Bhavan's Vivekananda College
of Science, Humanities and Commerce
Sainikpuri, Secunderabad – 500 094
Autonomous College, Affiliated to Osmania University
Accredited with 'A' grade by NAAC

M.Sc Microbiology

Program Outcomes

PO1: Knowledge: Apply the knowledge of basic concepts, fundamental principles and scientific theories and processes related to the fields of life sciences with their relevance in day-to-day life.

PO2: Analytical Skills: Select and implement the analytical skills acquired, in design of experiments followed by its effective execution in scientific research, industry and entrepreneurship.

PO3: Investigations and Problem analysis: Identify and investigate socially relevant issues using knowledge of Science and technology by design of experiments, analysis, interpretation of data and provide valid conclusions.

PO4: Design and development of solutions: Design innovative solutions for various societal needs like health care, food, water and energy through research and development with appropriate consideration for cultural, societal, environmental, public health and safety.

PO5: Communication: Communicate effectively on problems, issues and solutions with community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO6: Ethics & Environment: Apply ethical principles and commit to professional ethics and responsibilities and norms in research and the functional areas, understand the issues of environmental context and sustainable development.

PO7: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO8: Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio, economic and technological changes.

Program Specific Outcomes

PSO1: Apply the knowledge of Microbiology, Immunology, Virology, Molecular biology, Biochemistry, Nanobiotechnology and Bioinformatics as per the demands of research and Industry

PSO2: Design, perform and analyse the procedures as per laboratory standards in the areas of medical, food, agriculture, pharma, environmental, industrial microbiology in production, down streaming and Quality control and Quality assurance of microbial products.

PSO3: Integrate **t**he knowledge of Microbiology, Molecular biology, Nanobiotechnology and Computational Biology to solve research problem which has societal relevance.

Course Outcomes:

Name of the Course	**General Microbiology and Microbial physiology**
Course Code	**PMB 101**
CO1	Apply concepts of microscopy for identifying various microbes
CO2	Experiment different microbial culturing techniques
C03	Distinguish bacteria based on taxonomy
C04	Summarize factors on microbial growth
Name of the Course	**Virology**
Course Code	**PMB102**
CO1	Classify the virus based on structure, and replication
CO2	Distinguish lytic and lysogenic viruses
C03	Interpret concepts of recombination in phages
C04	Summarize applications of viruses in various areas

Name of the Course	**Research Methodology & Techniques (Core)**
Course Code	**PMB 103**
CO1	Select the right method for probing a given property of a sample molecule
CO2	Apply the most appropriate method for separation of molecules in a given mixture.
C03	Use Excel and apply appropriate statistical analysis.
CO4	Write an organized scientific manuscript for a project.

Name of the Course	**Microbial Biochemistry**
Course Code	**PMB 104**
CO1	Determine pH of solutions and prepare Buffers for laboratory work
CO2	Analyze the biomolecules by qualitative analysis
C03	Perform enzyme assay and calculate enzyme activity
C04	Identify enzymes from various sources and purify them

Name of the Course	**Communicative English**
Course Code	**PMB 105**
CO1	The students are able to understand that effective communication is important to express their views, thoughts and opinions
CO2	The students improve their listening, speaking' reading and writing skills . The students are confident enough to participate in group discussion and debate

Name of the Course	**Molecular Biology & Microbial Genetics**
Course Code	**PMB 201**
CO1	Compare the structural variations of DNA and genome organization
CO2	Illustrate Replication, Transcription ,translation and gene regulation
C03	Differentiate the types of mutations, DNA damage and repair mechanisms
C04	Solve problems in genetic recombination for genetic mapping

Name of the Course	**Environmental and Agricultural Microbiology**
Course Code	**PMB 202**
CO1	Construct a mind map on role of microbes in air and water pollution
CO2	Summarize the role of microbes in bioremediation technologies
C03	Interpret the role of microbes in decomposition
CO4	Apply the concepts of biofertilizers for better and sustainable agricultural practice.

Name of the Course	**Immunology**
Course Code	**PMB 203**
CO1	Illustrate the Antibody structure and diversity
CO2	Summarize the types of immunity and immunological responses to various antigens
C03	Apply immunological techniques practically
CO4	Relate between cancer and immunology

Name of the Course	**Pharmaceutical Microbiology**
Course Code	**PMB 204**
CO1	Analyze microbial spoilage, prevention and preservation of pharmaceutical products, GMP
CO2	Discriminate the mode of actions of various anti microbial agents
C03	Use Practical skills in preservation and testing of various industrial products
CO4	Perform microbiological assays in pharmaceutical industry

Name of the Course	**Computer Skill**
Course Code	**PMB 205**
CO1	Understand the applications of word processing using MS Word) and data analysis using MS. excel
CO2	Able to learn basics of poster designing and computer graphics

Name of the Course	**Food Microbial Technology**
Course Code	**PMB 301**
CO1	Discuss the significance of fermented foods in daily lives and describe the overall role of microbes involved in food processing.
CO2	Explain Dairy Microbiology and measure the role of different types of microbes and their significance.
CO3	Validate the concept and importance of Probiotics and Prebiotics.
CO4	Comprehend the overall concept involved in Microbial Intoxication (Bacterial and Fungal) and review detoxification measures.

Name of the Course	**Medical Bacteriology**
Course Code	**PMB302**
CO1	Explain the clinically important microorganisms and Normal flora of human body
CO2	Describe the nature and basic concepts of pathogenic microorganisms, infection and process of diagnosis and perform the requisite diagnostic protocols
C03	Discuss of air borne and sexually transmitted bacterial pathogens bacterial pathogens.
C04	Illustrate water borne bacterial pathogens and wound infections of bacteria.

