

COLLEGE OF FISHERIES, KISHANGANJ

BIHAR ANIMAL SCIENCES UNIVERSITY, PATNA

Lecture Plan

Course code: AAHM-111

Course Title: Fundamental Microbiology

Credit hrs: 2 (1+1)

Program: B.F.Sc.

Assigned Teacher: Mr. Pankaj Kumar

Theory	
Topics	No. of Classes
1. History of Microbiology.	1
2. Microscopy- Principle and construction of bright field, dark field, phase contrast, stereo, SEM and TEM.	1
3. Microbial taxonomy – Bergy's and molecular taxonomy.	1
4. Types of microorganisms: Prokaryotes– Morphology and ultrastructure of bacterial cell.	1
5. General features, types and importance of viruses, cyanobacteria, actinomycetes, archae, mycoplasma, rickettsia	1
6. Eukaryotes – Diagnostic features and importance of fungi and protozoa.	1
7. Microbial Techniques - Types of media, types of sterilization - physical and chemical agents, cultivation of microorganisms,	1
8. Staining techniques – simple, differential, structural staining enumeration of micro-organisms, culture preservation methods.	1
9. Bacterial metabolism: Nutrient requirements, nutritional types, bacterial photosynthesis and their ecological significance.	1
10. Microbial growth: Growth phases, measurement of cell growth, factors affecting growth- influence of physico-chemical factors - pH, temperature, moisture, light, osmotic pressure, fermentation - types and significance.	1
11. Microbial genetics- general principles, genetic recombination, transformation, transduction and conjugation.	1
12. Plasmids- types and their importance.	1
13. Mutation types and significance.	
14. Microbial ecology: Introduction and types of interaction, extremophiles and their significance	1
15. Aquatic Microbiology: Introduction and scope of aquatic microbiology, aquatic environment as habitat for microorganisms.	1
16. Influence of physical, chemical and biological factors on aquatic microbes.	1
17. Microbial biofilms. Role of microbes in the production and breakdown of organic matter, sedimentation and mineralization	1

process	
18. Nutrient cycles-carbon, nitrogen, sulphur, phosphorus, iron, and manganese cycles.	1
19. Sewage microbiology, self-purification in natural waters, sewage treatment, drinking water microbiology, sanitary quality of water for aquaculture	1
20. Bioremediators. Economic significance of aquatic microbes.	1
Total Number of classes	20
Practical	
1. Handling of microscopes	1
2. Wet mount, smear, and hanging drop preparations	1
3. Micrometry-Determination of size of microorganisms (ocular, stage micrometers).	1
4. Tools and techniques in sterilization methods: Filtration, dry heat, moist heat, chemical agents	1
5. Cultivation technique: Media preparation, Isolation -pure culture, subculture.	1
6. Observation of fungi, blue-green algae, and protozoans.	1
7. Staining techniques for bacteria– simple, differential and structural	1
8. Biochemical tests: Indole, methyl red, Voges Proskauer, citrate test, oxidase test, catalase tests.	1
9. Collection of water and sediment samples for microbiological analysis.	1
10. Isolation, identification, and enumeration of various groups of microorganisms from different water bodies including aquaculture systems.	2
11. Study of bacteria involved in nutrient cycles	1
12. Biofilms, water testing for potability, enumeration of coliform.	1
13. Antibiotic sensitivity of bacteria - antibiotic sensitivity test – disc diffusion method	2
Total Number of classes	15



Course Instructor
Mr. Pankaj Kumar