



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Science College
Semester-I (M.Sc.)

Subject: Medical Diagnostic Microbiology- MSCMT11504

Type of course: Major

Prerequisite: Essential understanding of human physiology and pathogen dynamics in medical microbiology.

Rationale: This subject integrates medical microbiology with diagnostic techniques to enable accurate identification of human pathogen and understand host-pathogen interactions, essential for laboratory-based disease diagnosis and public health management.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
4	0	0	4	60	30	10	00	50	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Continuous Assessment:

Sr. No.	Activity Learning Activity	Marks
1	Know your flora: Isolate, stain and microscopically identify the normal flora present on human body sites such as skin/Purulent infections. Take photograph of microscopic examination and upload into GMIU web portal.	10
2	Case study analysis: Analyze medical case studies and identify diagnostic techniques. Upload it into GMIU web portal.	10
3	Visual learning posters: Student has to prepare (In Group) a mini poster on different diagnostic technique ELISA, Agglutination, PCR, and Immunofluorescence and upload it into GMIU web portal.	10
4	GLP audit simulation: Student has to prepare report writing on critical evaluation and GLP implementation in diagnostic labs and upload it into GMIU web portal.	10
5	Instrument Chain Note: Student has to prepare a chain note from basic to advance, on commonly used instruments in a diagnostic microbiology laboratory. Upload it into GMIU web portal.	10
Total		50



CourseContent:

Unit No	Course content	Hrs	% Weightage
1	Introduction to Medical Microbiology and Host-Pathogen Interaction <ul style="list-style-type: none"> Historical developments and scope of medical microbiology Biochemical and Serological Identification Culture Media: Classification, composition, preparation, selective and differential media Normal flora of human body Pathogenicity and virulence factors Mechanisms of Immune Evasion by Pathogens Modes of disease transmission 	15	25
2	Bacterial Diseases and Diagnostic Techniques <ul style="list-style-type: none"> Gram-positive and Gram-negative bacterial pathogens Diagnostic features and clinical correlation (<i>Staphylococcus</i>, <i>Streptococcus</i>, <i>E. coli</i>, <i>Salmonella</i>, <i>Mycobacterium</i>, <i>Clostridium</i>, etc). Sample collection, transport, and processing - Urine, blood, sputum, pus, swabs Microscopy, staining techniques (Gram, Acid-fast, etc.) Antibiotic Sensitivity Testing (AST): Disc diffusion, MIC, and its interpretation Blood Culture Techniques and Septicemia Diagnosis Hospital-Acquired Infections: Common pathogens and control strategies 	15	25
3	Viral and Fungal Diseases <ul style="list-style-type: none"> Virology: Common human viruses (HIV, HBV, Influenza), detection methods (ELISA, PCR) Parasitology: Diagnosis of blood, stool, and tissue parasites (<i>Plasmodium</i>, <i>Giardia</i>, <i>Entamoeba</i>) Serological Methods: Agglutination, immunofluorescence, ELISA Molecular Diagnostics: PCR, RT-PCR, nucleic acid hybridization techniques 	15	25
4	Clinical Laboratory Diagnosis and Quality Management <ul style="list-style-type: none"> Biosafety in Clinical Microbiology Labs Importance of early diagnosis in infectious diseases Interpretation and Reporting of Microbiology Results: Clinical relevance and standard reporting formats Good Laboratory Practices (GLP) Automation and Digital Tools in Microbiology Labs 	15	25



Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage (%)	20%	40%	30%	10%	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course, the students should be able to:	
CO1	Acquired knowledge of diagnostic microbiology principles, biosafety, and proper specimen handling for laboratory analysis.
CO2	Carry out bacterial culture, identification, and antibiotic susceptibility testing with clinical interpretation.
CO3	Apply appropriate diagnostic methods to detect viral, fungal, and parasitic infections using serological and molecular tools.
CO4	Utilize quality assurance protocols and automation tools for reliable microbial diagnostics and antimicrobial resistance monitoring.

Instructional Method:

The course delivery method will depend upon the requirement of content and the needs of students. The teacher, in addition to conventional teaching methods by black board, may also use any tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

Reference Books:

- [1] Medical Microbiology by Jawetz, Melnick, & Adelberg
- [2] Textbook of Diagnostic microbiology by Connie R. Mahon, Donald C. Lehman, George Manuselis
- [3] Bailey & Scott's Diagnostic Microbiology by Patricia Tille.
- [4] Textbook of Microbiology by C.P. Baveja
- [5] Essentials of Medical Microbiology by Apurba Sastry & Sandhya Bhat

