



MANNAR THIRUMALAI NAICKER COLLEGE

A Co-educational, Autonomous and Linguistic Minority Institution

Affiliated to Madurai Kamaraj University

Re-accredited with "A" Grade by NAAC

Pasumalai, Madurai – 625 004 Tamil Nadu.

CURRICULUM RELEVANCE TO THE LOCAL, REGIONAL, NATIONAL AND GLOBAL NEEDS

NAME OF THE PROGRAMME-: B.Sc MICROBIOOGY

PROGRAMME CODE: UMB

PROGRAMME OUTCOMES

PO1: Demonstrate the knowledge and understanding of science concepts and its relevant fields

PO2: Identify, formulate, analyze complex problems and reach valid conclusions using the methodologies of science

PO3: Employ critical and analytical thinking in understanding the concepts and apply them in various problems appearing in different branches of science

PO4: Communicate the known concepts effectively within the profession and with any forum

PO5: Function successfully as a member / leader in any team and to apply ethics, accountability and equity in their life.

PO6: Use ICT tools in various learning situations, related information sources, suitable software to analyze data and furthermore participating in learning activities throughout life to meet the demands of work place through knowledge / up-skilling / re-skilling.



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PROGRAMME SPECIFIC OUTCOMES

PSO1: Acquire knowledge on fundamentals of microbiology and understand on historical perspective of microbiology, different types and structure of microbes and scope of various branches of microbiology.

PSO2: Gain Knowledge on growth of microbes and microbial metabolism and get to know about the microbes in food and environment

PSO3: Realize the application and productions of vermicompost and bioinoculants and understand the soil microorganisms and biogeochemical cycles prevail in environment

PSO4: Gain insight on cells and organs of the immune system and understand on various immunological reactions, techniques and autoimmune diseases.

PSO5: Assimilate technical skills on microbial genetics. Realize the application-oriented aspects of microbiology in mushroom and spirulina cultivation. Understand the concepts on agriculture microbiology and able to know about global environmental problems.

PSO6: Develop training in the safe handling of medically important microorganisms and microorganisms from different sources, to sharpen the microbiological skills as an entrepreneur.



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Sl. No	Course Code	Course Name	Course Outcomes
1	21UMBC11	General Microbiology	CO1: To identify and differentiate bacteria and fungi using staining techniques. CO2: To describe basic concepts of microbiology and provide a foundation for later study in biological sciences. CO3: The main objective of this course is to give students an insight into the world of microorganisms and to become familiar with the foundation concepts of history of Microbiology. CO4: To understand the structure and functions of a typical prokaryotic cell. CO5: To know various Culture media and their applications. CO6: To demonstrate an understanding of bacterial, algal and fungal classifications, reproduction and significance.
2	21UMBCP1	General Microbiology - Practical	CO1: To familiarize the students in general microbiology techniques CO2: To develop a sufficient background about the growth of microbes CO3: To give knowledge on ubiquitous nature and characteristics of microbes CO4: To prepare different types of media for culturing microorganisms CO5: To identify and



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			differentiate bacteria and fungi using staining techniques
3	21UMBS11	Bioinstrumentation and Microbial techniques	CO1: To gain knowledge in theoretical background and practical skills in microscopy CO2: To develop knowledge on principles and applications of various instruments used in biology CO3: To get idea the related to the methods for separation of biomolecules CO4: To understand characterize about the bacteriological technique. CO5: To familiarize the students about the staining technique in biology
4	21UMBC21	Microbial Physiology	CO1: To understand the nutritional requirements of microorganisms and their uptake. CO2: To elucidate the growth and growth factors of microorganisms. CO3: To provide knowledge about the metabolic pathways. CO4: To acquire the knowledge about anaerobic respiration and fermentation of microorganisms. CO5: To facilitate the understanding on microbial photosynthesis
5	21UMBCP2	Microbial Physiology - Practical	CO1: To learn the growth pattern of microorganisms. CO2: To demonstrate the effect of temperature, pH and salinity on the microbial



