



SOPHIA COLLEGE FOR WOMEN (EMPOWERED AUTONOMOUS)

Affiliated to the University of Mumbai

Programme: Science

Microbiology

T.Y.B.Sc. MICROBIOLOGY (VSC)

**Syllabus for the Academic Year 2025-2026 based on
the National Education Policy 2020**



SOPHIA COLLEGE FOR WOMEN (EMPOWERED AUTONOMOUS)

DEPARTMENT OF MICROBIOLOGY

COURSE DETAILS:

	SEMESTER 5
TITLE	Microbial Enzymes and Food Microbiology
TYPE OF COURSE	VSC
CREDITS	2 (practicals)



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Preamble:

The department of Microbiology at Sophia College was founded in 1966. Microbiology is the study of life and tentative life forms that cannot be viewed by the unaided eye. The microscopic life encompasses bacteria, protozoa, algae, fungi, and viruses. These organisms impact many aspects of plant, animal and human life and progress.

The Undergraduate curriculum provides fundamental and applied aspects of Microbial life that impacts the rest of the biosphere.

The instructions methodology focuses on providing the fundamental basic information on Microbiology and progressing to the advances. Furthermore, there is emphasis on developing critical and analytical thinking and reasoning skills through problem solving in keeping with the changing times. The courses provide training in Genetics, Biochemistry, Medical Microbiology, Immunology, Bioprocess technology, Food Science and Environmental Science. This interdisciplinary approach helps learners meet the requirements of higher education, research, and industry.

PROGRAMME OBJECTIVES

PO 1	To introduce the learners to Basic and Applied Microbiology.
PO 2	To build a strong knowledge base in the learner as well as impart sound practical skills in the subject.
PO 3	To provide opportunities for logical thinking, and critical reasoning, such that the learners can handle the demands of higher education, industry and research.
PO 4	To impart soft skills in learners thereby enhancing employability.

PROGRAMME SPECIFIC OUTCOMES

PSO 1	The learners will gain and apply knowledge of Genetics, Virology, Microbial Biochemistry, Medical Microbiology, Immunology, Cell Biology, Bioprocess technology, Environmental Microbiology, Food and Dairy Microbiology, etc to solve problems.
PSO 2	The learners will acquire basic knowledge about scientific methodology, plan and execute experiments using good laboratory practices, and interpret the experimental results effectively.
PSO 3	The students will undertake research projects, internships, visit industries, in order to become ready for higher studies, industry and research.
PSO 4	The students will do value added courses in order to enhance their soft skills and employability.



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Programme: Sciences Microbiology VSC	Semester – 5
PRACTICAL Course Title: Microbial Enzymes and Food Microbiology	Course Code: SVSC503

COURSE OUTCOMES:

The learner will be able to

1. isolate and screen microorganisms capable of producing invertase and carry out its large-scale production as well purification.
2. perform enzyme assays to evaluate invertase activity and analyze the effects of pH and temperature on its function.
3. apply whole cell immobilization techniques for invertase enzyme and assess the efficiency and stability.
4. identify microbial species responsible for spoilage in perishable foods and detect common foodborne pathogens.
5. conduct microbial load analysis and determine thermal resistance parameters (TDP and TDT) of food-borne microorganisms.
6. design and execute a mini-project to assess food preservation methods
7. monitor traditional food fermentations.

Lectures per week (1 Lecture is 120 minutes)	2		
Total number of Hours in a Semester	60		
Credits	2		
Evaluation System	Semester End Examination	3 Hours	50 marks
	Internal Assessment	--	



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Microbial Enzymes and Food Microbiology practicals 2 credits	1	Demonstrating activity of different commercially available microbial enzymes rennet (protease) to coagulate milk, amylase for bread, invertase in candy	60 hours
	2	Screening for Invertase Producers, Isolation of Invertase-Producing Microorganisms	
	3	Large scale Invertase Production	
	4	Enzyme Assay – Invertase Activity	
	5	Effect of pH and Temperature on Invertase Activity	
	6	Partial Purification of Invertase (Salt Precipitation)	
	7	Kinetic Study of enzyme: Effect of substrate concentration on invertase activity	
	8	Immobilization of Invertase in alginate beads	
	9	Detection of organisms causing spoilage of fruits/eggs/milk/ Butter.	
	10	Detection of Pathogenic Bacteria from Food (<i>Salmonella</i> , <i>Staphylococcus aureus</i>)	
	11	Microbial load testing of ready to eat food	
	12	Determination of TDP and TDT value for pathogenic/spoilage bacteria.	
	13	Production and study of progress of fermentation of Fermented Foods (Idli batter)	
	14	Student Project: Study of Effectiveness of chemical preservatives in Jam/Ketchup	



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ASSESSMENT DETAILS:

1. Practical exam Internal Assessment (IA): Total 40 marks
2. Class participation 10 marks

REFERENCES:

1. Wilson, K., & Walker, J. (2010). *Principles and techniques of biochemistry and molecular biology* (7th ed.). Cambridge University Press.
2. Sadasivam, S., & Manickam, A. (2008). *Biochemical methods* (3rd ed.). New Age International Publishers.
3. Jayaraman, J. (1981). *Laboratory manual in biochemistry*. Wiley Eastern Ltd.
4. Jay, J. M., Loessner, M. J., & Golden, D. A. (2005). *Modern food microbiology* (7th ed.). Springer Science.
5. <https://www.fssai.gov.in/upload/uploadfiles/files/Manual-Microbiology-Methods.pdf>