Name of the Course	**Microbial Biotechnology**
Course Code	**PMB303**
CO1	Understand the industrial important microorganisms and Basic awareness on fermentor design .Perform practical procedures to screen industrial important microorganisms & analyze their fermentative products.
CO2	Understand the nature and basic concepts of. optimization of fermentation media , process of fermentation and perform the requisite experiments on scale up & down stream processes
C03	Awareness of fermentative production of microbial products and Understand production and commercial application of microbial enzymes
C04	Update knowledge in new frontiers of industrial microbiology – steroid transformation, microbial biopesticides, genetically modified microbes and immobilization

Name of the Course	**Microbial Ecology and Plant Microbe Interactions**
Course Code	**PMB 304**
CO1	Describe microbial diversity and calculate statistical indices for diversity and explain molecular methods of diversity analysis
CO2	Explain direct and indirect mechanisms of plant growth promotion by PGPR and develop microbial formulations for field application
C03	Detect different bacterial and fungal pathogens based on signs and symptoms of plant diseases and their management using integrated pest control
C04	Explain molecular mechanism of pathogen recognition, induced and systemic resistance in plants and describe different quorum sensing circuits of microbes

Name of the Course	**Microbiological Quality Control and Quality Assurance in Food & Pharma Industry**
Course Code	**PMB 305**
CO1	Equip with fundamentals of GMP, GLP and SOP and understand the validation principles in food and pharma industry and Quality control . Awareness on procedures in quality assurance (QA) of finished product.
CO2	Practical knowledge in Microbial Standards for Different Foods and Water and sterility testing methods. Acquire practical knowledge in Microbial quality testing of Milk and Water. Understand importance of Quality control and Quality assurance in Food and Pharma products

Name of the Course	**Personality Development**
Course Code	**PMB 305**
CO1	Students are confident enough to use interpersonal skills.
CO2	Students developed self-confidence and empathetic

Name of the Course	**Cell and Molecular Biotechnology**
Course Code	**PMB 401**
CO1	Describe the mechanism of cell cycle regulation, apoptosis and Cancer induction & inheritance, Signal transduction pathways
CO2	Choose appropriate cloning vectors, sequencing methods for DNA /Protein, molecular library construction and cloning techniques in prokaryotes and eukaryotes
C03	Identify the Molecular Techniques like-PCR, RT PCR, RAPD, RFLP,SSR for application in molecular diagnostics and Discuss on Site directed mutagenesis, Reverse genetics, Gene knock and Gene Silencing, Gene therapy.
C04	Categorize Transgenic Plants and Animals with their applications; Explain the significance of Stem Cell technology and Genome Engineering applications in biology.

Course Code	**PMB 402**
CO1	Explain the process of diagnosis and perform the requisite diagnostic procedures for identification of viruses and list out air borne viral pathogens
CO2	Classify water borne viral pathogens and Zoonotic viral pathogens
C03	Describe sexually transmitted viral pathogens
C04	Categorize parasitic and mycotic infections

Name of the Course	**Tax Planning for Individuals**
Course Code	**PMB 403 A**
CO1	The subject will enable the students to understand basic concepts of tax the Income Tax Act 1961
CO2	Relevance of tax planning while computing the tax liability of individuals.

Name of the Course	**Elements of Marketing**
Course Code	**PMB 403 A**
CO1	Understand marketing concepts and techniques
CO2	Apply marketing concepts in the pharmaceutical industry.

Name of the Course	**Bioinformatics**
Course Code	**PMB 403 B**
CO1	Understand and find sequences for nucleic acid and protein of interest, and explain evolutionary relationships between sequences. Understand to design primers to amplify genes of interest
CO2	Understand and find alternatively spliced transcripts, tissue-specific expression levels and gene-editing technologies

Name of the Course	**Nanobiotechnology**
Course Code	**PMB 404**
CO1	Review the origin, properties and types of nanoparticles
CO2	Describe the methods of synthesis and characterization of nanoparticles
C03	Discuss the applications of nanoparticles in the field of environmental Nanobiotechnology
CO4	Explain the therapeutic role of nanoparticles in human health.

Name of the Course	**Seminar**
Course Code	**PMB 406**
CO1	Understand and present the scientific literature
CO2	Develop presentation skills

Name of the Program: MSc Microbiology											
Name of the Course: General Microbiology and Microbial-physiology							**Corse Code: PMB 101**				
Semester: I							**Year:2018 (First year)**				
Academic Year:2018-19							**Batch:2018-20**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
AVG	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Name of the Program: MSc Microbiology											
Name of the Course: Virology							**Course code: PMB 102**				
Semester: I							**Year:2018 (First year)**				
Academic Year:2018-19							**Batch:2018-20**				
	Program Outcomes								Program Specific Outcomes		
Course/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	1	2	3	3	1	1
CO2	3	1	3	2	1	1	2	2	3	1	2
CO3	3	1	2	2	1	1	2	3	3	1	3
CO4	3	2	3	2	2	2	2	3	3	1	2
AVG	**3**	**1.5**	**2.5**	**2**	**1.5**	**1.25**	**2**	**2.75**	**3**	**1**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Research Methodology & Techniques							**Course Code: PMB 103**				
Semester: I							**Year:2018 (First year)**				
Academic Year: 2018-2019							**Batch: 2018-2020**				
	Program Outccomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	2	3	3	3	1	1	2	2	3	3	2
CO2	2	3	3	3	1	1	2	2	3	3	2
CO3	3	3	3	3	3	2	3	2	3	3	2
CO4	3	3	3	2	3	2	3	2	3	3	2
AVG	**2.5**	**3**	**3**	**2.75**	**2**	**1.5**	**2.5**	**2**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Microbial Biochemistry								**Course Code: PMB104**			
Semester: I								**Year:2018 (First year)**			
Academic Year: 2018-2019								**Batch: 2018-2020**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
CO3	3	3	3	2	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Communicative English								**Course Code: PMB 105**			
Semester: I								**Year:2018 (First year)**			
Academic Year: 2018-2019								**Batch: 2018-2020**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Molecular Biology & Microbial Genetics								**Course Code: PMB201**			
Semester: II								**Year:2018 (First year)**			
Academic Year: 2018-19								**Batch:2018-20**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	2	3	3	2
CO3	3	3	3	3	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2.25**	**3**	**3**	**3**	**2.75**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Environmental and Agricultural Microbiology							**Course Code: PMB 202**				
Semester: II							**Year:2018 (First year)**				
Academic Year: 2018-19							**Batch:2018-20**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	2	2	3	3	3
CO2	3	3	3	3	2	3	3	3	3	3	3
CO3	3	3	3	3	2	3	2	2	3	3	3
CO4	3	3	3	3	2	3	3	3	3	3	3
AVG	**3**	**3**	**3**	**3**	**2**	**3**	**2.5**	**2.5**	**3**	**3**	**3**

Name of the Program: MSc Microbiology											
Name of the Course: Immunology							**Course Code: PMB 203**				
Semester: II							**Year:2018 (First year)**				
Academic Year: 2018-19							**Batch:2018-20**				
	Program Outcomes								Program Specific Outcomes		
Course/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	1	3	1	2	3	3	1	1
CO2	3	2	2	1	2	1	2	3	3	1	2
CO3	3	3	3	3	2	3	3	3	3	1	3
CO4	3	2	2	1	2	3	1	3	3	1	1
AVG	**3**	**2.25**	**2.25**	**1.5**	**2.25**	**2**	**2**	**3**	**3**	**1**	**1.75**

