

Syllabus for Environmental Science Bachelor's

Section 1: Subject Knowledge

Please Note: A Total of 40 Questions will be asked, combining the following topics, with the difficulty level commensurate to a Bachelor's Candidate.

Unit I: Earth Sciences

Study of Earth's materials, structure, and processes (rock formation, plate tectonics). Meteorology (weather patterns, climate change) and oceanography (ocean dynamics, marine ecosystems). Human impact (pollution, resource management, sustainability). Paleontology, stratigraphy, fossil record, and geospatial technologies.

Unit II: Physical and Chemical Sciences

The study of matter and its properties, atomic structure, chemical bonding, stoichiometry, and chemical reactions. Students explore the laws of thermodynamics, kinetics, and equilibrium, along with the principles of gas laws and solutions, mechanics, energy, waves, electromagnetism, and thermodynamics.

Unit III: Origin of Life

abiogenesis, the primordial soup theory, and the RNA world hypothesis, roles of environmental factors, such as volcanic activity and hydrothermal vents, implications of extraterrestrial life and the significance of current astrobiological research.

Unit IV: Genetic Material

Mendelian genetics, extending into complex inheritance patterns, gene interactions, and quantitative traits, the molecular basis of gene structure and function, including DNA replication, transcription, translation, and gene regulation, epigenetics, population genetics, genomics, CRISPR.

Unit V: Plant and Animal Systematics

Role of VOCs and hormones in plant-plant and plant-environment interactions. Signals (colors, scents) for pollinator attraction, and chemical communication in symbiotic and pathogenic interactions. Key signaling pathways (auxins, gibberellins) and their ecological roles.

Unit VI: Ecology and Environment

structure and function, biogeochemical cycles, population dynamics, and community interactions such as predation, competition, and symbiosis, the impact of human activities on the environment, including pollution, habitat destruction, and climate change.

Unit VII: Microbiology and Biotechnology

Classification, taxonomy, and evolution of bacteria, archaea, and viruses. Microbial physiology, genetics, and adaptation. Host-pathogen interactions. Environmental roles in biogeochemical cycles and biodegradation. Industrial applications: fermentation, antibiotics, waste treatment, and biotechnology.

Unit VIII: Natural Resources and Management

Classification of natural resources, including renewable and non-renewable resources, ecosystem services, biodiversity, water resource management, forest conservation, and soil preservation, impact of human activities on natural resources, focusing on pollution, climate change, and habitat destruction.

Unit IX: Global Environmental Issues

Climate change, biodiversity, and conservation. Pollution types, sources, impacts, and sustainable waste management. Sustainable development principles and natural resource management. Global environmental policies (e.g., Paris Agreement) and environmental justice for marginalized communities.

Unit X: Environmental Pollution

study of pollutants' chemical and biological properties, the mechanisms of their transport and degradation, and the impact of human activities such as industrialization, urbanization, and agriculture.

Unit XI: Waste Management

an introduction to waste management principles and policies, types of waste (solid, liquid, hazardous, electronic), waste generation and composition, and the environmental impacts of waste, waste treatment technologies, regulations governing waste management, and the role of community participation.

Unit XII: Instrumentation

basics of measurement systems, including accuracy, precision, and resolution; types of sensors and transducers; signal conditioning and processing; data acquisition systems; control theory fundamentals; and specific instrumentation techniques such as chromatography, spectroscopy, and electrophoresis.

Section 2: Fundamental Skills

Please Note: A Total of 28 Questions will be asked, combining the following topics, with the difficulty level commensurate to a Bachelor's Candidate.

Unit I: Data Analysis

Unit II: Math and Statistics

Unit III: Lab skills

Unit IV: Reading and Writing

Section 3: Specific Skill Proficiency

This section has more than 30 skills. You can select the ones you are proficient in from the enrollment form. You can choose a maximum of 2 skills. Each skill contains 10 questions.