



**Deccan Education Society's
Fergusson College (Autonomous), Pune**

Program Specific Outcomes(PSOs) and Course Outcomes (COs) 2019-20

Department of Microbiology

Programme: B.Sc. Microbiology

PSO No.	Program Specific Outcomes(PSOs) Upon completion of this programme the student will be able to
PSO1	Academic competence: (i) Understand fundamental concepts, principles and processes underlying the field of Microbiology, its different subfields and its linkage with related disciplinary areas/subjects. (ii) Demonstrate an understanding of a wide range of Microbiological techniques (e.g. basic microscopy ,sterilization and disinfection methods, cultivation of microorganisms, isolation techniques, characterization of pathogens, blood grouping, microbiological assays of antibiotics and vitamins, enzyme kinetics, chromatography, electrophoresis, immunological assays
PSO2	Personal and Professional Competence: (i) Carry out laboratory-orientated numerical calculations and be capable in data visualization and interpretation. (ii) Analyse biochemical data (e.g. in enzyme kinetics, biochemical analysis of serum components, sterility of pharmaceutical products). (iii) Formulate ideas, write scientific reports, demonstrate effective presentation and communication skills.
PSO3	Research Competence: (i) Apply microbiological methodology in order to conduct research and demonstrate appropriate skill to seek solutions to problems that emerge in various fields of Microbiology and interdisciplinary fields. (ii) Integrate informatics and statistical skills to explore and authenticate biological data for experimental and research purposes. (iii) Exhibit awareness of ethical issues in research with emphasis on academic and research ethics, scientific misconduct, intellectual property rights and issues of plagiarism.
PSO4	Entrepreneurial and Social competence: (i) Employ skills in specific areas related to Microbiology such as industrial production, technology development, clinical, health, agriculture and ensure multilevel commitment to health and human welfare

F. Y. B.Sc. Semester I

Title of the Course and Course Code	Introduction to Microbial World MIC1101	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the origin of microbial life on Earth by outlining the experiment relating to formation of organic matter in a laboratory set up.	1
CO2	Explain the evolution of the microbiology field and the scientific discoveries relating to each field.	2
CO3	Outline the relatedness of the different upcoming areas of biological sciences to the field of microbiology.	3
CO4	Classify different species according to the different classification systems.	4
CO5	Review the differences between the basic types of cells found in all biological systems.	5
CO6	Write about the morphological and differential characteristics of different groups of microorganisms.	6
Basic techniques in Microbiology MIC1102		
Title of the Course and Course Code	Basic techniques in Microbiology MIC1102	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the role of microorganisms in different fields and interdisciplinary approach. Recall the fundamental principles in Microbiology or science.	1
CO2	Discuss the history and discovery of different types of microscopes. Diagrammatically explain and compare the principle, working and applications of different types of advanced microscopic techniques.	2
CO3	Classify and differentiate various morphological forms of bacteria using differential staining and special staining techniques.	3
CO4	Explain different methods of sterilization, disinfections and their applications.	4
CO5	Validate sterilization efficiency of different instruments and evaluate disinfectants using biological and chemical indicators.	5

CO6	Specify the mode of action and application of different sterilizing agents and disinfectants.	6
Microbiology Practical – I MIC1103		
Title of the Course and Course Code	Microbiology Practical – I MIC1103	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the good lab practices and biosafety measures to be adopted while working in a microbiology lab and identify different instruments commonly used for microbiological experiments.	1
CO2	Give examples of different nutrient media popularly used in culturing microorganisms and compare different methods of sterilizing them.	2
CO3	Demonstrate different cultivation methods for different microbial groups.	3
CO4	Explain morphological characteristics of different microbial life forms by microscopic observation.	4
CO5	Measure the dimensions of different biological cells.	5
CO6	Design experiments to study the effect of sanitation methods on microflora.	6
F. Y. B.Sc. Semester II		
Title of the Course and Course Code	Diversity of Microbial World MIC1201	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe infection diseases, resistance, host defense and factors influencing resistance.	1
CO2	Articulate interdisciplinary approach and recent developments in the field of microbiology.	2
CO3	Infer morphology, physiology, cultivation, classification and importance with reference to viruses and bacteriophages.	3
CO4	Categorize different interactions within microbial communities, microorganisms, plants and animals.	4
CO5	Justify and explain the importance of microorganisms with reference to fungi, algae and protozoa.	5

