Department: Microbiology

Programme Specific Outcomes FYGUP NEW

Programme offered by the	Outcomes	
B.SC MIAJOR	• The course aim to inculcate interest with critical and analytical based understanding of the subject with encouragement and scope for creative learning.	
	• The course is helpful in advancing the understanding and impact of Microbiology by connecting and empowering the transition of resource based communities to an intellectually vibrant knowledge based communities.	
	• Ensuring an atmosphere conducive to teaching and learning process.	
	• Boostingstudent'sconfidence in preparingfor the hyper-competitive world.	
	• Holistic intellectual development of young adults enrolled as students.	
	• Providing Quality Higher Education and taking care of intellectual, social, economic needs of students.	
	• Adopting student-friendly approaches to reaching and learning as far as practicable.	
	• Igniting interests in students not only in their subjects but also in relat fields and help them ramify and diversify areas of interest.	
	• Encouraging participation of faculty in discussions to teach students with different learning paces for heterogeneous group of students.	
	• Promotion of leadership qualities by promoting soft skills.	
	Taking periodic feedbacks of students.	
	• To develop excellence in academics.	
B.SC MINOR		
	• The course is helpful in advancing the understanding and impact of Microbiology by connecting and empowering the transition of resource based communities to an intellectually vibrant knowledge based communities.	
	• Ensuring an atmosphere conducive to teaching and learning process.	
	• Boosting student's confidence in preparing for the hyper-competitive world.	
	• Holistic intellectual development of young adults enrolled as students.	
	• Providing Quality Higher Education and taking care of intellectual, social, economic needs of students.	

• Adopting student-friendly approaches to reaching and learning as far as practicable.

Course Outcomes FYGUP NEW

B.SC MAJOR			
Semester	Course Code	Course Title	Outcome
	MICRMAJ101	Introduction to Microbiology & Microbial Diversity	 The aim of this course is to familiarize the students with the elementary history of the subject Microbiology and the various theories proposed for Microbial existences which are used in understanding the basics of Microbiology in general. The core course will also help to describe the world-changing scientific contributions of pioneering scientist of the 17th to 18th century. The core course will help the students to understand the importance of morphological distinctness with respect to species diversity of Algae, Fungi and Protozoa and their Evolutionary relationship that exist in between them. Describe the contributions of eminent pioneer microbiologist, Anton von Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming, Martinus W. Beijerinck, Sergei N. Winogradsky and Selman A. Waksman in the establishment of the field of Microbiology. The Purpose of the lab course is to introduce students to the various types of instruments used in microbiology laboratory. They will learn to take weight measurements using electronics balance for preparing microbial media and reagents required in laboratory along with the art of sterilization using autoclaves, and hot air oven. The main objective of this subject is to help students identify the different latest measurement and sterilization techniques available for specific microbiological applications. Lastly, the course is so designed to provide greater safety awareness and to alert students to potential hazards in performing certain experiments in working laboratory.
			instruments used for measurement.

		 Understand the errors in measurements and their rectification. Understand the importance of aseptic practises in Microbiology laboratory
MICRMAJ102	Biotechniques & Biostatistics	 2. i) Fundamental knowledge on principles & applications of various biotechniques ii) Laboratory Skills in using biotechniques for biological sample analysis iii)Data analysis applying statistical tools for data collection, interpretation and presentation in biological research iv)Experimental Design & performing statistical tests v) Problem solving approach
MICRMAJ203	Bacteriology	 Bacteriology paper provides a thorough background on anatomical and structural organisation of the basic fundamental unit of all living organisms called cell. Students get to understand the basic microbial structure, function and study the comparative characteristics of prokaryotes and eukaryotes and also understand the structural similarities and differences among various physiological groups of bacteria/archaea. This course also helps to understand various physical and chemical means of sterilization, historical background of culture growth media and their applications also various microbial techniques for the isolation of pure cultures in an artificial growth media along with the safe laboratory practices. Moreover, the topics also provide an opportunity to understand the importance of three distinct Domain system of life (Eubacteria, Archaebacteria and Eukaryotes). By the end of the Bacteriology course, students will be able to: 1. Introduction to Bacteria: Explain the classification, structure, and general characteristics of bacteria. 2. Bacterial Morphology: Identify different bacterial shapes, arrangements, and structures (cell wall, capsule, flagella, pili). 3. Bacterial Growth: Describe the factors affecting bacterial growth, including

