

Rayat shikshan sanstha's

Dahiwadi college Dahiwadi

Microbiology

Programme Specific Outcomes-

B.Sc. Microbiology Programme Specific Outcomes

1. Learners will understand the scope and historical developments in microbiology, characteristics 2 of different types of microorganisms and methods of their classification.
2. Students will understand ultrastructure of bacterial cell. Explain the nutritional requirements and mechanisms of their transportation in the cell.
3. Understand and use methods of visualizing microorganisms, controlling growth of microorganisms, isolation of microorganisms.
4. Perform isolation and maintenance of bacterial cultures.
5. Learners will understand and explain the body defense mechanisms and describe the immunological concepts with reference to infection, immunity.

Sr. No.	Program	Program Objectives	Program Specific Objectives
	B.Sc. Microbiology	PO 1: Knowledge of different aspects of Microbiology has become crucial and indispensable to everyone in the society. Study of microbes has become an integral	F.Y.B.Sc: Students will be given the basic information that includes- Introduction of microbiological world, Classification of microorganisms,

		<p>part of education and human progress. Building a foundation and a sound knowledge-base of Microbiological principles among the future citizens of the country will lead to an educated, intellectual and scientifically advanced society.</p> <p>PO 2: Microbiological tools have been extensively used to study different life processes and are cutting edge technologies. There is a continual demand for microbiologists in the work force – education, industry and research. Career opportunities for the graduate students are available in manufacturing industry and research institutes at technical level</p>	<p>Techniques of Microscopy, isolation, observation of morphology.</p> <p>S.Y.B.Sc.: Students will be given the necessary information about classification of specific group of microorganisms, Physiology and genetics of microorganisms, and applied microbiology.</p> <p>T.Y.B.Sc.: Students will be dealt with broad applied areas of microbiology that are interactive with higher living forms. Four such areas are –Virology, Immunology, Food and Industrial Microbiology , agricultural Microbiology. The sixth course will be Microbial genetics, Microbial biochemistry, Environmental Microbiology and medical microbiology. Over all objectives are</p> <ul style="list-style-type: none"> • To enrich students' knowledge and train them in the pure microbial sciences • To introduce the concepts of application and research in Microbiology. • To inculcate sense of scientific responsibilities and social and
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			environment awareness. • To help students build-up a progressive and successful career.
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Course outcomes – B.Sc. Microbiology

Sr no	Course	Course outcomes
1.	F.Y.B.Sc. Course I: Introduction to Microbiology	CO 1: Students will be able to define Microbiology and Microorganisms. They will be able to identify different types of microorganisms. They will be able to describe the importance and applications of microbiology . They will be able to memorize and recite the names of microorganisms with genus and species.
2.	Course II : Microbial Diversity	Students will be able to define and state the principles various Microbial growth medium. Students will be able to name and list the classification of microorganism
3	Course III : Bacteriology	Students will be able to summarise the species concept in prokaryotes and re write it with the help of Chemotaxonomy, Numerical taxonomy. They will be able to defend the importance of genetic methods in taxonomy.
4	Course IV : Microbial Biochemistry	They will be able to distinguish between different classes of enzymes and give examples of of each class. They will be able to distinguish between different classes of Carbohydrates , Nucleic acids, protein and Lipids give examples of of each class. Students will be able to illustrate and explains the metabolic pathways. They will be able to

		paraphrase the term oxidative and substrate level phosphorylation.
	F.Y.B.S.c. Practicals	CO 1: Students will be trained to techniques in microbiology like staining, cultivation of microorganisms CO 2: They will be able to label the different parts of instruments like incubator, Microscope, Autoclave etc. They will be able to identify types of microorganisms with the help of microscope.
	S. Y. B. Sc.	
	Course V : Microbial Physiology and Metabolism	Students will be able to restate the importance of microorganisms in Industry. They will be able to give examples of industrially important micro-organisms and their applications. They will be able to explain process of Fermentation. They will be able to distinguish between the types of fermentations. They will be able to illustrate and label different parts of fermenters. They will be able to summaries the role of microorganisms in agriculture. They will be able to inter relate the microorganisms and elemental cycles in nature. Students will be able to understand effects of environmental factors on Microbial growth.
	Course VI : Applied Microbiology	Students will be able to explain both air and water microflora. They will be able to explain milk and food spoilage due to micro-organisms. They will be able to distinguish between air water microflora. They will be able to summarize different techniques to measure the air and water microflora and interpret the results. Students will be able to explain both air and water microflora. They will be able to distinguish between air water microflora. They will be able to summaries different techniques to measure the air