CO6	Write morphological, physiological characteristics and classify microorganisms with reference to fungi, algae and protozoa.	6
Title of the Course and Course Code	Bacteriology MIC1202	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall basic concepts of bacteriology. Define different terms involved in nutrition of bacteria, types of growth medium for isolation, cultivation and identification of bacteria.	1
CO2	Draw and compare the structure of eubacterial and archaebacterial cells. Discuss the composition and functions of different organelles.	2
CO3	Classify bacteria based on their nutritional requirements. Outline diversity of bacteria and their industrial and biotechnological applications.	3
CO4	Explain different types of growth medium for isolation, cultivation and identification of bacteria.	4
CO5	Compare different patterns of growth of bacteria and discuss the effect of environmental parameters on the growth of bacteria. Measure the growth of bacteria using different microbiological and chemical methods.	5
CO6	Design specific growth medium for a particular group of bacteria.	6
Title of the Course and Course Code	Microbiology Practical – II MIC1203	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Show an experiment to isolate the bacteria and determine the total count of bacteria from different environmental samples using different plate methods.	1
CO2	Differentiate bacteria based on their cell wall composition using differential staining techniques	2
CO3	Examine morphological characteristics of bacteria by different staining techniques.	3
CO4	Detect the phototaxis and chemotaxis in bacteria.	4

CO5	Measure the growth curve of bacteria in batch culture under standard environmental conditions.	5
CO6	Design experiments to determine the effect of different environmental parameters on the growth of bacteria.	6
S. Y. B.Sc. Semester III		
Title of the Course and Course Code	Microbial genetics MIC2301	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall the RNA world theory and outline the key events in evolution of life on earth.	1
CO2	Illustrate, differentiate and contrast between the structures of DNA and also discuss the DNA replication process.	2
CO3	Infer the experiments that led to the discovery of DNA, RNA as genetic material and apply the concepts in understanding the basics of genetics.	3
CO4	Explain the mechanism of gene expression in bacteria.	4
CO5	Compare different types of mutations and appraise the methods of isolation of spontaneous or induced mutants from bacterial population. Review fluctuation test, different types of mutagenic agents and their action on functioning of a cell.	5
CO6	Develop concepts about different types of plasmid DNA. Specify the differences between chromosomal DNA, plasmid DNA.	6
S. Y. B.Sc. Semester III		
Title of the Course and Course Code	Microbial Metabolism MIC2302	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify the biomolecules from the given structures and label the linkages. Recall the different techniques used in the detection of radioisotopes during the use of radioisotopic tracers in the elucidation of metabolic pathways.	1
CO2	Differentiate between reversible and irreversible inhibitors of enzymes. Explain the different metabolic pathways used by the microorganisms.	2

CO3	Classify naturally occurring substances into the class of biomolecules they belong to and the enzymes occurring in different metabolic pathways into the six classes of enzymes.	3
CO4	Integrate the different metabolic pathways to understand the metabolism of a particular microorganism well.	4
CO5	Evaluate the roles of different biomolecules in a microbial cell.	5
CO6	Construct a hypothetical pathway based on the given intermediates.	6

Microbiology Practical- III

Title of the Course and Course Code	Microbiology Practical- III MIC2303	Number of Credits :2
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On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Show different ways of isolation of bacterial mutants.	1
CO2	Differentiate microorganisms on the basis of biochemical characteristics.	2
CO3	Carry out mutations in bacteria using different inducing methods.	3
CO4	Identify the biomolecules present in different food items.	4
CO5	Justify the effect of U.V. light on death rate of bacteria.	5
CO6	Perform some of the tests that can be used to partially characterize microorganisms.	6

