

Department of Microbiology



**Learning Outcomes, Programme Outcomes,
Programme Specific Outcomes**

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Course Outcomes

DEPARTMENT OF MICROBIOLOGY

PROGRAMS: 1. GRADUATION: B.SC. (ANNUAL PATTERN)

B.Sc. - Microbiology (with Microbiology as one subject)

LEARNING OUTCOMES (LOs)

- ✓ **LO-1: Deep Knowledge** – Apply their broad knowledge of science across a range of fields.
- ✓ **LO-2: Research Applications** – Apply appropriate methods of research, investigation and design.
- ✓ **LO-3: Proficiency in Technology** – Recognize the need for information employs highly developed conceptual, analytic, qualitative and quantitative technical skills.
- ✓ **LO-4: Team Work** – Work effectively in groups to meet a shared goal with people whose disciplinary and cultural background differs from their own.
- ✓ **LO-5: Professional Ethical Behavior** – Demonstrative personal and professional integrity by respecting diverse point of view and intellectual contribution of other.
- ✓ **LO-6: Environmental Sensitivity** – To sensitize young ones towards environmental sustainability and significance of sustainable development.

PROGRAM OUTCOMES (POs)

- ✓ **PO-1: Basic Knowledge:** To provide adequate, basic understanding about Microbiology subject among the students.
- ✓ **PO-2: Problem resolving:** To apply the knowledge of molecular biology, genetics, instrumentation, Biochemistry and environmental microbiology to derive solutions to various environmental problems.
- ✓ **PO-3: Work together:** To Demonstrate their theoretical learning into practical skills and to work effectively in team.
- ✓ **PO-4: Practical Knowledge:** The students will be able to get a practical skill in isolating and handling pathogenic organisms and their safe disposal.
- ✓ **PO-5: Self-directed learning:** To derive knowledge of industrially important microbes and their applications in various industries, this would enhance their chances of employability.
- ✓ **PO-6: Research activity Skills:** Understand research-based knowledge and research methods including method of experiments, analysis and interpretation of data, development of the information and discussion to provide valid conclusions to the learners.
- ✓ **PO-7: Self-studying:** Ability to work individually / independently, identify appropriate resources required for experiments, project and manage up to completion.
- ✓ **PO-8: Long term learning:** Acquire the skill to be an independent long term learner. Promoting continuous development & improvement of the knowledge and skills needed for employment and personal fulfillment.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

- ✓ **PSO-1:** Students will be capable to access the primary knowledge, identify desirable works for a specific topic and able to evaluate the scientific content.
- ✓ **PSO-2:** Students will be able to identify the major groups of Micro-organisms and be able to classify them within a phylogenetic framework.
- ✓ **PSO-3:** Students will be able to compare and contrast the characteristics of Micro-organisms that differentiate them from each other and from other forms of organisms.
- ✓ **PSO-4:** Students after completing their graduation would be able to pursue their career in hospitals, pathology labs and quality control section of diary, food, pharmaceutical industries, FMCG companies etc.
- ✓ **PSO-5:** This program will enable students to understand and demonstrate the basics and fundamentals of the subject such as types of microorganisms, their life cycle, diseases caused by pathogens.
- ✓ **PSO-6:** Students will be able communicate the role of Micro-organisms in the ecosystem as well as human life.
- ✓ **PSO-7:** Student will acquire various communicative skills and will be able to manage with institutions.
- ✓ **PSO-8:** Students will develop the concept of culture and Instrumentation technique.

