

TTWRDC GIRLS- KOTHAGUDEM

(Affiliated to Kakatiya University, Warangal)

BHADRADRI DISTRICT- TELANGANA STATE



DEPARTMENT OF MICROBIOLOGY

COURSE OUTCOMES



Microbiology

COURSE OUT COMES OF B.Sc.MICROBIOLOGY

PO1: Apply theoretical knowledge to develop critical thinking and practical understanding in the field of microbiology to find solutions to human welfare.

PO2: Acquire, retain and apply technical concepts and knowledge relevant to different fields of microbiology.

PO3: Obtain knowledge on the role of microbes in human disease, development of novel diagnostic methods, and immune response to microbial infection.

PO4: Gain hands-on experience with laboratory equipment that could enrich them to perform high through put research on microorganisms and execute the research methodology required in the food, dairy, and pharmaceutical industries.

PO5: Communicate scientific concepts, experimental results, and analytical discussions clearly and concisely, both verbal and written.

PO6: Opt for higher studies in national level institutes and overseas, jobs in various sectors, and entrepreneurship abilities in the field of microbiology (consultancy, training centres, and diagnostic centres).

PO7: Acquire the ability to work efficiently with a team to accomplish a common goal. PO8: Understand the potential and impact of microbiological innovations in reducing environmental pollution, health sector, and agriculture.

Programme Specific Outcomes(PSOs):

PSO1: Get sufficient knowledge on principles and applications of microbiology, which will be applied in various sectors such as research and development, laboratories of

Microbial product-based industries (production of antibiotics, industrially important enzymes, and dairy products).

PSO2: Students can apply their knowledge in competitive exams such as CSIR-UGC NET, SET,GATE, ICMR-JRF, and other national levels exams, as well as in executing research projects.

Course outcomes(COs):

Semester I

General Microbiology

CO1: Know the history and development of microbiology contributions of various scientists.

CO2: To gain knowledge on principles of microbial diversity, phylogeny ,and taxonomy

.CO3: To learn the general characters and reproductive methods of algae,funghi,andprotozoa.

CO4: To understand microbial growth and the environmental effect on microbial growth.

CO5: To learn a met genomic approach to explore microbial diversity

Virology

CO1: Acquire knowledge about the structure and classification of viruses.

CO2: Understand the methods of cultivating plant viruses, animal viruses, and bacteriophages.

CO3: Understand the replication pattern of bacteriophages and plant and animal viruses.

CO4: Learn about viral vaccines, interferons, and antiviral drugs.

CO5: Acquire knowledge of different viral organisms and their importance in agriculture, environment, and health

Biological Chemistry

CO1: Understand the structure of carbohydrates and physicochemical properties from monosaccharide's to polysaccharides.

CO2: Understand the structure and classification of amino acids, the design of proteins and types of proteins, understanding of protein purification methods, etc.

CO3: Acquire knowledge about the classification, structures, importance, and functions of lipids.

CO4: Understand the difference between the properties and functions of nucleic acids and their chemical composition.

CO5: Understand the types of vitamins and their crucial role in metabolism. Learn about the structures and functions of porphyrins.

Cell Biology and Enzymology

CO1: Understanding of energy sources and synthesis of energy, cell signaling, and communication systems.

CO2: Acquire knowledge about cell division, cancer-causing agents, and cancer biology.

CO3: To know the importance of enzymes and their role in different biological pathways

.CO4: Acquire knowledge about the industrial production and applications of enzymes.

CO5: Understanding the application of various enzymes as biosensors.

Semester II

Microbial Physiology and Metabolism

CO1: Acquire the knowledge on nutritional diversity and nutrient uptake in microorganisms, their physiology, and economic importance

CO2: Understand the mechanism of phototropism, diversity of prototroph's photochemistry, and modes of CO₂ fixation

CO3: Understand the metabolism of carbohydrates and the interrelation between different metabolism pathways.