S.Y. B.Sc. Semester IV

Title of the Course and Course Code	Microbiology Practical- III MIC2401	Number of Credits :2
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On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define the primary, secondary pollutants of air. List the airborne, waterborne diseases. Outline the steps involved in the purification of raw water.	1

CO2	Compare and contrast between the different methods of secondary treatment of wastewater. Explain the different methods used for sampling and sanitation of air.	2
CO3	Calculate the values of different parameters such as BOD, COD, MPN, etc. based on given values.	3
CO4	Relate the industrial processes to environmental pollution.	4
CO5	Evaluate the quality of different water samples based on the values given for different parameters.	5
CO6	Propose eco-friendly ways and means for disposal of waste water.	6
Title of the Course and Course Code	Industrial Microbiology MIC2402	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall basics concepts of industrial microbiology including constituents of fermentation media and different types of industrial fermenters.	1
CO2	Compare between different types of industrial fermentations. Explain the process control and monitoring of fermentation parameters.	2
CO3	Examine the characteristics of industrial microorganisms and different strain improvement methods.	3
CO4	Explain the importance of sterilization in fermentation processes and different sterilization methods.	4
CO5	Justify the use of media for specific fermentation processes.	5
CO6	Plan different screening methods for isolating desired microorganism from environment. Devise inoculum development steps in industrial fermentations.	6

Practicals based on 'Environmental Microbiology & Industrial Microbiology'		
Title of the Course and Course Code	MIC2403	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the process for spore staining and demonstrate the capsule presence.	1
CO2	Discuss the functioning and design of waste-water treatment plant	2
CO3	Demonstrate air sampling techniques and evaluate different sampling parameters.	3
CO4	Classify the organisms capable of producing antibacterial substances and polysaccharides.	4
CO5	Measure different diversity indices and interpret the data in terms of probability.	5
CO6	Perform different water potability tests and compare them.	6
T.Y. B.Sc. Microbiology Semester V		
Title of the Course and Course Code	Medical Microbiology MIC3501	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe in details different human body systems, defence mechanisms associated with human body systems.	1
CO2	Give examples of pathogenic organisms affecting human body systems, differentiate between different types of pathogenic organisms, and explain in details pathogenicity, diagnosis of pathogenic organisms.	2
CO3	Interpret the possible suggested preventive and treatment methods for human pathogens.	3
CO4	Classify pathogenic organisms based on their morphological and biochemical characteristics and distinguish between based on	4

	clinical samples from which pathogens can be isolated.	
CO5	Compare different determinants of pathogenicity, Evaluate effect of these determinants on disease causation.	5
CO6	Write different resistance mechanisms of pathogens to human body system, Make comparative chart for types of toxins and its mode of action.	6
Title of the Course and Course Code	DNA Functioning & Transfer in Bacteria MIC3502	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the detailed mechanism of DNA replication in eukaryotic cells	1
CO2	Compare the DNA repair mechanisms functioning in bacteria	2
CO3	Illustrate the steps of gene expression in bacteria	3
CO4	Order the chemical reactions leading to DNA damage	4
CO5	Determine the modes of genetic recombination in bacteria	5
CO6	Design experiments to perform gene mapping using the knowledge of genetic recombination found in bacteria	6
Title of the Course and Course Code	Enzymology MIC3503	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	List micronutrients required for cellular activities and their correlate their biochemical activity and deficiency disorders.	1
CO2	Associate the presence of specific amino acids at the active site of enzymes with the 3D structure and function of the enzyme.	2
CO3	Outline from a variety of protein purification methods the correct procedures in order to purify a single protein/enzyme based on its properties and compare the use of these methods for lab level and large scale purification of proteins.	3
CO4	Explain the effect of enzyme inhibitors on the kinetic parameters of an enzyme catalyzed reaction and differentiate between	4

	enzyme inhibitors based on graphical representation.	
CO5	Compare between enzyme regulatory mechanisms used by prokaryotic and eukaryotic systems and evaluate the importance of these mechanisms.	5
CO6	Combine a variety of purification methods to achieve maximum purity and yield of a single protein.	6