Name of the Program: MSc Microbiology											
Name of the Course: Pharmaceutical Microbiology							**Course Code: PMB204**				
Semester: II							**Year:2018 (First year)**				
Academic Year: 2018-19							**Batch:2018-20**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
CO3	3	3	3	2	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2

AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Computer Skill							**Course Code: PMB 205**				
Semester: II							**Year:2018 (First year)**				
Academic Year: 2018-19							**Batch:2018-20**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Course: Food Microbial Technology							**Course Code: PMB 301**				
Semester: III							**Year: 2019 (second year)**				
Academic Year: 2019-2020							**Batch: 2018-2020**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	3	2	2	2	2	3	3	3
CO3	3	3	3	3	2	2	2	2	3	3	3
CO4	3	3	3	3	2	2	2	2	3	3	3
AVG	**3**	**3**	**3**	**3**	**2**	**2.25**	**2.25**	**2.25**	**3**	**3**	**3**

Name of the Program: MSc Microbiology											
Name of the Course: Medical Bacteriology							**Course Code: PMB 302**				
Semester: III							**Year: 2019 (second year)**				
Academic Year: 2019-2020							**Batch: 2018-2020**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	3	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	2	2	3	3	3	3	2	3
CO4	3	2	3	2	2	3	3	3	3	2	3
AVG	**3**	**2.25**	**2.75**	**2.5**	**2.25**	**3**	**3**	**3**	**3**	**2.25**	**3**

Name of the Program: MSc MICROBIOLOGY											
Name of the Course: Microbial Biotechnology								**Corse Code: PMB-303**			
Semester: III								**Year: 2019 (second year)**			
Academic Year: 2019-2020								**Batch: 2018-2020**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
CO3	3	3	3	2	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Microbial Ecology and Plant Microbe Interactions DSE (A)								**Course Code: PMB304**			
Semester: III								**Year: 2019 (second year)**			
Academic Year: 2019-2020								**Batch: 2018-2020**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2.5**	**3**	**3**	**3**	**3**	**3**	**3**	**2.5**

Name of the Program: MSc Microbiology											
Name of the Course: Microbiological Quality Control and Quality Assurance in Food & Pharma Industry								**Course Code: PMB 305**			
Semester: III								**Year: 2019 (second year)**			
Academic Year: 2019-2020								**Batch: 2018-2020**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology	
Name of the Course: Personality Development	**Course Code: PMB 305**

Semester: III									**Year: 2019 (second year)**		
Academic Year: 2019-2020									**Batch: 2018-2020**		
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Cell and Molecular Biotechnology									**Course Code: PMB401**		
Semester: IV									**Year: 2020 (Second year)**		
Academic Year: 2019-20									**Batch:2018-20**		
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
CO3	3	3	3	2	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: M.S c Microbiology											
Name of the Course: Medical Virology and Parasitology									**Corse Code: PMB 402**		
Semester: IV									**Year: 2020 (Second year)**		
Academic Year: 2019-20									**Batch:2018-20**		
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	3	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	2	2	3	3	3	3	2	3
CO4	3	2	3	2	2	3	3	3	3	2	3
AVG	**3**	**2.25**	**2.75**	**2.5**	**2.25**	**3**	**3**	**3**	**3**	**2.25**	**3**

Name of the Program: MSc Microbiology											
Name of the Course: Tax Planning for Individuals								**Course Code: PMB 403 A**			
Semester: IV								**Year: 2020 (Second year)**			
Academic Year: 2019-20								**Batch:2018-20**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO 3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Elements of Marketing								**Course Code: PMB 403A**			
Semester: IV								**Year: 2020 (Second year)**			
Academic Year: 2019-20								**Batch:2018-20**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO 3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course : Bioinformatics								**Course code : PMB 403**			
Semester: IV								**Year: 2020 (Second year)**			
Academic Year: 2019-20								**Batch:2018-20**			
	Program Outcomes								Program Specific Outcomes		
Course/POs	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO 3
CO1	3	3	2	3	2	0	2	3	3	3	3
CO2	3	3	2	3	2	0	2	3	3	2	3
AVG	**3**	**3**	**2**	**3**	**2**	**0**	**2**	**3**	**3**	**2.5**	**3**

Name of the Program:											
Name of the Course : Nanobiotechnology							**Course code : PMB 404**				
Semester: IV							**Year: 2020 (Second year)**				
Academic Year: 2019-20							**Batch:2018-20**				
	Program Outcomes								Program Specific Outcomes		
Course/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PSO1	PSO 2	PSO 3
CO1	3	2	2	3	1	3	1	2	3	3	3
CO2	3	1	2	2	2	2	1	1	3	3	3
CO3	3	3	2	2	1	3	1	1	3	3	3
CO4	3	3	2	2	1	3	1	1	3	3	3
AVG	**3**	**2.25**	**2**	**2.25**	**1.25**	**2.75**	**1**	**1.25**	**3**	**3**	**3**

Name of the Program: MSc Microbiology											
Name of the Course: Seminars							**Course Code: PMB 406**				
Semester: IV							**Year: 2020 (Second year)**				
Academic Year: 2019-20							**Batch:2018-20**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO 3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Program Target Matrix