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			growth. CO3: To acquire the knowledge about the physiological characteristics of microorganisms. CO4: To screen the enzymatic potential of microorganisms. CO5: To provide knowledge about biochemical characteristics of microorganisms.
6	21UMBS21	Mushroom and Spirulina cultivation	CO1: To familiarize the students in edible, medicinal and poisonous mushroom CO2: To develop a sufficient background various properties of mushroom CO3: To gain knowledge on cultivation, harvest and preservation of mushroom CO4: To understand the importance and health benefits of spirulina CO5: To get idea related to commercial production of spirulina
7	21UMBC31	Microbial Genetics and Molecular biology	CO1: To understand the structure and replication of DNA. CO2: To know about DNA damage and repair mechanism. CO3: To understand the central dogma of protein synthesis. CO4: To describe the basic concepts of codons and anticodons. CO5: To illustrate application of molecular biology in current research.
8.	22UMBA31	Allied– Microbiology I	CO1: To understand history



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		Fundamentals of Microbiology	of microbiology towards modern microbiology. CO2: To study the basic morphology structure, classification and biological and economic importance of bacteria. CO3: To interpret the characteristics and significance of Fungi. CO4: To explain the nomenclature and classification of Viruses. CO5: To enable the students to explore knowledge about the Algae and Protozoa.
9.	22UMBA41	(Applied Microbiology II) Applied Microbiology	CO1: To provide information regarding biofertilizers and their significance. CO2: To gain the Knowledge about microbes present in environments CO3: To learn to isolate industrially important organisms CO4: To understand the key concepts in food microbiology CO5: To acquire various basic concepts of medical microbiology
10.	21UMBCP3	Microbial Genetics and Molecular biology – Practical	CO1: To isolate genomic and plasmid DNA from bacteria. CO2: To demonstrate spontaneous mutation by gradient plate method. CO3: To isolate Auxotrophs & Prototrophs by replica plating method. CO4: To calculate percentage killing of <i>E.coli</i> after UV



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			irradiation. CO5: To Prepare Competent cell.
11.	21UMBA31	Biotechnology -I	CO1: To introduce the basic concepts in Biotechnology. CO2: To describe the fundamentals in the field of biotechnology and to prepare them for understanding advance concepts. CO3: To expose the students to the concept of Genetic Engineering. CO4: To understand the tools and techniques used in Gene Cloning. CO5: To illustrate the applications of DNA Vectors. CO6: To demonstrate an understanding of various enzymes used in Biotechnology and their significance.
12.	21UMBAP3	Biotechnology – Practical	CO1: To identify the media preparation methods for plants and animal cell culture CO2: To understand the principle in plant tissue culture. CO3: To get acquainted with plant tissue culture medium. CO4: To construct callus induction and protoplast isolation CO5: To examine synthetic seeds
13.	21UMBS31	Vermitechnology	CO1: To understand the biology of earthworms CO2: To conceptualize the role of earthworms in agriculture. CO3: To learn the basics of



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			vermicompost and its applications. CO4: To get acquainted with the applications of Vermitechnology. CO5: To understand the factors that promote and suppress the growth of earthworms.
14.	21UMBN31	Microbes in human welfare	CO1: To describe the history of microbiology and contributions to this field. CO2: To acquire knowledge about role of microbes in the field of agriculture. CO3: To enable the knowledge about production of antibiotics, vaccines, hormones and other useful products CO4: To gain an idea about importance of microbes in pharmaceutical field. CO5: To explain the role of microbes in human health-their sources, prevention and control measures.
13	21UMBC41	Agriculture and Environmental Microbiology	CO1: To study the importance of soil microorganisms and soil fertility and zones of soil microbes and its importance. CO2: To understand the nitrogen fixers and role of microorganisms in plants. CO3: To gain the knowledge about microbes present in soil. CO4: To understand how to isolate and identify microorganisms from the various water sources to check the Potability of water.



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			CO5: To enable the students to explore knowledge about the treatment of sewage water.
14	21UMBCP4	Agriculture and Environmental Microbiology – Practical	CO1: To enumerate bacteria from Soil, Water, Air, Leguminous plant and Diseased plants. CO2: To gain the knowledge about microbes present in environments. CO3: To learn to isolate the different types of microorganisms in soil sample. CO4: To deduct microbes from air and water. CO5: To acquire the basic knowledge about biofertilizer production
15	21UMBA41	Biotechnology -II	CO1: To describe the concepts of tissue culture. CO2: To outline the pathways of plant regeneration. CO3: To understand the methods of transformation in transgenic plants. CO4: To demonstrate various animal cell culture media. CO4: To identify the importance of transgenic plants and animals.
16	21UMBAP3	Biotechnology – Practical	CO1: To identify the media preparation methods for plants and animal cell culture CO2: To understand the principle in plant tissue culture. CO3: To get acquainted with plant tissue culture medium. CO4: To construct callus induction and protoplast