Title of the Course and Course Code	Fundamentals of Immunology MIC3504	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe and classify isotypes of antibodies on the basis of their structure and biological properties and explain the molecular basis of their diversity.	1
CO2	Articulate concepts of defense mechanisms of human body, types of immunity and different cells and organs involved in combating pathogens.	2
CO3	Demonstrate different types of antigen-antibody interactions and their application in diagnosing different infections.	3
CO4	Differentiate types of antigens and explain their destruction by different types of immune cells.	4
CO5	Compare polyclonal and monoclonal response of immune system against antigen.	5
CO6	Design an experimental protocol to produce monoclonal antibodies and study their applications.	6

Title of the Course and Course Code	Principles of Fermentation Technology MIC3505	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe a large number of substrates that are used for the industrial fermentation process.	1
CO2	Explain different types of reactors or fermenters which are used for laboratory, pilot and industrial scale fermentation and their process parameters.	2

CO3	Illustrate the detailed knowledge of the quality control procedures and how to apply them at industrial scale, the principles of IPR and their application in fermentation industry.	3
CO4	Analyse the given pharmaceutical product for its sterility, microbiological assay procedures to determine the potency of the products like antibiotics and vitamins	4
CO5	Evaluate the quality of fermentation products by carrying out the test for sterility, carcinogenicity, pyrogenicity, toxicity and shelf life of the product.	5
CO6	Synthesize different products with the upstream and several downstream processes carried out in fermentation industry	6

Agricultural Microbiology and Bio nanotechnology		
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Title of the Course and Course Code	Agricultural Microbiology and Bio nanotechnology MIC3506	Number of Credits :2
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On completion of the course, the students will be able to:		Bloom's Cognitive level
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CO1	Describe different methods of plant disease control.	1
CO2	Articulate the important developments in Plant growth improvement.	2
CO3	Infer soil health improvement with respect to microorganisms.	3
CO4	Explain characteristics and application of nanoparticles and nanomaterials.	4
CO5	Justify Structural and functional principles of nanotechnology.	5
CO6	Synthesize metal nanoparticles using biological entity.	6

Microbiology Practical I		
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Title of the Course and Course Code	Microbiology Practical I MIC3507	Number of Credits :2
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On completion of the course, the students will be able to:		Bloom's Cognitive level
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CO1	Outline basic knowledge of isolation of different types of lactic acid bacteria from the curd samples.	1
CO2	Discuss the effect on spoilage causing bacteria by testing the antifungal activity of the lactic cultures.	2
CO3	Calculate minimal inhibitory concentration and minimal bactericidal concentration to the standard antibiotic streptomycin.	3
CO4	Analyze the potency of antibiotics and vitamins using bioassay technique.	4
CO5	Test the antifungal activity of these lactic cultures and understanding its effect on spoilage causing bacteria.	5

CO6	Evaluate the quality of pharmaceutical products like surgical cotton and water for injection	6
Title of the Course and Course Code	Microbiology Practical II MIC3508	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall the laws pertaining to transmission and absorbance and their mathematical expression and correlate these to determination of absorption maxima and molar absorptivity	1
CO2	Extrapolate data to quantify samples by preparing standard dose responses made using quantitative biochemical estimation methods.	2
CO3	Examine quantitative enzyme assays for degradative extracellular enzymes such as Amylase	3
CO4	Detect the presence of amino acids and sugars using paper chromatography by resolving mixtures	4
CO5	Assess the use of neutral bivalent salts to concentrate proteins from natural samples	5
CO6	Formulate a combination of chemicals to produce a buffer of desirable pH, strength and quantity	6
Title of the Course and Course Code	Microbiology Practical III MIC3509	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Identify the pathogenic organisms associated with clinical samples	1
CO2	Conclude the observations of urine analysis with respect to body disorder such as diabetes, kidney malfunctioning etc.	2
CO3	Carry out physical, chemical, and microscopic tests of the urine sample	3
CO4	Classify human pathogens into different groups based on morphological and biochemical tests.	4
CO5	Determine sensitivity of pathogenic organisms to various antimicrobials	5
CO6	Write differences in the growth characteristics of pathogens on different media	6