CO4: To know the concepts of aerobic and anaerobic respiration and energy gaining, primary and secondary metabolisms, and biotransformation.

CO5: Understand the synthesis and catabolism of various lipids and amino acids. Importance of and breakdown of purine and pyrimidine nucleotides

Molecular Biology

CO1: Acquire knowledge about DNA replication, damage and repair mechanisms in prokaryotes and eukaryotes.

CO2: Understanding of transcription mechanism and role of different enzymes in transcription.

CO3: To know the importance of translation, protein targeting, folding, and sorting.

CO4: Acquire knowledge on the factors affecting the regulation of gene expression.

CO5: Understanding the role of different molecules in various biological systems.

Immunology

CO1: Learn about the structure and functions of lymphoid organs and the immune system.

CO2: Understand the principles of antigen-antibody interactions *invitro* and *invivo*.

CO3: Understand immunopathology (autoimmune diseases, hyper sensitivity reactions)

CO4: Acquire knowledge of tumor immunology and tissue and organ transplantation.

CO5: To understand complement systems and pathways, and Hybridoma technology

Biophysical Techniques and Instrumentation

CO1: Understanding the preparation of buffers and gaining knowledge about different types of microscopes.

CO2: Acquire knowledge about different analytical techniques like centrifugation and chromatographic techniques.

CO3: To know the importance of different electrophoresis and

radiation biology techniques and their applications.

CO4: Acquire knowledge about spectroscopic techniques and their applications.

CO5: Understanding the role of different biophysical techniques and their applications in various biological systems.

Semester III

Microbial genetics and Genetic engineering

CO1: Gain knowledge about recombination and its models. The concept of gene mapping, the importance of plasmids, and transposable elements.

CO2: Acquire knowledge about The mutation, mutagens, and their types. Importance of mutation screening methods.

CO3: Gain knowledge of recombinant technology and gene libraries.

CO4: Understand the mechanism of polymerase chain reaction and types of PCR and their importance. CO5: Understand the concept and strategies of gene therapy and its prospects

Bioinformatics and Computational methods

CO1: Acquire knowledge about the genomic tools and evolution of organisms.

CO2: Understanding various biological data management and data access and processing.

CO3: To know the importance of collecting, analyzing, and interpreting biological data using different statistical methods.

CO4: Acquire knowledge about different statistical methods and their applications in biology.

CO5: Understanding the different bioinformatics tools and biostatistician methods and their applications.

Bioprocess Technology

CO1: Understanding of growth and preservation of industrially important microbes. CO2: Acquire knowledge about different fermentation techniques.

CO3: Understanding the cost effect and recovery of industrially important microbial products.

CO4: Acquire knowledge about the industrial production of various microbial metabolites

CO5: Understanding the role of different microbes and their uses in various industries.

Medical Microbiology

CO1: Application of various fields of medical microbiology.

CO2: Understand the pathogenesis, epidemiology, and lab diagnostic procedure of bacterial infections.

CO3: To know the pathogenesis of different types of viral infections.

CO4: Acquire knowledge about the life cycle and pathogenesis of protozoan diseases.

CO5: Knowledge of different diagnostic procedures (morphological, serological, and molecular levels).

Microbial Technology

CO1: Understanding the involvement of different microbes in food

spoilage.

CO2: To know about different types of microbial foods.

CO3: Acquire knowledge about the production of microbial foods and enzymes

.CO4: To know about the industrial production of value-added products.

CO5: Understanding the role of different microbes in spoilage and production of valuable foods and compounds.

Pharmaceutical Microbiology

CO1: Understanding of growth and preservation of pharmaceutically essential microbes.

CO2: Acquire knowledge about different types of antibiotics and cosmetics.

CO3: To know about chemotherapy, mode of action of drugs, and screening methods

.CO4: Acquire knowledge regarding the assays to identify multidrug-resistant microbes

.CO5: Understanding pharmaceutically important microbes and their applications.