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			isolation CO5: To examine synthetic seeds
17	21UMBS41	Immunology and Immunotechnology	CO1: To describe the history of immunology, immune organs and immune cells. CO2: To classify the types of immunity and immune response. CO3: To characterize the antigen and antibody types, structure and properties. CO4: To analyze the hypersensitivity reactions and autoimmune diseases. CO5: To detect the antigen - antibody reactions.
18	21UMBN41	Management of human microbial diseases	CO1: To acquire knowledge on basics of Microbiology. CO2: To learn and differentiate on various microbial interactions. CO3: Outline on types of diseases and its mode of transmission. CO4: Examine common causes and treatment of microbial diseases. CO5: Summarize on management of Microbial diseases and its prevention
19	21UMBC51	Industrial Microbiology	CO1: know about Industrial Microbiology and its scope. CO2: To explain the fermentor and its types CO3: To apply their knowledge in industrial use of Microorganisms CO4: To understand the biosafety levels and its parameters
20	21UMBC52	Medical Microbiology	CO1: To get accustomed to the basics of Infectious



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			diseases. CO2: To become aware of diseases caused by viruses along with their disease establishment and progression CO3: To become familiar with the seriousness of infectious diseases caused by fungi. CO4: To get an exposure to various antibiotic drugs by which infectious diseases can be cured
21	21UMBCP5	Industrial Microbiology- Practical	CO1: To screen the antibiotic producing microbes. CO2: To demonstrate the yeast cell and enzyme immobilization. CO3: To isolate amylase and protease producing bacteria from soil. CO4: To calculate the alcohol content using di-chromate method. CO5: To prepare glycerol stock to preserve industrially important microbes.
22	21UMBCP6	Medical Microbiology- Practical	CO1: To get accustomed to the basics of Infectious diseases. CO2: To understand the concepts in diseases caused by microorganisms. CO3: To become aware of diseases caused by viruses along with their disease establishment and progression CO4: To become familiar with the seriousness of infectious diseases caused by fungi. CO5: To get an exposure to various antibiotic drugs by which infectious diseases can



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			be cured.
23	21UMBCP5	Industrial Microbiology – Practical	CO1: To screen the antibiotic producing microbes. CO2: To demonstrate the yeast cell and enzyme immobilization. CO3: To isolate amylase and protease producing bacteria from soil. CO4: To calculate the alcohol content using di-chromate method. CO5: To prepare glycerol stock to preserve industrially important microbes.
24	21UMBE51	Fundamentals of Botany and Zoology	CO1: To understand the Plant taxonomy - Nomenclature, Binomial system and classification of plants. CO2: To gain the knowledge about Plant physiology and Reproduction of plants. CO3: To study the features of plants, distribution and economic importance. CO4: To classify the introduction of animal Kingdom, Classification, Fertilization and Evolution theories . CO5: To enable the students to explore knowledge about human physiology
25	21UMBE52	Genetics and Biostatistics	CO1: To describe the genetics of microbes, Gene transfer mechanisms. CO2: To identify the genetic exchange Transduction, Conjugation.



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			CO3: To understand the Mutation and its types. CO4: To interpret the Data collection, Validation and diagrammatic representation. CO5: To gain the knowledge to explore students in central tendency and dispersion.
26	21UMBE53	Cosmetic microbiology	CO1: To outline the History, scope and role of microbes in cosmetic microbiology. CO2: To apply the various products and development in cosmetics. CO3: To describe the microorganisms in food and preservatives . CO4: To determine the Validation in laboratory methods. CO5: To gain the knowledge about cosmetic product regulation.
27	21UMBE54	Genomics in forensic science	CO1: To know about Basics and History of Forensic science. CO2: To understand about importance of DNA in identification of paternity test. CO3: To get idea about DNA typing and profiling. CO4: To gain knowledge on DNA Finger printing techniques. CO5: To aware of fake DNA evidences.
28	21UMBE55	Cell biology	CO1: To gain knowledge in diversity of microorganisms CO2: To learn in detail the structure of various cell organelles.



