

**B.Sc. Microbiology
Programme Outcomes (PO)**

PO No.	Upon completion of B.Sc Degree Programme, the graduates will be able to
PO-1	Impart knowledge on the fundamental principles of Microbiology.
PO-2	Perform analysis to assess, interpret and create innovative ideas through practical experiments.
PO-3	Combine the interdisciplinary knowledge and skills acquired through generic elective/ability or skill enhancement courses to solve day-to-day scientific problems.
PO-4	Involve in various co-curricular and extra-curricular activities and to be aware of social values and environmental issues.

Programme Specific Outcomes (PSO)

PSO No	Upon completion of B.Sc. Microbiology Degree programme, the students will be able to:	Mapping
PSO-1	Acquire sound knowledge of classification, taxonomy, structure , types of microorganisms and various fields of microbiology.	PO-1
PSO-2	Experiment in microbiology laboratory to identify the microorganisms in various samples including clinical, environmental, water and food samples.	PO-2
PSO-3	Acquire knowledge about various diseases thereby can create awareness to the public.	PO-3
PSO-4	Explain various fields of Applied Science including Medicine, Pharmacy, Cell biology, Biotechnology, Industrial Production, Biochemistry, Nanotechnology, Environmental Management, Food, Dairy, Immunology, Agriculture and Bioinformatics	PO-3
PSO-5	Provide knowledge on food processing, fermented food products, apiculture, aquaculture, Vermiculture and mushroom technology.	PO-3
PSO-6	Utilize various agricultural waste, marine sources as raw material for production of various fermented products to reduce accumulation of waste in the environment.	PO-3; PO-4
PSO-7	Check the quality of water, dairy and food products by various learnt techniques.	PO-3; PO-4
PSO-8	Develop their skills to start small scale business in various microbiological laboratories and in the field of research and health.	PO-3

I SEMESTER			
DSC-1		INTRODUCTION TO MICROBIAL WORLD	
Hrs/Week :4	Hrs/Sem: 4 X 15= 60	Hrs/Unit : 12	Credits:
4			

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Outline the historical events of microbiology.	PSO-1	Understanding
CO-2	Summarize the structure of prokaryotes and Eukaryotes.	PSO-1	Understanding
CO-3	Demonstrate the parts of microscope, types and its working principle of microscope.	PSO-2	Understanding
CO-4	Understand the basic techniques including sterilization, staining and culturing of microorganisms.	PSO-2	Understanding
CO-5	Explain the different types of growth media for isolating microorganisms.	PSO-1 ; PSO-2	Understanding

I SEMESTER			
DSC-2		MICROBIAL DIVERSITY	
Hrs/Week :4	Hrs/Sem: 4 X 15= 60	Hrs/Unit : 12	Credits:4

Course Outcome (CO)

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Interpret the characteristics of microbes, nomenclature of Modern Microbial Taxonomy and Classification.	PSO-1	Understanding
CO-2	Classify different types of bacteria by its different physiological and biochemical characteristics.	PSO-1	Understanding
CO-3	Distinguish the physiological and biochemical characteristics of microorganisms.	PSO-2	Analyzing
CO-4	Categorize modern methods of microorganisms.	PSO-2	Analyzing
CO-5	Illustrate multiplication patterns on microorganisms.	PSO-1	Understanding

SEMESTER-I			
Allied I AQUATIC MICROBIOLOGY			
Hrs/Week:4	Hrs/Sem: 4x15=60	Hrs/Unit: 12	credits:3

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Illustrate fresh water and marine water ecosystem.	PSO-1	Understanding
CO-2	Outline the biota of Mangrove Ecosystem.	PSO-1	Understanding
CO-3	Utilize the various bacteriological tests to check water quality.	PSO-2	Applying
CO-4	List out the methods for isolating, identifying and preserving of marine microorganism.	PSO-2	Analyzing
CO-5	Demonstrate modern techniques used to check the quality of water.	PSO-7	Understanding
CO-6	Create knowledge on production of bioactive compounds from marine microorganism.	PSO-6	Creating

