

Course Title: Aquatic Pollution

Course Code AEM-321

Credit Hours: 1+1

Course Teacher: Dr. Tapas Paul

Lecture Plan

Theory

S.No.	Topics to be Covered	No. of classes
1	Introduction to aquatic pollution; sources of pollutants; toxic organic compounds and their impacts on aquatic organisms and the abiotic environment	1
2	Classification of pollution: physical, chemical and biological; classification of water pollution and description of terminologies	1
3	Sewage and domestic wastes: composition and pollution effects; sewage treatment and its reuse	1
4	Agricultural wastes: organic detritus and nutrients; adverse effects of oxygen-demanding wastes; importance of dissolved oxygen, oxygen demand, BOD, COD and oxygen budget	2
5	Biological effects of organic matter; excessive plant nutrients, eutrophication, red tides and fish kills	1
6	Pesticide types and categories; inorganic pesticides, organochlorine compounds, organophosphorus compounds and polychlorinated biphenyls (PCBs)	1
7	Bioaccumulation and its impact on aquatic fauna and human health; toxicology	1
8	Heavy metals: interaction of heavy metals with water and aquatic organisms; bioremediation and phytoremediation	1
9	Oil pollution: crude oil and its fractions; sources of oil pollution; treatment of oil spills at sea and beach cleaning	1
10	Toxicity of petroleum hydrocarbons; ecological impact of oil pollution and case studies	1
11	Microbial pollution: types of aquatic microbes; autotrophs and heterotrophs; saprotrophs and necrotrophs; Sewage Fungus Complex	1
12	Transmission of human pathogenic organisms; zoonosis; development of antibiotic resistance and its impact; biofilms and biocorrosion	2
13	Radioactivity and background radiation of the earth; radionuclide pollution and special effects of radioactive pollution	1
14	Thermal pollution and its effects; physical and chemical nature of possible effluents from major industries in India	1
15	Monitoring and control of pollution; biological indicators of pollution	1
16	Solid waste management	1
Total		18

Practical

S.No.	Topics to be Covered	No. of classes
1	Study of physical characteristics of polluted waters: colour, odour and turbidity	1
2	Determination of pH, salinity, alkalinity and hardness in water	1
3	Determination of biochemical oxygen demand (BOD) in water	1
4	Determination of chemical oxygen demand (COD) in water	1
5	Determination of hydrogen sulphide, phosphates, ammonia and nitrates in water	1
6	Determination of heavy metals in water	1
7	Determination of oil and grease in water	1
8	Determination of pH and conductivity in sediments	1
9	Determination of organic carbon, nitrogen and phosphorus in sediments	1
10	Determination of heavy metals in sediments	1
11	Study of pathogenic and coliform bacteria; bacteriological quality of water	2
12	Coliform tests and IMViC test	1
13	Standard plate count and methods of enumerating bacterial biomass in waters and wastewaters	1
14	Study of pollution flora and fauna: indicator species, including algae, protozoa and insect larvae	1
15	Methods of pesticide residue analysis in water and fish tissue	1
16	Bioassay and toxicity study	1
Total		17