VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
M.Sc. MICROBIOLOGY SEM III

SKILL BASED ELECTIVE PAPER-3
GE-3: ADVANCES IN DIAGNOSTIC MICROBIOLOGY

1. Course Code & Title

Course code: **GE-3** (MB 3005)
Course title: Advances in diagnostic microbiology
Course type: Skill based elective paper
Course credits: 02

2. Course overview and Course Objectives

Diagnostic microbiology field continues to undergo a quiet revolution that already has resulted in many benefits for microbiologists, clinicians, and most importantly patients. This revolution was made possible by the use of advanced technologies. The objective of this paper is to introduce students a comprehensive, well-referenced, and up-to-date description of these rapidly evolving advanced methods for the diagnosis of infectious diseases in the routine clinical as well as research microbiology laboratory.

Course Objectives

- To study the methods for the cultivation and identification of antimicrobial activity.
- To learn the methods for the identification of parasitic, mycological and viral pathogens
- To gain an insight of molecular techniques used in identification of microbial agents
- To understand the advancement in clinical diagnosis of diseases.

3. Course Content

UNIT 1	DIAGNOSIS OF INFECTIOUS DISEASES AND EVALUATION OF ANTIMICROBIAL ACTIVITY
1.1	Traditional cultivation and identification
1.2	Nucleic acid based analytic methods for microbial identification and characterization
1.3	Immunochemical methods used for organism detection
1.4	Serologic diagnosis of infectious diseases
1.5	Laboratory methods and strategies for antimicrobial susceptibility testing

UNIT 2	LABORATORY METHODS FOR INFECTIOUS MICROBES
2.1	Overview of bacterial identification methods and strategies
2.2	Laboratory methods for diagnosis of parasitic infections
2.3	Laboratory methods in basic Mycology
2.4	Laboratory methods in basic Virology

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UNIT 3	ADVANCED LABORATORY DIAGNOSTIC TECHNIQUES - 1
3.1	Molecular Typing Techniques
3.2	PCR and Its Variations
3.3	Gel Electrophoresis, Southern Blot, and Colorimetric Microwell Plate-Based System Direct Nucleotide Sequencing for Amplification Product Identification
3.4	Microarray-Based Amplification Product Detection and Identification
3.5	

UNIT 4	ADVANCED LABORATORY DIAGNOSTIC TECHNIQUES - 2
4.1	Cellular Fatty Acid-Based Microbial Identification and Antimicrobial Susceptibility Testing
4.2	MALDI-TOF Mass Spectrometry-Based Microbial Identification
4.3	Nonamplified Probe-Based Microbial Detection and Identification
4.4	Microbial Identification by PCR/Electrospray Ionization-Mass Spectrometry
4.5	Bacterial Identification Based on Universal Gene Amplification and Sequencing

STUDENTS LEARNING OUTCOMES:

After successful completion of the course student will be able to

- Develop the skills for the application of basic and advanced techniques employed in Diagnostic Microbiology
- Use selected diagnostic techniques
- Familiar with working, principles, tools and techniques of Diagnostic Microbiology and creative use of advanced techniques in diagnosis of microbial diseases.

4. Course Learning Outcomes/Student's Learning Outcomes (SLO)

Unit 1: Students shall understand the application of basic techniques in

Unit 2: Students shall gain knowledge of usage of diagnostic techniques

Unit 3: Students will gain an understanding working, principles, tools and techniques of diagnostic Microbiology and creative use of advanced techniques in diagnosis of microbial diseases.

Unit 4: Students shall develop an understanding of advanced techniques of microbial diagnosis

Recommended learning resources

- Betty A Forbes, Daniel F Sahm and Alice S Weissfeld (2007), *Bailey & Scott's Diagnostic Microbiology*, 12th ed., Elsevier, ISBN: 9780070604605.
- Yi-Wei Tang and Charles W Stratton (2013), *Advanced Techniques in Diagnostic Microbiology*, 2nd ed., Springer, ISBN: 978-1-4614-3970-7 (eBook).

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