I SEMESTER		
DSCP – 1	PRACTICAL	
Hrs/ Week : 2	Hrs/ Sem : 2 ×15 =30	Credits :1

TECHNIQUES IN MICROBIOLOGY & MICROBIAL DIVERSITY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Apply the basic principles of microbiological techniques.	PSO-2	Applying
CO-2	Compare and contrast the different types of bacteria using staining techniques.	PSO-2	Evaluating
CO-3	Explain various sterilization techniques.	PSO-2	Understanding
CO-4	Organize the safety guidelines of Microbiological laboratory.	PSO-1	Applying
CO-5	Experiment with isolating pure culture by using various techniques	PSO-2	Applying

I SEMESTER			
AI-P-1		ALLIED PRACTICAL 1	
Hrs/Week : 2	Hrs /Sem : 2 x 15 = 30		Credits: 1

TECHNIQUES IN AQUATIC MICROBIOLOGY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Identify the bacteria in fresh and marine habitats by isolation process.	PSO-2	Applying
CO-2	Identify the fungi from fresh and marine habitats by using selective media.	PSO-2	Applying
CO-3	Identify the halophilic bacteria using selective media.	PSO-2	Applying
CO-4	Examine the quality of water using MPN.	PSO-2; PSO-7	Analyzing
CO-5	Identify the waterborne pathogen from water samples.	PSO-2	Applying

SEMESTER-II			
DSC-3		MICROBIAL PHYSIOLOGY AND METABOLISM	
Hrs/Week :4	Hrs/Sem: 4 X 15= 60	Hrs/Unit : 12	Credits:4

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain the microorganism based on the nutritional requirements.	PSO-1	Understanding
CO-2	Illustrate the mode of nutrition uptake and metabolism of microorganisms.	PSO-1	Understanding
CO-3	Compare various growth phases and effect of various factors on the growth of microorganisms.	PSO-1;PSO-2	Analyzing
CO-4	Summarize the basic concepts of anabolic and catabolic reactions.	PSO- 1	Understanding
CO-5	Demonstrate various types of photosynthesis.	PSO-1	Understanding

SEMESTER –II			
DSC4	ENVIRONMENTAL MICROBIOLOGY		
Hrs/Week:4	Hrs/Sem: 4x15=60	Hrs/Unit:12	Credits:4

Course Outcome (CO)

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Demonstrate the physiological adaptation of microbes.	PSO-1	Understanding
CO-2	Summarize the involvement of microorganism in biogeochemical cycles.	PSO-1	Understanding
CO-3	Illustrate biodegradation of various pollutants.	PSO-4	Understanding
CO-4	Explain the biological treatment of effluents of sugar, pulp and paper industry.	PSO-7	Understanding
CO-5	List out the bacterial indicators of water safety.	PSO-7	Analyzing

SEMESTER-II			
Allied II	BASIC BIOTECHNOLOGY		
Hrs/Week:4	Hrs/Sem: 4x15=60	Hrs/Unit: 12	credits:3

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain the historical events and the scope of biotechnology.	PSO-4	Understanding
CO-2	Explain the composition, structure of DNA and RNA.	PSO-4	Understanding
CO-3	Understand the theoretical aspects of separation of nucleic acid and protein.	PSO-4	Understanding
CO-4	Demonstrate the plant and animal tissue culture by using various techniques.	PSO-4	Understanding
CO-5	Apply the diagnostic techniques in medical and pharmaceutical fields.	PSO-4	Applying

II SEMESTER		
DSCP – 2	CORE PRACTICAL	
Hrs/ Week : 2	Hrs/ Sem : 2 ×15 =30	Credits :1

TECHNIQUES IN MICROBIAL PHYSIOLOGY & ENVIRONMENTAL MICROBIOLOGY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Analyse the bacterial growth pattern.	PSO-2	Analyzing
CO-2	Identify the isolated bacteria by using various biochemical tests.	PSO-2	Applying
CO-3	Compare the carbohydrate fermentation test by using various sugar sources.	PSO-2	Analyzing
CO-4	Classify the bacteria depends on the ability to produce extracellular enzymes.	PSO-1	Understanding
CO-5	Distinguish cultural characteristics of bacteria.	PSO-2	Analyzing
CO-6	Evaluate the coliform and bacterial indicators to check the water quality.	PSO-7	Evaluating

II SEMESTER		
A-II-P-3	ALLIED II PRACTICAL	
Hrs/Week : 2	Hrs / Sem : 2 x 15 = 30	Credits: 1

