.

Unit 4: Human and Environment

Environmental education-goals, Objectives and need for public awareness, Role of women in environmental education, Awareness and sustainable development, Role of NGO's and mass media, environmental organizations and governments in environmental education, Bishnoi movement, Chipko movement, Appiko movement, Narmada Bachao, Andolan, Tehri dam conflict, Environmental ethics: Anthropocentrism, Biocentrism, Ecocentrism, Technocentrism, Ecofeminism, Deep and shallow ecology, Land ethic and Gaia hypothesis.

Unit 5: Environmental Pollution

Ambient air quality: monitoring and standards, Types and sources of air pollution, Air quality index, Effects of air pollutants on environment and health, Indoor air pollution, Control of air pollution, Ambient noise quality and standards, Sources, Effects and Control of noise pollution, Water pollution: causes, impacts and prevention/control measures, Eutrophication, Thermal pollution, Water-borne diseases: Cholera, Typhoid, Hepatitis, Acid precipitation, Soil pollution, causes, effects and control measures, Solid waste: Municipal and industrial wastes, Drinking Water Quality Standards, Composition and characteristics of solid waste, Biomedical and hazardous waste, Color coding for waste disposal,

Unit 6: Environmental Geosciences and Disaster Management

Geological time scale, Continental drift and plate tectonic, Types of rocks and rock cycle, Internal and external earth surface processes, Weathering Process, Disaster management framework, Disaster risk and vulnerability, Physiography and river systems of India with special reference to J&K, Natural disasters and environmental challenges: Floods, Earthquakes, Landslides, Tsunamis Pandemics, Food and Water security.

Unit 7: Environmental legislation and Policy

International initiatives: Stockholm, Earth summit, Montreal and Kyoto protocol, Wildlife protection Act-1972, Water Act-1974, Air Act-1981, Environment protection act-1986, Forest conservation Act-1980, Noise pollution Rules-2000, Constitutional provisions: Article 21, 48A, 51A, Principle of no fault, Polluter pay principle, National Environmental Policy, 2006, National Water Policy, 2012, National Energy Policy, 2017, National Forest Policy, 2018, National Missions.

Unit 8: Aquatic Ecology

Major taxonomic groups of freshwater biodiversity: Algae, Zooplankton, Macrophytes, Macroinvertebrates and Fish, Measures of diversity, Endemism and Biological invasion in freshwater ecosystems, Stream classification, Lakes & Wetlands: Origin, diversity, distribution and Classification, Lake stratification, Threats to freshwater systems: Habitat and hydrology modification, Channelization, mining, invasion, pollution, overexploitation, acidification, dams, Climate change, Harmful algal blooms.

Unit 9: Environmental Economics and Sustainable Development

Environmental economics: definition and scope, Natural capital and flow, Concept of intangibles and externalities, Carbon credits and carbon market, Ecosystem Services and its Typologies, Valuation and accounting of ecosystem services, Methods of environmental valuation, (empirical approaches, revealed preference methods and direct methods), Incentives for ecosystem services (IES) in the Himalayas, Concept of sustainable development, Sustainable development goals, Circular economy, Green infrastructure, Sustainable cities and globalization.

Unit 10: Atmospheric Science

Meteorological parameters: Atmospheric pressure, temperature, precipitation, humidity, Wind, atmospheric stability, Radiation and heat budget Fundamentals of climatology, Classification of climate: Koppen's, Monsoon and climatic zones of India, Western disturbances and climate of J&K, Composition and structure of atmosphere, Atmospheric aerosols: Types & sources, Atmospheric-sea interactions, Atmospheric general circulation, El-Nino and southern oscillations (ENSO), Indian Ocean dipole (IOD), Weather analysis and forecasting techniques, Dry and wet atmospheric deposition.

Unit 11: Terrestrial Ecology

Distribution of terrestrial ecosystems, Community structure and functioning, Patterns of terrestrial primary production, Terrestrial decomposition, Carbon sequestration storage and utilization, Major forest types of the world, Major forest types in India, Forest community structure and function, Forest biota, Deforestation and global climate change, Introduction to world deserts, Classification of desert, Ecological adaptation of desert flora and fauna, Major grassland types of India and world, Concept of agroecosystems.

Unit 12: Environmental Impact Assessment and Auditing

Concept, history, and objectives of EIA, EIA process and guidelines (e.g., EIA guidelines 2006), , Various EIA methods, Assessment of air and water quality, Ecological and social impact assessments, Basics of environmental modeling, including model validation and forecasting, Principles and guidelines of environmental auditing, Preparation of environmental audit reports, Overview of ISO 14000 series, Concepts of risk analysis and risk management

Unit 13: Environmental Biotechnology & Techniques

Structure and function of cells, Cellular processes and interactions, Recombinant DNA technology, Polymerase chain reaction, GMO's, eDNA, Bioremediation (in situ and ex situ bioremediation), Principles and applications of paper, thin layer and gas-liquid chromatography, principle and working of spectrophotometry, gel electrophoresis,

Unit 14: Green Technology and Vermicomposting

Definition and concepts: green technology, 3 R's of green technology: recycle, renew and reduce, Green buildings, history of green buildings, need and relevance of green buildings over conventional buildings, LEED certified building, Eco-mark certification, establishment of Eco-mark in India, its importance and implementation, Carbon capture and storage (CCS) technologies, Life cycle assessment(LCA), Compact florescent light(CFL) and cogeneration, Importance of Vermicompost in Agri-horticultural practices, Vermicomposting for Organic Farming, Vermicomposting techniques, standard composition of vermicompost, Earthworms: Type, identification & usefulness.

Unit 15: Emerging Environmental Issues and Challenges

Climate change vulnerability and risk, Human population growth and environment, Epidemics, Zoonotic diseases and pandemics (e.g., COVID-19 and environmental linkages), Water and food security linkages, Desertification and land degradation, Hazardous Waste and E-waste, Radioactive waste (Threats & Management), Emerging Environmental Contaminants.