# SRR &CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA:
**520004 KRISHNA DISTRICT: ANDHRA PRADESH**

**DEPARTMENT OF MICROBIOLOGY**

## B.Sc Microbiology (MBC &MBF) Programme Objectives and Outcomes

### Aim and objectives of UG program BSc Microbiology

The programme BSc Microbiology introduces students to the vast array of microbes *viz* bacteria, archaea, viruses, fungi and protozoa around us, their diversity and applications. The programme has a strong practical emphasis, providing students with the basic laboratory skills required for a career in either applied or research microbiology.

### Programme outcome

Graduates will acquire adequate knowledge and basic laboratory skills required for career in either applied or research microbiology

### Programme specific outcomes

**Microbiology students who graduate with a Bachelor of Science with Microbiology will**

**PSO1:** Acquire knowledge on fundamentals of Microbiology, expertise in pure culture techniques & preservation of cultures and understand microbial physiology and biochemistry

**PSO2:** Gain insight into the various aspects of Microbial Genetics and r DNA technology.

**PSO3:** Grasp the fundamental concepts of immunity, immune response and epidemiology of microbial diseases. Demonstrate on collection and handling of laboratory specimens.

**PSO4:** Understand the role of microbes in nutrient recycling, sustainable agriculture, Microbial spoilage of food, principles of food preservation and Microbial production of Industrial products.

**PSO5:** Realize the application-oriented aspects of Microbiology and significance of Intellectual Property Rights.

# I B.Sc - SEMESTER- I: Microbiology

## MB-1324: INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY

### Aim and objectives of Course

To understand History & Development of Microbiology, Microscopy, staining and sterilization techniques, Ultra-structure of cell, Different methods of microbial characterization To study nature of viruses, viral classification, cultivation of viruses and Type study of TMV & HIV

### Learning outcomes of Course (COs)

**Up on completion of the course students able to**

**CO1:** Students will be able to illustrate the contributions made by the prominent Scientists for development of Microbiology
**CO2:** Students will able to differentiate a large number of bacteria by their salient characteristics
**CO3:** Know general characteristics of Viruses, Algae, Fungi and protozoa
**CO4:** Perform pure culture techniques and techniques for preservation and maintenance of stock cultures
**CO5:** Understand Principles of Microscopy. Analyse various techniques used for Sterilization and Disinfection techniques.

# I B.Sc - SEMESTER- II: Microbiology

## MB-2324: MICROBIAL BIOCHEMISTRY AND METABOLISM

### Aim and objectives of Course

To understand different biomolecules, analytical techniques, bacterial nutrition, growth and metabolism

### Learning outcomes of Course (COs)

**Up on completion of this course students should able to:**

**CO1:** Students able to describe the nutritional forms of bacteria and bacterial growth kinetics and methods to measure bacterial growth

**CO2:** Students will understand bacterial respiration, metabolism, photosynthesis and fermentations

**CO3**: Knowledge on classification of carbohydrates as structural and storage components, Classification of lipids and amino acids

**CO4**: Students will able to understand structure and functions of nucleic acids

**CO5:** Students will able to understand enzyme catalysis and kinetics

# II B.Sc - SEMESTER- III: Microbiology

## MB-3324: MOLECULAR BIOLOGY AND MICROBIAL GENETICS

### Aim and objectives of Course

To understand DNA, RNA, Protein structure and synthesis. DNA damage, mutations and repair. Gene transfer methods.

### Learning outcomes of Course (COs)

**Up on completion of the course students able to**

**CO1:** Understand the structure and functions of DNA, RNA, plasmids, transposons and bacterial replication.
**CO2:** Students will understand various mutations in DNA
**CO3:** Develop knowledge on genetic code and recombination in bacteria
**CO4:** Students acquire basic concepts of gene expression
**CO5:** Get knowledge on regulation of gene expression in prokaryotes

## II B.Sc - SEMESTER- IV: Microbiology

# MB-4324: MEDICAL MICROBIOLOGY AND IMMUNOLOGY

### Aim and objectives of Course

To study types of immunity, immune organs, cells, antibodies and antigen-antibody interactions.
To learn diagnostic and pathogenesis of various diseases. Antimicrobial defense and different toxins and vaccines.