TECHNIQUES IN BIOTECHNOLOGY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Experiment with the isolation of nucleic acids from microorganisms.	PSO-2	Applying
CO-2	Estimate the amount of nucleic acid using DPA and Orcinol method.	PSO-2	Creating
CO-3	Understand preservation of cell or enzyme by immobilization technique.	PSO-2	Understanding
CO-4	Identify the type of protein by SDS -PAGE separation technique.	PSO-2	Applying
CO-5	Elaborate the techniques applied to clone plants and animals.	PSO-2; PSO-4	Creating

III SEMESTER			
DSC -5	MICROBIAL BIOCHEMISTRY		
Hrs/Week: 4	Hrs / Sem : 4x 15 = 60	Hrs/unit:12	Credits:4

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Illustrate atom, bond and principles of bioenergy.	PSO- 4	Understanding
CO-2	Explain the importance of pH and buffers in biological system.	PSO-2	Understanding
CO-3	Summarize the classification, structure and importance of carbohydrates.	PSO-4	Understanding
CO-4	Explain the classification structure and functions of lipids.	PSO-4	Evaluating
CO-5	Classify the vitamins based on solubility nature.	PSO-4	Understanding
CO-6	Outline the factors affecting enzyme activity.	PSO-4	Understanding

III SEMESTER			
DSE IA	MEDICAL LAB TECHNOLOGY		
Hrs/Week: 4	Hrs / Sem : 4x 15 = 60	Hrs/unit:12	Credits:4

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Define safety guidelines of laboratory and basic rules of medical laboratories.	PSO-2	Remembering
CO-2	Explain the composition of blood, Blood Cell Count and Blood clotting mechanism.	PSO-4	Understanding
CO-3	Analyze on pathological conditions of Urine, Stool and Sperm.	PSO-3	Analyzing
CO-4	Utilize Screening Tests such as HBsAg, HIV, ELISA and general inflammatory markers – CRP, RA, ASO.	PSO-3	Applying
CO-5	Demonstrate routine biochemical test for blood glucose and protein.	PSO-4	Understanding

III SEMESTER			
DSE IB		BIOINFORMATICS	
Hrs/Week: 4	Hrs / Sem : 4x 15 = 60	Hrs/unit:12Credits:4	

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain the history and development of Bioinformatics.	PSO-4	Understanding
CO-2	Demonstrate nucleic acid sequence databases by NCBI, EMBL and DDBJ.	PSO-4	Understanding
CO-3	Demonstrate Protein Sequence by SWISS –PROT.	PSO-4	Understanding
CO-4	Explain the sequence alignment using BLAST.	PSO-4	Understanding
CO-5	Demonstrate molecular visualization of protein by using RASMOL.	PSO-4	Understanding

SEMESTER-III			
Allied III		BIOINSTRUMENTATION	
Hrs/Week:4	Hrs/Sem: 4x15=60	Hrs/Unit: 12	Credits:3

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain the pH measurement and buffer preparation.	PSO-2; PSO-4	Understanding
CO-2	Make use of instruments for various analysis.	PSO-2; PSO-8	Applying
CO-3	Choose different techniques to separate compounds from biological source by centrifugal force, chromatography and electrophoresis process.	PSO-2	Creating
CO-4	Understand the radio isotopes techniques.	PSO-4	Understanding
CO-5	Summarize the biological applications of radio isotopes.	PSO-4	Understanding

SEMESTER-III	
DSCP 3	CORE PRACTICAL
Hrs/Week:2Hrs/Sem: 2x15=30Credits:1	

TECHNIQUES IN MICROBIAL BIOCHEMISTRY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Utilize spectrophotometer to estimate the level of sugar, protein, vitamin in biological samples.	PSO-2	Applying
CO-2	Distinguish reducing and non-reducing sugars.	PSO-2	Analyzing
CO-3	Examine the saponification and acid value of fat.	PSO-2	Analyzing
CO-4	Identify amino acids by paper chromatography.	PSO-2	Applying
CO-5	Distinguish amino acid by spraying ninhydrin on thin layer chromatogram.	PSO-2	Analyzing

III SEMESTER		
ALLIED III PRACTICAL		
Hrs / Week : 2	Hrs / Sem : 2 x 15 = 30	Credits : 1

