



IDHAYA COLLEGE FOR WOMEN, KUMBAKONAM

Programme : B.Sc. Microbiology

PO No	Programme Outcomes by the end of B.Sc Microbiology course, the Graduates will be able
PO1	To understand the contributions of various scientists in microbiology and scope of the various branches.
PO2	To understand the kinds of Prokaryotic & Eukaryotic microbes and their interactions.
PO3	To describe the importance of organic compounds and its chemistry found in living cells.
PO4	To understand the various processes of metabolism of Carbohydrates Amino acids and Vitamins.
PO5	To learn about DNA, RNA and protein structure and synthesis.

Semester I

S.No	Course code	Name of the Course	Course Outcomes
1.	22SCCMB1	Basics of Microbiology	<ul style="list-style-type: none"> ➤ To understand classification of microorganisms and basic concepts of Microscopes. ➤ To understand bacterial size, shape and their structure. ➤ To understand the general characteristics of prokaryotic and eukaryotic microorganisms.
2.	22SACMB1	Fundamentals of Biological Sciences	<ul style="list-style-type: none"> ➤ To gain the basic knowledge about plants and animals. ➤ To study the biological concepts of plant and animal evolution and establishments. ➤ To understand the biological sciences' importance to human society.
3.	22SCCMB1P	Basics of Microbiology Practical	<ul style="list-style-type: none"> ➤ To learn operation of all laboratory equipments. ➤ To understand isolation techniques of microorganisms. ➤ To understand staining of microbial cells.
4.	22UGVED	Value Education	<ul style="list-style-type: none"> ➤ To gain deeper understanding about the purpose of their life. ➤ To understand and start applying the essential steps to become good leaders.

			➤ To emerge as responsible citizens with clear conviction to practice values and ethics in life.
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Semester II

S.No	Course Code	Name of the Course	Course Outcomes
1.	22SCCMB2	Microbial Physiology	<ul style="list-style-type: none"> ➤ To impart among the learners the fundamental principles of microbial physiology. ➤ To provide the role / functions of various organelles of a cell. ➤ To understand the route of a cell to metabolize carbohydrate, protein and fatty acids.
2.	22SACMB2	General Biochemistry	<ul style="list-style-type: none"> ➤ To provide basic understandings of cell structural compositions. ➤ To teach biochemical nature and functions of microbes. ➤ To study the basics of bio-molecules' synthesizing mechanisms and regulations
3.	22SCCMB2P	Microbial Physiology (Practical)	<ul style="list-style-type: none"> ➤ To provide the students hands-on practice on the first-line microbial physiology experiments. ➤ To train the learners to independently test various carbohydrate fermenting abilities of microbes. ➤ To make the students to understand the principles of significant biochemical tests done to identify bacterial isolates.
4.	22SACMB1P	Fundamentals of Biological Sciences & General Biochemistry (Practical)	<ul style="list-style-type: none"> ➤ To understand the plants' tissue anatomical structure. ➤ To learn the comparative characteristic features of vegetative natures. ➤ Preparation of normal, molar and percent solutions.
5.	22PELS1	Professional English for Life Sciences I	<ul style="list-style-type: none"> ➤ To develop the language skills of students by offering adequate practice in professional contexts. ➤ To focus on developing student knowledge of domain specific registers and the required language skills.

			<ul style="list-style-type: none"> ➤ To develop strategic competence that will help in effective communication.
6.	22UGCES	Environmental Studies	<ul style="list-style-type: none"> ➤ To understand the Natural resources and Eco system. ➤ To serve as an environmental resource, through service. ➤ To equip students with the knowledge and skills of Biodiversity.

Semester III

S.No	Course Code	Name of the Course	Course Outcomes
1	22SCCMB3	Introductory Virology	<ul style="list-style-type: none"> ➤ To describe the classification of viruses ➤ To explain virus structure, process of virus attachment and entry, virus assembly and release. ➤ To state the steps of viral replication .
2	22SCCMB3P	Introductory Virology (Practical)	<ul style="list-style-type: none"> ➤ To isolate and characterize bacteriophage from natural sources. ➤ To gain knowledge in preparing bacteriophage stock - Lambda & T4. ➤ To understand the T4 Phage Titration and plant virus transmission methods.
3	22SACMB3	Biostatistics	<ul style="list-style-type: none"> ➤ To create graphs using scientific data and to communicate important information about data, and interpret these in the form of graphs. ➤ To familiarize with widely used statistical databases. ➤ To know basic concepts of probability and statistics.
4	22PELLS2	Professional English for Life Sciences - II	<ul style="list-style-type: none"> ➤ To attend interviews with boldness and confidence. ➤ To adapt easily into the workplace context, having become communicatively competent. ➤ To develop strategic competence that will help in effective communication.
5	22SNMEND1	Nutrition for Health	<ul style="list-style-type: none"> ➤ To summarize, critically discuss and understand both fundamental and applied aspects of Food Science and nutrition terminologies. ➤ To explain functions of specific nutrients in food groups. ➤ To identify nutrient specific force and apply the principles from the various factors of foods to plan a balanced diet.

