DEPARTMENT OF ENVIRONMENTAL STUDIES
GITAM INSTITUTE OF SCIENCE
GITAM UNIVERSITY

Syllabus for M.Phil. /Ph.D. Entrance examination

Part-A

UNIT – I

Environmental Impact Assessment (EIA) definition and objectives, EIA Methodologies: Adhoc – Checklist Approach – Matrix Methods – Network Methods. Environmental Management Plan. Principles of Environmental Management System (EMS), ISO 14001, Eco-labeling. Environmental Auditing: Scope, Objectives and Procedures for environmental auditing. Disaster Management plan on-site & off-site.

UNIT-II

Industrial Waste Treatment: Introduction, Principles of industrial waste management, sources of pollution, physical, chemical, organic and biological properties, effects of waste water on streams, land environment and human health. Water and waste water treatment plants **:** Physical, Chemical & biological characteristics. Primary & Secondary Treatments.

Industrial Waste Management : Manufacturing processes, characteristics and composition of wastes including waste reduction, treatment and disposal methods following industries : Paper, Steel plant, refineries and Sugar & Dairy.

UNIT – III

Water and Waste Water Analysis – Laboratory procedures and importance of each of the following laboratory tests.

a) (i) Solids total & volatile (ii) Turbidity (iii) Color (iv) pH (v) Acidity (vi) Alkalinity (vii) Coagulation of water (viii) Hardness (ix) Water softening (x) Residual chlorine and chlorine demand (xi) Chlorides. b) (i) Biochemical Oxygen Demand (ii) Chemical Oxygen Demand (iii) Nitrogen (iv) Iron and Manganese (v) Fluoride (vi) Sulfate (vii) Phosphorous and Phosphate (viii) Grease (ix) Volatile acids.

UNIT – IV

Instrumentation: Basic principle, components and environmental application of the following (detailed calculations and problems not necessary): UV – Visible spectrophotometer, Gas Liquid Chromatography (GLC), Atomic Absorption Spectroscopy (AAS), Flame Photometry, Inductively Coupled Plasma Mass Spectrometry (ICPMS). Fine particulate samplers (PM_{10} and $PM_{2.5}$)

Vegetation Analysis: Quadrate & Line-Transect methods. Diversity Measure: Shannon -Wiener, Simpson and Brillouin's Index

Part-B

UNIT – I

Ecosystem Introduction, types of Ecosystems; structure and function of an ecosystem; Major ecosystems: Pond ecosystem; Ocean (marine) ecosystem, Grassland Ecosystem, Forest Ecosystems, Desert Ecosystem and Cropland Ecosystem. Functional aspects of an ecosystem; Food web, Food chains; Ecological Pyramids. Ecological energetics.

Biodiversity: definition, types, importance, threats, hot spots & conversation.

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UNIT – II

Water Resources: Types of Water sources, Ground Water, Surface Water etc, Water Conservation, Watershed Management, Rainwater Harvesting & Cloud seeding for artificial rains. Energy Resources: Conventional & Non-conventional energy Advantages & disadvantages of Fossil fuels, Nuclear energy, Hydel power, Geothermal & Tidal Energy, Wind Energy and Solar Energy. Biofuels

UNIT – II

Air Pollution: Types and sources of air pollutants; Effects of pollutants on human beings, plants, animals and materials. **Water Pollution:** Sources of pollution of surface and ground water, Types of water pollutants; Effects of water pollution on water bodies - eutrophication, **Soil Pollution:** Sources, effects and control of soil pollution. Biomagnification. **Noise Pollution:** Noise pollution – source, measurement, effects and control. Municipal solid waste management- Sources and types, composition and properties, collection and transportation, disposal methods (landfilling, incineration, composting). Recycling of paper, plastics, glass and metals. Hazardous Waste Management: Sources, characteristic, handling & disposal methods. Management of Biomedical & Nuclear Wastes.

UNIT – III

Global and National Environmental Issues: Climate change, ozone depletion, greenhouse effect, Acid rain, *el nino* &*la nina* effects, Deforestation and Biodiversity loss . Types of natural disasters and their Management Environmental consequences of Dams. Mining: Types of mining. Environmental consequences of Mining and control methods.

Environmental movements: Major environmental movements in India. Chipco movement, Silent Valley movement, Appiko movement, Narmada Bachavo Andolan and Tehri Dam conflict. International Conventions on Global Environmental issues.

UNIT – IV

Land degradation: Land use pattern in India, causes of land degradation, environmental consequences of land degradation due to Mining, soil erosion, desertification, Salination and water logging. Control of land degradation. Waste Lands: Causes of waste land formation and reclamation of waste lands. Wetlands: Importance and types of wetlands and their management. Ramsar convention. Environmental Legislation: Environmental Laws in India. Green benches: Structure and functions of green bench.