TECHNIQUES IN BIOINSTRUMENTATION

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Define the working principle of instruments.	PSO-2	Remembering
CO-2	Examine the role of buffer to resist the pH of samples.	PSO-2	Analyzing
CO-3	Experiment with preparation of nanoparticles.	PSO-2	Applying
CO-4	Understand the separation of compounds from plant crude extracts using chromatography..	PSO-2;PSO-4	Understanding
CO-5	Identify protein from bacterial sample by using SDS-PAGE electrophoresis.	PSO-2	Applying

III SEMESTER			
NME 1	VERMI CULTURE AND MUSHROOM TECHNOLOGY		
Hrs/Week:2	Hrs/Sem: 2x15=30	Hrs/Unit: 6	Credits:2

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain the scope of Vermi technology vermin-composting and mushroom cultivation for entrepreneurship	PSO-5	Understanding
CO-2	Demonstrate the techniques used for the cultivation of earthworm.	PSO-5	Understanding
CO-3	Demonstrate the methods of vermicompost and vermiwash.	PSO-5; PSO-6; PSO-8	Understanding
CO-4	Explain the habitat and importance of mushrooms.	PSO-5	Understanding
CO-5	Demonstrate the techniques used in the cultivation of mushroom.	PSO-5; PSO-6; PSO-8	Understanding

IV SEMESTER	
DSC-6	CELL BIOGLOGY AND MOLECULAR BIOLOGY
Hrs/Week:4Hrs/Sem: 4x15=60Hrs/Unit: 12	Credits:4

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Illustrate structural and functional aspects of cell.	PSO-4	Understanding
CO-2	Explain the cell division and cell cycle.	PSO-4	Understanding
CO-3	Understand the development of cancer cells and its diagnosis.	PSO-4; PSO-8	Understanding
CO-4	Demonstrate the principles and applications of rDNA technology.	PSO-2	Understanding
CO-5	Infer the gene transfer mechanism by earlier experimental evidence.	PSO-4	Analyzing

IV SEMESTER			
DSE 2A	MICROBIAL NANOTECHNOLOGY		
Hrs/Week:4	Hrs/Sem: 4x15=60	Hrs/Unit: 12	Credits:4

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain the fundamentals of nanotechnology.	PSO-4	Understanding
CO-2	Demonstrate the techniques of fabrication in nanoparticles.	PSO-4	Understanding
CO-3	Choose techniques to characterize the nanoparticles.	PSO-4	Applying
CO-4	Apply the biosynthetic process of nanoparticles by using bacteria and fungi.	PSO-4	Applying
CO-5	Apply nanoparticles for cancer cell imaging and drug delivery.	PSO-4	Applying

IV SEMESTER			
DSE 2B	PLANT SCIENCE		
Hrs/Week:4	Hrs/Sem: 4x15=60	Hrs/Unit: 12	Credits:4

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Demonstrate the basic principles of plant science.	PSO-4	Understanding
CO-2	Understand the structure of plant.	PSO-4	Understanding
CO-3	Distinguish the characters of the different plant families.	PSO-4	Analyzing
CO-4	Explain the nutrient transport mechanisms in plant.	PSO- 4; PSO-8	Understanding
CO-5	Utilize plants to produce drug.	PSO-4	Applying

IV SEMESTER		
All- II	PHARMACEUTICAL MICROBIOLOGY	
Hrs/Week:4	Hrs/Sem: 4 x 15=60Hrs/Unit:12	Credits:3

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain the basic informations of pharmaceutical microbiology.	PSO-4	Understanding
CO-2	Understand the type of microbiological assay to check the pharmaceutical products.	PSO-2	Understanding
CO-3	Analyze on sterility of pharmaceutical products using various methods.	PSO-2	Analyzing
CO-4	Formulate process to produce vaccines, insulin and antisera.	PSO-4	Creating
CO-5	Demonstrate the mode of action of antibiotics on bacteria.	PSO-4	Understanding