MSC Microbiology 2018-2020		Program Outcomes								Program Specific Outcomes		
	Course/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
PMB 101	**General Microbiology And Microbial Physiology**	3	3	3	3	3	3	3	3	3	3	3
PMB 102	**Virology**	3	1.5	2.5	2	1.5	1.25	2	2.75	3	1	2
PMB 103	**Research Methodology & Techniques**	2.5	3	3	2.75	2	1.5	2.5	2	3	3	2
PMB 104	**Microbial Biochemistry**	3	3	3	2	3	3	3	3	3	3	2
PMB 105	**Communicative English**	3	3	3	2	3	3	3	3	3	3	2
PMB 151	**General Microbiology & Virology**	3	3	3	3	3	3	3	3	3	3	3
PMB 152	**Research Methodology & Techniques**	2.5	3	3	2.75	2	1.5	2.5	2	3	3	2
PMB 153	**Microbial Biochemistry**	3	3	3	2	3	3	3	3	3	3	2
PMB 201	**Molecular Biology & Microbial Genetics**	3	3	3	2.25	3	3	3	2.75	3	3	2
PMB 202	**Environmental And Agricultural Microbiology**	3	3	3	3	2	3	2.5	2.5	3	3	3
PMB 203	**Immunology**	3	2.25	2.25	1.5	2.25	2	2	3	3	1	1.75
PMB 204	**Pharmaceutical Microbiology**	3	3	3	2	3	3	3	3	3	3	2
PMB 205	**Computer Skill**	3	3	3	2	3	3	3	3	3	3	2
PMB 251	**Molecular Biology And Microbial Genetics**	3	3	3	2.25	3	3	3	2.75	3	3	2
PMB 252	**Environmental & Agriculture Microbiology**	3	3	3	3	2	3	2.5	2.5	3	3	3
PMB 253	**Immunology & Pharmaceutical Microbiology**	3	3	3	2	3	3	3	3	3	3	2
PMB 301	**Food Microbial Technology**	3	3	3	3	2	2.25	2.25	2.25	3	3	3
PMB 302	**Medical Bacteriology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 303	**Microbial Biotechnology**	3	3	3	2	3	3	3	3	3	3	2
PMB 304	**Microbial Ecology And Plant Microbe Interactions**	3	3	3	2.5	3	3	3	3	3	3	2.5
PMB 305	**Microbiological Quality Control And Quality Assurance In Food & Pharma Industry**	3	3	3	2	3	3	3	3	3	3	2
	Personality Development	3	3	3	2	3	3	3	3	3	3	2
PMB 351	**Food Microbial Technology**	3	3	3	3	2	2.25	2.25	2.25	3	3	3
PMB 352	**Medical Bacteriology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 353	**Applied Microbiology**	3	3	3	2.5	3	3	3	3	3	3	2.5
PMB 401	**Cell And Molecular Biotechnology**	3	3	3	2	3	3	3	3	3	3	2
PMB402	**Medical Virology And Parasitology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 403	**Bioinformatics**	3	3	2	3	2	0	2	3	3	2.5	3
PMB 404	**Nanobiotechnology**	3	2.25	2	2.25	1.25	2.75	1	1.25	3	3	3
PMB 405	**Project**	3	3	3	3	3	3	3	3	3	3	3
PMB 406	**Seminar**	3	3	3	3	3	3	3	3	3	3	3
PMB 451	**Cell And Molecular Biotechnology & Bioinformatics**	3	3	3	2	3	3	3	3	3	3	2
PMB 452	**Medical Virology And Parasitology & Nanobiotechnology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
	Average Value	**2.96**	**2.81**	**2.87**	**2.42**	**2.57**	**2.68**	**2.74**	**2.78**	**3**	**2.7**	**2.44**

Attainment Matrix

MSC Microbiology 2018-2020		Program Outcomes								Program Specific Outcomes		
	Course/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
PMB 101	**General Microbiology And Microbial Physiology**	3	3	3	3	3	3	3	3	3	3	3
PMB 102	**Virology**	3	1.5	2.5	2	1.5	1.25	2	2.75	3	1	2
PMB 103	**Research Methodology & Techniques**	0.83	1	1	0.91	0.6	1.5	0.83	0.6	1	1	0.6
PMB 104	**Microbial Biochemistry**	3	3	3	2	3	3	3	3	3	3	2
PMB 105	**Communicative English**	3	3	3	2	3	3	3	3	3	3	2
PMB 151	**General Microbiology & Virology**	3	3	3	3	3	3	3	3	3	3	3
PMB 152	**Research Methodology & Techniques**	2.5	3	3	2.75	2	1.5	2.5	2	3	3	2
PMB 153	**Microbial Biochemistry**	3	3	3	2	3	3	3	3	3	3	2
PMB 201	**Molecular Biology & Microbial Genetics**	3	3	3	2.25	3	3	3	2.75	3	3	2
PMB 202	**Environmental And Agricultural Microbiology**	3	3	3	3	2	3	2.5	2.5	3	3	3
PMB 203	**Immunology**	3	2.25	2.25	1.5	2.25	2	2	3	3	1	1.75
PMB 204	**Pharmaceutical Microbiology**	3	3	3	2	3	3	3	3	3	3	2
PMB 205	**Computer Skill**	3	3	3	2	3	3	3	3	3	3	2
PMB 251	**Molecular Biology And Microbial Genetics**	3	3	3	2.25	3	3	3	2.75	3	3	2
PMB 252	**Environmental & Agriculture Microbiology**	3	3	3	3	2	3	2.5	2.5	3	3	3
PMB 253	**Immunology & Pharmaceutical Microbiology**	3	3	3	2	3	3	3	3	3	3	2
PMB 301	**Food Microbial Technology**	3	3	3	3	2	2.25	2.25	2.25	3	3	3
PMB 302	**Medical Bacteriology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 303	**Microbial Biotechnology**	3	3	3	2	3	3	3	3	3	3	2
PMB 304	**Microbial Ecology And Plant Microbe Interactions**	3	3	3	2.5	3	3	3	3	3	3	2.5
PMB 305	**Microbiological Quality Control And Quality Assurance In Food & Pharma Industry**	3	3	3	2	3	3	3	3	3	3	2
	Personality Development	3	3	3	2	3	3	3	3	3	3	2
PMB 351	**Food Microbial Technology**	3	3	3	3	2	2.25	2.25	2.25	3	3	3
PMB 352	**Medical Bacteriology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 353	**Applied Microbiology**	3	3	3	2.5	3	3	3	3	3	3	2.5
PMB 401	**Cell And Molecular Biotechnology**	3	3	3	2	3	3	3	3	3	3	2
PMB402	**Medical Virology And Parasitology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 403	**Bioinformatics**	3	3	2	3	2	0	2	3	3	2.5	3
PMB 404	**Nanobiotechnology**	3	2.25	2	2.25	1.25	2.75	1	1.25	3	3	3
PMB 405	**Project**	3	3	3	3	3	3	3	3	3	3	3
PMB 406	**Seminar**	3	3	3	3	3	3	3	3	3	3	3
PMB 451	**Cell And Molecular Biotechnology & Bioinformatics**	3	3	3	2	3	3	3	3	3	3	2
PMB 452	**Medical Virology And Parasitology & Nanobiotechnology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
	Average Value	**2.91**	**2.75**	**2.81**	**2.36**	**2.53**	**2.68**	**2.69**	**2.74**	**2.93**	**2.71**	**2.40**

MSc Microbiology 2018-2020 Batch											
Prog Target Matrix Avg	2.96	2.81	2.87	2.41	2.57	2.68	2.74	2.787879	3	2.77	2.44
Attainment Matrix Avg	2.91	2.75	2.81	2.36	2.53	2.68	2.69	2.74	2.93	2.71	2.4
Gap values	0.05	0.06	0.06	0.05	0.04	0	0.04	0.04	0.07	0.06	0.04

Bhavan's Vivekananda College
of Science, Humanities and Commerce
Sainikpuri, Secunderabad – 500 094
Autonomous College Affiliated to Osmania University
Accredited with 'A' grade by NAAC

M.Sc Microbiology

Program Outcomes

PO1: Knowledge: Apply the knowledge of basic concepts, fundamental principles and scientific theories and processes related to the fields of life sciences with their relevance in day-to-day life.

