

## COURSE CURRICULUM FRAMEWORK UNDER AUTONOMY

**Program: B.Sc.**

**Department: Microbiology**

| <b>Semester I</b>  |   |                |
|--------------------|---|----------------|
| <b>Course Code</b> | <b>Course Title</b>   | <b>Credits</b> |
| <b>SMIC 101</b>    | <b>Fundamentals of Microbiology</b><br>Introduction To Microbiology and Prokaryotic cell structure<br>Biosafety and Biomolecules<br>Nucleic Acid Structure and Chemistry            | <b>2</b>       |
| <b>SMIC 102</b>    | <b>Basic Techniques in Microbiology</b><br>Microscopy & Staining<br>Controlling Microbial Growth in the environment<br>Microbial Nutrition, Cultivation, Isolation and Preservation | <b>2</b>       |
| <b>SMIC1PR</b>     | Practicals based on Fundamentals of Microbiology and Basic techniques in Microbiology   | <b>2</b>       |
| <b>Semester II</b> |   |                |
| <b>Course Code</b> | <b>Course Title</b>   | <b>Credits</b> |
| <b>SMIC 201</b>    | <b>Microbial Diversity</b><br>Study of Different Groups of Microbes-I<br>Study of Different Groups of Microbes-II<br>Microbial growth   | <b>2</b>       |
| <b>SMIC 202</b>    | <b>Exploring Microbiology</b><br>Tools of the Laboratory<br>Microbial Interactions<br>Microbe-Human Interactions: Infection and Disease   | <b>2</b>       |
| <b>SMIC2PR</b>     | Practicals based on Microbial Diversity and Exploring Microbiology  | <b>2</b>       |

| <b>Semester III</b> |  |                |
|---------------------|--|----------------|
| <b>Course Code</b>  | <b>Course Title</b>  | <b>Credits</b> |
| <b>SMIC301</b>      | <b>Essentials of Molecular Biology</b><br>Principles of Inheritance<br>Molecular techniques based on nucleic acids<br>Replication in prokaryotes & eukaryotes                            | <b>3</b>       |
| <b>SMIC302</b>      | <b>Research methodology, Biostatistics and Analytical techniques</b><br>Estimation of biomolecules and Instrumentation-I<br>Instrumentation-II<br>Research methodology and Biostatistics | <b>3</b>       |
| <b>SMIC303</b>      | <b>Environmental and Applied Microbiology</b><br>Aeromicrobiology and Soil microbiology<br>Aquatic and Wastewater Microbiology<br>Applied Microbiology                                   | <b>3</b>       |
| <b>SMIC3PR</b>      | <b>Practicals based on SMIC301, SMIC302, SMIC303</b>   | <b>3</b>       |
| <b>Semester IV</b>  |  |                |
| <b>Course Code</b>  | <b>Course Title</b>  | <b>Credits</b> |
| <b>SMIC401</b>      | <b>Microbial Biochemistry</b><br>Thermodynamics and Introduction to Metabolism<br>Enzyme Kinetics<br>Transcription and Translation   | <b>3</b>       |
| <b>SMIC402</b>      | <b>Taxonomy and Basics in Immunology</b><br>Non –specific Host resistance<br>Diagnostic Microbiology<br>Classification and taxonomy  | <b>3</b>       |
| <b>SMIC403</b>      | <b>Food and Industrial Microbiology</b><br>Food microbiology<br>Dairy microbiology<br>Industrial Microbiology  | <b>3</b>       |
| <b>SMIC4PR</b>      | <b>Practicals based on SMIC401, SMIC402, SMIC403</b>   | <b>3</b>       |