IV SEMESTER		
DSCP 4	CORE PRACTICAL	
Hrs/Week:2	Hrs/Sem: 2 x 15=30	Credits:1

TECHNIQUES IN CELL AND MOLECULAR BIOLOGY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Simplify the process of slide preparation for microscopic observation by preparing permanent slide.	PSO-2	Analyzing
CO-2	Make use of techniques to visualize cell division in biological system.	PSO-2	Applying
CO-3	Build procedure to separate DNA.	PSO-4	Applying
CO-3	Utilize restriction and ligase enzymes to cut and link the DNA.	PSO-4	Applying
CO-4	Inference of DNA as genetic material by experimental evidence.	PSO-4	Analyzing

IV SEMESTER		
ALLIED IV PRACTICAL		
Hrs / Week : 2	Hrs / Sem : 2 x 15 = 30	Credits : 1

TECHNIQUES IN PHARMACEUTICAL MICROBIOLOGY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain various basic laboratory techniques in pharmaceutical microbiology.	PSO-2	Understanding
CO-2	Construct methods to standardize the pharmaceutical products.	PSO-2	Applying
CO-3	Categorize the pharmaceutical products by its solubility nature.	PSO-4	Analyzing
CO-4	Evaluate the sterility of pharmaceutical products.	PSO-4	Evaluating
CO-5	Experiment with microbiological assay of antibiotics.	PSO-4	Applying

IV SEMESTER			
NME -2 AQUACULTURE AND APICULTURE			
Hrs/Week:2	Hrs/Sem: 30	Hrs/Unit:	Credits:2

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Demonstrate aquaculture and apiculture and its significance.	PSO-5	Understanding
CO-2	Explain bacterial, fungal and protozoan diseases in fish.	PSO-5	Understanding
CO-3	Organize small scale industry in aquaculture	PSO-5; PSO-8	Applying
CO-4	List out the nutritional value and medicinal value of honey.	PSO-5	Analyzing
CO-5	Demonstrate the storage methods of honey.	PSO-5	Understanding

V SEMESTER			
DSC7		IMMUNOLOGY	
Hrs/Week:5	Hrs/sem:5x15=75	Hrs/unit:15	Credits:

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Illustrate the various immune responses of the human system against the pathogens.	PSO-4	Understanding
CO-2	Understand the structure and functions of primary and secondary lymphoid cells.	PSO-4	Understanding
CO-3	Summarize the structure, types and functions of immunoglobulin, antigen and vaccines.	PSO-4	Understanding
CO-4	Interpret the immunological reactions including precipitation, agglutination, immunodiffusion.	PSO-2; PSO-8	Understanding
CO-5	Explain the different types of hypersensitivity reaction against the allergen.	PSO-4	Evaluating

V SEMESTER			
DSC-8		MICROBIAL GENETICS	
Hrs/Week : 5	Hrs/Sem : 5x 15 = 75	Hrs/unit : 15	Credits :

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Define the structure and functions of the genetic material.	PSO-4	Remembering
CO-2	Illustrate the genome organization, transcription and translation process in prokaryotes.	PSO-2; PSO-4	Understanding
CO-3	Understand the regulation of gene expression.	PSO-4	Understanding
CO-4	Explain the mode of replication process in different types of viruses.	PSO-4	Understanding
CO-5	Classify the mutation process and mutagenic agents.	PSO-4	Analyzing

V SEMESTER			
DSC9 FOOD MICROBIOLOGY			
Hrs/Week : 5	Hrs/Sem : 5x 15 = 75	Hrs/unit : 15	Credits :

Course Outcome

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain the types of microorganisms in food and factors influencing the growth of microorganisms.	PSO-1	Understanding
CO-2	Outline the sources of food contamination.	PSO-4	Understanding
CO-3	Identify the food borne diseases and its causative microorganisms.	PSO-3; PSO-4	Applying
CO-4	Apply the preservation techniques to increase the shelf life of food.	PSO-7	Applying
CO-5	List out the food sanitation process.	PSO-5	Analyzing
CO-6	Develop methods to check safety and quality assurance in food industry.	PSO-7; PSO-8	Applying

V SEMESTER			
DSE3A GENETIC ENGINEERING			
Hrs/Week :4Hrs/	Sem : 4x 15 = 60Hrs/unit : 12	Credits :	

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Understand the methodologies of genetic engineering.	PSO-4	Understanding
CO-2	Explain the enzymes involved in the cloning technique.	PSO-4	Understanding
CO-3	List out the vectors used for the cloning technique.	PSO-4	Analyzing
CO-4	Illustrate the blotting and DNA finger printing techniques.	PSO-8	Understanding
CO-5	Choose recombinant techniques to produce disease resistant plants and animals.	PSO-8	Remembering