PO2: Analytical Skills: Select and implement the analytical skills acquired, in design of experiments followed by its effective execution in scientific research, industry and entrepreneurship.

PO3: Investigations and Problem analysis: Identify and investigate socially relevant issues using knowledge of Science and technology by design of experiments, analysis, interpretation of data and provide valid conclusions.

PO4: Design and development of solutions: Design innovative solutions for various societal needs like health care, food, water and energy through research and development with appropriate consideration for cultural, societal, environmental, public health and safety.

PO5: Communication: Communicate effectively on problems, issues and solutions with community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO6: Ethics & Environment: Apply ethical principles and commit to professional ethics and responsibilities and norms in research and the functional areas, understand the issues of environmental context and sustainable development.

PO7: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO8: Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio, economic and technological changes.

Program Specific Outcomes

PSO1: Apply the knowledge of Microbiology, Immunology, Virology, Molecular biology, Biochemistry, Nanobiotechnology and Bioinformatics as per the demands of research and Industry

PSO2: Design, perform and analyse the procedures as per laboratory standards in the areas of medical, food, agriculture, pharma, environmental, industrial microbiology in production, down streaming and Quality control and Quality assurance of microbial products.

PSO3: Integrate **t**he knowledge of Microbiology, Molecular biology, Nanobiotechnology and Computational Biology to solve research problem which has societal relevance.

Course Outcomes

Name of the Course	**General Microbiology and Microbial physiology**
Course Code	**PMB 101**
CO1	Apply concepts of microscopy for identifying various microbes
CO2	Experiment different microbial culturing techniques
CO3	Distinguish bacteria based on taxonomy
CO4	Summarize factors on microbial growth

Name of the Course	**Virology**
Course Code	**PMB102**
CO1	Classify the virus based on structure, and replication
CO2	Distinguish lytic and lysogenic viruses
CO3	Interpret concepts of recombination in phages
CO4	Summarize applications of viruses in various areas

Name of the Course	**Research Methodology & Techniques (Core)**
Course Code	**PMB 103**
CO1	Select the right method for probing a given property of a sample molecule
CO2	Apply the most appropriate method for separation of molecules in a given mixture.
CO3	Use Excel and apply appropriate statistical analysis.
CO4	Write an organized scientific manuscript for a project.

Name of the Course	**Microbial Biochemistry**
Course Code	**PMB 104**
CO1	Determine pH of solutions and prepare Buffers for laboratory work
CO2	Analyze the biomolecules by qualitative analysis
CO3	Perform enzyme assay and calculate enzyme activity
CO4	Identify enzymes from various sources and purify them

Name of the Course	**Communicative English**
Course Code	**PMB 105**
CO1	The students are able to understand that effective communication is important to express their views, thoughts and opinions
CO2	The students improve their listening, speaking' reading and writing skills . The students are confident enough to participate in group discussion and debate

Name of the Course	**Molecular Biology & Microbial Genetics**
Course Code	**PMB 201**
CO1	Compare the structural variations of DNA and genome organization
CO2	Illustrate Replication, Transcription ,translation and gene regulation
CO3	Differentiate the types of mutations, DNA damage and repair mechanisms
CO4	Solve problems in genetic recombination for genetic mapping

Name of the Course	**Environmental and Agricultural Microbiology**
Course Code	**PMB 202**
CO1	Construct a mind map on role of microbes in air and water pollution
CO2	Summarize the role of microbes in bioremediation technologies
CO3	Interpret the role of microbes in decomposition
CO4	Apply the concepts of biofertilizers for better and sustainable agricultural practice.

Name of the Course	**Immunology**
Course Code	**PMB 203**
CO1	Illustrate the Antibody structure and diversity
CO2	Summarize the types of immunity and immunological responses to various antigens
CO3	Apply immunological techniques practically
CO4	Relate between cancer and immunology

Name of the Course	**Pharmaceutical Microbiology**
Course Code	**PMB 204**
CO1	Analyze microbial spoilage, prevention and preservation of pharmaceutical products, GMP
CO2	Discriminate the mode of actions of various anti microbial agents
CO3	Use Practical skills in preservation and testing of various industrial products
CO4	Perform microbiological assays in pharmaceutical industry

Name of the Course	**Computer Skill**
Course Code	**PMB 205**
CO1	Understand the applications of word processing using MS Word) and data analysis using MS. excel
CO2	Able to learn basics of poster designing and computer graphics

Name of the Course	**Food Microbial Technology**
Course Code	**PMB 301**
CO1	Discuss the significance of fermented foods in daily lives and describe the overall role of microbes involved in food processing.
CO2	Explain Dairy Microbiology and measure the role of different types of microbes and their significance.
CO3	Validate the concept and importance of Probiotics and Prebiotics.
CO4	Comprehend the overall concept involved in Microbial Intoxication (Bacterial and Fungal) and review detoxification measures.

Name of the Course	**Medical Bacteriology**
Course Code	**PMB302**
CO1	Explain the clinically important microorganisms and Normal flora of human body
CO2	Describe the nature and basic concepts of pathogenic microorganisms, infection and process of diagnosis and perform the requisite diagnostic protocols
CO3	Discuss of air borne and sexually transmitted bacterial pathogens bacterial pathogens.
CO4	Illustrate water borne bacterial pathogens and wound infections of bacteria.

