Indo-American College
Not just another college
Permanently Affiliated to THIRUVALLUVAR UNIVERSITY, Vellore.
Accredited by NAAC with 'B' Grade
Recognised Under Section 2 (f) & 12 (b) of UGC Act.
T.N.Govt.G.O.MS. No.172, Higher Education Dept, dt.27-4-1998

DEPARTMENT OF MICROBIOLOGY
PROGRAMME OUTCOMES (B.Sc)

PO1:	Get knowledge about Microbiology, Bio-chemistry, Cell biology, Molecular Biology & Genetic Engineering DNA technology and Medical Microbiology etc.,
PO 2:	Analyze and interpret results from a variety of Microbiological methods
PO 3:	Communicate and collaborate with other disciplines by effectively communicating the concepts of Microbiology like ideas, books, media and technology in written and oral format
PO 4:	Understand the relationship between Science and Society by recognizing and discussing logical, scientific and ethical issues in Microbiology
PO 5:	The course offer reasoning and application based, making the students eligible for higher studies, jobs in various sectors and entrepreneurship abilities

COURSE OUTCOMES

S. NO	Course Code	Course Title	Course Outcomes
1	FMB11	Fundamentals Of Microbiology	• **LO1:** Understand the scope and relevance of microbiology as a scientific discipline. • **LO2:** Decide on the correct type of microscopy and staining. • **LO3:** Gain knowledge on the various classifications of microorganisms. • **LO4**: Study the morphology and structure of microorganisms. • **LO5:** Get acquainted with various sterilization techniques.

2	FABC15C	Biochemistry-I	• **LO1:** Explain the structure, biological importance of carbohydrates, from monosaccharide's to polysaccharides. • **LO2:** Identify the structure and classification of amino acids. • **LO3:** Classify proteins and explain their properties. • **LO4:** Define and classify lipids with examples, explain the properties of fats and describe the structure and biological functions of phospholipids, glycolipids and sterols. • **LO5:** Illustrate the structure of nucleotides, distinguish DNA and RNA and Describe the structure of DNA, types of RNA and their biological functions.
3	FES10	Environmental Studies	• **LO1:** Articulate the interconnected and interdisciplinary nature of environmental studies; • **LO2:** Demonstrate an integrative approach to environmental issues with a focus on sustainability; • Use critical thinking, and humanities in environmental problem solving; • **LO3:** Communicate complex environmental information to both technical and non-technical audiences; Understand and evaluate the global scale of environmental problems. • **LO4:** Reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.
4	FPE10D	Professional English I	• **LO1:** Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking. • **LO2:** Use language for speaking with confidence in an intelligible and acceptable manner. • Students will apply it at their work place for writing purposes such as

			Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing. • **LO3:** Students will be made to evaluate the correct & error-free writing by being well-versed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses.
	SEMESTER II		
5	FMB21	Microbial Physiology	• **LO1:** Outline on the nutritional requirement and nutritional types of bacteria • **LO2:** Demonstrate various techniques employed in the cultivation of microorganisms. • **LO3:** Discuss on the different phases of microbial growth • **LO4:** Explain the basic concepts of microbial metabolism
6	FABC25C	Biochemistry Ii	• **LO1:** Illustrate the reactions of various metabolic pathways. • **LO2:** Acquire knowledge on the various metabolic disorders. • **LO3:** Classify enzymes and explain their functions • **LO4:** Define and classify vitamins with examples, explain the sources, RDA and functions fat soluble and water soluble vitamins. • **LO5:** Illustrate the sources, RDA and functions of minerals.
7	FGA20	Value Education	• **LO1:**Students will understand the importance of value based living • **LO2:** Students will understand and start applying the essential steps to become good leaders • **LO3:** Students will emerge as responsible citizens with clear conviction to practice values and ethics in life. • **LO4:** Students will gain deeper

			understanding about the purpose of their life.
8	FSS20	Soft Skills	• **LO1:** Develop effective communication skills (spoken and written). • **LO2:** Develop effective presentation skills. • **LO3:** Conduct effective business correspondence and prepare business reports which produce results. • **LO4:** Become self-confident individuals by mastering inter-personal skills, team management skills, and leadership skills. • **LO5:** Develop all-round personalities with a mature outlook to function effectively in different circumstances.
9	FPMB22	Experiments In Basic Microbiology	• **LO1:** To enable the students to perform sterilization of glass ware's. • **LO2:** To prepare culture media and sterilize them, to stain and observe various microorganisms. • **LO3:** To perform biochemical test to differentiate bacteria.
10	FPBC 25C	Biochemistry Ii	• **LO1:** Quantify glucose in unknown solution by benedicts method • **LO2:** Quantify ascorbic acid in lemon by Dichlorophenol into phenol dye method • **LO3:** Quantify glycine by Sorenson's formal titration method • **LO4:** Qualtitaively analyze the carbohydrates and amino acid an report the types of carbohydrate based on specific tests.
	Semester III		