Title of the Course and Course Code	Clinical Biochemistry and Diagnostic Microbiology MIC3511	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall key indicators of organ damage associated with lifestyle disorders and methods to quantify the damage	1
CO2	Illustrate the data obtained from biochemical analyses of samples such as whole blood, serum, urine etc. with clinical symptoms and possible pathologies	2
CO3	Calculate the severity of the tissue damage or lifestyle disorder based on data generated through clinical biochemistry	3
CO4	Analyse load of pathogens from various samples such as food, water and bodily fluids using rapid diagnostic tests	4
CO5	Compare the efficiency, cost and use of routine lab procedures for isolation of bacterial, fungal and viral pathogens with rapid tests	5
CO6	Specify the use of rapid detection tests under conditions of emergency and unavailability of laboratory resources	6
Title of the Course and Course Code	Epidemiological Principles and Experimental Analysis MIC3512	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the disease distribution based on time, place and person	1
CO2	Give the examples of different sources and reservoirs of infection	2
CO3	Calculate incidence, prevalence, morbidity, mortality rate.	3
CO4	Explain types of modes of disease transmission, distinguish between methods of disease prevention and control	4
CO5	Evaluate and interpret the epidemiological data using different methods like case control study, cohort study	5
CO6	Write the differences between descriptive, analytical, and experimental epidemiology	6

T.Y. B.Sc. Microbiology Semester VI

Title of the Course and Course Code	Metabolic activities of microorganisms MIC3601	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Recall key bio catalytic agents involved in the biochemical synthesis and degradation of biomolecules in microbial systems and focus on their regulatory significance	1
CO2	Outline the composition of biological membranes to their structure and function differentiating cellular and subcellular systems on the diversity of membrane components	2
CO3	Calculate the energy requirements or energy output of biochemical pathways and grade these pathways for their use and indispensability	3
CO4	Analyse the free energy change occurring during the progress of a biochemical reaction and correlate it to the feasibility of the reaction in biological systems	4
CO5	Compare the use of multiple transport processes and their use under differing cellular conditions	5
CO6	Specify the use of certain groups of high energy compounds as common currency used by cellular systems	6
T.Y. B.Sc. Microbiology Semester VI		
Title of the Course and Course Code	Immunological Processes MIC3602	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe different types of mechanisms in the activation of innate immune response	1
CO2	Classify and compare major histocompatibility complex molecules and their role in transplantation of grafts	2
CO3	Demonstrate and classify hypersensitivity reactions and outline their mechanisms	3
CO4	Explain and identify the role of immunological mediators in innate immune response and cell-cell interactions	4
CO5	Compare the role of cytokines and categorize them according to their function in cell mediated immune response	5
CO6	Specify and analyse the pathways of antigen processing and presentation	6

Title of the Course and Course Code	Large Scale Bioprocess MIC3603	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe different types of commercially important fermentation products.	1
CO2	Explain how antibiotics, vitamins, enzymes, amino acids, organic acids are manufactured at industrial scale with the help of microorganisms.	2
CO3	Apply detailed knowledge of the transformation of steroids into pharmacologically active forms with the help of microorganisms	3
CO4	Analyze various flow sheets or flow charts used for extraction of different types of fermentation products	4
CO5	Evaluate the various methods of immobilization of enzymes and whole cells and change in their activity.	5
CO6	Synthesize and apply single cell proteins	6
Title of the Course and Course Code	Food and Dairy Microbiology MIC3604	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe the spoilage mechanisms in foods and thus identify methods to control deterioration and spoilage.	1
CO2	Articulate the basis of food safety regulations and discuss the rationale for the use of standard methods and procedures for the microbiological analysis of food.	2
CO3	Apply knowledge of microbiological methods for their isolation, detection and identification of microorganisms in food and employ in industries.	3
CO4	Categorize important pathogens and spoilage microorganisms in foods.	4
CO5	Justify the ways to control microorganisms in foods and thus know the principles involving various methods of food preservation.	5
CO6	Write the significance and activities of microorganisms in food and role of intrinsic and extrinsic factors on growth and survival	6

