

GOVERNMENT DEGREE COLLEGE NAIDUPET

Department of Microbiology

MICROBIOLOGY

Objectives of Department of Microbiology

- To teach the historical events in Microbiology
- To provide knowledge on diversity of microorganisms.
- To instill students on laboratory techniques like microscopy, sterilization and culture of microbes.
- To give thorough knowledge on biomolecules and their characterization/quantification.
- To endow with basics of Enzymology and nutrition and metabolism in microbes.
- To give thorough knowledge on Microbial genetics and applications
- To impart the knowledge of Molecular biology.
- To acquaint to understand the importance of different types immunity, lymphoid organs cells of immune system it also deals with types of antigen and antibody and its interaction
- To impart knowledge to learn about on human pathogens, etiology and epidemiology of diseases caused by them.
- To gain knowledge on the role on normal microbial flora and general principles of diagnostic microbiology.
- To acquaint to understand the concept of plant diseases and soil microorganisms
- To impart knowledge of importance of microbes in different fields
- To inculcate knowledge in diagnosing bacteriological disease

B.Sc Microbiology, Botany and Chemistry

PROGRAMME OUTCOMES

For every degree program expectations are listed out by the institution under the Program Outcomes. For B.Sc Microbiology, Botany and Chemistry Stream the following are set as Programme Outcomes.

Course	PROGRAMME OUTCOMES	
Microbiology	Knowledge and understanding of:	<ol style="list-style-type: none">1. Students to be able to acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology.2. Students will acquire and demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis.3. Students will communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing.4. Students will demonstrate engagement in the Microbiology discipline through involvement in research or internship activities
	Intellectual skills	<ol style="list-style-type: none">1. Think logically and organize tasks into a structured form.2. Assimilate knowledge and ideas based on wide reading and through the internet.3. Transfer of appropriate knowledge and methods from one topic to another within the subject.4. Understand the evolving state of knowledge in a rapidly developing field.5. Construct and test hypothesis.6. Plan, conduct and write a report on an independent term project.

	Practical skills	<ol style="list-style-type: none"> 1. Understand the importance of laboratory security as it applies to working with hazardous chemicals, biohazards, recombinant material, and general Microbiology laboratory rules and regulations 2. Students will evaluate the accuracy of different types of measuring devices to accurately measure a solution. They will statistically analyze their data to determine the best measuring device to use. 3. Students will evaluate to learn isolation and identification of different microbes from different samples. 4. Students evaluate different products of commercial production by using different raw materials 5. Characterize isolated DNA and RNA using agarose gel electrophoresis and analyze agarose gel data 6. Perform basic microbiological techniques such as sterile plating and isolation of single colonies, culturing bacteria in liquid broth. 7. PCR amplify target genomic DNA and ligate into vector and transform bacteria with rDNA.
	Transferable skills	<ol style="list-style-type: none"> 1. Use of IT (word-processing, use of internet, statistical packages and databases). 2. Communication of scientific ideas in writing and orally. 3. Ability to work as part of a team. 4. Ability to use library resources/Equipment. 5. Time management.
	Problem analysis	<ol style="list-style-type: none"> 1. Identify the taxonomic position of plants 2. Design solutions from medicinal plants for health problems, disorders and disease of human beings /animals which meet the specified needs 3. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data,
	Ethics	<ol style="list-style-type: none"> 1. Apply ethical principles and commit to environmental ethics and responsibilities and norms of the environment
	Individual and team work	<ol style="list-style-type: none"> 1. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. 2. Elicit views of others, mediate disagreements and help reach conclusions in group settings.

	Communication	1. Communicate effectively on complex group activities and with society at large. Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language Manage projects and in multidisciplinary environments.
	Critical Thinking:	1. Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
	Effective Citizenship	1. Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

B.Sc Microbiology, Botany and Chemistry Course

Semester No.	Title	Programme specific outcomes	Course outcomes
I	Introduction to Microbiology and Microbial Diversity	1. Acquire skills and competency in microbiological laboratory practices applicable to microbiological research or clinical methods. 2. Focus on different attributes of living cells.	1. Explain relationship and apply appropriate terminology relating to the structure, Genetics, metabolism and Ecology of prokaryotic microorganisms, Algae, Viruses and Fungi. 2. Demonstrate appropriate laboratory skill and techniques related to isolation, staining, identification and control of microorganisms
II	Introduction to Microbial Biochemistry and Metabolism	1. Impart knowledge on structure and biological functions of macromolecules. 2. Impart knowledge on mechanism of enzyme catalysis. 3. Impart knowledge on various metabolic pathways.	1. Explain working principle and applications of Colorimetry, Chromatography, Spectrophotometry, Centrifugation and Gel Electrophoresis. 2. Knowledge on Microbial nutrition, bacterial growth, metabolism and Respiration. 3. The student will get first-hand experience on

			separation methods
III	Microbial Genetics and Molecular biology	<ol style="list-style-type: none"> 1. Understand the concept of replication, gene expression and regulation. 2. Acquire knowledge on different gene mutations and their causative agents. 	<ol style="list-style-type: none"> 1. Develop knowledge on microbial genetics and molecular biology and instrumentation.
IV	Immunology and Medical Microbiology	<ol style="list-style-type: none"> 1. Understand the concept of immune mechanism. 2. Develop knowledge on different clinical immunological techniques. 3. Provides knowledge on the role normal microbial flora and general principles diagnostic microbiology. 	<ol style="list-style-type: none"> 1. Explain No-specific body defenses and the immune response 2. Develop knowledge on disease transmission and control 3. Demonstrate on collection and handling of laboratory specimens
V	Environmental and Agricultural Microbiology	<ol style="list-style-type: none"> 1. To impart knowledge on soil microorganisms and role in nutrient cycles. 2. To inculcate knowledge on plant diseases and their control. 	<ol style="list-style-type: none"> 1. The student will have fundamental concepts in soil microbiology, soil microbial diversity, basic concept of nitrogen fixation and plant growth promotion. 2. Understands the role of microorganisms in treatment of solid and liquid waste. 3. The student will acquire knowledge on application of microorganisms in agro – environmental fields.
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V	Food and Industrial Microbiology	1.To impart knowledge on microorganisms involved in food spoilage and their sources. 2.To impart knowledge on isolation and screening of industrially important microorganisms.	1.The course aim to provide general principles of food microbiology. 2. It is assumed that students will have got basic information on spoilage, principle of food preservation and Single cell proteins.
VI	Microbial Biotechnology	1. Understand about crop development, callus culture, biotechnological applications of plants, Animal tissue culture, Animal products and their production. 2. To understand concepts of IPR.	1. Student should be able to demonstrate with the wide diversity of microbes and their potential for use in microbial biotechnology 2. It is assumed that students will have get outlines of intellectual property rights.
VI	Microbial diagnosis in Health clinics	1.To acquire knowledge on human pathogens. 2. Course will provide practical knowledge about different types of bacteria, virus and fungi found in environment	1. Develop knowledge and skills on microbiological laboratory safety- General rules and regulations
VI	Microbial quality control in Food and Pharmaceutical Industries	1.To impart knowledge on different culture techniques. 2.To learn the process of PCR. 3.To learn Microbial Standards for Different Foods and Water.	1. Develop skills on disinfection of instruments and equipments in laboratory and Hospitals
VI	Biofertilizers and biopesticides	1.To impart knowledge on microbes involved in nitrogen fixation process. 2.to impart knowledge different plant growth promoting microbes. 3. to impart knowledge on cultivation and field applications of different biofertilizes.	1. Develop knowledge and skills on mass multiplication and field application of bio fertilizers and bio pesticides.