

## **DEPARTMENT OF MICROBIOLOGY**

### **COURSE OUTCOMES**

#### **SEMESTER - I**

### **PAPER-I INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY**

#### **THEORY**

<b>CO#</b>	<b>Course Outcome</b>
<b>CO1</b>	Students will develop knowledge on basics and importance of microbiology. (K3)
<b>CO2</b>	Demonstrate appropriate laboratory skills and techniques related to isolation, staining, identification and control of micro organisms. (K2)
<b>CO3</b>	Students will understand the evolution of the discipline of microbiology. (K5)
<b>CO4</b>	Student will understand the contribution made by prominent scientists in this field. (K5)
<b>CO5</b>	Students will differentiate the types of Growth medias. (K4)

#### **PRACTCAL**

<b>CO#</b>	<b>Course Outcome</b>
<b>CO1</b>	Explain microbiology good laboratory practices and bio safety. (K2)
<b>CO2</b>	Operate sterilization of medium and glassware using Autoclave and Hot air oven. (K3)
<b>CO3</b>	Generalize the light compound microscope and its handling. (K2)
<b>CO4</b>	Observation of electron micro graphs of bacterial cells (K2)

## SEMESTER – II

### PAPER-II MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

#### THEORY

CO#	Course Outcome
C01	Develop knowledge on microbial Metabolism and Biomolecules. (K6)
C02	The students will get express first-hand experience on separation methods. (K2)
C03	Evaluate about the microbial growth and nutrition. (K5)
C04	Differentiate the types of fermentation techniques. (K4)
C05	Demonstrate the basic metabolic activities pertaining to the catabolism and Anabolism of various bio-molecules. (K3)

#### PRACTCAL

CO#	Course Outcome
C01	Evaluate qualitative analysis of Carbohydrates and Amino acids. (K5)
C02	Estimate proteins by Biuret or Lowry method, through colorimeter (K4)
C03	Demonstrate column packing of column chromatography and electrophoretic technique. (K2)
C04	Differentiate the effect of temperature/ pH/ salt concentration on bacterial growth. (K4)

## SEMESTER - III

### PAPER-III MOLECULAR BIOLOGY AND MICROBIAL GENETICS

#### THEORY

CO#	Course Outcome
C01	Develop knowledge on microbial genetics and molecular biology. (K3)
C02	Students will construct a proper knowledge of Bimolecular synthesis and its control. (K6)
C03	Develop a good knowledge about the three well known mechanisms by which genetic material is transformed among the microorganisms. (K3)
C04	Distinguish the concepts of mutagenesis, mutations and mutants and their significance in microbial evolution. (K3)
C05	Explain the central dogma of molecular biology and flow of genetic information from DNA to proteins the society. (K2)

#### PRACTCAL

CO#	Course Outcome
C01	Diagram representing different types of DNA & RNA using micro graphs and model. (K4)
C02	Estimate DNA using UV spectrophotometer. (K4)
C03	Illustrate resolution and visualization of proteins by SDS-PAGE (Electrophoresis) (K3)
C04	Express different types of Molecular Biology techniques. (K2)

## SEMESTER – IV

### PAPER-IV- IIB IMMUNOLOGY AND MEDICAL MICROBIOLOGY

#### THEORY

CO#	Course Outcome
C01	Classify the different types of immune systems. (K2)
C02	Demonstrate on collection and handling of laboratory specimens. (K2)
C03	Explain the structure classification and chemistry of bio molecules and enzymes responsible for sustenance of life in living organisms. (K3)
C04	Develop knowledge on disease transmission and control. (K3)
C05	Students can predict him-self and society and can work on diagnostic approaches to look for safe and prompt decision of causative agents and further to identify novel therapy. (K3)

#### PRACTCAL

CO#	Course Outcome
C01	Report information making personal health decision in regard to infectious disease. (K3)
C02	Evaluate the hand sanitizer effectiveness by filter paper disc & thumb impression method. (K5)
C03	Demonstrate minimal inhibitory concentration of an antibiotic. (K3)
C04	Analyze immunodiffusion by Ouchterlony method. (K3)

## SEMESTER -IV

### PAPER- IIB2 MICROBIAL ECOLOGY AND INDUSTRIAL MICROBIOLOGY

#### THEORY

CO#	Course Outcome
C01	Learn to determine the portability of drinking water. (K3)
C02	Learn about Conversion of waste into fertile lands. (K2)
C03	Illustrate about management of waste and soil nutrients. (K3)
C04	Experiment has been done on solid waste management and treatment. (K3)
C05	To operate the knowledge about the food preservation, food fermentation, food safety, quality control and validation. (K3)

#### PRACTCAL

CO#	Course Outcome
C01	Compare different stages of bacterial growth curve. (K2)
C02	Students differentiate about various plant diseases. (K4)
C03	Describe concepts of screening and strain improvement, media fermentation assays with examples of industrially important process. (K2)
C04	Demonstrate the production of wine from grapes. (K3)

