Programme: M. Sc. Biotechnology

Course Code: GBT-501

Title of the Course: Lab I: TECHNIQUES IN MICROBIOLOGY

Number of Credits: 3

Effective from AY: 2022-23

Prerequisites for the course:	No prerequisite is required.	
Course objective:	This course involves 1) learning techniques to culture microbes in the lab 2) understanding the application in microbiological research studies.	
Content:	1. Sterilization and disinfection. 2. Preparation of solid & liquid media: 3. Isolation and maintenance of organisms: Streaking, slants and stabs cultures, storage of microorganisms. 4. Differential and Selective media 5. Enumeration: serial dilution methods, plating. 6. Isolation of bacteria from seawater /sediments samples 7. Study of morphology and cultural characteristics 8. Biochemical characterization of bacteria. 9. a. Sugar utilization test (minimal medium + sugar) b. Sugar fermentation test c. IMViC d. Enzyme detection – Gelatinase, Catalase, Oxidase e. Oxidative-fermentative test	**No. of hours** 45

	10. Bacteriological tests for portability of water a. MPN, Confirmed and Completed test. b. Membrane filter technique (Demonstration) 11. Staining methods: Gram staining, Endospore staining, Metachromatic granules, Cell wall staining. 12. Motility in bacteria using: Hanging drop method and swarming growth method. 13. Antimicrobial sensitivity test: Agar cup and Disc Diffusion methods. 14. Drug resistance: comparative studies of different drugs/ disinfectants. 15. Cultivation of fungi: a. Slide b. chunk c. coverslip techniques d. Wet mounts of fungal cultures	45
Pedagogy:	lectures/ tutorials assignments/practical	
References/Readings	1. W. Giltner, Laboratory Manual in General Microbiology. Creative Media Partners, LLC, 2017. 2. E.F. Harrigan, M.E. McCance. Laboratory Methods in Microbiology, Academic Press, 2014 3. A.S. Karwa, M.K. Rai, H.B. Singh. Handbook of Techniques in Microbiology: A Laboratory Guide to Microbes, 2012.	
Learning Outcomes	1. Key hands-on experience of converting and applying theoretical knowledge to laboratory. 2. Application of the varied interactions /reactions to be utilized in research. 3. Students become familiar with microbiology techniques that are used in many scientific disciplines as well as clinical medicine. 4. Hands-on experience with basic microbiological instruments to be used in future research studies.	

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