V SEMESTER		
DSE3B	DAIRY MICROBIOLOGY	
Hrs/Week :4Hrs/	Sem : 4x 15 = 60Hrs/unit : 12	Credits :

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Summarize the source and types of microorganisms in milk and dairy products.	PSO-4	Understanding
CO-2	Apply the microbial examination of milk and milk products to check its quality.	PSO-7	Applying
CO-3	Develop the production of fermented milk products.	PSO-5	Creating
CO-4	Choose the suitable method to preserve milk and dairy products.	PSO-7;PSO-8	Applying
CO-5	Understand the milk borne diseases and its control measures.	PSO-3;PSO-4	Understanding

V SEMESTER		
DSCP5	CORE PRACTICAL	
Hrs/Week :3Hrs/	Sem : 3x 15 = 45	Credits :

TECHNIQUES IN IMMUNOLOGY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Analyse the blood group using agglutination method.	PSO-2; PSO-4	Analyzing
CO-2	Estimate the number of red blood cells and white blood cells.	PSO-2; PSO-4	Evaluating
CO-3	Examine the pathological condition of individual using antigen and antibody reactions.	PSO-2	Analyzing
CO-4	Make use of agarose to identify the cross reactivity of antigen and antibody.	PSO-2	Applying
CO-5	Construct the clinical laboratory for immunological analysis.	PSO-2; PSO-4	Creating

V SEMESTER		
DSCP6	CORE PRACTICAL	
Hrs/Week :4Hrs/	Sem : 4x 15 = 60	Credits :

TECHNIQUES IN MICROBIAL GENETICS & FOOD MICROBIOLOGY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Demonstrate the gradient plate technique for the isolation of antibiotic resistant mutants.	PSO-2	Understanding
CO-2	Identify the mutation in gene.	PSO-2	Applying
CO-3	Categorize the bacteria and fungi responsible for food spoilage.		Analyzing
CO-3	Develop the high yielding industrially important microbial strains.	PSO-7	Applying
CO-4	Examine the quality of milk using Resazurin and Methylene blue reduction test.	PSO-7; PSO-8	Analyzing
CO-5	Experiment with microbial count in meat.	PSO-2	Applying

VI SEMESTER			
SEC 1	FOOD PROCESSING AND QUALITY CONTROL		
Hrs/Week:2	Hrs/Sem: 2x15=30	Hrs/Unit: 6	Credits:

CO No	Upon completion of this course, students will be able	PSO addressed	Blooms taxonomy classification
CO-1	Understand the significance of microorganisms in the food processing technology.	PSO-5	Understanding
CO-2	Explain the importance of food safety.	PSO-7	Understanding
CO-3	Analyze the quality and safety standards in food industry.	PSO-7	Analyzing
CO-4	Understand the law and standard for sanitation and hygiene in food.	PSO-7	Understanding
CO-5	Apply the techniques to produce processed food.	PSO-5; PSO-7	Applying

VI SEMESTER			
DSC 10		MEDICAL MICROBIOLOGY	
Hrs/Week: 6	Hrs/sem: 5x15=90	Hrs/unit: 15	Credits

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Understand the importance of medical microbiology.	PSO-1	Understanding
CO-2	Explain the epidemiology, pathogenesis, diagnosis and treatment of bacterial diseases.	PSO-1; PSO-4	Understanding
CO-3	Apply the diagnostic methods and the treatment for viral diseases.	PSO-1; PSO-4	Applying
CO-4	Explain the superficial, subcutaneous systemic mycoses, and opportunistic mycoses.	PSO-3	Understanding
CO-5	Summarize the parasitic infections including amoebiasis, giardia and malaria.	PSO-3	Understanding

VI SEMESTER			
DSC 11		INDUSTRIAL MICROBIOLOGY	
Hrs/Week: 5Hrs/	sem: 5x15=75Hrs/unit: 15	Credits	

