



University of Management and Technology, Lahore
School of Science
Department of Life Sciences
Certificate Course

Course Title:

“Experimental Methods in Microbiology”

Resource Person: Ms. Hareem Mohsin

Starting Date: May 27, 2023 & June 03, 2023

Duration: One day (Whole day)

Fee: UMT Students 1000, Others 1500.

Email: hareem.mohsin@umt.edu.pk

Introduction:

Microbiology has consistently proved to be one of the most significant fields in biology, making it possible to define how some microorganisms cause diseases, discover and novel microbial species, and even use of microbes for industrial applications like food and pharmaceutical industries. This subject delivers the basic understanding towards microbial growth and metabolic properties which are usually exploited to counter several issues related to environment and human health. Some of the key areas where molecular biology has made significant contributions including, but not limited to:

Environmental Microbiology: Environmental microbiology is the study of microorganisms in the soil, water and air and their application in bioremediation to reduce environmental pollution through the biological degradation of pollutants into non-toxic or less toxic substances.

Food Microbiology: Microbiology is important to food safety, production, processing, preservation, and storage. Microbes such as bacteria, molds, and yeasts are employed for the foods production and food ingredients such as production of wine, beer, bakery, and dairy products.

Antimicrobial Resistance/Pathogenicity: Microbiology helps in identification and elimination of Antimicrobial Resistance (AMR) which occurs when bacteria, viruses, fungi, and parasites change over time and no longer respond to medicines making infections harder to treat and increasing the risk of disease spread, severe illness and death.

Overall, Microbiology is a critical discipline that has a profound impact on our understanding of microbes and to use them to improve human health and environment.



University of Management and Technology, Lahore
School of Science
Department of Life Sciences
Certificate Course

Objectives:

The Microbiology course may aim to achieve:

1. *Understanding of the basic principles of microbiology:* A course may aim to provide participants with a fundamental understanding of the principles and concepts that underlie microbiology.
2. *Familiarity with laboratory techniques:* A course may teach participants a variety of laboratory techniques commonly used in research, such as microscopy, staining techniques, culture techniques, and biochemical tests.
3. *Knowledge of current research topics:* A course may cover current topics and trends in microbiology research, such as antimicrobials/pathogenicity, plant-bacteria interactions, bacterial metabolism, or genomics.

Overall, the main objective of this course is to provide participants with the knowledge and skills necessary to perform research and to contribute to the advancement of the field.

Learning Outcomes:

Participants will be able to attain:

1. *Knowledge of basic microbiology concepts:* Demonstrate a basic understanding of the principles and concepts of microbiology, such as isolation of microorganisms, bacterial cell morphology, categorization on basis of cellular characteristics, and various metabolic abilities in an aseptic environment.
2. *Laboratory skills:* To perform techniques, such as isolation, culture purification, microscopy, and biochemical characterization for preliminary microbial identification.
3. *Data analysis:* To perform microscopic analysis and taxonomic characterization to genus/specie level of the selected isolates.
4. *Research skills:* To develop research skills, such as experimental design, data interpretation, and literature review.

Duration:

Number of Days: 01



University of Management and Technology, Lahore
School of Science
Department of Life Sciences
Certificate Course

Number of hours: 05

Total Contact Hours: 05

Eligibility Criteria:

The course is designed for graduate students (currently enrolled in BS 4th semester and above) and research scholars interested to work in microbiology.

Course Outline:

1. Sampling and Isolation of Microorganisms
2. Culturing techniques
3. Microscopic Analysis
4. Microbial Growth Analysis
5. Identification and characterization of microorganisms

Evaluation Criteria:

Class Participation/Attendance/Quiz