



(Autonomous) Sion (West), Mumbai – 400022

Faculty: Science

Program: B.Sc.

Subject: MICROBIOLOGY

Academic Year: 2024– 2025

AS PER NATIONAL EDUCATION POLICY 2020

Choice Based Credit System (CBCS)

S.Y.B.Sc. (VSC)

**Revised Credit Based Semester and Grading Syllabus approved by
Board of Studies in Microbiology brought into effect from June 2024**

Approved in academic council meeting on 7th August 2024

PROGRAM OUTCOME (PO)

At the end of an Undergraduate Program, a student would have obtained the following:

- **PO1. Solving Complex Problem:**

Applying the knowledge of various courses learned under a program with an ability to break down complex problems into simple components, by designing processes required for problem solving.

- **PO2. Critical Thinking:**

Organizing thoughts to identify assumptions, verifying the accuracy and validity of assumptions, making informed decisions that guide actions (at Institutional, Personal and Intellectual level), developing the ability to think with different perspectives and ideas.

- **PO3. Reasoning ability and rational thinking:**

Developing rational thinking on the basis of acquired contextual knowledge, assessing societal, public health and safety, cultural, legal, gender, ethnic and environmental issues, and performing with decisive responsibility.

- **PO4. Research skill:**

Utilizing the contextual knowledge in an interdisciplinary framework. Integrating research-based knowledge and research methods involving problem definition, analysis and interpretation of data, synthesis of the information to provide valid conclusions. Exercising analytical skill, research ability, creativity, for employability and collaborating with industries.

- **PO5. Effective Communication skill:**

Facilitating to speak, read, write and listen effectively through both formal language and in one's own mother tongue, in order to make meaning of the world around. Enabling to comprehend and write effective reports and documentation, make successful presentations, give and receive clear instructions.

- **PO6. Proficiency with ICT:**

Equipping to create, select, apply appropriate tools and techniques, resources through electronic media for the

purpose of gathering, analyzing data and drawing inference with an understanding of its merits and demerits.

- **PO7. Social Interactive Skills and team work:**

Eliciting networking with people, mediate disagreement and help reach conclusions in group settings. Functioning effectively as an individual, and as a member in diverse groups, and in multidisciplinary settings exhibiting adaptability, leadership quality and team-building

- **PO8. Ethical values:**

Recognizing and respecting different value systems including one's own, to understand the moral dimensions of one's decisions, intention to help the society and feeling good about it, commitment to professional duties and responsibilities.

- **PO9. Self-directed Learning:**

Acquiring the ability to explore and gain knowledge in independent ways, keep evolving lifelong in the broad context of socio-technological changes.

- **PO10. Sensitization towards Environment and Sustainability:**

Understanding the need for sustainable development and concern for environmental issues, realizing the importance of cohabitation, co-evolution in our achievements of sustainable development goal

- **PO11. Gender Sensitization:**

Demonstrating knowledge and understanding of gender equity-issues and gender justice.

- **PO12. Civic Values and Global Citizenship:**

Expressing empathetic social concern while helping others when their rights are violated, no matter where in the world they live, to act with an informed awareness on issues, to participate in civic life by volunteering for social justice.

PROGRAMME SPECIFIC OUTCOMES (PSO) (FOR MICROBIOLOGY)

- PSO1: Students will be introduced to the subject of Microbiology which is not taught at the junior college
- PSO2: Eloquence in specific phraseology pertaining to the subject of microbiology.
- PSO3: Familiarize with the theories and techniques of the various areas in microbiology.
- PSO4: Obtain expertise in essential practical techniques required in microbiological analysis and prepare for advance studies.
- PSO5: Discuss the applications of microorganisms in the various fields of microbiology.

VOCATIONAL SKILL COURSE		
Course code	SEMESTER III	
SIUMIVS211	Techniques in Microbiology I (Practicals)	2 Credits

SKILL ENHANCEMENT COURSE		
Course code	SEMESTER IV	
SIUMISE221	Techniques in Microbiology II (Practicals)	2 Credits

**SEMESTER III
VOCATIONAL SKILL COURSE
TECHNIQUES IN MICROBIOLOGY - I**

Course: VOCATIONAL SKILL COURSE

Course code: SIUMIVS211

Course Outcomes (CO)

At the end of the course the students will be able to:

1. Perform lipid extraction using soxhlet apparatus
2. Learn and apply molecular biology technique for the extraction and isolation of DNA from biological sample
3. Estimate DNA quantitatively and visualize by electrophoretic technique
4. Perform water analysis and analyze potability of water
5. Identify pathogens from clinical samples using cultural techniques

Course code	VOCATIONAL SKILL COURSE TECHNIQUES IN MICROBIOLOGY - I	Credits
SIUMIVS211	TOPIC	2 Credits
	<ol style="list-style-type: none"> 1. Extraction of lipid by Soxhlet method (Demonstration) 2. Isolation and detection of DNA from onion /E.coli 3. Demonstration of agarose gel electrophoresis 4. Study of biofilm: slide immersion tech and staining 5. Routine analysis of water: Standard Plate Count, Detection of Coliforms in water: Presumptive Test, Confirmed Test, Completed Test 6. Study of microbial flora in raw and treated sewage 7. Use of Biochemical Media/Tests for Identification of Pathogens: Carbohydrate fermentation, Indole test, Methy Red test, Vogues Proskauer test, Citrate Utilization, Lysine Decarboxylase, Gelatin Liquefaction, Nitrate Reduction, Phenylalanine deaminase test, Urease test, TSI agar, Oxidase test, Catalase test, Bile solubility test, Coagulase test, Optochin test and Bacitracin test. 	

SEMESTER IV

SKILL ENHANCEMENT COURSE

TECHNIQUES IN MICROBIOLOGY - II

Course: SKILL ENHANCEMENT COURSE

Course code: SIUMISE221

Course Outcomes (CO)

At the end of the course the students will be able to:

1. Perform primary screening of potential industrially important enzyme producing microbes
2. Analyze quality of milk as per BIS and FSSAI standards
3. Comprehend physical and chemical methods of food preservation.

COURSE CODE	PRACTICALS	1 Credits
SIUMISE221	SKILL ENHANCEMENT COURSE TECHNIQUES IN MICROBIOLOGY - II	1 Credit
	TOPIC	
	<ol style="list-style-type: none">1. Isolation of amylase, protease, lipase producers2. Extracellular production of invertase from yeast3. Microbiological Quality Control of Milk as per BIS/FSSSAI4. Analysis of Cheese, Paneer, Butter, Yogurt/curd as per BIS/FSSAI (Group experiment)5. Determination of TDT and TDP6. Determination of Salt and sugar tolerance7. Determination of MIC of a Chemical preservative	