

Syllabus for Environmental Science

(PGQP32)

Earth Sciences: Structure and composition of Environment- Atmosphere, Hydrosphere and Lithosphere, Earth Processes, Mineral and Power Resources in India, Biogeochemical Cycles, Meteorology, Climate Change, Origin and evolution of earth, Mineral and Power Resources in India.

Physical and Chemical Sciences: Fundamentals, Atmospheric Chemistry, Water Chemistry, Geochemistry, Green Chemistry. Water - physical characteristics, buffering capacity, Essential and trace elements in living systems, Bio-molecules - chemical components of cells, Biogeochemical cycles – carbon, nitrogen and phosphorus, Hydrological cycle and global water balance, Toxicity of Heavy metals.

Life Sciences:

Origin of life: Theories of evolution, genetic drift, speciation, cell organelles, cell division, modes of reproduction, principles of inheritance, epistasis, mutations, chromosomal aberrations, extra- chromosomal inheritance.

Genetic Material: DNA structure and replication, transcription and translation, chromosome structure, protein structure, mutability and repair of DNA, reverse genetics.

Photosynthesis, Plant growth hormones, Dormancy and seed germination, Respiration

Plant and Animal systematics: Bryophytes, Tracheophytes, Gymnosperms, Angiosperms. Membrane structure and Ion transport, ATPase - structure and function, Photosynthesis, Photoperiodism, Vernalization, RUBISCO.

Animal systematics, physiology and diseases: Cnidaria, Echinodermata, Chordata, Protostomia; Anatomy and physiology of humans; major classes of bacterial and viral pathogens, Apoptosis and cancer, inherited diseases, animal cell culture.

Ecology and Environment: Biosphere, Organizational levels of biosphere, Ecosystem: Structure and Types, Food Chain and Energy Flow, Population and Community Ecology, Biodiversity and its Conservation.

Microbiology and Biotechnology: Principles of Microbiology, Microbiology of Air, Water, Soil, Sewage, Recombinant DNA technology, principles of gene cloning, transposition, applications of biotechnology in medicine, industry, agriculture and environment.

Natural resources and Management: Natural Resources-Forest, Water, Minerals, Marine, Energy (Renewable and Nonrenewable) - Sources, Threats, Conservation and Management, **Global Environmental issues:** ozone depletion and global warming, Acid rain and Smog, Sustainable Development.

Environmental Pollution: Air, Water, Soil, Noise Pollution- Sources, Causes, Effects, Consequences.

Waste Management: Solid waste - disposal, Management; Waste to energy conversion.

Instrumentation: Principles and applications of microscopy, spectrophotometry, centrifugation, radioisotope techniques, electrophoresis and chromatographic separation techniques, Blotting and hybridization techniques.