

Course Title: Aquatic Microbiology

Course Code AEM-508

Credit Hours:1+1

Course Teacher: Dr. Tapas Paul

Lecture Plan

Theory

S.No.	Topics to be Covered	No. of classes
1.	Microbial community in freshwater ecosystems: types, distribution and ecological roles	1
2.	Microbial communities in estuarine and marine environments: types and abundance	1
3.	Factors affecting microbial growth and abundance in aquatic ecosystems	1
4.	Extremophiles: types, characteristics and significance in aquatic environments	1
5.	Microbial interactions and interrelationships in aquatic ecosystems	1
6.	Microbial degradation of persistent organic pollutants (POPs)	1
7.	Water-borne pathogens of public health importance: protozoans, bacteria and enteroviruses	1
8.	Microbial toxins and algal toxins: occurrence, effects and public health significance	1
9.	Disinfection methods and microbial standards for different water uses	1
10.	Principles and applications of bioremediation and biofertilization	1
11.	Biofilms and biofloc: formation, characteristics and applications in aquaculture	1
12.	Probiotics in aquaculture: types, mechanisms and applications	1
13.	Bio-leaching, bio-corrosion and bio-fouling: principles and significance	1
14.	Microorganisms as bioindicators and biosensors in aquatic environments	1
15.	Methods of assessing microbial biomass production and bioprospecting: current practices, biopiracy and associated concerns	1
16.	Microbial metabolites and their industrial applications; recent advances in aquatic microbiology	1
Total		16

Practical

S.No.	Topics to be Covered	No. of classes
1.	Introduction to microbiology laboratory equipment, instruments and safety precautions	1

2.	Preparation of culture media, reagents and sterilization of materials	1
3.	Collection and processing of water and sediment samples from aquatic habitats	1
4.	Isolation of bacteria from polluted aquatic habitats using serial dilution and spread plate techniques	1
5.	Enumeration of bacteria in aquatic samples by viable plate count method	1
6.	Isolation and identification of algae from aquatic habitats	1
7.	Microscopic examination and identification of common aquatic bacteria	1
8.	Microscopic examination and identification of common freshwater microalgae	1
9.	Maintenance and preservation of bacterial cultures	1
10.	Maintenance and preservation of algal cultures	1
11.	Study of bacterial growth and preparation of a bacterial growth curve	1
12.	Microbial sensitivity testing using the disc diffusion method	1
13.	Bioactivity testing of selected microbial isolates or their metabolites	1
14.	Demonstration and comparative study of physical and chemical disinfection methods	1
15.	Assessment of microbial load in aquatic samples and interpretation of results with reference to applicable water-quality standards	1
16.	Demonstration of biofloc or probiotic applications in aquaculture and preparation of a practical record with results and discussion	1
Total		16