		and water microflora and interpret the results.
	Course VII : Microbial Genetics and Molecular Biology	Students will be able to summaries the development of genetics. They will be able to paraphrase the concept of gene. They will be able to interpret the central dogma of molecular biology . They will be able to explain the cellular processes like DNA replication, transcription and translation. They will be able to inter relate the cause of adaptation, evolution and cancer with the change in genetic inheritance
	Course VIII : Basics in Medical Microbiology and Immunology	Students will be able to define the term immunology. They will be able to list out components of immune system and describe them in detail. They will be able to distinguish between humoral and cell specific immunity and innate and adaptive immunity. Students will be trained with various techniques in clinical Microbiology like isolation and identification of pathogen by classical method .
	S.Y.B.S.c. Practicals	Practical for the second year students will be carried out Serological test Biochemical test also be less defined i.e. kept more flexible, designed to evolve project themes on environment, agriculture and pollution aspects and acquiring laboratory related skills.. These aspects can be practiced better while carrying out the Tour reports.
	T.Y.B.Sc.	
	Course IX : Virology	Students will understand about structures of viruses, Isolation cultivation and purification of viruses and methods of enumeration of viruses. Students will understand about Cancer.
	Course X : Immunology	Students will understand about Immunology and Immune system . well Knowledge of Immune system cell , APC , primary and secondary organs of immune system. Students

		will understand about molecular mechanism of antibody production monoclonal antibodies, production, Hypersensitivity , immunological tolerances and autoimmunity.
	Course XI : Food and industrial microbiology	Students will be able to define and analyses the role microorganisms in dairy, food, and environment. Students will be able to define fermentation. CO 2: They will be able to describe process of industrial fermentation. They will be able to understand the role of bioreactor in fermentation. They will understand about strain improvement and microbiological assays. They will be able to describe and apply process of food preservation.
	Course XII : Agricultural microbiology	Students will understand the role of microorganisms in elemental cycles, Microbial interaction, Methods of Productions of Manure and compost, standards of city compost and vermicompost. Students will understand about Biofertilizers, Biopesticides, Plant pathology and plant diseases.
	Course XIII : Microbial Genetics	Students will be able to extend their study from prokaryotic gene expression to eukaryotic gene expression. They will be able to describe and interpret various techniques of gene mapping and able to solve problems based on it. Students will be able to define recombinant DNA technology (RDT) and state their applications. Students will be able to explain the various steps in RDT.
	Course XIV : Microbial Biochemistry	Students will be able to extend their study in enzymology with respect to identification and purification of enzyme. They will be able to describe and generalize the role of co enzyme in enzyme catalysis. Students will be able to interrelate between anabolism and catabolism. Students will be able to elaborate their study about bioenergetics

	Course XV : Environmental Microbiology	Students will be able to extend their study in Sewage microbiology , treatment of waste, biological safety in laboratory, environmental Monitoring, Bioremediation and Bioleaching.
	Course XVI : Medical Microbiology	Students will be able to organize diseases with respect to system. They will be able to categories disease causing organisms like bacterial, fungal, viral etc. They will be able to match diseases and their causative agents They will able to understand the role antibiotics in the irradiation of disease and resistance generate against them
	Practicals I Virology and microbial genetics	Isolation of coliphages from sewage. Effect of U.V. light on bacteria and graphical presentation of result. Isolation of auxotrophic mutants by replica plate technique Transfer of genetic material by transformation in <i>E.coli</i> Isolation of chromosomal DNA from bacteria (J. Marmurs method or by Phenol chloroform method) Electrophoretic separation of DNA. Isolation of streptomycin - resistant mutants (gradient plate technique) Testing of carcinogenicity of a substance by Ame's test.
	Practicals II Food And Industrial microbiology	Assay of amylase by DNSA method (graphical estimation) Bio-assay of Vitamin B12 Bio-assay of Penicillin. Production of wine and examination for pH, colour and alcohol content. Citric acid fermentation, recovery and estimation by titration. Amylase production by using <i>Bacillus</i> species. Isolation of lactic acid bacteria from fermented food.

		Examination of milk by Direct microscopic count (DMC)
	Practicals III Agriculture and environmental Microbiology	<p>Isolation of Azotobacter from soil.</p> <p>Isolation of Xanthomonas from infected citrus fruit.</p> <p>Isolation of Rhizobium from root nodules.</p> <p>Isolation of phosphate solubilising bacteria from soil.</p> <p>Determination of BOD of sewage</p> <p>Estimation of Calcium and Magnesium from soil (EDTA method)</p> <p>Determination of organic carbon content of soil (Walkley and Black method)</p> <p>Determination of COD of sewage.</p>