

SARVAJANIK UNIVERSITY

Faculty of Science

Ph.D. Entrance Syllabus Environmental Science



SARVAJANIK
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Ph.D. Entrance Test Syllabus (PET)
Environmental Science

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Unit 1: General Perspectives and Ecosystem

Man and environment, Concept of population growth and carrying capacity, Sustainable development, Sustainable Developmental Goals (SDGs), Environmental components – Atmosphere, Hydrosphere, Lithosphere and Biosphere, Components and types of ecosystem, Ecological succession, Trophic levels, Ecological pyramids; Food Chains, Food webs, Ecological energetics; Homeostasis, Adaptations of plants and animals in various habitats.

Unit 2: Biodiversity and Conservation

Biodiversity-levels, values, threats, hotspots and conservation measures, Natural resources and associated problems, Planning conservation areas, Criteria for conservation, Biodiversity in India, National parks, Sanctuaries, Wetlands, Ramsar Sites.

Unit-3: Agriculture and Forestry

Origin, history and world agricultural system, Factors affecting to crop production, Environmental pollution and associated hazards on Agriculture, Ecological and socioeconomic dimension of Agriculture; Tillage: types, implementation and characteristics of crop; Crop nutrition and Integrated Nutrient Management; Indian and World scenario in forest ; Biogeographic classifications of India and wild life in India; Forest economics: basic concept, national income and types of inflation.

Unit 4: Geospatial Technologies and Disaster Management

History, principle, components, types and methodology of Remote Sensing and GIS, Component of GPS, Types of satellites, Applications of remote sensing in natural resource conservation, Types of hazards and disasters, Disaster management cycle, Earthquake, Tsunamis, Flood and Cyclone, Role of NIDM in disaster management and mitigation, Applications of information technologies in disaster management.

Unit 5: Environmental Pollution

Sources, types and effects of Air, Water, Soil and Noise Pollution and their control measures and treatment technologies, Pollution control and management in Thermal Power and Nuclear Power Plants.

Unit 6: Global Environmental Problems and Remediation Technologies

Causes, consequences and mitigation measures of Global Warming, Ozone layer depletion, Greenhouse effect and acid rains, Climate change – El-Nino & La-Nina effects, Soil Erosion, Formation and reclamation of Alkaline and Saline Soil. Waste lands and their reclamation. Desertification and its control, Solid/Hazardous waste management, Principal and Types of bioremediation and bioleaching, Concept of Biopesticide, Biofertilizer, Bioscrubber and Biofuel.

Unit 7: Environmental Law and Movements

Overview and key components of Indian Environment laws-Forest laws, Pollution control laws, Conservation laws, Chipko movement, Beej Bachao Aandolan, Appiko Movement, Bisnoi movement, Fisherfolk movement.

Unit 8: Environmental Management

Introduction to EIA and EA, Methodology and audit report, Environment management cycle, Importance of environmental audit, GPCB, CPCB and APHA standards for pollutant emission.

Unit 9: Chemical reactions in environment

Particles, ions and radicals in the atmosphere, Chemical processes for formation of inorganic and organic particulate matter, Thermochemical and photochemical reactions in the atmosphere, Meteorology of air pollution, Temperature inversion, Plume behavior, Oxygen and ozone chemistry, Chemistry of air pollutants, Smog formation, Redox potential, Inorganic and organic components of soil, Nitrogen pathways and NPK in soils, Pedogenesis, Concept of DO, BOD, COD, sedimentation, coagulation, aeration, filtration, Advance treatment.

Unit 10: Analytical Methods in Environmental Science

Titrimetry, Gravimetry, Colourimetry, Spectrophotometry, Chromatography, Gas Chromatography, Atomic Absorption Spectrophotometry, GLC, HPLC, Electrophoresis. X-Ray fluorescence, X-Ray diffraction, Flame photometry, Sampling and analysis techniques of pollutants in ambient air and from stack emission, Physical, Chemical and Biological methods for water/wastewater analysis.

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4. Water Supply & Sanitary Engineering - G.S.Birdie & J. S.Birdie, Dhanpat Rai Sons Publications.
5. Wastewater Engineering: Treatment and Reuse – G. Tchobanoglouse, F.L. Burton and H. D. Stensel, Metcalf and Eddy, 4th Edition, 2003, TataMcGraw Hill.
6. Standard methods for the Examination of Water and Wastewater, A.D. Eaton, L.S. Clesceri, E.W. Rice, A. Greenberg, 22nd Edition, 2012, APHA, AWWA, WEF.
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