## SEMESTER - V

### PAPER-V(A) ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY

#### THEORY

CO#	Course Outcome
C01	Describe soil profile and soil micro flora (K1)
C02	Explain various types of microbial interactions.(K3)
C03	Outlines of solid and liquid waste management. (K4)
C04	Illustrate plant growth promoting microorganisms. (K3)
C05	Explain various symptoms of plant diseases and control. (K3)

#### PRACTCAL

CO#	Course Outcome
C01	Determination of dissolved oxygen of water samples. (K3)
C02	Analyze microbiological method of portable water standard plate count. (K4)
C03	Observe photo micro graphs of plant diseases. (K4)
C04	Categorize soil and air micro flora by petriplate exposure method. (K4)

## SEMESTER - V

### PAPER-V (B) FOOD AND INDUSTRIAL MICROBIOLOGY

#### THEORY

CO#	Course Outcome
C01	To operate the knowledge about the food preservation, food fermentation, food safety, quality control and validation. (K3)
C02	Practice a detailed knowledge on production process of various industrially important products. (K3)
C03	Describe intrinsic extrinsic parameters that affect microbial growth in food. (K2)
C04	Distinguish different types of fermentation processes. (K2)
C05	Explain downstream processing technology. (K3)

#### PRACTCAL

CO#	Course Outcome
C01	Determine the microbial quality of milk samples by MBRT. (K3)
C02	Design of different types of fermenters. (K4)
C03	Demonstrate microbial fermentation for production of ethanol and citric acid. (K3)
C04	Express isolation of antagonistic micro organisms by crowded plate technique.(K4)

## SEMESTER – VI

### PAPER- VII MICROBIAL BIOTECHNOLOGY

#### THEORY

CO#	Course Outcome
C01	Design the genetic engineering techniques to make therapeutic and industrially important products. (K6)
C02	Explain scope and importance of microbial biotechnology. (K3)
C03	Describe immobilization methods and applications. (K2)
C04	Discuss about commercial production of bio-ethanol, bio-diesel, bio-gas as bio fuels. (K5)
C05	Outlines of intellectual property rights for copyrights and trademarks. (K4)

#### PRACTCAL

CO#	Course Outcome
C01	Demonstrate study of algal single cell proteins. (K3)
C02	Estimate the pigment production from fungi. (K4)
C03	Analyze the isolation of xylanase or lipase producing bacteria. (K4)
C04	Estimate enzyme immobilization by sodium alginate method. (K4)



## SEMESTER - VI

### PAPER- A I MICROBIAL DIAGNOSIS IN HEALTH CLINICS

#### THEORY

CO#	Course Outcome
C01	Students develop knowledge on anti microbial agents, chemical nature and basics of resistance of microbes. (K6)
C02	Students develop understanding of different types of disinfectants / antiseptics and their uses. (K3)
C03	Determine the resistance/ of sensitivity of bacteria by disk diffusion method.. (K3)
C04	Express various serological methods. (K2)
C05	Demonstrate on collection of clinical sample and precautions required. (K2)

#### PRACTCAL

CO#	Course Outcome
C01	Report maintenance and reservation of stock cultures. (K3)
C02	Demonstrate on collection, transport and processing of clinical specimens. (K3)
C03	Experiment on isolation of bacteria in pure culture and antibiotic sensitivity. (K3)
C04	Report the identification of common bacteria. (K3)

## SEMESTER - VI

### PAPER-A 2 MICROBIAL QUALITY CONTROL IN FOOD & PHARMACEUTICAL INDUSTRIES

#### THEORY

CO#	Course Outcome
C01	Evaluate the knowledge of bactericidal and bacteriostatic actions of cell cultures. (K5)
C02	Illustrate the methods of biochemical and immunological techniques. (K4)
C03	Explain processing of enrichment culture techniques and detection of micro organisms. (K3)
C04	Develop practical skills of testing pharmaceutical products for sterility testing in different methods. (K3)
C05	Interpret quality control of food and drinking water. (K3)

#### PRACTCAL

CO#	Course Outcome
C01	Analyze standard qualitative test of water. (K4)
C02	Analyze the microbial homogenized food samples by different microscopic count. (K4)
C03	Test the sterility of instruments -Autoclave and Hot air oven. (K4)
C04	Estimate the sterility testing of microbiological media. (K4)

## SEMESTER - VII

### PAPER- A 3 BIOFERTILIZERS & BIOPESTICIDES

#### THEORY

CO#	Course Outcome
C01	Students transform waste into biofertilizers for good soil fertility. (K2)
C02	Illustrate the development of biofertilizers from microorganisms. (K4)
C03	Student can judge good understanding of microbes in the soil.(K5)
C04	Students develop a fairly good understanding of the use of microbes in sustainable agriculture. (K3)
C05	Interpret about use and importance of bio insecticides over synthetic pesticides. (K3)

#### PRACTCAL

CO#	Course Outcome
C01	Report the biofertilizers production unit after visiting. (K3)
C02	Report the staining and observation of VAM micro organism. (K3)
C03	Report the isolation of phosphate solubilizers from soil. (K3)
C04	Produce the rhizobium from root nodules. (K3)