Name of the Course	**Microbial Biotechnology**
Course Code	**PMB303**
CO1	Understand the industrial important microorganisms and Basic awareness on fermentor design .Perform practical procedures to screen industrial important microorganisms & analyze their fermentative products.
CO2	Understand the nature and basic concepts of. optimization of fermentation media , process of fermentation and perform the requisite experiments on scale up & down stream processes
CO3	Awareness of fermentative production of microbial products and Understand production and commercial application of microbial enzymes
CO4	Update knowledge in new frontiers of industrial microbiology – steroid transformation, microbial biopesticides, genetically modified microbes and immobilization

Name of the Course	**Microbial Ecology and Plant Microbe Interactions**
Course Code	**PMB 304**
CO1	Describe microbial diversity and calculate statistical indices for diversity and explain molecular methods of diversity analysis
CO2	Explain direct and indirect mechanisms of plant growth promotion by PGPR and develop microbial formulations for field application
CO3	Detect different bacterial and fungal pathogens based on signs and symptoms of plant diseases and their management using integrated pest control
CO4	Explain molecular mechanism of pathogen recognition, induced and systemic resistance in plants and describe different quorum sensing circuits of microbes

Name of the Course	**Microbiological Quality Control and Quality Assurance in Food & Pharma Industry**
Course Code	**PMB 305**
CO1	Equip with fundamentals of GMP, GLP and SOP and understand the validation principles in food and pharma industry and Quality control . Awareness on procedures in quality assurance (QA) of finished product.
CO2	Practical knowledge in Microbial Standards for Different Foods and Water and sterility testing methods. Acquire practical knowledge in Microbial quality testing of Milk and Water. Understand importance of Quality control and Quality assurance in Food and Pharma products

Name of the Course	**Personality Development**
Course Code	**PMB 305**
CO1	Students are confident enough to use interpersonal skills.
CO2	Students developed self-confidence and empathetic

Name of the Course	**Cell and Molecular Biotechnology**
Course Code	**PMB 401**
CO1	Describe the mechanism of cell cycle regulation, apoptosis and Cancer induction & inheritance, Signal transduction pathways
CO2	Choose appropriate cloning vectors, sequencing methods for DNA /Protein, molecular library construction and cloning techniques in prokaryotes and eukaryotes
CO3	Identify the Molecular Techniques like-PCR, RT PCR, RAPD, RFLP,SSR for application in molecular diagnostics and Discuss on Site directed mutagenesis, Reverse genetics, Gene knock and Gene Silencing, Gene therapy.
CO4	Categorize Transgenic Plants and Animals with their applications; Explain the significance of Stem Cell technology and Genome Engineering applications in biology.

Name of the Course	**Medical Virology and Parasitology**
Course Code	**PMB 402**
CO1	Explain the process of diagnosis and perform the requisite diagnostic procedures for identification of viruses and list out air borne viral pathogens
CO2	Classify water borne viral pathogens and Zoonotic viral pathogens
CO3	Describe sexually transmitted viral pathogens
CO4	Categorize parasitic and mycotic infections

Name of the Course	**Tax Planning for Individuals**
Course Code	**PMB 403 A**
CO1	The subject will enable the students to understand basic concepts of tax the Income Tax Act 1961
CO2	Relevance of tax planning while computing the tax liability of individuals.

Name of the Course	**Elements of Marketing**
Course Code	**PMB 403 A**
CO1	Understand marketing concepts and techniques
CO2	Apply marketing concepts in the pharmaceutical industry.

Name of the Course	**Bioinformatics**
Course Code	**PMB 403 B**
CO1	Understand and find sequences for nucleic acid and protein of interest, and explain evolutionary relationships between sequences. Understand to design primers to amplify genes of interest
CO2	Understand and find alternatively spliced transcripts, tissue-specific expression levels and gene-editing technologies

Name of the Course	**Nanobiotechnology**
Course Code	**PMB 404**
CO1	Review the origin, properties and types of nanoparticles
CO2	Describe the methods of synthesis and characterization of nanoparticles
CO3	Discuss the applications of nanoparticles in the field of environmental Nanobiotechnology
CO4	Explain the therapeutic role of nanoparticles in human health.

Name of the Course	**Seminar**
Course Code	**PMB 406**
CO1	Understand and present the scientific literature
CO2	Develop presentation skills

Name of the Program: MSc Microbiology											
Name of the Course: General Microbiology and Microbial Physiology								**Corse Code: PMB 101**			
Semester: I								**Year:2017 (First year)**			
Academic Year:2017-18								**Batch:2017-19**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
AVG	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Name of the Program: MSc Microbiology											
Name of the Course: Virology								**Course code: PMB 102**			
Semester: I								**Year:2017 (First year)**			
Academic Year:2017-18								**Batch:2017-19**			
	Program Outcomes								Program Specific Outcomes		
Course/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO 1	3	2	2	2	2	1	2	3	3	1	1
CO2	3	1	3	2	1	1	2	2	3	1	2
CO3	3	1	2	2	1	1	2	3	3	1	3
CO4	3	2	3	2	2	2	2	3	3	1	2
AVG	**3**	**1.5**	**2.5**	**2**	**1.5**	**1.25**	**2**	**2.75**	**3**	**1**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Research Methodology & Techniques								**Course Code: PMB 103**			
Semester: I								**Year:2017 (First year)**			
Academic Year: 2017-2018								**Batch: 2017-2019**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	2	3	3	3	1	1	2	2	3	3	2
CO2	2	3	3	3	1	1	2	2	3	3	2
CO3	3	3	3	3	3	2	3	2	3	3	2
CO4	3	3	3	2	3	2	3	2	3	3	2
AVG	**2.5**	**3**	**3**	**2.75**	**2**	**1.5**	**2.5**	**2**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Microbial Biochemistry							**Course Code: PMB104**				
Semester: I							**Year:2017 (First year)**				
Academic Year: 2017-18							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
CO3	3	3	3	2	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Communicative English							**Course Code: PMB 105**				
Semester: I							**Year:2017 (First year)**				
Academic Year: 2017-18							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Molecular Biology & Microbial Genetics							**Course Code: PMB201**				
Semester: II							**Year: 2017 (first year)**				
Academic Year: 2017-18							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	2	3	3	2
CO3	3	3	3	3	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2.25**	**3**	**3**	**3**	**2.75**	**3**	**3**	**2**

Name of the Program: M.Sc Microbiology											
Name of the Course: Environmental and Agricultural Microbiology								**Course Code: PMB 202**			
Semester: II								**Year: 2017 (first year)**			
Academic Year: 2017-18								**Batch:2017-19**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	2	2	3	3	3
CO2	3	3	3	3	2	3	3	3	3	3	3
CO3	3	3	3	3	2	3	2	2	3	3	3
CO4	3	3	3	3	2	3	3	3	3	3	3
AVG	**3**	**3**	**3**	**3**	**2**	**3**	**2.5**	**2.5**	**3**	**3**	**3**

Name of the Program: MSc Microbiology											
Name of the Course :Immunology								**Course Code: PMB 203**			
Semester: II								**Year: 2017 (first year)**			
Academic Year: 2017-18								**Batch:2017-19**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO 1	3	2	2	1	3	1	2	3	3	1	1
CO2	3	2	2	1	2	1	2	3	3	1	2
CO3	3	3	3	3	2	3	3	3	3	1	3
CO4	3	2	2	1	2	3	1	3	3	1	1
AVG	**3**	**2.25**	**2.25**	**1.5**	**2.25**	**2**	**2**	**3**	**3**	**1**	**1.75**