11	CMB31	Immunology	• **LO1:** Outline the history and scope of Immunology. • **LO2:** Explain the structure, functions and properties of immune cells. • **LO3**: Compare the different types of antibodies and relate them to antigens. • **LO4:** Comprehend on the complement system and Major histocompatibility complex. • **LO5:** Familiarize with immunohaematology and hypersensitivity reaction.
12	CAMB32	Bioinstrumentation	• **LO1:** Appreciate Importance of instrumentation in biology labs. • **LO2:** illustrate the design of the instruments. • **LO3:** Comapre different instruments. • **LO4:** Make the use of different instruments for analysis. • **LO5:**Apply the knowledge of the instruments in biological analysis
13	CSMB33	Haematology And Blood Banking	• **LO1:** Discuss in detail the collection and processing of blood. • **LO2:** Understand the appropriate methods of diagnosis and management of disorders. • **LO3:** Understand how to diagnose and manage hematological disorders and blood parasites. • **LO4:** Appreciate the various types of blood group systems. • **LO5:** Know the methods of preservation, storage and transportation of blood to distant places.
14	CNMB34	Microbes In Human Welfare	• **LO1:** Students will be able to relevance of Microbiology in daily life • **LO2:** Students will be able to knowledge on the various types of microorganisms • **LO3:** Students will be able to the potential of microorganisms • LO4: Categorize the beneficial aspects of microorganisms.
	• **SEMESTER IV**		

15	CMB41	Microbial Genetics	• **LO1:** Outline the structure, replication and function of DNA • **LO2:** Explain about mutation, types of mutation and DNA repair mechanism. • **LO3:** Elaborate the different gene transfer methods in bacteria. • **LO4:** Compile the gene regulation in prokaryotes and eukaryotes.
16	CAMB42	Biostatistics	• **LO1:** Appreciate the importance of statistics • **LO2:** Differentiate the basic terms and formulae in statistics • **LO3:** Relate the formulae with the applications • **LO4:** Plan analysis with statistical tools • **LO5:** Apply statistical tools in biological subjects.
17	CSMB43	Mushroom Cultivation	• **LO1:** Outline the structure, cultivation of mushroom. • **LO2:** Explain about spawn preparation • **LO3:** Elaborate the cultivation of important mushroom varieties. • **LO4:** Appreciate the nutritional value of mushroom. • **LO5:** Describe the economic aspects of mushroom cultivation.
18	CNMB44	EMERGING MICROBIAL DISEASES	• **LO1:** Students gain the knowledge role of Microbiology in diseases. • **LO2:** Differentiate to the various types of pathogenic microorganisms. • **LO3:** Students Able to learn the mode of disease spread and prevention diseases. **LO4:** Categorize Communicable And Non-Communicable Disease.

19	CPMB45	Experiments In Immunology And Microbial Genetics	• **LO1:** Apply diagnostic laboratory techniques to diagnose immunological disorders • **LO2:** Plan laboratory experiments and interpret experimental data on research in immunology • **LO3:** To reinforce and better understand information delivered in lectures. • **LO4:** To provide students with opportunities to explore techniques that are commonly used in immunology research and diagnostic immunology • **LO5:** Develop experimental and analysis skills
20	CPMB46	Practical – Bioinstrumentation & Biostatistics	• **LO1:** Appreciate Importance of instrumentation in biology labs. • **LO2:** Make the use of different instruments for analysis. • **LO3:** Apply the knowledge of the instruments in biological analysis. • **LO4:** Differentiate the basic terms and formulae in statistics, Relate the formulae with the applications • **LO5:** Plan analysis with statistical tools, Application of statistical tools in biological subjects.
	Semester V		
21	CMB51	Molecular Biology And Genetic Engineering	• **LO1:** Outline the basic techniques in gene cloning. • **LO2:** Understand the molecular tools employed in gene cloning system. • **LO3:** Able to apply genetic engineering in medical field. • **LO4:** Understand the Gene / DNA transfer techniques. • **LO5:** Appreciate the applications of rDNA technology.