Semester IV

S.No	Course Code	Name of the Course	Course Outcomes
1	22SCCMB4	Immunology	<ul style="list-style-type: none"> ➤ To understand the fundamental bases of immune system and immune response. ➤ To gather information about the structure and organization of various components of the immune system. ➤ To assimilate the operation and the mechanisms which underlie the immune response.
2	22SCCMB4P	Immunology (Practical)	<ul style="list-style-type: none"> ➤ To understand blood collection, serum & plasma separation methods. ➤ To obtain hands- on training on immune-electrophoresis technique. ➤ To perform blood grouping technique and other immunological tests.
3	22SACMB4	Bioinformatics and Computational Biology	<ul style="list-style-type: none"> ➤ To understand the biological challenges and the computational solutions. ➤ To analyze the biological data using computer. ➤ To assess sequence submission and retrieval.
4	22SNMEND2	Nutrition for Women	<ul style="list-style-type: none"> ➤ To learn about the role of nutrients and food in daily life. ➤ To understand the various factors influencing health and nutritional status of women. ➤ To identify the foods to be included and avoided to combat nutrient deficiency disorders.
5	22SACMB2P	Biostatistics & Bioinformatics And Computational Biology (Practical)	<ul style="list-style-type: none"> ➤ To analyze statistical data using MS-Excel. ➤ To organize, manage and present data. ➤ To present statistical data graphically using frequency distributions and cumulative frequency distributions.

Semester V

S.No	Course Code	Name of the Course	Course Outcomes
1	22SCCMB5	Medical Microbiology	<ul style="list-style-type: none"> ➤ To make the students understand normal flora, host parasite interactions and epidemiology of infectious diseases. ➤ To acquire a basic understanding of the common infections. ➤ To understand the diseases of medical importance, their microbial causes and pathogenic action.
2	22SCCMB6	Environment and Agricultural Microbiology	<ul style="list-style-type: none"> ➤ To communicate the basic principles of microbiology and their applications to environment and agriculture. ➤ To know the type of waste disposing mechanisms using microbial sources. ➤ To provide the fundamental knowledge pertaining to the various scopes of agricultural and environmental microbiology.
3	22SCCMB7	Molecular Biology and Microbial Genetics	<ul style="list-style-type: none"> ➤ To provide the fundamental principles and concepts of prokaryotic genes and genomes. ➤ To study about the molecular organization, replication and functions of gene and genome. ➤ To understand the genetic transfer mechanisms in microbes.
4	22SCCMB5P	Medical Microbiology, Environment and Agricultural Microbiology & Molecular Biology and Microbial Genetics (Practical)	<ul style="list-style-type: none"> ➤ To provide hands on training in identifying bacteria using culture media ➤ To handle clinical specimen for fungal infection diagnosis ➤ To handle microscopic methods to diagnose protozoa and helminth infections.
5	22SMBEMB1A	Diagnostic Microbiology	<ul style="list-style-type: none"> ➤ To impart the knowledge of various clinical specimen collection from human cases. ➤ To provide the basics of clinical pathology and hematology. ➤ To provide methods of handling instruments, principle and advantages of diagnostics.

6	22SSBEMB1	Mushroom Technology	<ul style="list-style-type: none"> ➤ To gain basic science knowledge of mushroom cultivation. ➤ To understand the nutritional benefits of the microbes concerned and also related drawbacks. ➤ To acquire knowledge about the prevailing market demands and scope of these technologies.
8	22UGSDC	Soft Skills Development	<ul style="list-style-type: none"> ➤ To effectively communicate through verbal/oral communication and improve the listening skills ➤ To become more effective individual through goal/target setting, self-motivation and practicing creative thinking ➤ To function effectively in multi-disciplinary and heterogenous teams through the knowledge of team work, inter-personal relationships, conflict management and leadership quality.