	of microorganisms in foods.	
Title of the Course and Course Code	Antimicrobial Therapy and Prevention MIC3605	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define MIC, MBC and LD50, Describe desirable properties of chemotherapeutic agents	1
CO2	Explain different targets in bacteria and mode of action of different antimicrobial compounds, differentiate between types of antimicrobial compounds	2
CO3	Classify drugs based on the site of action, Interpret mode of action of antifungal and antiviral drugs	3
CO4	Explain mode of action of antimicrobial compounds, distinguish between antifungal and antiviral drugs	4
CO5	Compare different types of vaccines, review different types of antisera, assess the immunization schedules in developed and developing countries	5
CO6	Write types of clinical research and scope of clinical research and good clinical practices	6
Title of the Course and Course Code	Recombination and Gene Manipulation MIC3606	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	List the steps of different models for recombination and describe the role of proteins involved in them	1
CO2	Explain the types and use of bacteriophage mutants in the study of genetic complementation	2
CO3	Outline the guidelines for setting up a facility for gene manipulation experimentation	3
CO4	Explain the basic procedure for generating a recombinant DNA molecule	4
CO5	Evaluate the generation of recombinant DNA using basic molecular biology tools	5
CO6	Generate a sequence of DNA using the conventional methodologies	6

Title of the Course and Course Code	Microbiology Practical IV MIC3607	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	State the name of the microorganism used in synthesis of nanoparticles and synthesize <i>metal nanoparticles</i> .	1
CO2	Estimate and grade microbial quality of food and dairy products and name the methods used in testing of microbial quality food items.	2
CO3	Carry out isolation and identification of spoilage causing organism from food	3
CO4	Detect adulterants in food products.	4
CO5	Test and perform enrichment, Isolation, Preparation and Application of Bioinoculants at laboratory scale.	5
CO6	Prepare fermented food in the laboratory.	6
Title of the Course and Course Code	Microbiology Practical VI MIC3609	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define and compare different types of haematological indices by using different parameters	1
CO2	Articulate the working, handling and storage of blood in blood banks	2
CO3	Classify different clinical specimens and to interpret the data obtained using different parameters	3
CO4	Organize the data obtained from different haematological tests and predict the clinical condition of the patient	4
CO5	Determine the potential blood donors and recipients by categorizing different types of blood groups and blood cells	5
CO6	Combine and arrange the haematological data obtained and prepare the hemogram	6

Title of the Course and Course Code	Marine Microbiology MIC3611	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Describe experiment physico- chemical parameters of marine water and correlate the knowledge with microbial diversity	1
CO2	Explain microbial diversity in oceans and appraise the metabolic differences in marine bacteria	2
CO3	Classify the organisms based on their nutritional requirements and determine their growth on different culture media	3
CO4	Analyse the ability of microorganisms to produce bioactive compounds useful in day- to- day life	4
CO5	Determine about marine biogeochemical cycles and choose correct sampling techniques to collect water samples	5
CO6	Create methods to isolate bacteria of medical importance	6
Title of the Course and Course Code	Prebiotics and Probiotics MIC3612	Number of Credits :2
On completion of the course, the students will be able to:		Bloom's Cognitive level
CO1	Define prebiotics, probiotics and functional foods.	1
CO2	Discuss about the importance gut microflora in maintaining good health, immune response and prevention of IBD.	2
CO3	Infer the characteristics of probiotics for selection.	3
CO4	Analyse various fermented products for their probiotics properties	4
CO5	Review different mechanisms of probiotic's action	5
CO6	Synthesize functional foods by getting the knowledge of prebiotics and probiotics.	6