

## Program Specific Outcomes and Course Outcomes

### Department of Microbiology

#### Govt. P.G. College Khargone(M.P.)

#### PROGRAMME SPECIFIC OUTCOMES: B. Sc. Microbiology

<b>Department of Microbiology</b>	<b>B.Sc. Microbiology Course:</b> B.Sc. Microbiology or Bachelor of Science in Microbiology is an Undergraduate Microbiology course. Microbiology is the discipline in which scientists combine chemistry and biology to investigate living systems and their relationship to the environment. B.Sc. Microbiology course covers the studies of microorganisms and their effect on humans. It gives theoretical and practical knowledge through the B.Sc. Microbiology subjects. The duration is <b>3 academic years</b> .
<b>Program Specific Outcomes</b>	<b>Students who graduate with a Bachelor of Science in Microbiology will:-</b> <b>PSO1:</b> Acquire knowledge on fundamentals of Microbiology <b>PSO2:</b> Understand details of bacterial, fungal, algal and viral morphology and physiology. <b>PSO3:</b> Competently be able to cultivate and characterize bacterial and fungal forms. <b>PSO4:</b> Grasp the fundamental concepts of

immunity and the contribution of organs and cells in the development of immune response.

**PSO5:** Gain insight into the various aspects of microbial genetics.

**PSO6:** Be proficient on cloning vectors and rDNA technology.

**PSO7:** Assimilate technical skills on microbial genetics and molecular biology.

**PSO8:** Realize the application oriented aspects of Microbiology.

**PSO9:** Understand the concepts and development of microbial diseases in animals & plants.

**PSO10:** Realize the principles of prevention and treatment of microbial diseases.

## Course Outcomes B.Sc. Microbiology

course	outcomes
<b>MB101-General microbiology and cell biology</b>	<p><b>CO1:</b> Gain knowledge on various classes of microorganisms; their structure extracellular and intracellular components, cultural characteristics and their growth conditions.</p> <p><b>CO2:</b> Know about the different parts and working mechanisms of basic light microscope up to electron microscopes with deep knowledge on the sample preparation and staining techniques.</p> <p><b>CO3:</b> Acquire knowledge on sterilization techniques with adequate information on sterile, aseptic conditions.</p> <p><b>CO4:</b> Know about different classes of antibiotics and their mode of actions, treatment strategies and detection of resistant forms of bacteria from clinical settings.</p> <p><b>CO5:</b> Microbial culture media and pure culture techniques for aerobic and anaerobic cultivation methods for bacteria.</p>
<b>MB102-Tools &amp; Techniques in Microbiology</b>	<p><b>Course Objectives:</b> The candidate will gain hands-on knowledge and acquire adequate skill required to sterilize media and to prepare, inoculate observe and distinguish the growth patterns in different media.</p> <p>At the end of the course, learners will be able to:</p> <p><b>CO1:</b> Perform cleaning &amp; sterilization of glassware's</p> <p><b>CO2:</b> Competently prepare and cultivate bacteria in different types of media.</p> <p><b>CO3:</b> Gain knowledge on filter sterilization techniques.</p> <p><b>CO4:</b> Know how to grow algae in the lab</p> <p><b>CO5:</b> Competently able to identify sensitivity and resistance of bacteria.</p>

**MB201- Biochemistry & microbial physiology**

**CO1:** Conceptual knowledge of aerobic and anaerobic respiration and various intermediary mechanisms involved, oxidative phosphorylation

**CO2:** Overview of major biomolecules – carbohydrates, lipids, proteins, amino acids, nucleic acids, classification, structure, function of the above mentioned biomolecules

**CO3:** Discuss the biosynthesis and the degradation pathways involved.

**CO4:** Specify the biological significance of biomolecules in metabolism

**CO5:** Conceptual knowledge of properties, structure, function of enzymes, enzyme kinetics and their regulation, enzyme engineering, Application of enzymes in large scale industrial processes.

