

Institute of Microbiology and Molecular Genetics
Faculty of Life Sciences
University of the Punjab, Lahore
Course Outline



Programme	BS	Course Code	MMG 305	Credit Hours	3(2+1)
Course Title	MEDICAL MICROBIOLOGY				
COURSE INTRODUCTION					
<p>The BS course in Medical Microbiology offers an in-depth exploration of microorganisms that cause diseases in humans and the methods used to diagnose, treat, and prevent these infections. This course covers fundamental aspects of medical microbiology, including the microbial mechanisms of pathogenesis, host-parasite interactions, and the role of the normal human microbiota. Students will study various clinically significant bacteria, such as gram-positive and gram-negative organisms, and delve into topics like antibiotic susceptibility testing and microbial resistance. The curriculum also includes medical mycology, parasitology, and the quality issues related to clinical microbiology. Practical sessions provide hands-on experience in diagnostic techniques, specimen collection and handling, culture methods, and antibiotic susceptibility testing. Through case studies and clinical correlations, students will apply theoretical knowledge to real-world medical scenarios, preparing them for careers in clinical microbiology, healthcare, and research.</p>					
LEARNING OUTCOMES					
<p>On the completion of the course, the students will:</p> <ol style="list-style-type: none"> 1. Understand General Aspects of Medical Microbiology 2. Identify and Characterize Clinically Significant Microorganisms 3. Develop Diagnostic and Laboratory Skills 4. Understand the mechanisms of microbial pathogenesis, diagnosis, and treatment. 5. Apply medical microbiology knowledge to develop strategies for disease prevention and control. 					
COURSE CONTENT					
<p>General aspects of medical microbiology, microbial mechanisms for pathogenesis, host-parasite relationship, infection and disease, normal human microbiota, phases of the diagnostic cycle, important gram-positive bacteria (<i>Streptococci</i> group, <i>Staphylococci</i> and <i>Micrococcus</i> group), <i>Enterobacteriaceae</i> members (<i>E. coli</i>, <i>Klebsiella</i>, <i>Salmonella</i>, <i>Shigella</i> and others), <i>Pseudomonas</i> group, antibiotic susceptibility testing, gram-positive rods, <i>Mycobacterium</i> spp, <i>Neisseria</i> spp, <i>Haemophilus</i> spp, microbial resistance to antibiotics, emerging microbial pathogens, quality issues in clinical microbiology, anaerobes of clinical importance (<i>Clostridium</i> spp etc), medical mycology, medical parasitology, diagnostic medical microbiology and clinical correlation, case studies</p>					
PRACTICALS					
<p>Preparation of McFarland Standards, principles of specimen collection and handling, techniques for the storage of microorganisms, culture and sensitivity test (Throat, Nose, Skin, Ear, Eye etc normal flora sites), wound and pus culture, blood and bone marrow culture, stool culture, urinalysis and urine culture and sensitivity, gram staining and special staining from different culture swabs, fluid screening for pathogens, identification techniques for medically important bacteria, analytical profile index, antibiotic susceptibility testing techniques according to recent CLSI table. Diagnostic techniques for <i>Mycobacterium tuberculosis</i>, phenotypic detection</p>					

techniques for multidrug-resistant bacteria (MDR), culture and reporting techniques for fungal infections, and medical reporting of different infectious specimens.

TEXTBOOKS AND READING MATERIAL

1. Riedel, S., Morse, S., Mietzner, T and Steve Miller, S., 2019. *Jawetz, Melnick, & Adelberg's. Medical Microbiology*. 28th Edition, McGraw-Hill, New York, NY 10019
2. Procop, G. W., Church, D. L., Hall, G. S., & Janda, W. M. (2020). *Koneman's Color Atlas and Textbook of Diagnostic Microbiology*. Jones & Bartlett Learning.
3. Cheesbrough, M. (2006). *District Laboratory Practice in Tropical Countries, part 2*. Cambridge University Press.
4. Carroll, K. C., & Pfaller, M. A. (2023). *Manual of Clinical Microbiology* 13th Edition. ASM Press and John Wiley & Sons.
5. Murray, P.R., Rosenthal, K.S., Pfaller, M.A., (2020). *Medical Microbiology*. 9th Edition. Elsevier, Philadelphia, PA.
6. Baron, E.J., Miller, J.M., Weinstein, M.P., Richter, S.S., Gilligan, P.H., (2019). *Principles and Practice of Clinical Bacteriology*. 2nd Edition. Wiley Blackwell. Hoboken, NJ.
7. Veralovic, J., Carroll, K., Funke, G., (2021). *Diagnostic Microbiology and Infectious Disease*. 4th Edition, ASM Press. USA.

ASSESSMENT

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on activities, short tests, projects, practicals, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, fieldwork, report writing etc.