

CLASS-XII

SUBJECT : ENVIRONMENTAL SCIENCE (EVSC)

SEMESTER-III

FULL MARKS:35

CONTACT HOURS :80 HOURS

COURSE CODE : THEORY

Chapter	Subtopics	Contact Hours	Marks
7.Environmental microbiology and biotechnology	7.1 Introduction to Microbiology <ul style="list-style-type: none"> Definition & Scope: Study of microorganisms and their roles. Types of Microorganisms: Bacteria, fungi, algae, protozoa, viruses. Microbial World: Habitats of microorganisms and their ecological roles. 7.2 Microbial Ecology <ul style="list-style-type: none"> Symbiotic Relationships: Mutualism, commensalism, parasitism. Microbial Communities: Presence in soil, water, and air. Nutrient Cycles: Microbes' role in nitrogen, carbon, sulfur, and phosphorus cycles. 7.3 Microorganisms and Human Health <ul style="list-style-type: none"> Impact on Health: Disease-causing microorganisms (e.g., E. coli, Salmonellosis). Immunology: Antigen-antibody interactions, vaccines. 7.4 Biotechnology for Environmental Sustainability <ul style="list-style-type: none"> Introduction to Biotechnology: Definition, branches, and tools/techniques. Genetic Engineering: GMOs with examples. Sustainable Agriculture: Biofertilizers, organic farming, vermicomposting, integrated pest management. Concept of Bioremediation with their types. Microbes for wastewater treatment and pollutant cleanup. Biofuels: Concepts and types of biofuels based on generations. Biosensors: Role in environmental monitoring. Ethics & Biosafety: Guidelines and protocols for safe biotechnology use 	30	12
8. Environmental Health and Toxicology	8.1 Environmental Health <ul style="list-style-type: none"> Concept, Principle, and Components: Understanding environmental factors affecting health. Epidemiological Concepts: Measurement of 	30	12

	<p>mortality, morbidity, screening, and surveillance.</p> <ul style="list-style-type: none"> • Public Health & Environmental Stewardship: Promoting health through environmental protection. <p>8.2 Community and Health</p> <ul style="list-style-type: none"> • Health Education & Communication: Introduction to health programs and family planning in India. <p>8.3 Occupational Health: Health issues in various occupations (e.g., Anthracosis, Silicosis, Asbestosis).</p> <p>8.4 Concept of Toxicology</p> <ul style="list-style-type: none"> • Toxicants & Xenobiotics: Types of toxic substances, exposure routes, and their effects. Toxicokinetic and Toxicodynamic. • Acute & Chronic Toxicity: Understanding dose-response (LD50, LC50). • Sublethal Concentration: NOEL, MATC for safe levels. • Bioassay: Types and methodologies for toxicity testing. • Biomarkers, Bioaccumulation, Bioconcentration, and Biomagnification: Key concepts in tracking toxic substance effects. 		
9. Environmental legislation and policy	<p>9.1 Environmental Conservation in British India & Independent India:</p> <ul style="list-style-type: none"> • Indian Penal Code 1860, Van Mahotsava (1950), National Forest Policies (1952, 1988), National Water Policy (2002), National Environment Policy (2006). <p>9.2 Legal Provisions for Environmental Management:</p> <ul style="list-style-type: none"> • Indian Forest Act (1927), Wildlife (Protection) Act (1972), Water (Pollution Control) Act (1974), Water Cess Act (1977), Forests (Conservation) Act (1980), Air (Pollution Control) Act (1981), Environment (Protection) Act (1986), Motor Vehicle Act (1988), Public Liability Insurance Act (1991), Noise Pollution Rules (2000), Biological Diversity Act (2002). <p>9.3 International Environmental Agreements:</p> <ul style="list-style-type: none"> • Ramsar Convention (1971), Stockholm Conference (1972), Montreal Protocol (1987), UN Conference on Environment and Development (1992), Kyoto Protocol (1997), Convention on Climate Change, Carbon Credit and Trading, Clean Development Mechanism (CDM), World Summit on Sustainable Development (2002), Paris Agreement (2015). 	20	11