22	CMB52	MEDICAL BACTERIOLOGY	• **LO1:** Outline the importance of Normal microbial flora of human body and Host-Parasite relationships. • **LO2:**Knowledge about the collection, processing and storage of clinical specimens • **LO3:** Understand the morphology, pathogenesis, epidemiology, laboratory diagnosis and control of various human pathogens • **LO4:** Explain about the diseases caused by different bacterial pathogens, prevention and treatment. • **LO5:** Understand about zoonotic disease and their control.
23	CMB53	Medical Virology Mycology And Parasitology	• **LO1:** Explain the properties, classification and cultivation of viruses. • **LO2:** Outline the zoonotic and arthropod borne diseases. • **LO3:** Compare the morphological classification of fungi, and perform isolation of fungi from clinical specimen. • **LO4:** Compile the common mycotic diseases, their pathogenicity and various antifungal agents used for treatment. • **LO5:** Describe the classification of parasites and demonstrate the laboratory diagnosis of parasitic diseases.
24	CNMB54	HERBAL TECHNOLOGY	• **LO1:** Get basic knowledge of Pharmacognosy. • **LO2:** Gain knowledge of medicinal plants. • **LO3:** Understand the use of various medicinal plants. • **LO4:** Appreciate the Herbal medicines used to treat human ailments. • **LO5:** Understand the Propagation methods of medicinal plants.

25	CSMB55	Mushroom Cultivation Technique	• **LO1:** Outline the structure, cultivation of mushroom • **LO2:** Elaborate the Cultivation of important Mushroom varieties. • **LO3:** Appreciate the nutritional value of mushrooms. • **LO4:** Describe the economic aspects of mushroom cultivation.
	SEMESTER VI		
26	CEA60	Extensions Activity	• LO: To create social awareness amongst the students by providing those opportunities to work with people.
27	CMB61	Food Microbiology	• **LO1:** Outline the important microorganisms present in food. • **LO2:** Elaborate the principles and methods of food preservation. • **LO3:** Compile the contamination, spoilage and spoilage of various foods. • **LO4:** Demonstrate and prepare fermented foods. • **LO5:** Summarize bacterial and non-bacterial food borne diseases.
28	CMB62	Soil, Agricultural And Environmental Microbiology	• **LO1:** Outline the physical, chemical properties and microflora of soil. • **LO2:** Explain the role of microorganisms in biogeochemical cycles. • **LO3:** Compile the significance of microbial interactions and phytopathogens. • **LO4:** Demonstrate the air sampling techniques and summarize on air borne pathogens. • **LO5:** Apply the processes involved in the treatment of municipal water supplies.
29	CMB63	Industrial And Pharmaceutical Microbiology	• **LO1:** Outline the history and scope of Industrial Microbiology.

			• **LO2:** Explain about the methods involved in screening and development of production strains. • **LO3:** Elaborate on the principles, design and types of bioreactors. • **LO4:** Compile on the fermentation process and downstream processing. • **LO5:** Discuss on the industrial production of various products using microorganisms
30	CEMB64	Bioinoculants Technology	• **LO1:** Understand the role of Plant Growth Promoting Rhizobacteria. • **LO2:** Get acquainted with production and field application of *Rhizobium* and *Frankia* . • **LO3:** Gain knowledge of Cyanobacteria as N_2 fixers. • **LO4:** Understand the Phosphate solubilizing microbes. • **LO5:** Appreciate the role of Mycorrhiza in plant growth promotion.
31	CEMB65	Food Analysis And Quality Control	• **LO1:** Understand the Techniques used in food analysis. • **LO2:** Get acquainted with various food analysis methods. • **LO3:** Gain knowledge on the various methods of food quality assessment. • **LO4:** Understand the Food quality management procedures. • **LO5:** Appreciate the role of Food Safety organizations.
32	CSMB66	Bioinstrumentation	• **LO1:** Appreciate Importance of instrumentation in biology labs. • **LO2:** illustrate the design of the instruments. • **LO3:** Comapre different instruments.

			• **LO4:** Make the use of different instruments for analysis. • **LO5:** Apply the knowledge of the instruments in biological analysis
33	CPMB67	Practical – 3 Experiments In Medical Microbiology	• **LO1:** To learn the staining method. • **LO2:** To learn the Isolation and cultivation of Microbes. • **LO3:** To learn the Antibiotic Susceptibility Test.
34	CPMB68	Practical – 4 Experiments In Applied Microbiology	• **LO1:** To learn the Enumeration of microorganisms from different food sample and environmental sources. • **LO2:** Learning about the different enzymes produce microbes • **LO3:** To learn isolation Rhizobium from root nodules.