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			CO3: To acquire knowledge on structural and functional knowledge of cells, tissues and organelles. CO4: To get familiarize with mechanisms of cell signaling. CO5: To identify the concept of cell in terms of growth and cell division.
29	21UMBE56	Public health microbiology	CO1: To know about importance of Public Health Microbiology. CO2: To aware of infectious air borne diseases. CO3: To acquire knowledge about water treatment and water borne diseases. CO4: To recognize about food hygiene and food borne diseases. CO5: To understand about Hospital borne infections and biomedical waste management
30	21UMBS51	Computer applications in biology	CO1: To gain the knowledge about basics components of computer. CO1: To study in detail the the features of computer. CO2: To acquire knowledge on computer application in biology. CO3: To enable the students to explore knowledge about scope & applications of bioinformatics. CO4: To get familiarize with Sequence alignment in biological databases



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31	21UMBC61	Food and Dairy microbiology	CO1: The main objective of this course is to give students an insight into the world of Food and Dairy Microbiology. CO2: To understand various microbial interactions and role of microbes in spoilage of Food. CO3: To know the principles in traditional methods of preservation and modern preservation techniques. CO4: To demonstrate an understanding of using Lactic acid bacteria as starter cultures and to learn more on microbes as source of food. CO5: To identify and differentiate microbes causing food intoxications and food infection.
32	21UMBC62	Virology	CO1: To understand the basic characters and classification of virus. CO2: To know about different steps of virus multiplication. CO3: To gain knowledge about human viral diseases. CO4: To get idea about common plant viral diseases and their control measures. CO5: To recognize antiviral agents and antiviral therapy.
33	21UMBCP7	Food and Dairy Microbiology Practical	CO1: To develop basic skills in Food preparation. CO2: To gain basic understanding of principle behind milk testing. CO3: To acquire knowledge in various milk testing employed in industries.



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			CO4: To get familiar with various plating techniques in raw milk. CO5: To develop skilled in tests followed in dairy and food processing industries.
34	21UMBPR1	Project	
35	21UMBE61	Biosafety and IPR	CO1: To understand the basics and need for Biosafety procedures. CO2: To get accustomed to the Governing bodies of Biosafety guidelines CO3: To become aware of and manage biological risks. CO4: To acquire the knowledge about Intellectual property and its legal protection. CO5: To understanding the types of patents and patent filing procedures.
36	21UMBE62	Fundamentals of Algae, Fungi and Lichens (or)	CO1: Describe general characteristics of algae, fungi and lichens. CO2: Become familiar with the concepts of the life cycle of algae, fungi and lichens. CO3: Know the life cycle of algae and fungi. CO4: Understand the sexual and asexual reproduction of algae and fungi.. CO5: Demonstrate and understand economic importance of algae, fungi and lichens.
37	21UMBE63	Marine Microbiology	CO1: To describe the diversity of marine microorganism CO2: To describe basic concepts of marine



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			microbiology and provide a foundation for later studies. CO3: The main objective of this course is to give students an insight into the dynamics of marine microbes CO4: To become familiar with concepts of microbes of extreme environments. To know various marine pollutants. CO5: To demonstrate and understand seafood microbiology.
38	21UMBE64	Nanotechnology	CO1: To understand the basics and need for Biosafety procedures. CO2: To get accustomed to the Governing bodies of Biosafety guidelines CO3: To become aware of and manage biological risks. CO4: To acquire the knowledge about Intellectual property and its legal protection. CO5: To understanding the types of patents and patent filing procedures
39	21UMBE65	Parasitology	CO1: To understand the basics and need for Biosafety procedures. CO2: To get accustomed to the Governing bodies of Biosafety guidelines CO3: To become aware of and manage biological risks. CO4: To acquire the knowledge about Intellectual property and its legal protection. CO5: To understanding the types of patents and patent



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			filing procedures.
40	21UMBE66	Clinical Biochemistry	CO1: The main objective of this paper is to skill the students in procedures followed in biochemistry Laboratory.. CO2: To acquire knowledge in the field of biochemistry. CO3: To get familiarize with the test protocols followed in Hospital Laboratory. CO4: To understand the principle and clinical significance behind various diseases. CO5: To learn and understand the methods of body fluid collection
41	21UMBS61	Diagnostic Microbiology	CO1: To outline the Diagnostic microbiology - Methods, Collection, Transport and Processing of clinical specimens. CO2: To categorise Culture media, Microscopic examination and Serological test of bacterial infections. CO3: To describe the Laboratory methods of mycology. CO4: To understand the Isolation, Identification of virus. CO5: To gain the knowledge about parasitology.