SCHEME OF EXAMINATION

SUBJECT	PAPER	MAX. MARKS	TOTAL MARKS	MIN. MARKS
Environmental Studies	-	75	100	33
Field Work	-	25		
Foundation Course – Hindi Language	I	75	75	26
Foundation Course – English Language	I	75	75	26
Three Elective Subject:				
Botany	I	50	100	33
	II	50		
	Practical	50	50	17

Zoology	I	50	100	33
	II	50		
	Practical	50	50	17
Chemistry	I	33	100	33
	II	33		
	III	34		
	Practical	50	50	17
Microbiology	I	50	100	33
	II	50		
	Practical	50	50	17

COURSE PROFILE

CLASS	SUBJECT	PAPER	NAME OF PAPER
B. Sc. Part - I	Microbiology	I	General Microbiology & basic techniques
		II	Biochemistry & Physiology
B. Sc. Part - II	Microbiology	I	Molecular biology and Genetic engineering
		II	Bioinstrumentation and Biostatistics
B. Sc. Part - III	Microbiology	I	Medical Microbiology and Immunology
		II	Environmental, Industrial and Agricultural Microbiology

COURSE OUTCOMES (COs)

<u>COURSE OUTCOMES</u>		
PAPER	NAME OF PAPER/ CODE	OUTCOMES
After completion of the course the student should be able to		
<u>B.Sc. Part – I</u>		
PAPER - I	GENERAL MICROBIOLOGY & BASIC TECHNIQUES	CO-1: To Understand: The objective of this course is to enable students to understand the history and developments in the field of microbiology.
		CO-2: To Understand: The different methods of sterilization (Physical & Chemical), plating, pure culture and staining techniques.
		CO-3: To Understand: The diversity of microbial world, principles of classification of viruses, bacteria and their economic importance.
		CO-4: To Understand: The various diseases caused by these organisms their life-cycle, symptoms and methods of prevention.
PAPER - II	BIOCHEMISTRY & PHYSIOLOGY	CO-1: To Understand: The characters & classification of Algae.
		CO-2: The course will enable students to understand the structure and properties of biologically important molecules (Carbohydrates, Proteins and Lipids).
		CO-3: To Understand: Structure & function of enzymes, various metabolic pathways, photosynthesis and growth of bacteria.
		CO-4: To Understand: Cell division, transport system, diffusion and concept of Uniport, Antiport & Symport.
<u>B.Sc. Part – II</u>		
PAPER - I	MOLECULAR BIOLOGY AND GENETIC ENGINEERING	CO-1: To Understand: Fundamentals of Molecular biology, basic concepts of heredity and DNA replication mechanism along with experimental evidences.
		CO-2: To Understand: Basics of genetic code and process of protein synthesis.

		CO-3: To Understand: Various types of mutations, Beneficial & harmful effect of mutation and the DNA repair mechanisms involved.
		CO-4: To Understand: Basic concepts of bioinformatics, gene regulation and genetic engineering including various vectors and their screening procedures.

<u>COURSE OUTCOMES</u>		
PAPER	NAME OF PAPER/ CODE	OUTCOMES
After completion of the course the student should be able to		
<u>B.Sc. Part – II</u>		
PAPER - II	BIOINSTRUMENTATION AND BIOSTATISTICS	CO-1: To Understand: The principles and applications of different types of microscopes and centrifuges.
		CO-2: Students will enable to acquire knowledge of working of various instruments like pH meter and techniques of chromatography.
		CO-3: To Understand: Process and mechanism of the Spectrophotometers, Turbidometry, X-ray diffraction and electrophoresis.
		CO-4: To Understand: Basics of biostatistics like data and its analytical methods.
<u>B.Sc. Part – III</u>		
PAPER - I	MEDICAL MICROBIOLOGY AND IMMUNOLOGY	CO-1: To Understand: The different air and water borne disease along with their symptoms and preventive measures.
		CO-2: To Understand: The basics of immunity and types of immune systems.
		CO-3: To Understand: knowledge of various clinical and immune related diseases and their diagnosis.
		CO-4: To Understand: Types, properties, function and theories of antibody production.
PAPER - II	ENVIRONMENTAL, INDUSTRIAL AND AGRICULTURAL	CO-1: This course will enable students to understand the microbiology of air and water along with knowledge of methods to

MICROBIOLOGY	determine their quality.
	CO-2: To Understand: The different microbial interactions existing in soil and help gain knowledge of microbiological examination of soil.
	CO-3: To Understand: Industrial microbiology and its scope with knowledge of different industrially important microorganisms and their role.
	CO-4: To Understand: Different agriculturally important microorganisms and the role of bio-fertilizers in agriculture.



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