Name of the Program: MSc MICROBIOLOGY											
Name of the Course: Pharmaceutical Microbiology								**Course Code: PMB204**			
Semester: II								**Year: 2017 (first year)**			
Academic Year: 2017-18								**Batch:2017-19**			
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
CO3	3	3	3	2	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Computer Skill							**Course Code: PMB 205**				
Semester: II							**Year: 2017 (first year)**				
Academic Year: 2017-18							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Food Microbial Technology							**Course Code: PMB 301**				
Semester: III							**Year: 2018 (second year)**				
Academic Year: 2018-2019							**Batch: 2017-2019**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	3	2	2	2	2	3	3	3
CO3	3	3	3	3	2	2	2	2	3	3	3
CO4	3	3	3	3	2	2	2	2	3	3	3
AVG	**3**	**3**	**3**	**3**	**2**	**2.25**	**2.25**	**2.25**	**3**	**3**	**3**

Name of the Program: MSc Microbiology											
Name of the Course: Medical Bacteriology							**Course Code: PMB 302**				
Semester: III							**Year: 2018 (second year)**				
Academic Year: 2018-2019							**Batch: 2017-2019**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	3	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	2	2	3	3	3	3	2	3
CO4	3	2	3	2	2	3	3	3	3	2	3
AVG	**3**	**2.25**	**2.75**	**2.5**	**2.25**	**3**	**3**	**3**	**3**	**2.25**	**3**

Name of the Program: MSc MICROBIOLOGY											
Name of the Course: Microbial Biotechnology							**Corse Code: PMB-303**				
Semester: III							**Year: 2018 (second year)**				
Academic Year: 2018-2019							**Batch: 2017-2019**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
CO3	3	3	3	2	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Microbial Ecology and Plant Microbe Interactions DSE (A)							**Course Code: PMB304**				
Semester: III							**Year: 2018 (second year)**				
Academic Year: 2018-2019							**Batch: 2017-2019**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2.5**	**3**	**3**	**3**	**3**	**3**	**3**	**2.5**

Name of the Program :MSc Microbiology											
Name of the Course: Microbiological Quality Control and Quality Assurance in Food & Pharma Industry							**Course Code: PMB 305**				
Semester: III							**Year: 2018 (second year)**				
Academic Year: 2018-2019							**Batch: 2017-2019**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Personality Development							**Course Code: PMB 305**				
Semester: III							**Year: 2018 (second year)**				
Academic Year: 2018-2019							**Batch: 2017-2019**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Cell and Molecular Biotechnology							**Course Code: PMB401**				
Semester: IV							**Year: 2019 (Second year)**				
Academic Year: 2018-19							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
CO3	3	3	3	2	3	3	3	3	3	3	2
CO4	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course: Medical Virology and Parasitology							**Corse Code: PMB 402**				
Semester: IV							**Year: 2019 (Second year)**				
Academic Year: 2018-19							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	3	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	2	2	3	3	3	3	2	3
CO4	3	2	3	2	2	3	3	3	3	2	3
AVG	**3**	**2.25**	**2.75**	**2.5**	**2.25**	**3**	**3**	**3**	**3**	**2.25**	**3**

Name of the Program: MSc Microbiology											
Name of the Course: Tax Planning for Individuals							**Course Code: PMB 403 A**				
Semester: IV							**Year: 2019 (Second year)**				
Academic Year: 2018-19							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program :MSc Microbiology											
Name of the Course: Elements of Marketing							**Course Code: PMB 403A**				
Semester: IV							**Year: 2019 (Second year)**				
Academic Year: 2018-19							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Name of the Program: MSc Microbiology											
Name of the Course : Bioinformatics							**Course code : PMB 403**				
Semester: IV							**Year: 2019 (Second year)**				
Academic Year: 2018-19							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
Course/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	0	2	3	3	3	3
CO2	3	3	2	3	2	0	2	3	3	2	3
AVG	**3**	**3**	**2**	**3**	**2**	**0**	**2**	**3**	**3**	**2.5**	**3**

Name of the Program: MSc Microbiology											
Name of the Course : Nanobiotechnology							**Course code : PMB 404**				
Semester: IV							**Year: 2019 (Second year)**				
Academic Year: 2018-19							**Batch:2017-19**				
	Program Outcomes								Program Specific Outcomes		
Course/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	3	1	3	1	2	3	3	3
CO2	3	1	2	2	2	2	1	1	3	3	3
CO3	3	3	2	2	1	3	1	1	3	3	3
CO4	3	3	2	2	1	3	1	1	3	3	3
AVG	**3**	**2.25**	**2**	**2.25**	**1.25**	**2.75**	**1**	**1.25**	**3**	**3**	**3**

Name of the Program: MSc Microbiology										
Name of the Course: Seminars							**Course Code: PMB 406**			
Semester: IV							**Year: 2019 (Second year)**			
Academic Year: 2018-19							**Batch:2017-19**			
	Program Outcomes								Program Specific Outcomes	
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3	3	3	3	2
CO2	3	3	3	2	3	3	3	3	3	3	2
AVG	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