			temperature, pH, and nutrients.
			4. Bacterial Reproduction: Understand bacterial cell division through binary fission and the bacterial growth curve.
			5. Gram Staining Techniques: Perform Gram staining and other staining methods to differentiate bacteria.
			6. Culture Techniques: Demonstrate various bacterial culture methods (aerobic, anaerobic, solid, and liquid media).
			7. Bacterial Metabolism: Explain bacterial metabolism, including aerobic and anaerobic respiration.
			8. Pathogenic Bacteria: Identify common pathogenic bacteria and their role in infectious diseases.
			9. Antibiotics and Resistance: Understand the mechanism of antibiotics and the causes of bacterial resistance.
			10. Sterilization and Disinfection: Apply methods of sterilization, disinfection, and aseptic techniques in laboratory practice.
			These outcomes help students gain comprehensive knowledge of bacterial structure, growth, and their role in health and disease.
11	MICRMAJ204	Microbes in sustainable agriculture & Development	At the end of this course students will have a clear knowledge on the use of biofertilizers and its types. This course also provides a clear knowledge of soil composition and microflora that are responsible for various mineralization processes in soil. Biofuel processing parameters, biogas production, genetically modified crops will teach them about the sustainable and advanced alternatives. 1. Role of Microbes in Soil Fertility: Explain how microbes contribute to soil health, nutrient cycling, and organic matter decomposition.

	2. Biofertilizers and Biopesticides: Understand the importance of microbial biofertilizers (e.g., Rhizobium, Azotobacter) and biopesticides in sustainable agriculture.
	3. Plant-Microbe Interactions: Describe beneficial relationships between microbes and plants, such as nitrogen fixation and mycorrhizal associations.
	4. Waste Management: Demonstrate the role of microbes in composting, bioremediation, and waste recycling.
	5. Environmental Sustainability: Evaluate the use of microbial technology in promoting sustainable agricultural practices and reducing chemical dependency.
	These outcomes highlight the importance of microbes in enhancing agricultural productivity while protecting the environment.

B.SC MINOR				
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	MICRMIN101	Microbial Diversity	 The aim of this course is to familiarize the students with the elementary history of the subject Microbiology and the various theories proposed for Microbial existences which are used in understanding the basics of Microbiology in general. The core course will also help to describe the world-changing scientific contributions of pioneering scientist of the 17th to 18th century. The core course will help the students to understand the importance of morphological distinctness with respect to species diversity of Algae, Fungi and Protozoa and their Evolutionary relationship that exist in between them. This course will lead the students to Understand the basic working of instruments used for measurement. Understand the importance of aseptic practises in Microbiology laboratory
Ι	MICRMIN202	Bacterial Morphology & Growth	 By the end of this course, students will be able to: 1. Understand Bacterial Structure: Describe the morphology, shape, and arrangement of bacterial cells (cocci, bacilli, spirilla). 2. Cell Wall Composition: Explain the structure and function of bacterial cell walls, including Gram-positive and Gram-negative bacteria. 3. Bacterial Growth Requirements: Identify

		physical and chemical factors affecting bacterial growth (temperature, pH, oxygen,
		nutrients).
		4. Bacterial Reproduction: Understand
		binary fission as the primary method of bacterial reproduction.
		5. Growth Phases: Explain the bacterial growth curve (lag, log, stationary, and death phases).
		6. Sterilization and Control: Demonstrate methods of bacterial growth control through physical and chemical agents (disinfection, antibiotics).
		These outcomes help students understand the structural features and growth patterns
		of bacteria for applications in microbiology and health sciences.
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B.SC IDC				
Semester	Course Code	Course Title	Outcome	
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11	LSC2IDC203	Basic Microbiology	By the end of the Basic Microbiology course, students will be able to:	
			1. Understand Microorganisms: Describe the types, structure, and classification of microorganisms (bacteria, viruses, fungi, and protozoa).	
			2. Microscopic Techniques: Demonstrate the use of microscopes and staining techniques for microbial identification.	
			3. Microbial Growth: Explain the physical and	

		chemical requirements for microbial growth and reproduction.
		4. Microbial Control: Apply methods of sterilization, disinfection, and antimicrobial agents to control microbial growth.
		These outcomes provide foundational knowledge in microbiology for further studies in health sciences, medicine, and research.
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