Academic Council Meeting No. and Date: **11 / June 27, 2025**

Agenda Number : 3 **Resolution Number : 52/ 3.3**

Vidya Prasarak Mandal's
B. N. Bandodkar College of
Science (Autonomous), Thane

Certificate Course
on
Bacterial Identification by 16S rRNA gene Analysis

With effect from Academic Year 2025-2026

Preamble:

The identification of bacteria by 16S rRNA gene analysis has become an indispensable tool in Microbiology and Biotechnology, offering precise taxonomic resolution and phylogenetic insights. This certificate course introduces participants to the complete workflow of bacterial identification using 16S rRNA gene sequencing. Core laboratory techniques including isolation of pure cultures, genomic DNA extraction, PCR, and agarose gel electrophoresis (AGE) would be demonstrated to provide foundational understanding. Participants would also be provided with sequencing data and gain hands-on experience in analyzing and interpreting results using widely used bioinformatics tools like BLAST and RDP.

OBJECTIVES OF THE COURSE:

1. To introduce students to the fundamental concepts, importance and techniques of microbial pure culture and genomic DNA extraction
2. To train students in performing PCR and analyzing products using agarose gel electrophoresis (AGE)
3. To familiarize students with DNA sequencing methods and their applications in microbial genomics
4. To enable students to use bioinformatics tools such as BLAST and RDP for 16S rRNA gene analysis

LEARNING OUTCOMES:

After completion of this course, participants will be able to

1. Explain the fundamental concepts related to microbial cultures, genomic DNA, PCR, and sequencing technologies.
2. Comprehend the procedures and critical aspects involved in obtaining pure bacterial cultures and extracting genomic DNA, followed by its assessment through agarose gel electrophoresis (AGE).
3. Understand the principles and workflow of 16S rRNA gene amplification, along with the analysis of PCR products using agarose gel electrophoresis (AGE).
4. Analyze 16S rRNA sequence data using online tools such as NCBI BLAST and RDP.

Eligibility: Students of Biological Sciences

Mode of Conduct: Offline /Online

VPM's B. N. Bandodkar College of Science (Autonomous), Thane

Structure of Programme

Course Code	Course Title	No. of lectures	Credits
BCCBI040	**Bacterial Identification by 16S rRNA gene analysis**	**45**	**2**

Syllabus

Course Code	Course Title Bacterial Identification by 16S rRNA gene sequencing	Credits 2	No. of lectures
1	Introduction		15+30
2	Importance of 'pure culture' in 16S rRNA gene identification		
3	gDNA extraction and AGE		
4	PCR and AGE		
5	Sequencing platforms (theoretical)		
6	BLAST and RDP		
7	Analysis of data		

Evaluation Scheme:

At the end of the course , learner need to pass Final examination worth 50 Marks to earn 2 credits