### Learning outcomes of Course (COs)

**Up on completion of the course students able to**

**CO1:** Explain No-specific body defense and the immune response

**CO2:** Develop knowledge on disease transmission and control

**CO3:** Students will demonstrate on collection and handling of laboratory specimens

**CO4:** Students will understand mode of action of antimicrobial drugs and types of vaccine

**CO5:** Develop information on epidemiology, treatment and control of infectious diseases

# III B.Sc - SEMESTER- V: Microbiology

## MB-5324-5: ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY

### Aim and Objectives of Course

To study soil microorganism, solid and liquid waste treatment, principles of plant disease control and PGPR.

### Learning outcomes of Course (COs)

**Up on completion of the course students able to**

**CO1:** The student will have fundamental concepts in soil microbiology and soil water and aero microbial diversity and microbial interactions

**CO2:** Students will understand basic concepts in treatment of drinking water.

**CO3:** Understand the role of microorganisms in treatment of solid and liquid waste.

**CO4:** Student will acquire knowledge on application of microorganisms in agro – environmental fields.

**CO5:** Get fundamental concepts in principles of plant disease control and PGPR

# III B.Sc - SEMESTER- V: Microbiology

## MB-5324-6: FOOD AND INDUSTRIALMICROBIOLOGY

### Aim and objectives of Course

To study concepts of screening and strain improvement, media, Fermentation, assays with examples of industrially important processes.

### Learning outcomes of Course (COs)

**Up on completion of the course students able to**

**CO1:** Students will demonstrate with the wide diversity of microbes and their potential for use in industrial microbiology

**CO2:** Students will **a**ble to understand principles of food preservation

**CO3:** Understand Screening methods and techniques involved in strain improvement

**CO4:** Get basic information on design of fermentor, fermentation processes and downstream process

**CO5:** Self-reliance in the industrial application of Microbiology in life and industry and entrepreneurship can be established with the gained knowledge.

## III B.Sc - SEMESTER- VI: Microbiology

# MB-7324 A: MICROBIAL BIOTECHNOLOGY

**Aim and objectives of Course**

To study applications of microbial biotechnology

**Learning outcomes of Course (COs)**

**Up on completion of the course students able to**

**CO1:** Students should be able to demonstrate with the wide diversity of microbes and their potential use in medicine, agriculture and industry.

**CO2:** Students will understand the production of recombinant vaccines

**CO3**: Students will get knowledge on microbial transformation of steroids and sterols

**CO4:** Students will understand the production methodology for bioethanol and biodiesel

**CO5: S**tudents will get outlines of intellectual property rights.

# III B.Sc - SEMESTER- VI: Microbiology

## MB- 8324 A1: Microbial Diagnosis and Health Clinics

### Aim and objectives of Course

To realize the principles of prevention and treatment of microbial diseases and to understand the concepts and development of microbial diseases in animals

### Learning outcomes of Course (COs)

**Up on completion of the course students able to**

**CO1:** Develop knowledge and skills on microbiological laboratory skills for identification of pathogens

**CO2:** Students will demonstrate the collection of clinical samples

**CO3:** Students will get knowledge on staining techniques

**CO4:** Students able to perform diagnostic techniques

**CO5:**To understand drug resistance

# III B.Sc - SEMESTER- VI: Microbiology

## MB- 8324 A2: Microbial Quality Control in Food and Pharmaceutical Industries

### Aim and objectives of Course

To study quality control in food and pharmaceutical industries.

### Learning outcomes of Course (COs)

**Up on completion of the course students able to**

**CO1:** Develop skills on disinfection of instruments and equipment's in laboratory and Hospitals.

**CO2:** To understand the techniques like MPN and direct microscopic methods

**CO3:** Students will get basic principles in serological techniques

**CO4:** Students will perform Enrichment culture technique and detection of specific microorganisms

**CO5:** Students will understand concepts Hazard analysis of critical control point (HACCP)

# III B.Sc - SEMESTER- VI: Microbiology

## MB- 8324 A3: Bio fertilizers and Bio pesticides

### Aim and objectives of Course

To develop sustainable Agriculture

### Learning outcomes of Course (COs)

**Up on completion of the course students able to**

**CO1:**Develop knowledge and skills on mass multiplication and field application of bio fertilizers and bio pesticides.

**CO2:** To get knowledge on mass multiplication and field application of *Azatobacter*, and *Azospirellum*

**CO3:** Knowledge on mass multiplication and field application of phosphate solubilizing microbes

**CO4:** Mass inoculums production and field application of mycorrhizae

**CO5:** To understand the concept of bio insecticides