Program Average Matrix

MSC Microbiology 2017-2019		Program Outcomes									Program Specific Outcomes	
	Course/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
PMB 101	**General Microbiology and Microbial Physiology**	3	3	3	3	3	3	3	3	3	3	3
PMB 102	**Virology**	3	1.5	2.5	2	1.5	1.25	2	2.75	3	1	2
PMB 103	**Research Methodology & Techniques**	2.5	3	3	2.75	2	1.5	2.5	2	3	3	2
PMB 104	**Microbial Biochemistry**	3	3	3	2	3	3	3	3	3	3	2
PMB 105	**Communicative English**	3	3	3	2	3	3	3	3	3	3	2
PMB 151	**General Microbiology & Virology**	3	3	3	3	3	3	3	3	3	3	3
PMB 152	**Research Methodology & Techniques**	2.5	3	3	2.75	2	1.5	2.5	2	3	3	2
PMB 153	**Microbial Biochemistry**	3	3	3	2	3	3	3	3	3	3	2
PMB 201	**Molecular Biology & Microbial Genetics**	3	3	3	2.25	3	3	3	2.75	3	3	2
PMB 202	**Environmental and Agricultural Microbiology**	3	3	3	3	2	3	2.5	2.5	3	3	3
PMB 203	**Immunology**	3	2.25	2.25	1.5	2.25	2	2	3	3	1	1.75
PMB 204	**Pharmaceutical Microbiology**	3	3	3	2	3	3	3	3	3	3	2
PMB 205	**Computer Skill**	3	3	3	2	3	3	3	3	3	3	2
PMB 251	**Molecular Biology And Microbial Genetics**	3	3	3	2.25	3	3	3	2.75	3	3	2
PMB 252	**Environmental & Agriculture Microbiology**	3	3	3	3	2	3	2.5	2.5	3	3	3
PMB 253	**Immunology & Pharmaceutical Microbiology**	3	3	3	2	3	3	3	3	3	3	2
PMB 301	**Food Microbial Technology**	3	3	3	3	2	2.25	2.25	2.25	3	3	3
PMB 302	**Medical Bacteriology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 303	**Microbial Biotechnology**	3	3	3	2	3	3	3	3	3	3	2
PMB 304	**Microbial Ecology and Plant Microbe Interactions**	3	3	3	2.5	3	3	3	3	3	3	2.5
PMB 305	**Microbiological Quality Control and Quality Assurance in Food & Pharma Industry**	3	3	3	2	3	3	3	3	3	3	2
	Personality Development	3	3	3	2	3	3	3	3	3	3	2
PMB 351	**Food Microbial Technology**	3	3	3	3	2	2.25	2.25	2.25	3	3	3
PMB 352	**Medical Bacteriology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 353	**Applied Microbiology**	3	3	3	2.5	3	3	3	3	3	3	2.5
PMB 401	**Cell and Molecular Biotechnology**	3	3	3	2	3	3	3	3	3	3	2
PMB402	**Medical Virology and Parasitology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 403	**Bioinformatics**	3	3	2	3	2	0	2	3	3	2.5	3
PMB 404	**Nanobiotechnology**	3	2.25	2	2.25	1.25	2.75	1	1.25	3	3	3
PMB 405	**Project**	3	3	3	3	3	3	3	3	3	3	3
PMB 406	**Seminar**	3	3	3	3	3	3	3	3	3	3	3
PMB 451	**Cell And Molecular Biotechnology & Bioinformatics**	3	3	3	2	3	3	3	3	3	3	2
PMB 452	**Medical Virology And Parasitology & Nanobiotechnology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
	Average Value	**2.96**	**2.81**	**2.87**	**2.41**	**2.57**	**2.68**	**2.74**	**2.78**	**3**	**2.77**	**2.44**

Attainment Matrix

MSC Microbiology 2017-2019		Program Outcomes								Program Specific Outcomes		
	Course/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
PMB 101	**General Microbiology And Microbial Physiology**	3	3	3	3	3	3	3	3	3	3	3
PMB 102	**Virology**	3	1.5	2.5	2	1.5	1.25	2	2.75	3	1	2
PMB 103	**Research Methodology & Techniques**	1.6	2	2	1.8	1.3	1	1.6	1.3	2	2	1.3
PMB 104	**Microbial Biochemistry**	3	3	3	2	3	3	3	3	3	3	2
PMB 105	**Communicative English**	3	3	3	2	3	3	3	3	3	3	2
PMB 151	**General Microbiology & Virology**	3	3	3	3	3	3	3	3	3	3	3
PMB 152	**Research Methodology & Techniques**	2.5	3	3	2.75	2	1.5	2.5	2	3	3	2
PMB 153	**Microbial Biochemistry**	3	3	3	2	3	3	3	3	3	3	2
PMB 201	**Molecular Biology & Microbial Genetics**	3	3	3	2.25	3	3	3	2.75	3	3	2
PMB 202	**Environmental And Agricultural Microbiology**	3	3	3	3	2	3	2.5	2.5	3	3	3
PMB 203	**Immunology**	3	2.25	2.25	1.5	2.25	2	2	3	3	1	1.75
PMB 204	**Pharmaceutical Microbiology**	3	3	3	2	3	3	3	3	3	3	2
PMB 205	**Computer Skill**	1	1	1	0.6	1	1	1	1	1	1	0.6
PMB 251	**Molecular Biology And Microbial Genetics**	3	3	3	2.25	3	3	3	2.75	3	3	2
PMB 252	**Environmental & Agriculture Microbiology**	3	3	3	3	2	3	2.5	2.5	3	3	3
PMB 253	**Immunology & Pharmaceutical Microbiology**	3	3	3	2	3	3	3	3	3	3	2
PMB 301	**Food Microbial Technology**	3	3	3	3	2	2.25	2.25	2.25	3	3	3
PMB 302	**Medical Bacteriology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 303	**Microbial Biotechnology**	3	3	3	2	3	3	3	3	3	3	2
PMB 304	**Microbial Ecology And Plant Microbe Interactions**	2	2	2	1.6	2	2	2	2	2	2	1.6
PMB 305	**Microbiological Quality Control And Quality Assurance In Food & Pharma Industry**	3	3	3	2	3	3	3	3	3	3	2
	Personality Development	3	3	3	2	3	3	3	3	3	3	2
PMB 351	**Food Microbial Technology**	3	3	3	3	2	2.25	2.25	2.25	3	3	3
PMB 352	**Medical Bacteriology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 353	**Applied Microbiology**	3	3	3	2.5	3	3	3	3	3	3	2.5
PMB 401	**Cell And Molecular Biotechnology**	3	3	3	2	3	3	3	3	3	3	2
PMB402	**Medical Virology And Parasitology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
PMB 403	**Bioinformatics**	3	3	2	3	2	0	2	3	3	2.5	3
PMB 404	**Nanobiotechnology**	3	2.25	2	2.25	1.25	2.75	1	1.25	3	3	3
PMB 405	**Project**	3	3	3	3	3	3	3	3	3	3	3
PMB 406	**Seminar**	3	3	3	3	3	3	3	3	3	3	3
PMB 451	**Cell And Molecular Biotechnology & Bioinformatics**	3	3	3	2	3	3	3	3	3	3	2
PMB 452	**Medical Virology And Parasitology & Nanobiotechnology**	3	2.25	2.75	2.5	2.25	3	3	3	3	2.25	3
	Average Value	**2.95**	**2.77**	**2.83**	**2.39**	**2.54**	**2.67**	**2.70**	**2.77**	**2.96**	**2.72**	**2.44**

GAP

MSC Microbiology 2017-2019											
	Program Outcomes								Program Specific Outcomes		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
ProgTarget Matrix Avg	2.96	2.81	2.87	2.41	2.57	2.68	2.74	2.78	3	2.77	2.44
Attainment Matrix Avg	2.95	2.77	2.83	2.39	2.54	2.67	2.70	2.77	2.96	2.72	2.44
Gap values	0.01	0.04	0.04	0.02	0.02	0.004	0.03	0.01	0.03	0.046	0.00