Semester VI

S.No	Course Code	Name of the Course	Course Outcomes
1	22SCCMB8	Food Microbiology	<ul style="list-style-type: none"> ➤ To learn the fundamental association between food and microbes. ➤ To acquire knowledge about the key concept of food fermentations. ➤ To analyze the mechanism of food spoilage.
2	22SCCMB9	Industrial Microbiology	<ul style="list-style-type: none"> ➤ To impart the knowledge of current technology as to produce microbial products from cheap sources. ➤ To provide broad theoretical and practical skills in industrial microbiology. ➤ To explain the nature of the bio-resources, industrially important microorganisms, up and down stream process.
3	22SCCMB6P	Food Microbiology and Industrial Microbiology (Practical)	<ul style="list-style-type: none"> ➤ To study the basics of food microbiology processes. ➤ To know the food quality assessment testing procedures. ➤ To provide the food contaminants possibility and causing agents.

4	22SMBEMB2B	Microbial Biotechnology & Bioethics	<ul style="list-style-type: none"> ➤ To introduce the role of micro-organisms in biotechnology. ➤ To understand various metabolic processes involved. ➤ To provide the first- line knowledge of utilizing microbes for the industrial production.
5	22SSBEMB2	Biofertilizers Technology	<ul style="list-style-type: none"> ➤ To introduce the necessity and application relevance of biofertilizers. ➤ To initiate towards the development of sustainable agriculture. ➤ To learn production of biofertilizers in large scale level.
6	UGGS	Gender Studies	<ul style="list-style-type: none"> ➤ Identify and analyse the link among gender, sexuality, identify power and social justice. ➤ Identify and analyse inter sections among gender and sexuality and other categories of difference such as class, race, religion, nationality and physical ability.
7.	22SMBPW	Project	<ul style="list-style-type: none"> ➤ To undergo projects and gain knowledge in the relevant field of study.

Programme: M.Sc. Microbiology

PO. No	Programme Outcomes upon completion of M.Sc., Degree Programme, the Graduates will be able
PO1	To apply the process of science by formulating hypotheses and design experiments based on the scientific method.
PO2	To analyze and interpret results from a variety of microbiological methods.
PO3	To use quantitative reasoning by using mathematical calculations and graphing skills to solve problems in microbiology.
PO4	To communicate and collaborate with other disciplines by effectively communicating about the fundamental concepts of microbiology in written and oral format.
PO5	To identify credible scientific sources to interpret and evaluate the evidences.

Semester I

S.No	Course Code	Name of the Course	Course Outcomes
1	P22MBCC11	General Microbiology	<ul style="list-style-type: none"> ➤ To provide unique characteristic features of microbes. ➤ To describe the different types of microscopy and their working principles. ➤ To explain about microbial media, preservation and control techniques.
2	P22MBCC12	Biological Macromolecules	<ul style="list-style-type: none"> ➤ To understand the structure and functions of blood, hormones and phytohormones. ➤ To study the basic metabolic regulators' characteristic features. ➤ To understand the interrelationships among biological energy, functions and health.
3	P22MBCC1A	Applied Biological Sciences	<ul style="list-style-type: none"> ➤ To enable the students to understand the basics components of biology. ➤ To understand the biological diversity, uniqueness and their characteristic features. ➤ To study the importance of biological sciences in human welfare.
4	P22MBE1B	Food and Dairy Microbiology	<ul style="list-style-type: none"> ➤ To understand various methods of food fermentations and fermented food products. ➤ To portray the conceptual basis for understanding probiotics.

			<ul style="list-style-type: none"> ➤ To impart awareness about microbial illness in foods, food sanitations and other related aspects.
5	P22MBVAC1	Medical laboratory Technology	<ul style="list-style-type: none"> ➤ To teach conventional methods of disease diagnosis and their moderation in the current era. ➤ To provide the knowledge of collection and processing of clinical samples. ➤ To study the pathogenic microbial culture and their identification techniques.
6	P22MBCC1P	General Microbiology and Biological Macromolecules (Practical)	<ul style="list-style-type: none"> ➤ To educate hands-on skills on the first-line experimental methods of the fundamental microbiology. ➤ To deepen students' understanding on the importance of lab sterility. ➤ To provide hands-on experience on analytical techniques.

Semester II

S.No	Course Code	Name of the Course	Course Outcomes
1	P22MBCC21	Microbial Physiology and Metabolism	<ul style="list-style-type: none"> ➤ To describe the anabolic and catabolic sections of metabolism deeply. ➤ To impart the knowledge of extremophilic organisms and their merits. ➤ To understand metabolic processes of energy substrates.
2	P22MBCC22	Medical Microbiology	<ul style="list-style-type: none"> ➤ To describe the molecular diagnostic methods and automated equipments used for diagnosis of diseases caused by microorganisms. ➤ To understand the common infections and diseases of medical importance, their microbial causes and pathogenic action. ➤ To understand the fungal and Protozoan diseases and their preventive measures.
3	P22MBCC2P	Microbial Physiology and Metabolism & Medical Microbiology (Practical)	<ul style="list-style-type: none"> ➤ To impart skills required for estimating protein & nucleic acids. ➤ To study the microbial growth influencing factors. ➤ To ensure a familiarity with all conventional methods of microbial identification.