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Demonstrate the techniques used for the isolation and improvement of industrially important microorganisms.	PSO-1	Understanding
CO-2	Illustrate the design and types of fermentor.	PSO-1	Understanding
CO-2	Formulate the production media for the production of valuable products.	PSO-4, PSO-5	Creating
CO-3	Apply the downstream process for the extraction and purification of end products.	PSO-2: PSO-8	Applying
CO-4	Utilize the raw materials used for the production of antibiotic, organic acids and enzymes.	PSO-6	Applying
CO-5	Propose a plan for the small scale business to produce valuable products.	PSO-8	Creating

VI SEMESTER		
DSC 12	PROJECT	
Hrs/Week: 6	Hrs/sem: 6x15=90	Credits:

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Understand the basic information for carrying the research project individually.	PSO-2; PSO-8	Understanding
CO-2	Apply various microbial and biotechnological techniques for research experiments.	PSO-2; PSO-8	Applying
CO-3	Compile the collected information from the research papers.	PSO-8	Creating
CO-4	Analyze and interpret the obtained data for their project study.	PSO-2; PSO-8	Analyzing
CO-4	Propose and solve the research issues thereby paying way for higher studies and future research.	PSO-8	Creating

VSEMESTER		
DSE4A	AGRICULTURAL MICROBIOLOGY	
Hrs/Week:5	Hrs/Sem: 5x15=75	Hrs/unit: 15 Credits:

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Explain the role of microorganisms in soil.	PSO-1	Understanding
CO-2	Outline the diseases associated with plants.	PSO-3	Understanding
CO-3	Illustrate the microbial interactions with plants.	PSO-4	Understanding
CO-4	Explain the different types of nitrogen fixation.	PSO-4	Understanding
CO-5	Make use of microorganisms to produce biofertilizers and biopesticides.	PSO-4	Applying

VI SEMESTER			
DSE4B		BIostatISTICS	
Hrs/Week:5	Hrs/Sem: 5x15=75	Hrs/unit: 15	Credits:

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Understand the basic concepts of biostatistics.	PSO-4	Understanding
CO-2	Analyze the collection of data, primary and secondary, types, methods and its classification.	PSO-4; PSO-8	Analyzing
CO-3	Understand the measures of centre tendency.	PSO-8	Analyzing
CO-4	Demonstrate the statistical correlation and regression.	PSO-8	Understanding
CO-5	Apply and analyze the research data.	PSO-4	Applying

VI SEMESTER			
DSCP7		CORE PRACTICAL	
Hrs/Week:3	Hrs/Sem: 3x15=45	Credits:	

TECHNIQUES IN MEDICAL MICROBIOLOGY

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Identify the microorganisms responsible for various diseases.	PSO-2	Applying
CO-2	Analyse specific antibiotic for the specific disease using diffusion method.	PSO-2; PSO-3	Analyzing
CO-3	Combine various techniques to confirm the specific organism responsible for urine infection.	PSO-3	Creating
CO-4	Identify the pathogen associated with throat and wound infection.	PSO-2	Applying
CO-5	Categorize the treatment process for associated diseases.	PSO-2	Analyzing

TECHNIQUES IN INDUSTRIAL MICROBIOLOGY

VI SEMESTER	
DSCP8	CORE PRACTICAL
Hrs/Week:4Hrs/Sem: 4x15=60	Credits:

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Understand the fermentation process.	PSO-2; PSO-5	Understanding
CO-2	Choose the microorganisms, raw materials for the production of industrially important products.	PSO-6	Applying
CO-3	Apply suitable extraction method to extract the end products.	PSO-4	Applying
CO-4	Identify the yeast responsible for wine production.	PSO-2	Applying
CO-5	Identify the enzyme produced by <i>Bacillus</i> sp.	PSO-2	Applying

VI SEMESTER			
SEC 2	BASIC DIETETICS		
Hrs/Week:2	Hrs/Sem: 2x15=30	Hrs/Unit:6	Credits:

CO No	Upon completion of this course, students will be able to:	PSO addressed	Blooms taxonomy classification
CO-1	Summarize the diet therapy.	PSO-4	Understanding
CO-2	Explain the nutritional care for weight management.	PSO-4	Understanding
CO-3	Outline the nutritional care for gastrointestinal disorders.	PSO-4	Understanding
CO-4	List out the nutritional care for liver disease.	PSO- 4; PSO-8	Understanding
CO-5	Identify the vitamin deficiency.	PSO-4	Understanding