**MB202- Microbial Genetics and Molecular Biology**

**Course Objectives:** The candidate will gain knowledge about the structure, shape and

significance of DNA, RNA. Synthesis of RNA and proteins along with its control. Role of genes as basic units of expression.

**CO1:** Understand the flow of information from DNA to Protein.

**CO2:** Know in detail the structure of DNA & RNA as well as their physical & chemical properties.

**CO3:** Gain insights into the various processes involved in the replication of DNA.

**CO4:** Grasp the replication of single-stranded DNA molecules and the various features of retrovirus replication.

**CO5:** Assimilate knowledge regarding various natural and artificial means by which DNA may be altered and the repair mechanisms in the eventuality of damage.

**CO6:** Study the various aspects of integration of extraneous DNA into host chromosome.

**CO7:** Get a complete understanding of the process of formation of RNA from DNA in both prokaryotes & eukaryotes. **CO8:** Appreciate the various cellular mechanisms involved in the control of transcription.

**CO9:** Firm grasp of the process of protein synthesis with post-synthetic modifications.

**CO10:** Basic understanding of control methods

	<p>for gene expression.</p> <p><b>CO11:</b> Understanding the language for communication in cells.</p> <p><b>CO12:</b> Basic knowledge about gene transfer mechanisms prevalent in bacteria.</p> <p><b>CO13:</b> Rudimentary knowledge about plasmids and transposons especially as cloning vectors.</p> <p><b>CO14:</b> Molecular basis of heritable changes in cells along with insights about evolutionary methods to overcome change.</p> <p><b>CO15:</b> Firm grasp of E.coli gene mapping methods as well as those of yeast.</p>
<p><b>MB301- Immunology &amp; medical microbiology</b></p>	<p><b>Course Objectives:</b> The candidate will gain knowledge about immunity, organs of immunity and cells involved. Types of antigens and immunoglobulin's. Antigen- antibody reactions and assays. MHC and its significance.</p> <p>At the end of the course, learners will be able to:</p> <p><b>CO1:</b> Understand the fundamental concepts of immunity, contributions of the organs and cells in immune responses.</p> <p><b>CO2:</b> Understand the antigens &amp; their characters</p> <p><b>CO3:</b> Understand the different types antibodies &amp; their properties.</p> <p><b>CO4:</b> Understand the mechanisms involved in antigen-antibody reactions</p> <p><b>CO5:</b> Differentiate the humeral and cell mediated immune mechanisms</p> <p><b>CO6:</b> Comprehend the overreaction by our immune system leading to hypersensitive conditions and its consequences</p> <p><b>CO7:</b> Know how MHC functions in the immune system</p> <p><b>CO8:</b> Gain knowledge on vaccines, toxoids and immunotherapy</p>
<p><b>MB302-Applied &amp; environmental microbiology</b></p>	<p><b>Course Objectives:</b> The candidate will gain knowledge about the role of microbes in soil, especially, rhizosphere, philosopher. Nutrient cycling with emphasis on role of various groups of microorganisms at different stages of various cycles. Nitrogen fixation – Bio fertilizers, bio pesticides and plant pathology.</p> <p><b>Course Outcome :-</b>At the end of the course,</p>

learners will be able to:

**CO1:** Gain knowledge about the role and importance of soil microbes.

**CO2:** Learn about the impact of the soil microbes for plants growth.

**CO3:** Acquire knowledge on the symbiotic, free living association of nitrogen fixation.

**CO4:** Learn importance and the need of nitrogen fixation process by microbes.

**CO5:** Become skilled in mass production and applications of bio fertilizer.

**CO6:** Gain knowledge of bacterial, fungal and viral bio pesticides.

**CO7:** Attain knowledge in plants and microbial interactions

**CO8:** Learn the disease management in crops.

**CO9:** Achieve information and importance of biogeochemical cycles in environment.