4	P22MBCC2B	Pharmaceutical Microbiology	<ul style="list-style-type: none"> ➤ To impart production and quality control of prophylactic compounds. ➤ To teach methods of controlling pharma products microbial contamination and role of cell culture in pharmacy. ➤ To bring an awareness about antimicrobial resistance.
5	P22FSNME1	Fitness Nutrition	<ul style="list-style-type: none"> ➤ To acquire knowledge on sports nutrition. ➤ To understand the various diets for sportspersons. ➤ To gain insight into the vital role of dietary management to enhance sports performance.
6	P22MBE2B	Microbial Biotechnology	<ul style="list-style-type: none"> ➤ To transpire a knowledge about production of pharmaceuticals. ➤ To portray about microbial biopolymers. ➤ To impart the potential applications of microbial and molecular biotechnology in medicine, agriculture and various other current industrial processes.

Semester III

S.No	Course Code	Name of the Course	Course Outcomes
1	P22MBCC31	Molecular Biology and Microbial Genetics	<ul style="list-style-type: none"> ➤ To explain the processes behind mutations and other gene transfer mechanism. ➤ To understand genetic regulatory mechanisms at different aspect. ➤ To describe mechanisms of transcription, translation and gene expression in detail.
2	P22MBCC32	Environment and Agricultural Microbiology	<ul style="list-style-type: none"> ➤ To know about the significance of the microbes in atmosphere and water. ➤ To get in-depth information about the harmful effects and beneficial role of microbes in each sector. ➤ To acquire in depth knowledge on water and waste water treatment to tackle the current environmental problems.
3	P22MBCC3B	Bioethics and Intellectual Property Rights	<ul style="list-style-type: none"> ➤ To gain awareness about Intellectual Property Rights (IPRs) for protecting their ideas. ➤ To devise business strategies by taking account of IPRs. ➤ To get proficient in technology upgradation and enhancing competitiveness.

4	P22MBCC3P	Molecular Biology and Microbial Genetics & Environmental and Agricultural Microbiology (Practical)	<ul style="list-style-type: none"> ➤ To handle the clinical samples and process them for molecular techniques ➤ To get a clear practical knowledge on instruments used in molecular biology lab. ➤ To practice procedures to enumerate microbes of air and water.
5	P22MBE3A	Genetic Engineering	<ul style="list-style-type: none"> ➤ To understand the basics of gene cloning steps and various methods of gene cloning. ➤ To acquire the knowledge of various tools required for Genetic Engineering. ➤ To understand genome mapping and protein engineering methods.
6	P22FSNME2	Community Nutrition	<ul style="list-style-type: none"> ➤ To list ecological factors leading to malnutrition. ➤ To explain nutritional problems of the community. ➤ To assess nutritional status of the community.

Semester IV

S.No	Course Code	Name of the Course	Course Outcome
1	P22MBCC41	Advances in Virology	<ul style="list-style-type: none"> ➤ To gain knowledge about newer emerging viral infections including the viral mutant forms. ➤ To explain steps in virus infection, transmission, patterns of infection, virus virulence and host defense against virus infection. ➤ To know methods of making virus vaccines and anti-viral drugs, drivers of virus evolution and emerging viruses.
2	P22MBCC42	Immunology and Immuno Technology	<ul style="list-style-type: none"> ➤ To understand the fundamental basis of immune system and immune response. ➤ To gather information about the structure and organization of various components of the immune system. ➤ To elaborate the genetic organization of the genes meant for expression of immune cell receptors and the bases of the generation of their diversity.
3	P22MBIBC	Entrepreneurship in Microbiology	<ul style="list-style-type: none"> ➤ To understand the basic knowledge of entrepreneurship programmes. ➤ To learn the resource for government and non-government schemes for entrepreneurship ➤ To imbibe structure of a bio-based technology.
4	P22MBVAC2	Quality Control In Industries	<ul style="list-style-type: none"> ➤ To explore mainly the quality control of pharmaceutical and food products. ➤ To investigate the quality control of foodstuffs to maintain their safety and quality.

			<ul style="list-style-type: none"> ➤ To acquire knowledge on environment monitoring and regulations.
5	P22MBPW	Project Work	<ul style="list-style-type: none"> ➤ To understand preparation of the research project. ➤ To enable students to write research articles, review articles and book chapters. ➤ To provide an additional learning experience on different methods of research, recent advances in research, methods of project preparation, writing research articles, collection, processing and presentation of data and writing hypothesis etc.