| <b>Semester V</b>  |   |                |
|--------------------|---|----------------|
| <b>Course Code</b> | <b>Course Title</b>   | <b>Credits</b> |
| <b>SMIC501</b>     | <b>Microbial Genetics and Cell Biology</b><br>Mutation and DNA Repair<br>Genetic Exchange & Homologous Recombination<br>Cell Biology<br>Cell Signalling   | <b>04</b>      |
| <b>SMIC502</b>     | <b>Medical Microbiology &amp; Immunology: Part-I</b><br>Bacterial Strategies for Evasion and Study of a Few Diseases (Respiratory Tract and Urinary Tract)<br>Study of G.I Tract and Skin Infections<br>General Immunology-I<br>General Immunology-II | <b>04</b>      |
| <b>SMIC503</b>     | <b>Microbial Biochemistry: Part – I</b><br>Biological Membranes & Transport<br>Bioenergetics & Bioluminescence<br>Methods of Studying Metabolism & Catabolism of Carbohydrates<br>Fermentative Pathways and Anabolism of Carbohydrates                | <b>04</b>      |
| <b>SMIC504</b>     | <b>Bioprocess Technology: Part – I</b><br>Strain Improvement and Inoculum Development<br>Types of Fermenters and Sterilization<br>Scale up, Scale down of Fermentation and Downstream Processes<br>Traditional Fermentations                          | <b>04</b>      |
| <b>SMIC5PR1</b>    | <b>Practicals Based on SMIC501 and SMIC502</b>  | <b>04</b>      |
| <b>SMIC5PR2</b>    | <b>Practicals Based on SMIC503 and SMIC504</b>  | <b>04</b>      |
| <b>Semester VI</b> |   |                |
| <b>Course Code</b> | <b>Course Title</b>   | <b>Credits</b> |

|                 |  |           |
|-----------------|--|-----------|
| <b>SMIC601</b>  | <b>rDNA TECHNOLOGY, BIOINFORMATICS &amp; VIROLOGY</b><br>Recombinant DNA Technology<br>Applications of rDNA Technology & Bioinformatics<br>Regulation & Basic Virology<br>Advanced Virology                      | <b>04</b> |
| <b>SMIC602</b>  | <b>MEDICAL MICROBIOLOGY AND IMMUNOLOGY PART-II</b><br>Study of vector borne, sexually transmitted and CNS infections<br>Chemotherapy of infectious agents<br>Immunology –I<br>Immunology –II                     | <b>04</b> |
| <b>SMIC603</b>  | <b>MICROBIAL BIOCHEMISTRY: PART-II</b><br>Lipid Metabolism & Catabolism of Hydrocarbons<br>Metabolism of Proteins and Nucleic Acids<br>Metabolic Regulation<br>Prokaryotic Photosynthesis & Inorganic Metabolism | <b>04</b> |
| <b>SMIC604</b>  | <b>BIOPROCESS TECHNOLOGY- PART-II</b><br>Advances in bioprocess technology<br>Pharmaceutical microbiology<br>Instrumentation and IPR<br>Industrial fermentations   | <b>04</b> |
| <b>SMIC6PR1</b> | <b>Practicals Based on SMIC601 and SMIC602</b>   | <b>04</b> |
| <b>SMIC6PR2</b> | <b>Practicals Based on SMIC603 and SMIC604</b>   | <b>04</b> |

## Applied Component: Food Production and Processing

| <b>Semester V</b>  |  |                |
|--------------------|--|----------------|
| <b>Course Code</b> | <b>Course Title</b>  | <b>Credits</b> |
| <b>SMIC5AC</b>     | <b>FOOD PRODUCTION AND PROCESSING<br/>(General Principles)</b><br>Food Science and Nutrition<br>Traditional Production Methods<br>Principles of Food Processing<br>Principles and Methods of Food Preservation           | <b>2.5</b>     |
| <b>SMIC5ACPR</b>   | <b>Practicals based on SMIC5AC</b>   | <b>2.5</b>     |
| <b>Semester VI</b> |  |                |
| <b>SMIC6AC</b>     | <b>Food Production and Processing<br/>(Applications and Q.A)</b><br>Modern Methods of Food production<br>Production of Fermented Food and Beverages<br>Food Safety and Quality Assurance<br>Food Packaging and Marketing | <b>2.5</b>     |
| <b>SMIC6ACPR</b>   | <b>Practicals based on SMIC6AC</b>   | <b>2.5</b>     |