



GOVERNMENT DEGREE COLLEGE (AUTONOMOUS), SIDDIPET
Department of Microbiology



B.Sc., Microbiology(CBCS)

Course Learning Outcomes

SEMESTER-I & II . Course title : General Microbiology And Microbial Diversity .

HPW :04+3 : Credits:04+1.

General Microbiology & Microbial Diversity , After successful completion of this course students are expected to be able to: Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea . Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae Master aseptic techniques and be able to perform routine culture handling tasks safely and effectively Comprehend the various methods for identification of unknown microorganisms ,Understand the microbial transport systems and the modes and mechanisms of energy conservation in microbial metabolism – Autotrophy and heterotrophy Know the various Physical and Chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement.

- Know how viruses are classified • Understand the architecture of viruses • Know the methods used in studying viruses • Discern the replication strategies of representative viruses from the seven Baltimore classes • Comprehend the intricate interaction between viruses and host cells •

SEMESTER-III & IV: Course title: Food And Environmental Microbiology, Medical Microbiology & Immunology. HPW: 04+3; Credits :04+1.

Upon successful completion of the course, students are expected to be able to:

- Understand the beneficial role of microorganisms in fermented foods and in food processing and the microbiology of different types of fermented food products – dairy, pickles, Legume and cereal based food products
- Understand the significance and activities of microorganisms in food and role of intrinsic and extrinsic factors on growth and survival of microorganisms in foods • Know the

spoilage mechanisms in foods and thus identify methods to control deterioration and spoilage

- Recognize and describe the characteristics of important pathogens and spoilage microorganisms in foods.

- Learn various methods for their isolation, detection and identification of microorganisms in food and employ in industries
- Identify ways to control microorganisms in foods and thus know the principles involving various methods of food preservation
- Understand of the basis of food safety regulations and Discuss the rationale for the use of standard methods and procedures for the microbiological analysis of food
- Acquire, discover, and apply the theories and principles of food microbiology in practical, real-world situations and problems.

Environmental & Agriculture Microbiology Core paper.

Upon successful completion of the course, students are expected to be able to:

- Appreciate the diversity of microorganism and microbial communities inhabiting a multitude of habitats and occupying a wide range of ecological habitats.
- Learn the occurrence, abundance and distribution of microorganism in the environment and their role in the environment and also learn different methods for their detection and characterization
- Competently explain various aspects of environmental microbiology and microbial ecology and to become familiar with current research in environmental microbiology.
- Understand various biogeochemical cycles – Carbon, Nitrogen, Phosphorus cycles etc. and microbes involved
- Understand various plant microbes interactions especially rhizosphere, phyllosphere and mycorrhizae and their applications especially the biofertilizers and their production techniques
- Understand the basic principles of environment microbiology and be able to apply these principles to understanding and solving environmental problems – waste water treatment and bioremediation
- Know the Microorganisms responsible for water pollution especially Water-borne pathogenic microorganisms and their transmission
- Comprehend the various methods to determine the Sanitary quality of water and sewage treatment methods employed in waste water treatment.

Immunology :Upon successful completion of the course, students are expected to be able to:

- Demonstrate an understanding of key concepts in immunology.
- Understand the overall organization of the immune system
- Conceptualize how the collection of individual clones of lymphocytes (termed the “immune repertoire”) arises from rearrangement within two genetic loci: the Ig gene in B cells and the antigen receptor in T cells.
- Learn how “clonal selection” allows for the expansion of a limited number of antigen-recognizing lymphocytes in response to an specific antigenic stimulus
- Begin to appreciate the significance of maintaining a state of immune tolerance sufficient to prevent the emergence of autoimmunity.
- To understand about Tumor Immunology and help the students to understand its immune prophylaxis and immune therapy.
- To make them understand the salient features of antigen antibody reaction & its uses in diagnostics and various other studies.
- Learn about immunization and their preparation and its importance
- Demonstrate scientific quantitative skills, such as the ability to evaluate experimental design, read graphs, and understand and use information from scientific papers. Demonstrate skill in communication of scientific data in standard format.

• This course provides learning opportunities in the basic principles of medical microbiology and infectious disease. • It covers mechanisms of infectious disease transmission, principles of aseptic practice, and the role of the human body's normal microflora. • The course provides the conceptual basis for understanding pathogenic microorganisms and the mechanisms by which they cause disease in the human body. • It also provides opportunities to develop informatics and diagnostic skills, including the use and interpretation of laboratory tests in the diagnosis of infectious diseases. • To understand the importance of pathogenic bacteria in human disease with respect to infections of the respiratory tract, gastrointestinal tract, urinary tract, skin and soft tissue. • Helps to understand the use of lab animals in medical field. • Recall the relationship of this infection to symptoms, relapse and the accompanying pathology. • Explain the methods of microorganisms control, e.g. chemotherapy & vaccines. Solve problems in the context of this understanding. • Demonstrate practical skills in fundamental microbiological techniques.

SEMESTER-V & VI ; Course title : Molecular Biology & Microbial Genetics , Industrial Microbiology. HPW: 4+3. Credits:4+1.

Molecular Biology and Microbial Genetics DSE Paper. Upon successful completion of the course, students are expected to be able to: • Know the terms and terminologies related to molecular biology and microbial • Understand the properties, structure and function of genes in living organisms at the molecular level • Explain the significance of central dogma of gene action • Have a conceptual knowledge about DNA as a genetic material, enzymology, and replication strategies • Understand the molecular mechanisms involved in transcription and translation • Describe the importance of genetic code and wobble hypothesis • Discuss the molecular mechanisms underlying mutations, detection of mutations and DNA damage and repair mechanisms • Explain the concept of recombination, linkage mapping and elucidate the gene transfer mechanisms in prokaryotes and eukaryotes • Handle and independently work on lab protocols involving molecular techniques.

Industrial Microbiology DSE . Upon successful completion of this course the student will be able to • Get equipped with a theoretical and practical understanding of industrial microbiology • Appreciate how microbiology is applied in manufacture of industrial products • Know how to source for microorganisms of industrial importance from the environment • Know about design of bioreactors, factors affecting growth and production, heat transfer, oxygen transfer • Understand the rationale in medium formulation & design for microbial fermentation, sterilization of medium and air • Appreciate the different types of fermentation processes • Understand the biochemistry of various fermentations • Identify techniques applicable for Improvement of microorganisms based on known biochemical pathways and regulatory mechanisms • Comprehend the techniques and the underlying principles in down stream processing.
